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Unintended Pregnancies Among Adult Mothers Who Have Not Graduated High School: Family Planning Intentions, Birth Control Practices, and Optimal Interpregnancy Intervals

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Abstract

Literature Review and Statement of Purpose: Unintended pregnancy and non-optimal interpregnancy intervals can lead to a host of maternal and infant morbidities and mortality. The purpose of this study is to inform future intervention efforts aimed at increasing planned pregnancies and optimal interpregnancy intervals for a demographic of women at high risk for experiencing unplanned pregnancies and non-optimal interpregnancy intervals: Black and Latina women who have not graduated from high school.

Methods: Study assessments included repeated measures collected prenatally during the participant's last trimester of pregnancy continuing thereafter at the target child's age of 4, 10, and 24 months. A comprehensive 2-hour assessment of mother and child characteristics and functioning was conducted. As part of this assessment, a structured interview was used to collect demographic information at the prenatal and 24-month assessments, and family planning information was collected that pertained to pregnancy intentions, birth control practices, and interpregnancy intervals at the prenatal, 4-, 10-, and 24-month assessments.

Data Analysis and Results: There were no significant differences in interpregnancy interval by race. There were significantly greater odds of becoming pregnant before 24 months postpartum (i.e., a non-optimal birth interval outcome) for women who reported stable non-optimal birth control practices across time when compared to women who reported stable optimal birth control practices.

Discussion, Conclusions, and Recommendations: There is a need to focus on a more comprehensive view of pregnancy intention and birth control practice that does not rely solely on self-reported data and understand barriers that prevent the use of effective birth control methods for creation of tailored fitted interventions.

Keywords: Unintended pregnancy; Interpregnancy interval; Birth control practices

Dedication

To my niece, Sariyah, who inspires me daily to keep pushing

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Chapter I: Literature Review and Statement of Purpose

A woman's ability to plan when she bears a child and her ability to ensure optimal interpregnancy intervals are essential to maternal and child health and well-being across the life course (Mccrory & Mcnally, 2012; Cruz-Bendezu et al., 2020; Dehlendorf et al., 2010). Optimal interpregnancy intervals are defined as no less than a 24-month interval between the delivery of one infant and the conception of the subsequent pregnancy (U.S. Department of Health and Human Services, 2020). Whereas optimal interpregnancy intervals reduce the risk of adverse maternal and infant outcomes (U.S. Department of Health and Human Services, 2020), non-optimal interpregnancy intervals incur serious health complications, including mother and infant mortality and a host of morbidities across their respective life courses (U.S. Department of Health and Human Services, Health Resources and Services Administration [HRSA], Maternal and Child Health Bureau, 2013).

Unintended pregnancy is defined as either a mistimed (too early or too late) or unwanted pregnancy (Messer, 2005). Unintended pregnancies are an epidemic in the U.S. with 45% of all pregnancies being unintended (Arcara, Caton, & Gómez, 2022). However, this figure is not representative across demographic groups as extreme demographic disparities exist (Singh, Sedgh, & Hussain, 2010). While there is debate about whether and how best to measure pregnancy intentions (Potter et al., 2019; Santelli et al., 2003), there is extensive evidence that unintended pregnancies have profound short- and long-term consequences for mothers and children over their lifetimes (Mccrory & Mcnally, 2012).

The literature on unintended pregnancy and non-optimal interpregnancy intervals shows strong evidence for numerous health disparities. Black women and Hispanic women experience suboptimal reproductive health education and care compared to their non-Hispanic White

counterparts (Leung et al., 2021). Racial disparities in reproductive care speak to the profound barriers some women face. Racism and implicit bias (Loder et al., 2021), healthcare access (Leung et al., 2021), intimate partner violence (Basile et al., 2019), and attitudes toward contraception (Heller et al., 2019), among other contributing factors (Loder et al., 2021) has led to poor maternal and infant outcomes for women and infants of color (Malat et al., 2020).

Incidence and Prevalence of Unintended Pregnancy and Interpregnancy Intervals

In the United States, there are substantial, persistent disparities in unintended pregnancy and non-optimal interpregnancy intervals by race/ethnicity, socioeconomic status, and adolescent status. One of the few comprehensive reports on interpregnancy intervals in the continental U.S. dates to 2014 and focuses on very short intervals of less than 18 months (Thoma, Copen, Kirmeyer, 2014). This study documented that 31% of non-Hispanic White mothers had a pregnancy interval of less than 18 months (Thoma, Copen, Kirmeyer, 2014). Non-Hispanic Black mothers had a similarly reported prevalence of 30% of pregnancy intervals less than 18 months, compared to Hispanic mothers with 24.5% of pregnancies with intervals less than 18 months (Thoma, Copen, Kirmeyer, 2014).

Women of low socioeconomic status are more likely to have an interpregnancy interval of six months or less compared to women of higher socioeconomic status (Ahrens et al., 2018). Researchers have found that short interpregnancy intervals are inversely associated with maternal education and income (Cheslack-Postava & Winter, 2015). The short-interval odds were 30-40% lower for women with at least a high school education than those without (Cheslack-Postava & Winter, 2015). Another study found that the odds of short interpregnancy intervals were 1.4 times higher among Black mothers than White mothers (Cheslack-Postava & Winter, 2015). Differences between Black and White women are attributed to a lack of access to

healthcare (Dehlendorf et al., 2010; Finer & Henshaw, 2006), more likelihood of using ineffective methods of birth control (Dehlendorf et al., 2010; Finer & Henshaw, 2006), lack of social mobility (Cheslack-Postava & Winter, 2015), and one's neighborhood environment (Cheslack-Postava & Winter, 2015). Short intervals of less than 6 months and 6-11 months were most common among non-Hispanic Black mothers (7.1% and 11.7%, respectively) compared to non-Hispanic White mothers (4.1% and 11.2%, respectively) and Hispanic mothers (5.0% and 9.3, respectively) Additionally, women with no high school diploma were more likely to have a 6-month or less interval than women with a doctoral or professional degree (Thoma, Copen, & Kirmeyer, 2016).

A study by Kim et al. (2011) using data from the National Survey of Family Growth from 2006 to 2010 observed that 50% of all pregnancies within this sample were unintended, consistent with the national average. However, women of color had higher proportions of unintended pregnancy within the sample (Kim et al., 2011). Black women had an unintended pregnancy rate of 63%, and Hispanic women had an unintended pregnancy rate of 48% compared to 42% for White women (Kim et al., 2011). Low socioeconomic women carry the burden of higher rates of unintended pregnancy than women of higher socioeconomic status (Ahrens et al., 2018).

Historical Sexual and Reproductive Health Disparities and Racial Trauma

Numerous factors examined and identified as correlates or predictors of unintended pregnancy are also identified as risk factors for non-optimal interpregnancy intervals. These factors include younger age, minority race/ethnicity, lower income, and lower education (Brunner et al., 2018). However, there has been a striking lack of acknowledgement or consideration of the context of historical and current racial trauma in reproductive health care

and its implications. Hence, it is crucial to examine this context. Health disparities related to the sexual and reproductive health of Black women in the U.S surfaced with slavery (Walters, 2012). From 1619-1865, Black women were sold on the auction block, where public and nude examinations of their bodies began (Prather et al., 2018). These public examinations were used to determine their reproductive ability (Prather et al., 2018; Thompson, 2020). Black women, viewed as property, endured nonconsensual surgeries that did not include anesthesia (Prather et al., 2018). Physicians, during this time, would practice reproductive procedures such as cesarean sections (i.e., C-sections), ovariotomy, and female sterilization (also known as permanent contraception) to learn and perfect procedures (Leung et al., 2021). During the enslavement of Black women, reproductive coercion manifested in several different ways, as a means to eliminate Black women's autonomy over their reproduction and bodies (Shreffler et al., 2015; Davis, 1982; Leung et al., 2021; Loder et al.,2021). One form of reproductive coercion was White men were allowed to force abortions when a pregnancy occurred out of rape (Prather et al., 2018). During the enslavement of Black women from 1619-1865, over 58% of all enslaved women aged 15-30 were raped by their enslavers and other white men (Prather et al., 2018).

Another form of reproductive coercion was forced pregnancies (Shreffler et al., 2015). Childbearing during slavery was viewed as an economic benefit for enslavers since babies were birthed into slavery (Thompson, 2020). Black women were exploited economically with enslavers favoring women or young girls who were fertile and could produce many children (Shreffler et al., 2015). It was common for enslaved women to resist their unfair treatment by aborting their pregnancies, unknown to people in power, as a desperate attempt to gain reproductive autonomy (Prather et al., 2018). The exploitation of Black women not only inflicted pain but birthed the idea of victim blaming (Walters, 2012). Ideology that reasoned the

horrendous mistreatment included the false narrative that Black women were more hypersexual than White women. During this time, the enslaved were not only victims of heinous sexual and reproductive acts that jeopardized their health, but also endured a full spectrum of offenses that prevented their forward social mobility that enslavers enforced to keep Black women and men in a generational cycle of poverty and servitude (Prather et al., 2018; Thompson, 2020). Successful in their tactics, Black women and men were denied education and lynched for reading (Prather et al., 2018).

Black Americans were freed from chattel slavery in 1865, but hatred and discriminatory practices continued in many ways, including social institutions such as housing, education, employment, and healthcare (Prather et al., 2018). From 1865 to 1955, Jim Crow laws (or Black codes) enforced Black Americans' racial segregation and disenfranchisement (Prather et al., 2018; Thompson, 2020). Black women continued to endure nonconsensual medical experiments, rape without offenders being punished, poor or no healthcare, public genitalia/reproductive mutilation, physician-determined sterilization, and lynching (Armstrong, 2011). Additionally, many poor Black women underwent unnecessary hysterectomies at teaching hospitals so medical students could practice the procedure (Patterson, 1999). Black women could not give consent, as they were unaware of the risks associated with the procedure or did not understand the long-term effects (Prather et al., 2018). Civil rights, employment, education, and healthcare access were reserved for White Americans to provide further access and rewards (Bonilla-Silva, 2017) that continued to widen the health gap between Black and White Americans.

