Missed opportunities in social media to reduce maternal health disparities for Black women

Nerissa George
*University at Albany, State University of New York, nerissageorge@icloud.com*

The University at Albany community has made this article openly available. **Please share** how this access benefits you.

Follow this and additional works at: https://scholarsarchive.library.albany.edu/legacy-etd

Part of the African American Studies Commons, Communication Commons, and the Public Health Commons

**Recommended Citation**
https://scholarsarchive.library.albany.edu/legacy-etd/2911

This Dissertation is brought to you for free and open access by the The Graduate School at Scholars Archive. It has been accepted for inclusion in Legacy Theses & Dissertations (2009 - 2024) by an authorized administrator of Scholars Archive.
Please see Terms of Use. For more information, please contact scholarsarchive@albany.edu.
Missed Opportunities in Social Media to Reduce Maternal Health Disparities for Black Women

by

Nerissa P. George

A Dissertation
Submitted to the University at Albany, State University of New York
In Partial Fulfillment of the
Requirements for the Degree of
Doctor of Public Health

School of Public Health
Department of Health Policy and Management
Spring 2022
ABSTRACT

Pregnancy-related maternal morbidity and mortality disproportionately affect Black women more than their White counterparts. Black pregnant women are more likely to omit or engage in prenatal care late than White women. Social media is an essential source of pregnancy-related information and shows it effectively improves pregnancy knowledge. Greater than 80% of Black women own a mobile device, and some data demonstrate that Black women use social media for pregnancy-related information. However, little is known about social media use during pregnancy for this population. Several gaps exist about what maternal health content is available on social media, how Black women use social media during pregnancy, and what factors influence their social media use behaviors. It is vital to explore how this tool can be utilized to address knowledge gaps and promote equitable maternal health among Black women. This dissertation sought to fill these gaps by conducting a content analysis of maternal health Instagram posts from three popular parenting accounts (Aim 1) and doing a cross-sectional survey of Black women who were pregnant or gave birth within a year to (1) assess whether health literacy or eHealth literacy influenced their social media to use patterns (Aim 2) and (2) examine whether prenatal care quality (precisely the quality of guidance and support and respect) impacted how they use social media (Aim 3). Aim 1 results suggest that maternal health and Black maternal health topics are rarely posted on popular parenting Instagram accounts. Aim 2 analyses indicate that Black women use social media and share pregnancy information and obtain support. Black birthing women with low health literacy used social media more and obtained support from social media. Women with higher health literacy reported sharing information found online with others more. Those with higher eHealth literacy were more likely to use social media, share pregnancy information found on social media with others, and use social media for support. Aim 3 found that the quality of guidance and the quality of support and
respect delivered during prenatal care were scored as good. Black women who reported getting more prenatal care guidance from their provider reported more social media use and more use of social media for giving and getting support. Also, Black women who reported getting more prenatal care support and respect from their provider reported more social media use and more use of social media for giving and getting support. Findings across all three aims highlight possible opportunities to improve pregnancy knowledge, share high-quality pregnancy information and resources, and improve patient-provider relationships. Results also suggest the importance of continued evaluations of the impact of social media use by Black women during pregnancy and the potential implications social media use can have for Black women with respect to maternal health. Social media can be a viable and innovative solution to help promote maternal health equity. Results from all three studies can advance research, identify strategies for information dissemination, provide ideas for future social media interventions, and inform practice for pregnancy care providers and organizations that support pregnant women.
ACKNOWLEDGEMENTS

I am incredibly grateful to the University at Albany School of Public Health for awarding me with the opportunity to become the first doctoral recipient of my family. I would also like to thank SUNY Downstate Medical Center and the University at Albany SUNY Center Scale Award for partially supporting this work.

Throughout the development of this dissertation, I have received an immense amount of support and assistance. Firstly, I would like to offer my deepest gratitude to my Advisor, Committee Chair, Miracle Worker, and Anchor, Dr. Jennifer Manganello. Her expertise and guidance were invaluable throughout all phases of the development of my work. Her insightful feedback enabled me to sharpen my rationale and present my work clearly and concisely, bringing it to new heights each time. Thank you for constantly pushing me to bounds I did not know I had within myself and reeling me back in when needed.

I want to express my most profound appreciation to my committee members, Dr. Rachel de Long, Dr. Rukhsana Ahmed, and Dr. Marilyn Kacica, for their continuous support, feedback, and flexibility with my deadlines. I am highly grateful to Dr. Simone Reynolds for her statistical expertise and feedback. I would also like to thank the research assistants (Keiyana Phillip & Haley Cowlin) for assisting with the data collection for the content analysis.