As lynching for Black Americans remained an acceptable form of punishment in the Civil rights era (1955-1975), Black Americans fought restlessly against oppression (Patterson, 1999). Black girls and women did not have the same educational opportunities as their White

counterparts (History.com Editors, 2009). The U.S Supreme court ruled racial segregation in public schools was unconstitutional in Brown vs. the Board of Education in 1954 (History.com Editors, 2009). Although this ruling banned racial segregation, this did not prevent practices such as giving lower-quality education materials and lack of funding to schools educating Black students (History.com Editors, 2009); restricting access to quality health services by residential segregation and employment opportunities to low-paying jobs (Prather et al., 2018).

For centuries, people in a position of power unjustly treated Black Americans. Black Americans were oppressed by White Americans and their systems that for so long did not solely neglect Black Americans but harmed them in all aspects of their lives. With little acknowledgment and "whitewashing" American history, it has become difficult for many Black Americans to trust in American systems, including healthcare. The historical events highlighted still may impact Black women's decision-making ability today out of fear and mistrust.

Current Sexual and Reproductive Health Disparities and Racial Trauma

There are many practices that have led to distrust and perceived discrimination among Black Americans, which has contributed to today's sexual and reproductive health disparities. Today, the prevalence of permanent contraception is higher among people of color, low socioeconomic status, and with low levels of educational attainment (Leung et al., 2021). The 2015-2017 National Survey of Family Growth revealed that permanent contraception was the preferred contraception method for 22.9% of non-Hispanic Black women compared to 18.1% for non-Hispanic White women, and the method of choice for 41.9% of individuals without a high school diploma compared to 11.3% for those with a bachelor's degree (Leung et al., 2021). Although the reasons behind the use of permanent contraception among vulnerable populations are not well understood, significant historical events such as the Puerto Rico Pill Trials have

played a role in concerns about the safety and motive behind birth control (Leung et al., 2021). As such, women who report distrust in the U.S healthcare system or in contraception were less likely to use contraception (Loder et al., 2021).

A secondary analysis of the Women's Healthcare Experiences and Preferences study of 1,078 women aged 18-55 revealed that women who reported high perceived discrimination were less likely to use contraception (Loder et al., 2021). Participants who reported high perceived discrimination had less education, lower income, lacked health insurance, and were less likely to be employed compared to those who did not report high perceived discrimination (Loder et al., 2021). While examining contraceptive method users only, an association was found that women who reported high perceived discrimination were more likely to report using highly effective contraceptive methods. In addition to discrimination, exposure to stress over one's lifetime may affect birth intention through many avenues, including reducing cognitive resources for pregnancy planning and psychological costs from experiencing stress such as hopelessness and risky behavior (Malat et al., 2022). Risky behaviors, including incorrect or nonuse of contraception, could lead to higher rates of unintended pregnancies (Maleat et al., 2022). The alarming inequitable treatment of minority and low socioeconomic women in the U.S. compared to their White, socially advantageous counterparts is marked by differences in (dis)advantages and their lived experiences (Malat et al., 2022).

Healthcare Education and Care Disparities

An essential aspect of planned and optimally timed pregnancies is access to reproductive health services, which includes family planning and access to affordable birth control (Heller et al., 2019). Racial disparities in birth control use are well documented in the literature (Heller et al., 2019). Non-Hispanic Black women have the highest rate of nonuse among non-Hispanic

White and Hispanic women (Heller et al., 2019). Long-Acting Reversible Contraception (LARC) methods are highly effective birth control methods (Leung et al., 2021). However, LARCs have perceived, and actual barriers associated with them as they are provider-controlled (Leung et al., 2021). LARCs require a clinician to place and remove the device (Leung et al., 2021). For example, a loss of healthcare insurance could pose a socioeconomic barrier that could prevent removal. Additionally, a woman may perceive their provider as unwilling to remove the device when desired, reducing reproductive autonomy (Leung et al., 2021). Reproductive autonomy is often cited as the reason for choosing permanent contraception, with knowledge, access to other birth control methods, and health insurance influencing the decision (Leung et al., 2021). There are persistent inequalities with the use of LARCs, with their use more prevalent among urban, educated, higher-income women (Leung et al., 2021). Results from a sample of 21-45-year-old women insured by Medicaid, who self-identified as not interested in future childbearing, revealed that participants who sought permanent contraception had lower knowledge scores on permanent contraception and LARCs than those not seeking permanent contraception (Leung et al., 2021). Two-thirds of participants who signed consent, incorrectly believed that IUDs and implants are less effective for preventing pregnancy than permanent contraception. Almost 50% of women believed permanent contraception was reversible (Leung et al., 2021).

Intimate Partner Violence

Intimate partner violence (IPV) is described as abuse or aggression that occurs in a romantic relationship. IPV includes physical violence, sexual violence, stalking, and psychological aggression (CDC, 2022). Reproductive coercion is a type of intimate partner violence (Basile et al., 2022). Reproductive coercion occurs when an abusive partner attempts to control through explicit attempts to get their partner pregnant against their wishes or control the

outcome of pregnancy (Basile et al., 2022). The mechanism for reproductive control includes forces of unprotected sex, condom nonuse, inconsistent condom use, fear of condom negotiation, and inconsistent contraception use (Basile et al., 2022). Any of these mechanisms can ultimately lead to unintended pregnancies. In a large family planning study in Pennsylvania, 5% of clients reported reproductive coercion in the past three months. Reproductive coercion was associated with an 80% increase in 'past year' unintended pregnancy compared to women not experiencing reproductive coercion (Miller et al., 2014). Even though reproductive coercion frequently co-occurs with other forms of IPV, that is not always the case. A study of 641 women found that Black women were significantly more likely to report reproductive coercion occurring without any other form of IPV than women of other races/ethnicities (Clark et al., 2014). However, reproductive coercion commonly intersects with other forms of IPV and racial and ethnic minorities. Non-Hispanic Black women are heavily burdened by intimate partner violence (Basile et al., 2021).

Birth Control Behavior

Non-Hispanic Black and Hispanic women tend to use less effective methods of birth control than White women (Heller et al., 2019). In 2014, the U.S. Food and Drug Administration approved the sale of over-the-counter generic versions of progestin-only emergency contraception for women of all ages (Heller et al., 2019). Emergency contraception (EC) is 95% effective in preventing pregnancy if taken within five days after intercourse (Heller et al., 2019). The National Center for Health Statistics (2017), using data from 2011-2016, reported that 22% of Hispanic women self-reported ever-use of EC compared to 17% for both non-Hispanic Black and non-Hispanic White women. Consistent with national reporting, Hispanic women carried the highest prevalence of EC use in the Heller et al. cross-sectional study (2019), with 37% of

Hispanic women self-reported use compared to 27% EC usage among White women, and 25% EC usage among non-Hispanic Black women (Heller et al., 2019). Across all racial groups, there were no significant associations between attitudes toward pregnancy and EC use (Heller et al., 2019). The strongest correlation among ever use of EC was awareness and beliefs of effectiveness and safety (Heller et al., 2019). Although casual direction cannot be determined, women who believed EC was ‘somewhat effective' or 'very effective' had higher odds of EC use (Heller et al., 2019). For Hispanic women, beliefs about the safety of EC was associated with EC use. However, this was not true for non-Hispanic Black women or White women (Heller et al., 2019).

Sequelae

Non-optimal interpregnancy intervals have many short and long-term risks associated with the mother and baby (Ahrens et al., 2018). Birth intervals shorter than six months are extremely dangerous, partly due to the inadequate maternal replenishment of nutrients after giving birth (Ahrens et al., 2018). A systematic review and meta-analysis found that having a birth interval of 17 months or less is associated with 40% higher odds of preterm birth, 61% higher odds of a low birthweight infant, and 26% higher odds for small-for-gestational-age in the subsequent pregnancy (Ahrens et al., 2018). Additionally, time-varying confounders may be present due to a short interpregnancy interval. For example, shorter birth intervals may lead to higher pregnancy BMI, as 75% of women do not return to their pre-pregnancy weight by 12 months postpartum (Ahrens et al., 2018). A higher BMI during pregnancy is associated with a higher risk of miscarriage, gestational diabetes, preeclampsia, heart problems, sleep apnea, the need for a C-section, and stillbirth (Mayo Foundation for Medical Education and Research, 2022). Maternal depression has also been associated as a cause and consequence of unintended

pregnancies. In other words, mothers who have unintended pregnancies are at risk of maternal depression, and mothers who experience depression are at risk of unintended pregnancies (Abajobir et al., 2016). Babies whose mothers are depressed are at risk for poor social-emotional health, which alters the brain's learning pathway, leading to delays in physical, cognitive, and emotional learning (Fellenzer & Cibula, 2014). Reducing mistimed unintended pregnancies, specifically pregnancies occurring sooner than desired, could increase interpregnancy intervals (Gemmill & Lindberg, 2013) and reduce the risk of adverse health effects (Abajobir et al., 2016).

Critical Need for Intervention

Given the horrific treatment of Black women in the U.S that has spanned over centuries, Black women's protection from adverse health outcomes related to reproductive health is warranted. Black women have often been treated as invisible and in inhumane ways within society and research. Understanding the unique barriers to optimally timed births Black women experience could help reduce the health disparities within reproductive health. Black women deserve to have reproductive autonomy restored and promoted, by having access to a wide range of contraception and quality healthcare and education that meets their needs and coincide with their evolving intentions to bear a child.

Limitations

Systematic surveillance of pregnancy intervals is lacking in the United States (Gemmill & Lindberg, 2013). Instead, the literature relies on single-state reporting and key subpopulations, such as minority women or low-income women (Gemmill & Lindberg, 2013). Most data summarizing unintended pregnancies and non-optimal interpregnancy intervals relies on retrospective methodologies and lacks the rigor to control for reflective bias. Additionally, previous studies lack prospective longitudinal designs to examine beliefs/attitudes and practices

relative to planned, optimal birth outcomes. This study uses secondary data from an NIH data set (R01 HD044868), which was produced from a randomized controlled trial that examined the efficacy of a parenting intervention, which targeted sensitive and responsive maternal behavioral interactions with their children across the infant and toddler developmental periods (Guttentag et al., 2014).

Statement of Purpose

This purpose of this study is to inform future intervention efforts aimed at increasing planned pregnancies and optimal interpregnancy intervals for a demographic of women at high risk for experiencing unplanned pregnancies and non-optimal interpregnancy intervals: Black and Latina women who have not graduated from high school. Research questions include the following:

Research Question 1

For Black, White, and Latina mothers, what are (a) the trajectories, beginning prenatally and continuing through 10 months postpartum, of optimal interpregnancy interval intentions (as defined by the intention not to get pregnant less than 24 months postpartum) and (b) the trajectories across the first year postpartum (at 4- and 10-months) of optimal birth control practices (defined as moderately to most effective by the CDC)?

Research Question 2

Beginning in pregnancy and continuing through 10 months postpartum, is stability in optimal interpregnancy interval intention (as defined as the intention not get pregnant less than 24 months postpartum across time) related to stability of optimal birth control practices for Black, White, and Latina mothers, respectively?

Research Question 3

Does stability in optimal pregnancy intentions and birth control practices combine to predict optimal interpregnancy intervals at 24-months for Black, White, and Latina mothers, respectively.

To address the above questions, an existing NIH clinical trial study data set (Grant HD044868-0 from the National Institute of Child Health and Development; Guttentag et al., 2014) was used.

Chapter II: Methods

"My Baby & Me" (MBM) was an early, comprehensive multimodule parenting intervention (Guttentag et al., 2014). Participants were randomly assigned to a low-intensity intervention condition in which mothers received need-based community referrals and check-ins or a high-intensity intervention condition in which mothers received need-based community referrals and a comprehensive intervention to enhance parent and child outcomes (Guttentag et al., 2014). The "My Baby & Me" (Guttentag et al., 2014) data set was selected for this study for several reasons: First, the study sample included several demographic groups in high need of effective interventions targeting planned, optimally timed pregnancies. The sample included women who did not graduate from high school, and who were predominantly Black and Latina (Guttentag et al. 2014). Second, the longitudinal study design included repeated measurement of maternal pregnancy intention and birth control practices spanning from the third trimester of pregnancy through one year (10 months postpartum). This allowed for pregnancy intention to be measured prospectively among a predominately minority sample.

Original Study Methodology

Recruitment

Participants of the MBM study were pregnant at the time of consent, were at least 15 years of age or older, did not have a high school degree, and did not meet any of the following exclusion criteria at the time of consent (Guttentag et al., 2014). Exclusion criteria included a preexisting diagnosis of major mental illness such as schizophrenia, currently receiving substance abuse treatment in a residential facility, or planning not to keep the baby after birth (Guttentag et al., 2014). MBM was a multi-site project, recruiting participants from South Bend, Indiana; Kansas City, Kansas; Washington, D.C; and Houston, Texas. A brief description of the socioeconomic climate for each respective city during the time of recruitment is provided below.

Setting

South Bend, Indiana. South Bend had a total population of about 105,540 in 2003 and had a racial composition of about 66.1% non-Hispanic White, 24.6% Black, and 8.5% Hispanic (U.S. Census Bureau, 2003). The median household income was $32,439 (U.S. Census Bureau, 2003). The poverty rate was 16.7%, and 25 years or older, the percentage of persons that were high school graduates or higher was 77.7% (U.S. Census Bureau, 2003).

Kansas City, Kansas. Kansas City, Kansas, had a total population of approximately 145,757 in 2003, and had a racial composition of 55.8% non-Hispanic White, 30.1% Black, and 16.8% Hispanic (U.S. Census Bureau, 2003). The median household income was $33,011 and the poverty rate was 17.1 % (U.S. Census Bureau, 2003). For adults 25 years or older, the percentage of people who were high school graduates or higher was 73.4% (U.S. Census Bureau, 2003).

Kansas City, Missouri. Kansas City, Missouri, had a total population of approximately 442,768 in 2003, and had a racial composition of 60.7% non-Hispanic White, 31.2% Black, and 6.9% Hispanic (U.S. Census Bureau, 2003). The median household income was $37,198 and the poverty rate was 14.3 % (U.S. Census Bureau, 2003). For adults 25 years or older, the percentage of people who are high school graduates or higher was 82.5% (U.S. Census Bureau, 2003).

Washington, D.C. Washington D.C had a total population of approximately 563,384 in 2003, with a racial composition of 30.8% non-Hispanic White, 60.0% Black, and 7.9% Hispanic (U.S. Census Bureau, 2003). The median household income was $40,127; and there was a poverty rate of 20.2% (U.S. Census Bureau, 2022). For adults 25 years or older, the percentage of people who were high school graduates or higher was 77.8% (U.S. Census Bureau, 2003).

Houston, Texas. Houston had a total population of approximately 2,009,690 in 2003 and had a racial composition of 50.1% non-Hispanic White, 25.3% Black, and 37.4% Hispanic (U.S.

Census Bureau, 2003). The median household income was $36,616; and there was a poverty rate of 19.2% (U.S. Census Bureau, 2003). For adults 25 years or older, the percentage of people who were high school graduates or higher was 70.4% (U.S. Census Bureau, 2003).

Assessment Approach

Study assessments included repeated measures collected prenatally during the participant's last trimester of pregnancy continuing thereafter at the target child's age of 4, 10, and 24 months. A comprehensive 2-hour assessment of mother and child characteristics and functioning was conducted. As part of this assessment, a structured interview was used to collect demographic information at the prenatal and 24-month assessments, and family planning information was collected that pertained to pregnancy intentions, birth control practices, and interpregnancy intervals at the prenatal, 4-, 10-, and 24-month assessments.

Demographic Variables

Race/Ethnicity. Race and ethnicity information was gathered during the participant's prenatal assessment in two different ways. First, participants were asked about their race and ethnicity in the way necessary for the National Institute of Health's (NIH) Inclusion Enrollment form. The NIH inclusion enrollment definitions included: Black or African American, White, non-Hispanic Asian, multi-racial, White Hispanic, Black Hispanic, and multi-racial Hispanic. After NIH selection, participants self-described their race.

Age. Participants' age in years was derived from participant's date of birth relative to their prenatal assessment interview.

Marital Status. Participant's self-reported marital status with the categorical response options of single, divorced, married, widowed, with a partner, separated, and other– please describe. Participants reported their marital status at the prenatal and 24-month assessment visits.

Education. Education was measured as the current years of school completed. Education was categorized as Less than 8th grade, 8th grade, 9th grade, 10th grade, 11th grade, 12th grade, Ungraded (not differentiated by grade level), GED program, Community or Junior college, Vocational program. Education was reported during the prenatal and 24-month assessment visits.

Relevant MBM Study Variables

Interpregnancy Interval Intention (Pregnancy Intention). Pregnancy intention was assessed during the prenatal assessment interview and the subsequent 4- and 10- month assessment interview. Participants were asked: (1) "Do you want to have more children?" and (2) "About how old do you think [target child] will be when you get pregnant again?".

Birth Control Practices. Birth control practice was assessed during the 4- and 10-month assessment visits, participants were asked, "Are you currently using any type of birth control or doing anything to keep from getting pregnant?". If a participant responded yes, a research assistant (RA) shared a list of birth control methods with participants and participants selected all methods that applied to them. If participants reported being pregnant during their 4- or 10-month visit, participants reported on their birth control practices prior to becoming pregnant.

Interpregnancy Interval. Interpregnancy intervals were assessed using data from the 24-month assessment. Researchers asked, "Have you become pregnant any other time since the birth of (target child)?". Participants that reported being pregnant were asked subsequent questions related to their pregnancy outcome, pregnancy intentions, and birth control practices. A comprehensive list of at all relevant study variables can be found in Table 1.

Prior to conducting study assessments, all assessors (i.e., RAs) completed a cross-site training over a two-week period followed by field practice. RAs were certified to criterion for reliable administration with an expert assessor. RAs had at least a bachelor's degree in psychology, education, or another related field.

MBM Sample Characteristics

At the time of consent, participants of the MBM study were pregnant, at least 15 years of age or older, and did not have a high school diploma (Guttentag et al., 2014). Exclusion criteria at the time of consent included a preexisting diagnosis of major mental illness such as schizophrenia, currently receiving substance abuse treatment in a residential facility, or planning not to keep the baby after birth (Guttentag et al., 2014). Across all sites, 378 participants completed a prenatal assessment visit. The majority (55%) of the sample was Black or African American (n=188). About 19% identified as non-Hispanic White (n=43), 15.6 % White Hispanic (n=46), about 2% multi-racial Hispanic (n=7), 2 % multi-racial (n=6), 1 % Asian (n=3), and less than 1 percent Black Hispanic (n=2). The average adult age at enrollment was 24.29 years old (SD=4.97) (Guttentag et al., 2014).

Secondary Analysis Methodology

Because Kansas law prevented researchers from asking minors questions regarding family planning, the sample for the current secondary analysis was restricted to adult participants (i.e., at least 18 years or older at the time of consent). Of the 378 participants from the original study, 240 participants were adults by this criterion. Given the focus of this study is race comparisons, only participants that reported their race were included in this sample (n=188). Of the 188 participants, about 55% were Black (n=104), 19% were non-Hispanic White (n=35), 18% White Hispanic (n=34), 3% Multi-racial Hispanic (n=6), 2 % multi-racial (n=4), 1.6% were Asian (n=3), and 1% Black Hispanic (n=2). The average age was 23 years old.

Data Coding Definitions

Race/Ethnicity. Given the focus of this study is non-Hispanic Black, Latina, and Non-Hispanic White adult comparisons race was recoded to reflect these three racial/ethnic groups. Participants that identified as Black or African American or multi-racial were recoded as ‘0’ for

non-Hispanic Black. All four participants that identified as multi-racial indicated they were Black or African American and White. Two of the four participants also indicated they were also American Indian or Alaska Native. Non-Hispanic White participants were coded as '1' and Latina participants were coded as '2'. Participants that identified as Asian were recoded as '3' for a new race category called 'other'. See Table 2 for participant demographics.