I want to thank my mother for her wise counsel and sympathetic ear. Momma, I have officially made it!

In addition, I would like to thank my partner Ronell Kirven for his endless support, listening ear, and boundless advice throughout my meltdowns. Thank you for always being willing to pick up the pieces whenever I need you and for your commitment to supporting me through my final lap.

Finally, I could not have completed this dissertation without the support of my friends, especially Alyssa Eaton, Blair Phoenix, and Jermaine Brookshire Jr., who were with me when this degree was just a thought in my head – for providing stimulating discussions, endless support, and happy distractions to rest my mind outside of my research and work. Furthermore, I cannot forget the laughter they all delivered along the way!

May this body of work reflect the massive amount of effort, time, and dedication contributed by everyone noted above to get this dissertation to its final version.

Thank You Always!

\textit{Dr. Nerissa George}
Table of Contents

LIST OF FIGURES AND TABLES .................................................................... vii

CHAPTER 1 ............................................................................................................. 1
I. Introduction ........................................................................................................... 1
   A. Statement of the Problem ............................................................................... 1
   B. Purpose of the Study ...................................................................................... 5

II. Review of the Literature .................................................................................. 6
   C. Existing Pregnancy-Related Maternal Health Disparities .......................... 6
   D. Provider Role in Prenatal Care and Communication with Black Women 12
   E. Internet Health Seeking Behaviors of Pregnant Women ......................... 16
   F. Social Media Use of Pregnant Women ......................................................... 18
   G. Health Literacy and eHealth Literacy ......................................................... 21
   H. Conceptual Framework ................................................................................ 26
   I. Questions and Hypothesis .............................................................................. 30

CHAPTER 2 ............................................................................................................ 35
III. Maternal Health Posts Shared on Instagram: A Content Analysis of Accounts
     Popular with Black Pregnant Women ........................................................... 35
    A. Background .................................................................................................. 35
    B. Methods ....................................................................................................... 38
    C. Results .......................................................................................................... 40
    D. Discussion ..................................................................................................... 43
    E. Limitations ..................................................................................................... 47
    F. Conclusion ...................................................................................................... 47
    G. References ..................................................................................................... 49
    H. Appendices .................................................................................................... 52

CHAPTER 3 ............................................................................................................ 54
IV. Social Media Use Among Black Pregnant Women: Does Health Literacy or eHealth
    Literacy Play A Role? ...................................................................................... 54
    A. Background .................................................................................................. 54
    B. Methods ....................................................................................................... 57
    C. Results .......................................................................................................... 61
    D. Discussion ..................................................................................................... 64
    E. Limitations ..................................................................................................... 67
CHAPTER 4 ................................................................................................................................ 76
V. Does Quality of Prenatal Care for Black Birthing Women Impact How They Use Social Media? ........................................................................................................................... 76
   A. Background ................................................................................................................... 76
   B. Methods .......................................................................................................................... 79
   C. Results ............................................................................................................................ 82
   D. Discussion ...................................................................................................................... 84
   E. Limitations ..................................................................................................................... 88
   F. Conclusion ..................................................................................................................... 89
   G. References ...................................................................................................................... 90
   H. Appendices ..................................................................................................................... 93

CHAPTER 5 ................................................................................................................................ 98
VI. Summary of Findings ........................................................................................................ 98
VII. Limitations ...................................................................................................................... 100
VIII. Implications for Future Research and Practice ............................................................ 101
REFERENCES .......................................................................................................................... 113
APPENDICES ........................................................................................................................... 126
   Appendix 1 – Aim 1 Content Analysis Codebook ............................................................. 126
   Appendix 2 – Aim 2 and 3 Survey Questions .................................................................. 129
LIST OF FIGURES AND TABLES

CHAPTER 1

Figure 1: Howell’s Conceptual Framework ................................................................. 28

Figure 2: Social Media Potential Influences on Socio-Ecological Factors for Obtaining Pregnancy-Related Health Information – Adapted from the Socio-Ecological Model and Pathways to Racial and Ethnic Disparities in Severe Maternal Morbidity & Mortality Framework .................. 29

CHAPTER 2

Table 1: Number of Instagram Posts by Social Media Account................................. 74

Figure 1: Maternal Health Posts by Year and Social Media Account ............................ 74

Figure 2: Word Cloud of the Topics Discussed on all Instagram Accounts ..................... 75

Figure 3: Use of Diverse Birthing Women Images in Posts by Year and Social Media Account ...................................................................................................................... 75

CHAPTER 3

Figure 1: Study Eligibility Flow Chart ........................................................................ 73

Table 1: Participant Characteristics ............................................................................. 74

Table 2: Health Literacy and Social Media Use Bivariate Analyses ............................. 74

Table 3: Correlation Analysis of eHealth Literacy and Social Media Use ..................... 75

Figure 1: Social Media Use Measurement Instrument .................................................... 75

CHAPTER 4

Table 1: Demographic Characteristics ........................................................................ 93

Table 2: Results of How Often Black Women Share Pregnancy Information Found on Social Media ......................................................................................................................... 93

Table 3: Correlation of Analysis of Prenatal Care Quality and Social Media Use ............ 94

Table 4: Multivariate Analysis Results of Prenatal Care Quality and Social Media Use .... 74

Figure 1: Study Flow Chart ............................................................................................ 96

Figure 2: Social Media Use Measurement Instrument ..................................................... 7597
CHAPTER 1

I. Introduction

A. Statement of the Problem

In the United States (US), roughly 700 women die from pregnancy-related complications each year (CDC, 2019). Nearly 60% of pregnancy-related deaths are preventable (Petersen et al., 2019a). Cardiovascular conditions were responsible for greater than 33% of pregnancy-related deaths; these conditions include cardiomyopathy (10.8%), other cardiovascular diseases (15.1%), and cerebrovascular accidents (7.6%) (Petersen et al., 2019a). Other leading causes of pregnancy-related death included other non-cardiovascular medical conditions (14.3%), infection (12.5%), and obstetric hemorrhage (11.2%) (Petersen et al., 2019a).

Black women were three times more likely to die from a pregnancy-related cause than White women; this likelihood increases despite income and educational status (CDC, 2019). These two populations’ proportionate differences might reflect differences in access to care, quality of care, and chronic disease prevalence (Howell, 2018). For instance, national birth certificate data from 2020 highlighted that 9.1% of Black women giving birth received late (starting in the third trimester) or no prenatal care, compared to 4.5% of White women (Osterman et al., 2022). Chronic diseases associated with an increased risk for pregnancy-related mortality (e.g., hypertension, diabetes, heart disease) are more prevalent and less well-controlled amongst Black women (Fryar et al., 2017).

Likewise, severe maternal morbidity (unforeseen outcomes of labor and delivery which result in substantial short- or long-term consequences to a woman’s health) reflects where preventative measures and continuity of care would impact its steadily increases in recent years (CDC, 2020;
American College of Ob & Gyn, 2016). It remains unclear why severe maternal morbidity is rising, but differences in the women’s overall health before and during pregnancy may contribute. Increases in maternal age (Martin et al., 2019), pre-pregnancy obesity (Hinkle et al., 2012; Fisher et al., 2013), pre-existing chronic medical conditions (Campbell et al., 2013; Small et al., 2012), and cesarean delivery (Martin et al., 2019) have been observed within the literature. These increases may directly impact the women with these comorbidities experiencing pregnancy and birth, increase medical costs, and yield more extended hospital stays (Callaghan et al., 2012).

While complications due to high blood pressure, pre-eclampsia and eclampsia, and postpartum hemorrhage are common predictors for pregnancy deaths and complications, implicit bias and lower quality of care are also leading contributors (Wilkins et al., 2019; Building US Capacity to Review and Prevent Maternal Deaths, 2018). Many maternal mortality disparities are rooted in racism. Structural racism within the health care and social service delivery systems signifies that Black women frequently receive a reduced quality of care than White women (Howell et al., 2016b). Therefore, stressors such as the denial of care when Black women reach out for assistance when enduring pain or the failure of healthcare and social service providers to treat them with dignity and respect highlight the undermining of Black women’s physical and mental health (Novoa & Taylor, 2018). These actions only strengthen the distrust between the Black community and these systems. To combat these systems’ disappointments, taking steps such as (1) increasing women and their family’s awareness of pregnancy complications and their respective warning signs (Neighmond, 2019), (2) raising the awareness of doula and midwifery services (Taylor et al., 2019), and (3) educating women and their families on the importance of prenatal care would provide Black women with concrete evidence-based information which
aligns with their best interests. One affordable way to reach a large population of Black women is through social media.

When examining social media networks and sites’ growth, it has become an imperative channel for connecting with others. mHealth apps and social media have been deemed feasible and acceptable to support pregnancy care (Chen et al., 2018). The utilization of new technology and the increasing popularity of social media have grown tremendously among vulnerable populations. Most Black women own mobile devices (80% own smartphones and 57% own a tablet), providing them access to the internet and phone apps unrelated to socioeconomic status (Nielsen Company, 2017). However, many gaps persist within the literature about social media usage by pregnant women during prenatal care, especially Black women.