Optimal Interpregnancy Interval Intention (Optimal Pregnancy Intention). The World Health Organization's (WHO) recommends an interpregnancy interval of at least 24 months for optimal maternal and infant outcomes. Participants had optimal pregnancy intentions if they responded "no" to wanting more children or responded their subsequent pregnancy would be when their target child was 24 months or older. Participants with optimal pregnancy intention were coded as '1' and those who reported their subsequent pregnancy would be when their target child was younger than 24 months were coded as '0', indicating non-optimal pregnancy intentions.

Optimal Birth Control Practices. First, birth control methods were categorized based on their level of effectiveness using ÇDC guidelines (Trussell et al., 2018). An ordinal variable, 'birth control effectiveness' was created. A code of '0' reflected the use of no birth control. No birth control was the lowest level of birth control effectiveness participants could have selected. A code of '1' was given for participants that used 'least effective' birth control methods, which have an unintended pregnancy rate of 28% to 18% within a year. A code of '2' was used for 'moderately effective' methods (e.g., NuvaRing), which have an unintended pregnancy rate is between 12% and 6% within a year. For most effective methods (e.g., tubal ligation), a code of '3' was given. The unintended pregnancy rate for 'most effective' methods is between 0.5% and 0.05% within a year. See Table 3. A new variable was constructed labeled 'optimal birth control

practices' to reflect if participants were engaging in effective birth control practices that would consistently reduce their risk of unintended pregnancy. Optimal birth control practices was defined as participants who reported using a 'moderately effective' or 'most effective' birth control method.

Stability in Optimal Pregnancy Intention and Optimal Birth Control Practices. Stability variables were created for optimal pregnancy intention and optimal birth control practices. The purpose of these variables was to understand if participants' reported pregnancy intention and birth control practices changed over time or stayed the same. Given the WHO recommendation of an interpregnancy interval of at least 24 months, ideally, participants would report optimal pregnancy intentions and optimal birth control practices during their prenatal, 4- and 10-month assessment visits. 'Stability in optimal pregnancy intentions' is an ordinal variable. If a participant had non-optimal pregnancy intentions at the prenatal, 4-, and 10-month assessment visits, they had stable non-optimal pregnancy intentions and were given a code of '0'. Participants were given a code of '1' if they had: 1) optimal intentions at the prenatal assessment visit and non-optimal intentions at either or both the 4-month or 10-month assessment visit; Or 2) non-optimal pregnancy intentions during the prenatal assessment visit and non-optimal pregnancy intentions at either the 4-month or 10-month assessment visits. A participant's desire to become pregnant again before their youngest child is 24 months places both mother and child at risk for adverse health complications if a woman becomes pregnant before 24 months postpartum. If a participant had non-optimal pregnancy intentions at the prenatal assessment visit, but optimal pregnancy intentions at the 4- and 10-month assessment visit, they were given a code of '2'. This was to account for women who were educated about the negative consequences of short interpregnancy intervals after giving birth. Participants with a code of '1'

or ‘2’ had unstable pregnancy intentions. If participants had optimal pregnancy intentions at the prenatal, 4-, and 10-month assessments, they had stable optimal pregnancy intentions and were given a code of ‘3’.

Stability in optimal birth control practices was defined similarly as an ordinal variable. If a participant had non-optimal birth control practices at both the 4- and 10-month assessment visits, they had stable non-optimal birth control practices and were given a code of ‘0’. Participants who had non-optimal birth control practices at the 4-month or 10-month assessment visits had unstable birth control practices and were given a code of ‘1’. Lastly, if participants had optimal birth control practices at the 4- and 10-month assessments, they were described as having stable optimal birth control practices and were given a code of ‘2’.

Chapter III: Data Analysis and Results

Data Analysis

Research Question 1: For Black, White and Latina mothers, what are (a) the trajectories, beginning prenatally and continuing through 10 months postpartum, of optimal interpregnancy interval intentions (as defined by the intention not to get pregnant less than 24 months postpartum) and (b) the trajectories across the first year postpartum (at 4- and 10-months) of optimal birth control practices (defined as moderately to most effective by the CDC)?)

The purpose of research question 1 is to provide a descriptive view of optimal pregnancy intentions (prenatal, 4, and 10 months) and optimal birth control practices at 4 and 10 months using a repeated measure. This approach has heuristic value to the field of reproductive health, as often the examination of pregnancy intention and birth control practice by race, across time, is neglected in research. The foundational descriptive view addresses research gaps and highlight the critical need for intervention. The first approach will be to graphically display the percentage of mothers who reported optimal pregnancy intentions by race across time. Both race and optimal pregnancy intentions are categorical variables. Thus, the Chi-square test of independence will be used to analyze the association between race and optimal pregnancy intentions at all time points (prenatal, 4- and 10-month postpartum). The assumptions of the chi-square test include the following: 1)The data in the cells are frequencies or counts of cases rather than percentages; 2) The levels (or categories) of the variables are mutually exclusive; 3) Each subject may contribute data to only one cell in the X2; 4) The study groups are independent; 5) There are at least two variables, and they are both measured as categories; and 6)The value of the expected cells are five or more in at least 80% of the cells. If the assumptions from the Chi-square test are not met, caution will be used and conclusions will not be drawn from results, instead, only a descriptive report of the breakdowns of optimal pregnancy intentions within each group at each timepoint.

Next, the relationship between race and birth control practices will be displayed graphically by race, across time, then explored using a Kruskal Wallis test. The assumptions include: 1) there is one independent variable with two or more levels; 2) an ordinal, ratio or interval-dependent variable is needed; 3) observations are independent; and 4) all groups should have the same shape distribution. The independent variable used will be the race variable which has three levels (Black, White, and Latina mothers). The variable 'birth control practices' is an ordinal variable, ordered by effectiveness. All participants in the sample are counted once, thus, observations are independent. The last assumption will be tested in SPSS as a part of the Kruskal Wallis test. If met, the Kruskal-Wallis test will be used to statistically assesses if there is a difference in the rank totals between groups; however, the test does not indicate which group is different from others. If statistically significant, a post hoc test using Dunn's test would determine which group is statistically different. A chi-square test or contingency table will be used if the same shape distribution assumption is violated.

Research Question 2: Beginning in pregnancy and continuing through 10 months postpartum, is stability in optimal interpregnancy interval intention related to stability of optimal birth control practices for Black, White, and Latina mothers, respectively?

Given our two variables of interest (stability in optimal pregnancy intentions and stability in optimal birth control practices) are both ordinal variables, appropriate statistical tests rely on either a descriptive approach or a nonparametric approach. First, data will be graphed to show the percentage of participants in each of the four categories of 'stability in optimal pregnancy intentions' by race. Then, the percentage of participants in each of the three categories of 'stability in optimal birth control practices' by race will be graphed. Next, Spearman's Rank Order Correlation will be used. This test assumes that two variables are measured on an ordinal, interval, or ratio scale. The second assumption is the two variables represent paired observations, thus, only participants who reported pregnancy intentions and birth control practices at all

timepoints will be used. The third and final assumption is that there is a monotonic relationship between the two variables. A monotonic relationship exists when either the variables increase in value together or as one variable increases, the other decreases. This assumption holds true as we would expect as stability in optimal pregnancy intention increases, stability in optimal birth control practices would increase as well.

Research Question 3: Does stability in optimal pregnancy intentions and optimal birth control practices combine to predict optimal interpregnancy intervals at 24-months for Black, White, and Latina mothers, respectively?

A multivariable logistic regression will be used to explore the association between optimal interpregnancy intervals and stability in optimal pregnancy intentions and optimal birth control practices, controlling for race-ethnicity. The assumptions of a logistic regression test include: 1) appropriate outcome type; 2) Linearity of independent variables and log odds; 3) No strongly influential outliers; 4) Absences of multicollinearity; 5) Independence of observations; and 6) sufficiently large sample size (Stoltzfus, 2011). Logistic regressions are limited to binary, multinomial, or ordinal variables. 'Optimal interpregnancy interval' is a binary outcome with an optimal interval (subsequent pregnancy occurs when the target child is 24 months or older) or a non-optimal interval (subsequent pregnancy occurs when the target child is younger than 24 months). The second and third assumptions only apply to continuous variables; thus, these assumptions are automatically met. Multicollinearity occurs when the data contains highly correlated independent variables. This reduces the precision of the estimated coefficients, weakening the statistical power. Multicollinearity will be checked using the variance inflation factor (VIF) in SPSS. If no collinearity exists, variables will have a VIF value of 1. If the VIF exceeds a value higher than 5, the variable will be eliminated from the model. The independence assumption is met as observations are not influenced by or related to the rest of the observations. Lastly, there is debate about the best way to determine the number of variables to include based

on a 'sufficiently large' sample (Stoltzfus, 2011). One rule of thumb is that there should be at least ten observations with the least frequent outcome for each independent variable (Stoltzfus, 2011). This will be checked by viewing the value counts for each variable. This criterion will determine how many predictors will be included in the model. A backward elimination approach will be used to avoid overfitting the model. This approach keeps all potential predictor variables in the model so that the predictors that best explain the variability in optimal interpregnancy intervals may be identified. Two interaction variables will be considered: Stability in pregnancy intention * race and stability in optimal birth control practices * race. These variables will explore if race moderates the relationship between stability in pregnancy intention and stability in optimal birth control practices. The interaction terms will be eliminated from the model if the sample size does not support the additional predictors, to prevent overfitting.

Results

Research Question 1

Research question 1 examines the relation between race/ethnicity categories (Black, White, and Latina) and both optimal pregnancy intention and optimal birth control practices across prenatal (pregnancy intention only), 4-month and 10-month assessments. To determine if there were racial differences in optimal pregnancy intention at each timepoint, Chi-Square tests were performed. Results showed that there was a significant relation between race and optimal pregnancy intention prenatally and at 4 months [$X^2(2, 170) = 10.6$, p=.005; $X^2(2, 137) = 10.1$, p=.006), respectively, but not at 10-months ($X^2(2, 128) = .17$, p=.917). The contingency tables further indicated that 50% of cells had an expected cell count of less than 5 both prenatally and at 10-months, with 30% of cells at 4-months having an expected cell count less than 5. The low cell counts violate the expected cell count assumption for the Chi-Square test. Due to cautions associated with these violations, the data are presented descriptively. As can be seen by viewing

pregnancy intention by race/ethnicity across time (Figure 1), 100% of Black and White mothers reported optimal pregnancy intentions prenatally, with 92 % of Latina mothers reporting optimal pregnancy intention. At 4-months, a similar trend was observed, with a lower percentage of Latina mothers reporting optimal pregnancy intention (81%) when viewed relative to the percentage of Black and White mothers. At 10-months, however, reported optimal intentions across race/ethnicity categories converged, with over 90% of mothers in each category reporting optimal pregnancy intention.