In addition to social media, data has shown that health providers are a critical source of information for pregnant women (Volkman et al., 2014). Positive interactions with providers are essential for good maternal health. Successful communication with providers allows women to receive adequate information to make informed decisions regarding their prenatal care and birthing experience. Simultaneously, providers can empower Black women by respecting and supporting concerns and questions and engaging them in shared decision-making throughout their care (Heaman et al., 2014). Providers may also serve the role of discounting or supporting information obtained from online sources. Patients’ social media use can affect the healthcare provider and patient relationship bidirectionally. The COVID-19 pandemic has shown us the importance of addressing misinformation or misinterpretations of health information available to the public; therefore, it is crucial to examine the providers’ perspective on social media’s role during pregnancy.
Health literacy plays a critical role in social media usage and interpersonal communication that should be considered when conducting the proposed project. Health literacy is a multidimensional construct that measures “the degree to which individuals can obtain, process, understand, and communicate about health-related information needed to make informed decisions” (McCormack et al., 2010). Since health information is often delivered verbally, especially during medical visits, communication skills are significant in obtaining and sharing health information, including listening, speaking, and negotiating. While research has found a direct relationship between an individual’s health literacy skills and their health outcomes (Berkman et al., 2010), many factors may also facilitate this relationship, including health status, attitudes, emotions, motivation, and self-efficacy, which are further affected by ecological influences. Health literacy and eHealth literacy are potentially a more readily modifiable path to address than other contributing factors for this population, which requires a significant amount of societal or policy-related changes. Adjusting providers’ communication strategies and delivering education to Black women would be plausible to improve the level of understanding and, in turn, the prenatal care practices of Black women through social media. There have not been any published peer-reviewed studies investigating the association between health literacy and social media use among Black pregnant women.

This project was informed by the Pathways to Racial and Ethnic Disparities in Severe Maternal Morbidity and Mortality model (Howell, 2018) and the Socio-Ecological Model (SEM) (Stokols et al., 1996) since poor maternal health outcomes are not merely a product of a woman’s health and behaviors, but also interpersonal relationships, factors present within the community and society, and policies, and social media has the potential to influence all levels of the SEM at a reasonably low cost.
B. Purpose of the Study

This project hoped to unveil possible missed opportunities to improve pregnancy knowledge, share high-quality pregnancy information and resources, and increase patient-provider relationships. The data collected could inform new strategies for educating Black women about pregnancy-related health information, future designs of social media interventions, and future research. These findings can inform future social media uses in practice and organizations’ policies regarding social media use. This dissertation utilized a mixed-methods approach to investigate the intended research questions. The content analysis examined the pregnancy-related content posted on social media accounts popular with mothers. The cross-sectional survey assessed whether health literacy, eHealth literacy, and quality of prenatal care impact social media use among Black women.
II. Review of the Literature

C. Existing Pregnancy-Related Maternal Health Disparities

Trends of Pregnancy-Related Maternal Morbidity and Mortality

Pregnancy is a life-changing journey many women worldwide undergo each year. According to the Center for Disease Control and Prevention (CDC), the provisional number of births in the United States in 2019 was 3,745,540, which was lower than in 2018 (Hamilton et al., 2020). Although the number of births continually decreases amongst all races, significant racial and ethnic disparities in maternal mortality and morbidity rates exist in the US. Pregnancy-related maternal mortality is a woman’s death while pregnant or within one year of pregnancy from any cause related to or intensified by pregnancy or its management (CDC, 2019). Recent data reported that the number of pregnancy-related deaths in the US has steadily increased from 7.2 deaths per 100,000 live births in 1987 to 17.3 deaths per 100,000 live births in 2017 (Petersen et al., 2019b). From 2011 to 2015, 3,410 pregnancy-related deaths occurred in the United States; the overall pregnancy-related mortality ratio was 17.2 pregnancy-related deaths per 100,000 live births (Petersen et al., 2019a). Only 87.7% of pregnancy-related deaths time deaths were able to be identified; 937 (31.3%) occurred during pregnancy, 506 (16.9%) on the day of delivery, 556 (18.6%) 1–6 days postpartum, 640 (21.4%) 7–42 days postpartum, and 351 (11.7%) 43–365 days postpartum (Petersen et al., 2019a). Overall, the distribution of the timing of death varied by the cause of death. The leading causes of death also varied by time relative to the end of pregnancy. During pregnancy, other non-cardiovascular and other cardiovascular conditions were the leading causes of death; on the day of delivery, obstetric emergencies such as hemorrhage and amniotic fluid embolism were the significant causes of death (Petersen et al., 2019a). Hemorrhage, hypertensive disorders during pregnancy, and infection were the leading
causes of death during the first six days postpartum (Petersen et al., 2019a). Lastly, late in the postpartum period (from 6 weeks postpartum through the end of the first year), cardiomyopathy was the leading cause of death (Petersen et al., 2019a).

The reasons for the overall constant increase in pregnancy-related mortality remain unclear. The identification of pregnancy-related deaths has improved due to computerized data linkages between maternal death records, birth and fetal death records by states, changes in coding the causes of death, and a pregnancy checkbox added to death records (Baeva et al., 2018). However, errors in reported pregnancy status on death records on any of the information sources listed above and reporting inconsistencies can lead to overestimations or underreporting of the number of pregnancy-related deaths (Baeva et al., 2018; Hoyert & Miniño, 2020; Blanchard, 2019).

Black women continue to die at higher rates than White women (37.1 and 14.7 per 100,000 live births, respectively) despite socioeconomic class in the US, even when the possibility of errors within the data available is considered (CDC, 2019; Petersen et al., 2019b). Among women with a college education or higher, Black women have over five times higher pregnancy-related mortality rates than White women (Petersen et al., 2019b). These disparities for Black women also worsen as their age increases (>30 years old). For example, the rate for Black women between ages 30 to 34 widens to over four times higher than that for White women (48.6 vs. 11.3 per 100,000) (Petersen et al., 2019b). It also highlighted that nearly 60% of the reported pregnancy-related deaths were preventable (Petersen et al., 2019a). During Dr. Petersen and her colleagues’ analysis of 2011-2015 maternal mortality data, they found a more significant proportion of deaths among Black women (14.9%) occurred 43–365 days postpartum compared to the ratio of deaths among White women (10.2%) that occurred during the same period.
A national study that examined pregnancy-related mortality found that Black women had a case-fatality rate 2.4 to 3.3 times higher than White women for five specific pregnancy complications, including pre-eclampsia and eclampsia, abruptio placentae, placenta previa, and postpartum hemorrhage (Tucker et al., 2007).

Mortality is not the only risk facing pregnant women. Morbidity or unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman’s health is also imperative to pay attention to (Kilpatrick et al., 2016). For every woman who dies of pregnancy complications, at least 70 experience a near miss—that is, severe maternal morbidity (SMM) (50,000 annually), and maternal morbidity has increased disproportionately among ethnic/racial minority women in the United States (Liese et al., 2019; CDC, 2020). Recent data shows that severe maternal morbidity has grown almost 200% over the years, from 49.5 in 1993 to 144.0 per 10,000 delivery hospitalizations in 2014 (CDC, 2020). Blood transfusions have accounted for most of these increases. Procedures such as hysterectomies and ventilation or temporary tracheostomy were the second most common procedures contributing to maternal morbidity increases (CDC, 2020).

As with mortality, morbidity impacts Black women more than other groups; SMM also highlights huge gaps—as the incidence is 166% higher among Black women than White women (CDC, 2020). Severe maternal morbidity occurred in 231.1 and 139.2 per 10,000 delivery hospitalizations among Black and White women, respectively (Admon et al., 2018). A population-based study from New York City demonstrated that severe maternal morbidity rates were higher among Black versus White women (4.2% and 1.5%, respectively) (Howell et al., 2016b). Black women also have the highest rates for 22 of 25 severe morbidity indicators used by the CDC to monitor population estimates for severe maternal morbidity (Creanga et al., 2019a).
2014). However, the CDC has reduced its list of morbidity indicators to 21 instead of 25. Black women have the highest proportion of SMM across all pregnancy intervals, with a 70% greater SMM risk during the period before childbirth (antepartum) after adjusting for all cofactors (Liese et al., 2019). National delivery data have shown that Black women had elevated rates of pregnancy-induced and chronic hypertension, asthma, placental disorders, gestational diabetes, pre-existing diabetes, and blood disorders compared to White women (Howell et al., 2016a). Increases in maternal age, lack of prenatal care, lower levels of educational attainment, lower socioeconomic status, pre-existing or pregnancy-induced chronic medical conditions, and cesarean delivery have been observed within the literature as contributing factors for disparities in both morbidity and mortality (Martin et al., 2019; Howell et al., 2016a; Hinkle et al., 2012; Fisher et al., 2013; Campbell et al., 2013; Small et al., 2012). These contributing factors negatively impact these women by increasing medical costs and yielding more extended hospital stays (Callaghan et al., 2012).