Independent-Samples Kruskal Wallis tests were performed to examine the relationship between race/ethnicity and birth control practices at 4 and 10 months (See Figures 2 and 3). The shape of the distribution of birth control practice varied by race/ethnicity categories at both 4-months ($p<.001$) and 10-months ($p=.004$). This violates the Kruskal Wallis test assumption that all groups should have the same shape distribution. Because the Independent-Samples Kruskal Wallis test is not robust to the same shape distribution violation, Chi-Square tests were run due to their robustness to the assumption. The Chi-Square results showed a significant relationship between race/ethnicity and birth control practices at 4 and 10 months [($X^2(2, 150) = 19.3$, $p<.001$, $\varphi_c = 0.36$); $X^2(2, 128) = 6.4$, $p=.041$, $\varphi_c = 0.22$, respectively]. At the 4-month assessment visit, White mothers (76 %) reported the highest percentage of optimal birth control practices compared to Black (69%) and Latina (31%) mothers. During the 10-month visit, fewer mothers reported using optimal birth control practices across race/ethnicity categories. Black women (51%) reported the highest percentage of optimal birth control practices at the 10-month assessment visit comparative to White (41%) and Latina (25%) mothers. Figures 5-7 display non-optimal birth control practices for Black, White, and Latina mothers, respectively. Latina mothers had the lowest percentage of optimal birth control practice use at both the 4-month and

the 10-month assessments (Figure 4) and the highest percentage of no birth control usage at both the 4-month and the 10-month assessments.

Research Question 2

Research Question 2 focuses on stability over time in both birth control intentions and practices. Stability estimates can only be made for mothers who reported these birth-related characteristics across all timepoints. Hence, analyses are limited to mothers who completed assessments at the prental, 4-, and 10-month assessments for birth control intentions (N=96) and at the 4- and 10-month assessments for birth control practices (N=121). As such, for birth control intentions, data were available for only 52% of overall sample of Black mothers (n=56), 49% of of the overall sample of White mothers (n=17), and 55% of the overall sample of Latina mothers (n=23). For birth control practices, data were available for only 63% of the overall sample of Black mothers (n=68), 60% of the overall sample of White mothers (n=21), and 76% of the overall sample of Latina mothers (n=32). A Spearman's rank correlation was computed to assess the relationship between stability in optimal pregnancy intention and stability in optimal birth control practice for each race/ethnicity. There was a small, but significant, positive correlation between stability in intention and birth control practices for Black women, $r(53)= .35$, $p=.010$. In contrast, there was not a significant relationship between stability in optimal pregnancy intention and stability in optimal birth control practices for White women ($r(16)= -.34$, $p=.203$) or Latina women ($r(22)= -.04$, $p=.873$).

Figure 8 displays the percentage of women who reported stability in optimal pregnancy intentions and birth control practice across assessment points. In contrast, Figures 9 and 10 display non-optimal pregnancy intentions and birth control practices. Although Latina women reported high stability in optimal pregnancy intentions (87%), the majority of women reported stability in non-optimal birth control practices (63 %). Black women, had the highest percentage

(50%) of mothers who reported stable optimal birth control practices, that is, optimal birth control methods at both the 4-month and 10-month visit, compared to White and Latina mothers.

Research Question 3

A logistic regression was conducted to determine the strongest predictors of optimal or non-optimal interpregnancy intervals at 24 months postpartum. Predictors included race, stability in optimal pregnancy intentions, and stability in optimal birth control practices. With the exception of the stability in optimal pregnancy intention variable, all variables to be included within the regression model met the assumptions of an appropriate outcome type, linearity of independent variables and log odds, no strongly influential outliers, absence of multicollinearity, independence of observations, and a sufficiently large sample size needed for logistic regression. The stability in optimal pregnancy intention variable did not meet the "sufficiently large" sample size (Stoltzfus, 2011) assumption given the extremely low number of mothers reporting non-optimal pregnancy intentions across time. Therefore, the logistic model examined viewed stability in optimal birth control practices and race/ethnicity in relation to optimal/non-optimal interpregnancy interval outcomes.

There were no significant differences in interpregnancy interval by race (p-value=.74) (Table 2). Holding race/ethnicity constant, the odds of becoming pregnant before 24 months postpartum (i.e., a non-optimal birth interval outcome) were 4.15 times more likely for women reporting stable non-optimal birth control practices across time when compared to women reporting stable optimal birth control practices (β= 1.42, s.e. = .533, 95 % CI: 1.46, 11.81, p=.008). Women with unstable birth control practices (participants that had optimal birth control practices at either 4-months or 10-months) did not differ in their birth interval outcome when compared to women with stable optimal birth control practices (β= .76, s.e. = .531, 95 % CI: 0.76, 6.08, p=.150).

Chapter IV: Discussion, Conclusions, and Recommendations

This study laid foundational work in understanding the differences in pregnancy intention and birth control practices as it relates to optimal interpregnancy intervals. Because national surveillance of interpregnancy intervals and unintended pregnancies is lacking, this study provides a view of the current state of these variables for a high-risk sample. The presentation of pregnancy intention and birth control practice by race/ethnicity group could help inform the type of interventions needed. Often, Black women and Latina women are represented in the literature as having similar birth control practices, but our study showed how the two groups varied in the type of birth control they were using and how many times they reported using effective methods. Most mothers across races/ethnicity reported optimal pregnancy intentions, supporting other cross-sectional study findings (Kemet, Lundsberg, & Gariepy, 2017). Though most mothers in the sample reported optimal pregnancy intention across time, the majority of all mothers reported non-optimal birth control practices at 10 months postpartum. This could potentially be explained by the structural and systemic inequalities low-income women face regarding reproductive healthcare and education. In a systematic review of qualitative studies of pregnant or postpartum women, the most frequently mentioned barriers to postpartum care were gaining pregnancy-related Medicaid coverage, challenges finding providers who would accept Medicaid, lack of provider continuity, transportation, and childcare hurdles (Bellerose, Rodriguez, & Vivier, 2022).

In addition to structural inequalities, individual factors could impact the type of care individuals receive and their adherence to medication, such as contraception. Bellerose and colleagues (2022) found for low-income women who accessed care, experiences of dismissal, discrimination, and disrespect related to race, insurance status, age, and language were common. Latina mothers reported ‘no birth control use’ more than any other race/ethnicity at both time points, and only one Latina mother reported using a highly effective birth control method at the

4-month visit. Latina women and other women of color tend to use less effective birth control methods likely influenced by cultural and historical reasons, including preferences for methods that do not change menstrual cycles, methods that an individual can stop themselves at any time, and methods used during intercourse only (Caballero et al., 2021). Other reasons include a desire to protect reproductive autonomy, a history of negative personal and collective health care experiences, limited acess to prescriptions and contraceptive appointmments, lack of information about methods, and high out-of-pocket cost for caontraceptive devices (Caballero et al., 2021). While Black mothers reported moderately effective birth control practices at both time points, by the 10-month visit, nearly half of the Black mothers were either not using birth control at all or using ineffective methods. These findings are reflective of the current reproductive health disparities that exist among minority women. The differences in the type of birth control uptake demonstrate the need to better understand the perceived and actual barriers associated with selecting, accessing and using contraception.

In examining the relationship between stability in optimal pregnancy intention and stability in optimal birth control practice, the smallest gap in the percentage of mothers who reported having optimal pregnancy intentions at all three timepoints, and those who were using optimal birth control practices at both timepoints, were Black mothers. Although White women reported more stable optimal pregnancy intention than any other race, they were less stable in optimal birth control practice compared to Black women. Previous studies have documented that Black women tend to report using less effective birth control methods and have higher rates of non-use than their White counterparts (Daniels and Abma, 2018). Findings from this study have important implications as minority contraceptive patterns and use are not well understood (Isquick et al., 2016).

Although most women reported optimal pregnancy intentions, nearly half (46 %) had a non-optimal pregnancy interval (i.e., became pregnant sooner than 24 months postpartum). This finding suggests the possibility of limited reproductive autonomy to achieve their desire. There are numerous possibilities that could lead to dimished reproductive autonomy, including abuse of a partner.This is consistent with prior research in which reproductive coercion was associated with a 80% increase in unintended pregnancy (Miller et al., 2014). Futhermore, it has been well documented that low-income, low education, and minority women are at an increased risk of unintended pregnancy (Kuroki et al., 2008). However, in this study, race was not associated with having a non-optimal interpregnancy interval. It could be that our sample size for Latina mothers was too small to detect an effect, as a high percentage of Latina mothers were not using effective birth control methods.

Limitations

This study used secondary data, as such there were several methodological limitations of the original study that produced the secondary data set for this study. For example, there were no questions that asked participants if they were using their reported birth control method correctly (e.g., as prescribed) or consistently. Thus, a participant who took birth control pills for two weeks and missed days would be counted the same as a person who took birth control pills every day for months. Similarly, since all the data gathered about family planning was self-reported, participants' biases may have affected the results, given this topic is viewed as sensitive or personal information. Another limitation is there was a small number of White and Latina women in comparison to the Black women in the study, and not all adult participants in the sample reported their race, or all family planning questions at each timepoint, reducing statistical power. This could be why no significant racial differences emerged despite the three racial

groups having different birth control practices. Finally, there were only two measurement timepoints from the prenatal assessment to the 24-months postpartum assessment for current birth control practices and retrospective pregnancy intentions. More frequent timepoints may result in more sensitive reporting to understand if these variables changed over time, since a woman's desires are not static and birth control use could change due to several intrapersonal or interpersonal factors.