While complications due to high blood pressure, pre-eclampsia and eclampsia, and postpartum hemorrhage are common predictors for pregnancy deaths and complications among Black women, implicit bias and lower quality of care are also leading contributors (Wilkins et al., 2019; Building US Capacity to Review and Prevent Maternal Deaths, 2018). Implicit bias, also identified as implicit social cognition, refers to the attitudes or stereotypes that affect our understanding, actions, and decisions in an unconscious manner (Kirwan Institute, 2015). These biases include both favorable and unfavorable assessments triggered involuntarily and without an individual’s awareness or intentional control (Kirwan Institute, 2015). These biases are different from known biases that individuals may choose to conceal for social or political correctness due to them being embedded deep in the subconscious. Our subconscious implicit connotations cause
us to have feelings and attitudes about other people constructed on characteristics such as race, ethnicity, age, and appearance (Kirwan Institute, 2015; Hall et al., 2015). These relations mature throughout a lifetime, starting from an early age through exposure to direct and unintended messages. Subtle racial biases may be expressed in such ways as approaching patients with a condescending tone that decreases the likelihood that patients will feel heard and valued by their providers or recommending different treatment options for patients based on assumptions about their treatment adherence capabilities or presumed health conditions (Hall et al., 2015). Besides early life experiences, the media and news programming are often-cited roots of implicit associations (Kirwan Institute, 2015). Implicit bias is directly correlated with lower quality of care for patients and may be activated under stressful working conditions, especially in emergency departments or labor and delivery settings (Hall et al., 2015).

Recent data also suggest that a considerable portion of racial and ethnic disparities in severe maternal morbidity and mortality may be explained by variations in hospital quality. Several recent investigations have found that Black women deliver in different and lower quality hospitals than their White counterparts (Howell et al., 2016a; Howell et al., 2016b). A national sample observed that 75% of Black deliveries in the United States occurred in a quarter of hospitals, where only 18% of Whites delivered in those same hospitals (Howell et al., 2016a). Hospitals that disproportionately cared for Black deliveries had higher risk-adjusted severe maternal morbidity rates for Black and White women in those hospitals.

Another notable disparity that aligns with this issue is the timing and receipt of prenatal care variations by race and ethnicity. First-trimester prenatal care initiation was higher for White women (79%) compared to Black women (64%) in 2012 (Antony & Dildy, 2013). Population-based studies have documented that Black women are nearly four-fold more likely to receive 0–5
prenatal care visits than White women (Howell et al., 2016b). Health insurance status, transportation availability, and other social factors likely play a role in the receipt and timing of prenatal care. Black women are more likely to begin their prenatal care later or use prenatal care less than their White counterparts. Based on recent national birth certificate data from 2020, 9.1% of Black women giving birth received late (starting in the third trimester) or no prenatal care, compared to 4.5% of White women (Osterman et al., 2022). Delay of prenatal care initiation has been associated with endorsing racism experiences (Gadson et al., 2017).

Existing racial bias has driven some Black women to remain quiet and forced them to conduct their research on questions. Black women’s experiences with prejudice and discrimination when receiving medical care harm present inequalities (NWLC, 2018). A 2018 commentary identified addressing social inequality as key to reducing high maternal mortality rates in the United States (Lu, 2018). It also highlighted research on the specific social determinants of health; including the link between adverse childhood events and chronic health problems, the cumulative stress of poverty and long-term outcomes, and how racism can lead to “weathering” or accelerated aging, which is related to increased rates of chronic health problems and, potentially, maternal mortality (Lu & Halfon, 2003). A literature review in 2020 examining the relationship between social determinants of health and pregnancy-related mortality and morbidity found strong evidence for the effects of race and ethnicity, health insurance, and education on maternal mortality and severe morbidity (Wang et al., 2020). This review indicated a need for a more comprehensive evaluation of various determinants, such as the role of socioeconomic and political contexts or locality-level physical and material circumstances impacting maternal outcomes. It also addressed the need to closely examine the mechanisms beneath observed associations of determinants and the use of more diverse study designs. Thus,
expanding research in this area may help develop interventions to reduce maternal death and illness rate inequities within the US.

Some states have created Maternal Mortality Review Committees (MMRCs) to study and address these immense disparities. On average, MMRCs identified three to four contributing factors and two to three prevention strategies per pregnancy-related death occurrence (Petersen et al., 2019b). These contributing factors and prevention strategies can be categorized at the community, health facility, patient, provider, and systems levels. Some examples of community factors were unstable housing and limited access to transportation; health facility factors (e.g., little experience with obstetric emergencies and lack of appropriate personnel or services); patient characteristics (e.g., lack of knowledge of warning signs and not taking medications as prescribed); provider factors (e.g., missed or delayed diagnosis and lack of continuity of care); and system factors (e.g., inadequate access to care and poor case coordination) (Petersen et al., 2019a). The most common contributing factors were at the patient, provider, and system levels (Petersen et al., 2019b; Building US Capacity to Review and Prevent Maternal Deaths, 2018). Interventions that leverage health information technology tools to target the underlying drivers of disparities at the patient, clinician, and health care system levels potentially could reduce disparities in quality of care throughout the continuum of maternal care (Jean-Francois et al., 2020).