Implications for Policy, Practice, and Future Research

Policy implications ,regarding the finding that nearly half of the participants became pregnant before 24 months postpartum, include expanding Medicaid for postpartum women through 24 months postpartum. Beyond the numerous adverse health outcomes associated with unplanned, non-optimal pregnancy intervals, over 90% of the sample consistently reported they would like to avoid pregnancy during this critical period. Expanding Medicaid could help reduce non-optimal interpregnancy interval disparities for low-income women by making effective contraception affordable, increasing healthcare access during the postpartum period, and increasing education about reproductive health, specifically, planned, optimally timed births. Another implication for policy recommendation is allowing pharmacist to provided moderately effective birth control methods, at no-cost for low-income women. This could encourage all women of reproductive age, regardless if they have had a recent pregnancy or not, to use effective birth control methods to reduce the risk of unintendend pregnancies. It would also reduce the barrier of access to healthcare.

With regard to program practice,this study revealed a significant relationship between race/ethnicity and birth control practices. This finding should be considered within intervention research when developing targeted programs for planned, optimally timed pregnancies.

Historically, Black and Latina women have been grouped when discussing intervention strategies. This finding suggests unique strategies are required to initiate the use of effective birth control among Latina mothers and different strategies for supporting the consistent use of effective birth control among Black mothers. Creating tailored programs for specific minority groups could help reduce disparities in birth control practices by race/ethnicity. These tailored programs with the objective of initiating and maintaining effective birth control usage should be tested through randomized control trials to help inform future practice.

With regard to future research, subsequent studies could shed light on the finding that participants in the current study who reported unstable birth control practices, that is both optimal and non-optimal birth control practices across the two time points (4- and 10- months postpartum) were not statistically different in their non-optimal interpregnancy interval than participants with stable optimal birth control practices. Although this finding was unexpected, it is not entirely surprising due to methodological constraints. The first issue was low power, therefore it will be important for future studies to increase sample size. Secondly, there was a 13-month gap between the 10-and 24-month time points in which there was no assessment of birth control practices. To improve measurement sensitivity, future studies should assess practices more frequently to elucidate the occurrence potentially changing birth control practices. Finally, more precise report measures are needed to differentiate "any use" from "consistent use" of methods such as birth control pills that require dosing precision for effectiveness.

Table 1.

Original Demographic and MBM Family Planning Questions

Category	Variable	Question	Assessment
Demographics	Race/Ethnicity	What is your ethnicity?	Prenatal
		What is your race?	Prenatal
	Age	Participant's date of birth	Prenatal
	Marital status	[What is your] marital status?	Prenatal, 24-month
	Education	What was the highest grade you completed?	Prenatal, 24-month
Family Planning	Interpregnancy interval intentions	After this baby, do you want to get pregnant again?	Prenatal, 4-month, 10-month
		About how old do you think your youngest child will be when you want to get pregnant again?	Prenatal, 4-month, 10-month
	Birth control practices	At the time you became pregnant, had you been using any type of birth control or doing anything to keep from getting pregnant?	Prenatal 4-month, if applicable 10-month if applicable
	Interpregnancy intervals	Are you currently pregnant now (or have been) since the birth of the target child?	4-month, 10-month
		Have you been pregnant since the birth of (target child)?	24-month

Table 2.

Sample demographics and outcome of interest

Baseline characteristics	**Black (n=108)**	**White (n=35)**	**Latina (n=42)**	**All participants (N=185)**
Highest Education Completed				
Less than 8th grade	0 (0%)	0 (0%)	6 (14.6%)	6 (3.3%)
8th grade	1 (0.9%)	0 (0%)	6 (14.6%)	7 (3.8 %)
9th grade	7 (6.5%)	3 (8.6%)	9 (22.0%)	19 (10.4 %)
10th grade	14 (13.1%)	11 (31.4%)	5 (12.2%)	30 (16.4%)
11th grade	41 (38.3%)	7 (20%)	11 (26.8%)	59 (32.2%)
12th grade	19 (17.8%)	1 (2.9%)	1 (2.4%)	21 (11.5%)
Ungraded	1 (0.9%)	0 (0%)	1 (2.4%)	2 (1.1%)
GED program	19 (17.8%)	12 (34.3)	2 (4.9%)	33 (18.0%)
Community or Junior college	3 (2.8%)	1 (2.9%)	0 (0%)	4 (2.2%)
Vocational program	2 (1.9%)	0 (0%)	0 (0%)	2 (1.1%)
Marital Status				
Single	73 (67.6%)	15 (42.9%)	10 (23.8%)	98 (53.0%)
Divorced	1 (0.9%)	0 (0%)	0 (0%)	1 (0.5%)
Married	6 (5.6%)	3 (8.6%)	15 (35.7%)	24 (13.0%)
With partner	27 (25%)	16 (45.7%)	17 (40.5%)	60 (32.4%)
Separated	0 (0%)	1 (2.9%)	0 (0%)	1 (0.5%)
Other	1 (0.9%)	0 (0%)	0 (0%)	1 (0.5%)
Age				
Minimum	18.0	18.0	18.3	18.0
Maximum	41.6	30.2	38.3	41.6
Mean (Standard deviation)	22.6 (4.9)	21.4 (2.9)	24.5 (5.1)	22.8 (4.7)
Outcome variable				
Interpregnancy interval				
Non-optimal interval	30 (47.6)	8 (40.0%)	15 (46.9%)	53 (46.1%)
Optimal interval	33 (52.4%)	12 (60.0%)	17 (53.1%)	62 (53.9%)

*Note: A non-optimal interpregnancy interval refers to a participant becoming pregnant before 24 months postpartum; An optimal interpregnancy interval is no pregnancy before 24 months postpartum

Table 3.

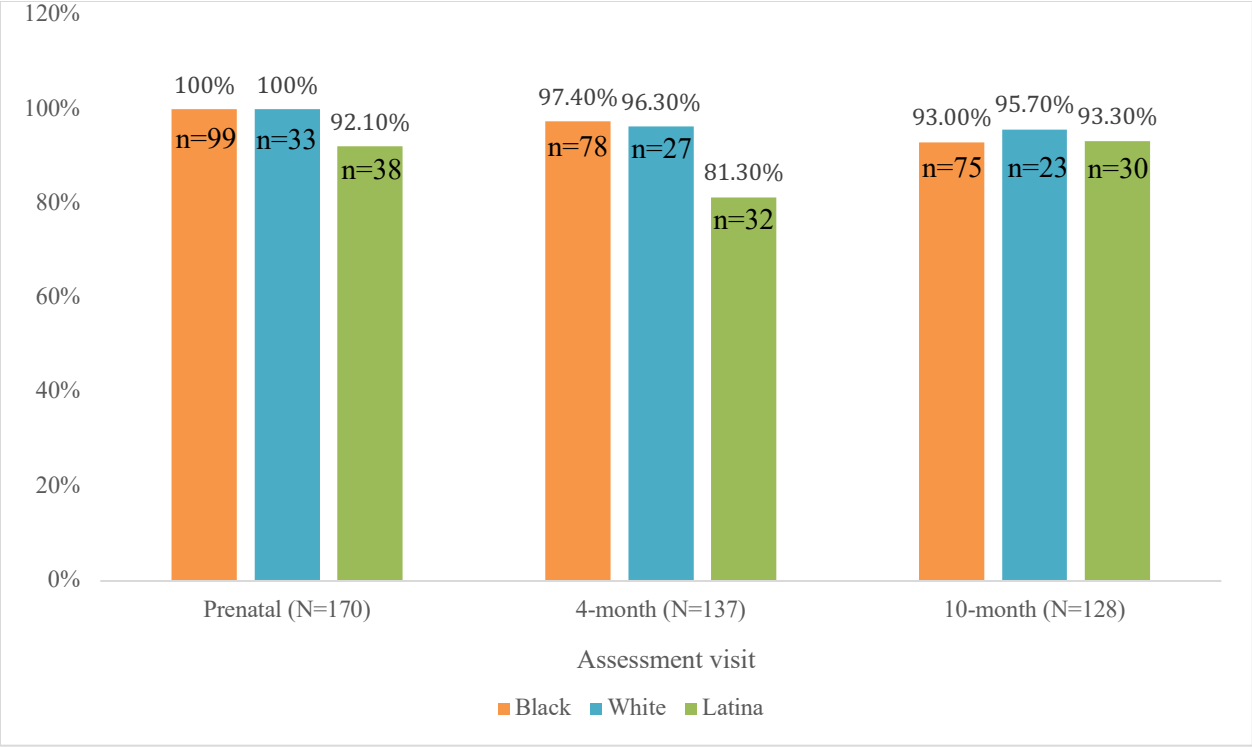
Birth control effectiveness categories

	Center for Disease Control and Prevention	**Current study**
Most effective *Less than 1 pregnancy per 100 women in a year*	Implant (0.05%) Intrauterine Device (LNG- 0.2%; Copper T- 0.8%) Male Sterilization (Vasectomy) (0.15%) Female Sterilization (Abdominal, Laparoscopic, Hysteroscopic) (0.5%)	Norplant (implants) IUD, coil, or loop My partner has a vasectomy I have a tubal ligation
Moderately effective *6-12 or more pregnancies per 100 women in a year*	Injectable (6%) Pill (9%) Patch (9%) Ring (9%) Diaphragm (12%)	I took depo Provera – the birth control shot I used the birth control "patch" I used NuvaRing- the birth control "ring" I used a diaphragm I took birth control pills at least sometimes I took "the morning after" pil
Least effective *18 or more pregnancies per 100 women in a year*	Male condoms (18%) Female condoms (21%) Withdrawal (22%) Sponge (24% parous women) Fertility-Awareness Based Methods (24%) Spermicide (28%)	I tried not to have sex (abstinence) I had my partner withdraw or pull out I had my partner use condoms Tempsafe The Today sponge (spermicidal) Vaginal pouches(spermicidal) Foam (spermicidal) Suppository (spermicidal) I douched or cleaned right after sex I used the rhythm method
No birth control *85 pregnancies per 100 women in a year*		Nothing

Note: CDC birth control effectiveness categories Adapted from World Health Organization (WHO) Department of Reproductive Health and Research, Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs (CCP). Knowledge for health project. Family planning: a global handbook for providers (2011 update). Baltimore, MD; Geneva, Switzerland: CCP and WHO; 2011; and Trussell J. Contraceptive failure in the United States. Contraception 2011;83:397–404.

Figure 1

The percentage of participants that reported optimal pregnancy intention from the 'My Baby & Me' study



Note: Optimal pregnancy intention reflects participants that reported wanting to get pregnant when they were at least 24 months postpartum or not wanting to have another child.
Black women missing data: Prenatal- 9 missing (8.3%); 4-month- 30 missing (27.8%); 10-month- 33 missing (30.6%)
White women missing data: Prenatal- 2 missing (5.7%); 4-month- 8 missing (22.9%); 10-month- 12 missing (34.3%).
Latina women missing data: Prenatal- 4 missing (9.5%); 4-month- 10 missing (23.8%); 10-month- 12 missing (28.6%).

Figure 2

The percentage of participants reported 4-month birth control practices from the 'My Baby & Me' study

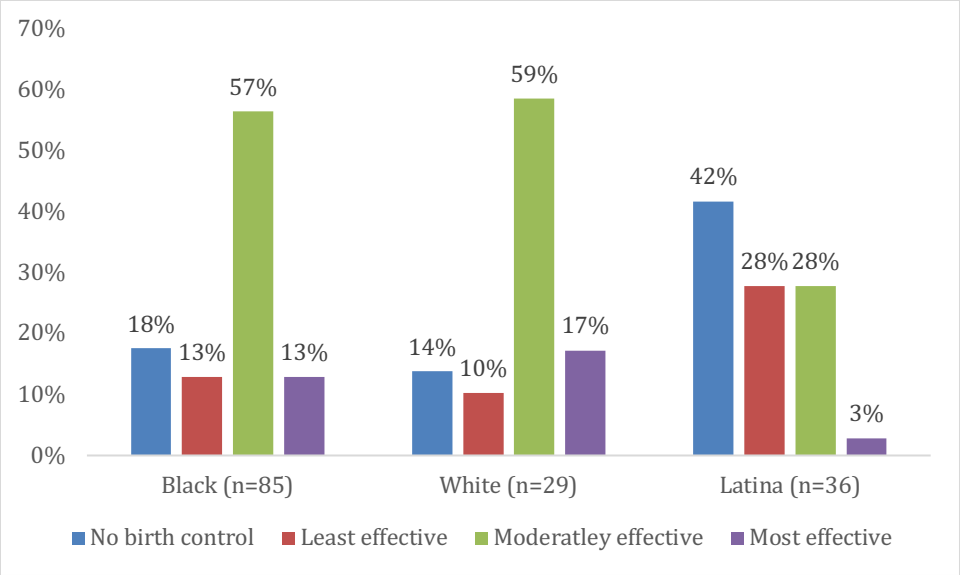


Figure 3

The percentage of participants reported 10-month birth control practices from the 'My Baby & Me' study

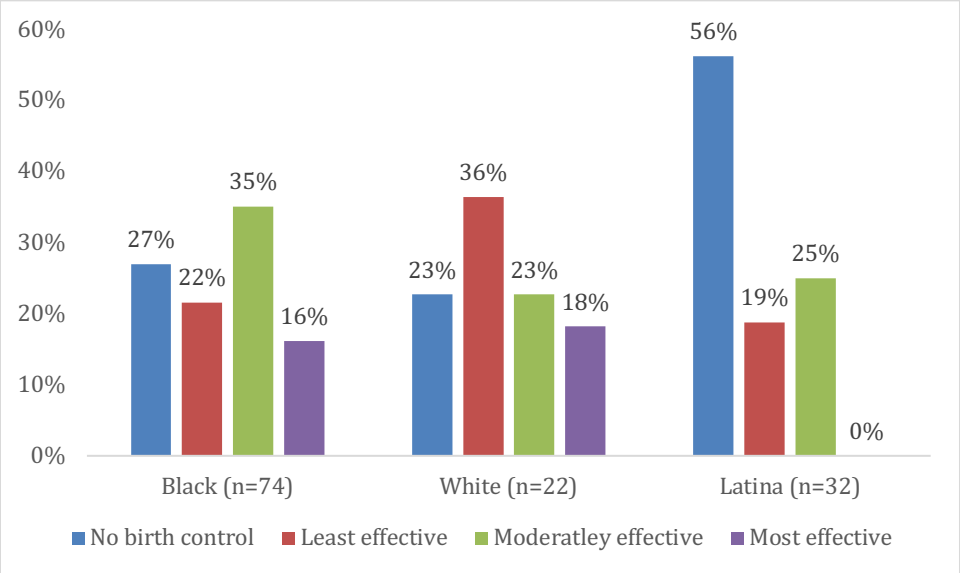
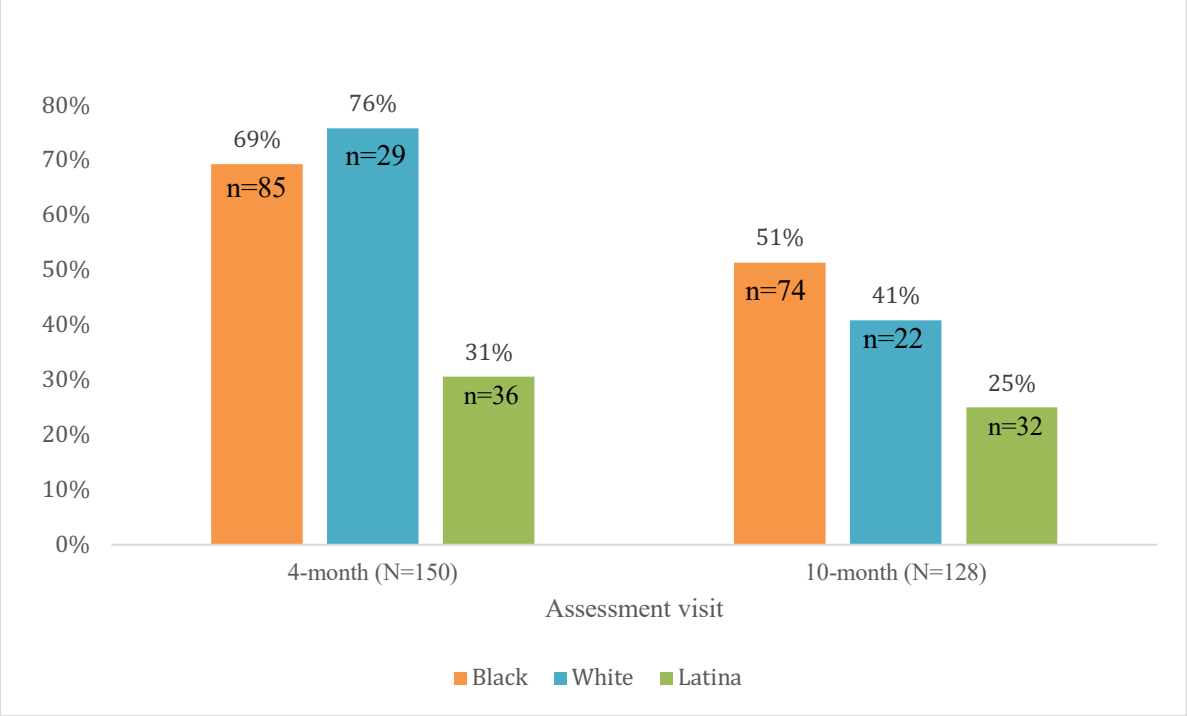


Figure 4

The percentage of participants that reported optimal birth control practices from the 'My Baby & Me' study



Note: Participants that reported using a 'moderately' effective or 'most' effective birth control method

Figure 5

Non-optimal birth control practices for Black women from the 'My Baby & Me' study

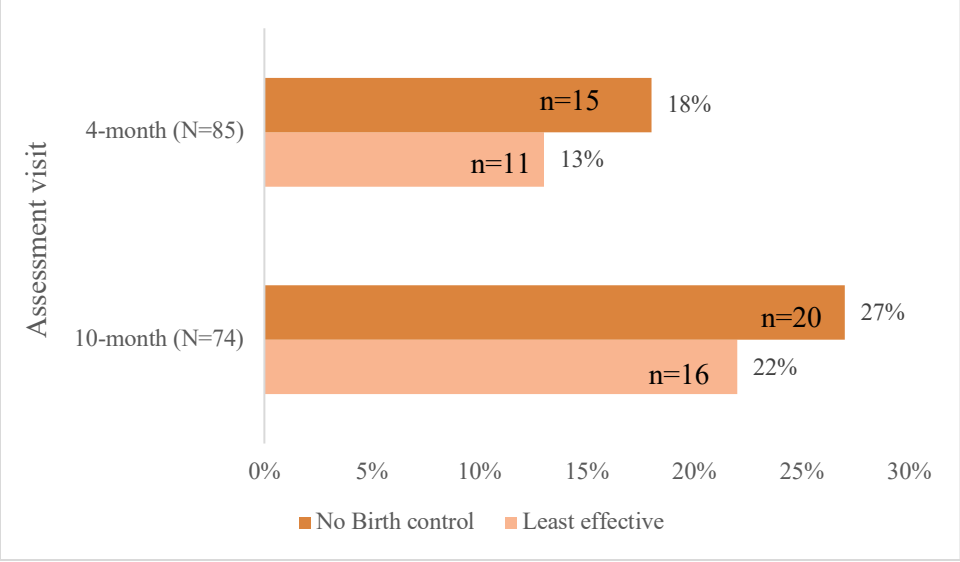


Figure 6

Non-optimal birth control practices for White women from the 'My Baby & Me' study