D. Provider Role in Prenatal Care and Communication with Black Women

The Institute of Medicine defines patient-centered care as “providing care that is respectful of, and responsive to, individual patient preferences, needs and values, and ensuring that patient values guide all clinical decisions” (Baker, 2001). This type of care strengthens the patient-provider relationship by increasing communication, providing information, and
facilitating patients’ engagement in their care (Lewin et al., 2001). Generally, ideal patient-provider relationships involve a trusting connection, achieved through effective communication, establishing supportively created treatment goals, and patient contribution to the decision-making process (Kim et al., 2001). Pregnant women’s physical status, emotional state, and behaviors are frequently closely monitored across their pregnancy duration by their health care providers due to the known effect on maternal, fetal, and infant outcomes (Betts et al., 2014; Mahrer et al., 2020). Prenatal care involves frequent visits with the same providers over pregnancy progression, giving women multiple chances to build trusting relationships with their prenatal care providers (Lori et al., 2011). Trusted prenatal care providers can offer emotional reassurance, encourage better self-care and acceptance of treatment plans, and link women to other services (Lori et al., 2011; Nicoloro-SantaBarbara et al., 2017). These strong and trusted relationships give women a better sense of control, confidence, and empowerment. This sense of control, confidence, and empowerment are likely protective factors from emotional distress and promote better self-care (Nicoloro-SantaBarbara et al., 2017; Javanmardi et al., 2018).

Research has shown that in addition to consistent check-ups, several other forms of pregnancy care provided by medical professionals, therapists, and social workers are useful means to improve maternal well-being during pregnancy, such as yoga and physical activity, lifestyle, mindfulness, and psychotherapeutic interventions (Barth et al., 2013; Davis et al., 2015; Matvienko-Sikar et al., 2016). However, traditional health services are often restricted by time and place, as working parents may not attend during the daytime. Also, women from disadvantaged groups often have limited resources, which prevents their access to health services (Bushar et al., 2017; Chen et al., 2018). From a provider perspective, traditional services for pregnancy care often involve several health professionals providing face-to-face treatment,
which is relatively expensive and cannot reach different populations (Scott et al., 2015). Social media appears to have the potential to get various people from all socio-ecological backgrounds, but more extensive quantitative studies are needed.

Pregnancy health care providers are critical because pregnant women often receive common misinformation regarding certain health behavior practices’ safety and advisability about caring for themselves from various sources (friends, family, the internet, and other sources) (Cannella et al., 2010). Health providers are a critical source of accurate information for pregnant women (Volkman et al., 2014), and positive interactions with providers are essential for good maternal health (Nicoloro-SantaBarbara et al., 2017). Successful communication with providers allows women to receive adequate information to make informed decisions regarding their prenatal care and birthing experience. Simultaneously, providers can empower Black women by respecting and supporting concerns and questions and engaging them in shared decision-making throughout their care (Heaman et al., 2014). A qualitative study found that Black women want providers who demonstrate quality patient-provider communication, provide continuity of care, and treat them with respect and deliver compassionate care (Lori et al., 2011). Black women desire prenatal providers that know and remember them. Wanting your prenatal providers to understand your life’s context from your numerous prenatal interactions is necessary to have a successful relationship filled with trust, especially since comprehensive documentation of each patient’s lifestyle is documented in their medical records.

While there is notable documentation of what Black women want from their providers, their pregnancy-related healthcare experiences constantly fall short of their expectations. In 2018, the New York State Department of Health (NYSDOH) Division of Family Health conducted seven listening sessions in seven high-risk areas throughout New York State with 244
women, including those who were recently or currently pregnant women, their families, and women who have experienced an adverse birth outcome. These listening sessions highlighted minority women’s birth experiences and validated six common contributors to maternal health disparities noted in the literature. Across all seven listening sessions, these women shared they combatted the following challenges: feeling disrespected by providers, not getting their questions answered and their concerns addressed, insufficient time with the provider (and not receiving individualized care), not receiving enough information to make proper decisions, feeling pressure to agree to specific medical procedures, and lack of social support during the prenatal and postpartum periods (NYSDOH, 2018). Social media can help alleviate three out of six of these challenges by providing these women a source to obtain answers to the questions and concerns their providers were unable to address. The information they receive from social media sources would provide them with a plethora of information to discuss with their provider to further engage them in the decision-making process. Lastly, these pregnancy social media platforms provide access to other currently or recently pregnant women who are willing to provide support during all pregnancy phases. Many women who have experienced pregnancy are very willing to share their experiences and knowledge with other and future mothers.