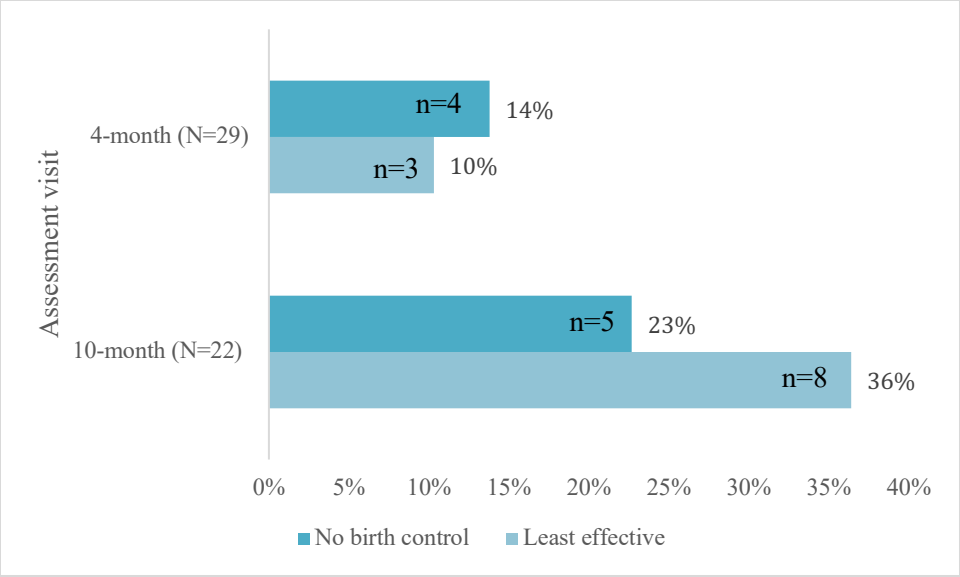


Figure 7

Non-optimal birth control practices for Latina women from the 'My Baby & Me' study

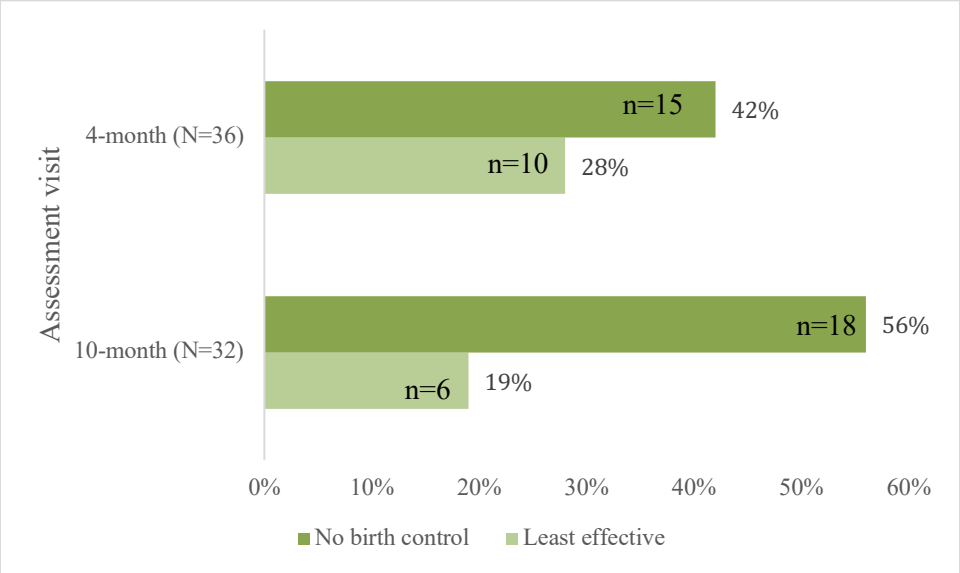
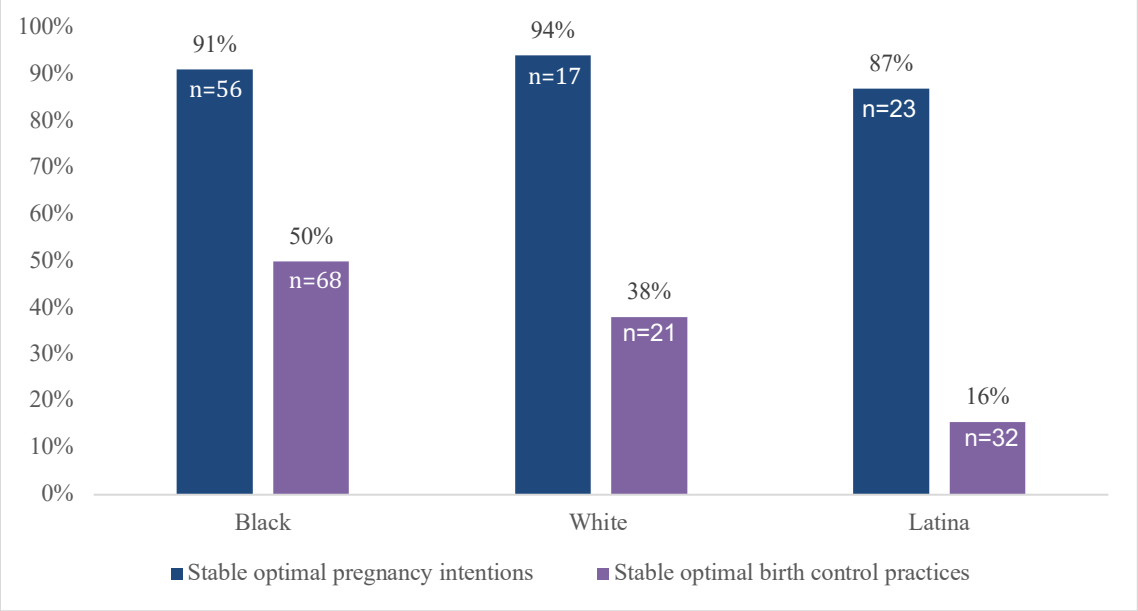


Figure 8

The percentage of participants that reported stability in optimal pregnancy intentions and optimal birth control practices from the 'My Baby & Me' study



*Note: Only participants who had data for all three timepoints for pregnancy intention (prenatal, 4-month, and 10-month) and both timepoints for birth control practice (4-month and 10-months) were included.
Ns listed in the bars represent the sample size for each race.

Figure 9

The percentage of participants that reported stability in non-optimal pregnancy intentions from the 'My Baby & Me' study

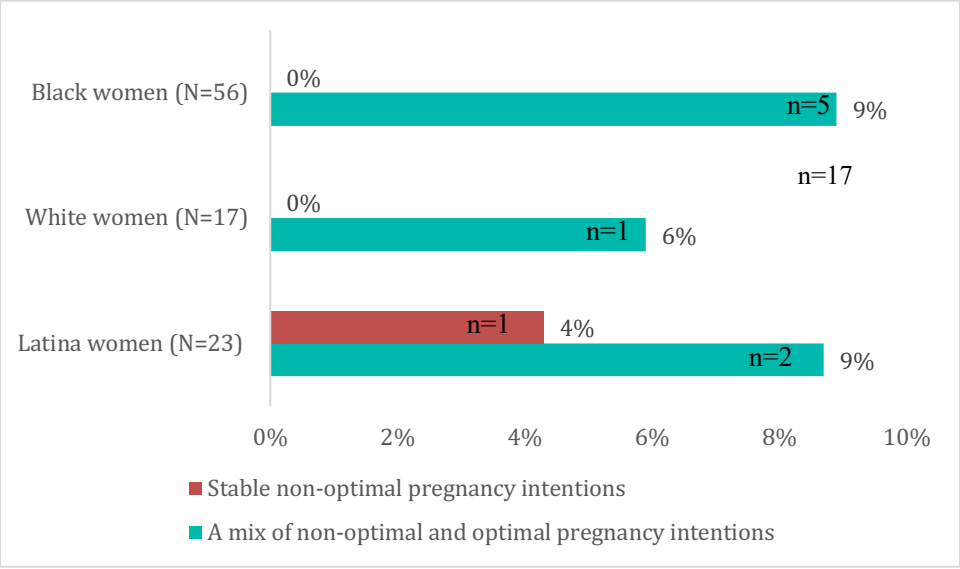
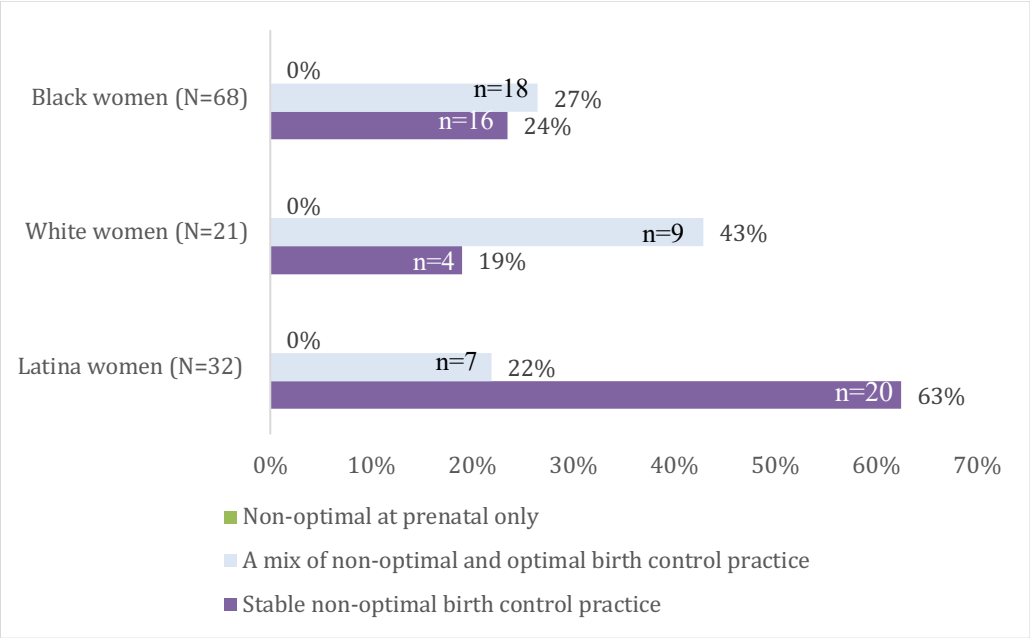


Figure 10

The percentage of participants that reported stability in non-optimal birth control practices from the 'My Baby & Me' study


Black women (N=68)
0%
n=18
27%
n=16
24%
White women (N=21)
0%
n=9
43%
n=4
19%
Latina women (N=32)
0%
n=7
22%
n=20
63%
0%
10%
20%
30%
40%
50%
60%
70%
Non-optimal at prenatal only
A mix of non-optimal and optimal birth control practice
Stable non-optimal birth control practice

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