A recent study found that many pregnant women do not share the information they found on the internet with their providers (Ahmadian et al., 2020). This lack of sharing highlights a significant missed opportunity to better educate these women and improve the patient-provider relationship. Providers can discount or support information obtained from online sources since vast amounts of information on the internet can be easily misinterpreted. However, there is almost no research about the internet use by Black pregnant women for pregnancy information and how they communicate with providers about the information they see online.
E. Internet Health Seeking Behaviors of Pregnant Women

Although health care providers play a critical role in prenatal care, women obtain pregnancy-related information through various channels. The most common sources were healthcare providers, informal sources (family members, friends, and their own experience), and digital media such as websites (Dalhaug & Haakstad, 2019; Ghiasi, 2021; Grimes et al., 2014). Although pregnant women regularly access the internet for pregnancy information, there is a lack of evidence about how pregnant women use this source. The literature has documented that some women also ask their health professionals to advise them on useful internet websites regarding their respective health issues (Salo et al., 2004). Ahmadian et al. (2020) recently found that after being seen by health providers, 43% of pregnant women searched the Internet about the discussed topics, to complete the information received from their health professionals (27%), re-check the information (12%), or a combination of both (4%). The most common reasons for pregnant women using the internet were for support, information seeking and decision-making purposes, reliability and convenience of online information, anonymity and self-disclosure, and community that shared similar experiences (Bjelke et al., 2016; Hether et al., 2016; Taştekin Ouyaba & İnaf Kesim, 2020).

In Ghiasi’s (2021) international review of 31 studies about pregnant women, 24 articles reported that women most frequently sought health information related to themselves and their babies on the internet. Some of these topics included fetal development, caring for their unborn child, the impact of maternal illness on their babies, labor and delivery, as well as nutrition during pregnancy (Sayakhot & Carolan-Olah, 2016; Javanmardi et al., 2018; Ghiasi, 2021; Ahmadian et al., 2020; Taştekin Ouyaba & İnaf Kesim, 2020). Other sources have also highlighted pregnancy complications, diet, exercise, pain management, shopping for the mom
and baby, and breastfeeding as common pregnancy-related topics women search online (Bjelke et al., 2016; Javanmardi et al., 2018; What To Expect, 2020). It is essential to examine the relationship between the types of information pregnant women seek based on demographic or clinical characteristics since their pregnancy-related issues information needs may vary. For example, Willcox et al. (2015) revealed that women pregnant for the first time were seven times more likely to seek “gestational weight gain” information than those with subsequent pregnancies. Bjelke et al. (2016) also found that women over 35 years were more likely to seek “prenatal diagnosis” information than those in younger age groups. In a study by Kamali et al. (2018), the number of pregnancies and gestational age were two factors that significantly affected pregnant women’s types of information. There are continuous opportunities to learn more about pregnant women’s behaviors and information needs regarding pregnancy-related issues within the vast amount of variation in information needs.

While the literature regarding internet use among pregnant women for pregnancy-related information is limited, research on Black women is predominantly non-existent. This scarcity of information highlights the need for studies focusing on this population. One study conducted focus groups with disadvantaged first-time pregnant women and mothers of children under the age of five; they found that 84% owned or had access to a computer and 87% owned or used a smartphone, and their accessibility was correlated with web searching (Guendelman et al., 2017). Black women have high ownership of mobile devices (80% own smartphones and 57% own a tablet), providing them access to the internet and phone apps (Nielsen Company, 2017). In fact, they spend more weekly time using apps and browsing the web on smartphones (19 hours and 27 minutes) than women overall (17 hours and eight minutes) (Nielsen Company, 2017). Therefore, the outlook for internet-based programs within this particular population is promising.
F. Social Media Use of Pregnant Women

While many women use the internet for information while pregnant, social media also play a significant role in information seeking and support during pregnancy. The health promotion profession has recognized social media’s power and success in achieving public health goals and objectives, including behavioral, organizational, and policy change (Korda & Itani, 2003). Aside from mHealth apps and social media being distinguished as viable and adequate methods to support pregnancy care (Chen et al., 2018). They were also found to have a significant effect size on improving knowledge about pregnancy (d=0.80) and maternal mental health (d=0.84) (Chan & Chen, 2019). Social media’s success depends on adjusting to users’ dynamic social contexts and evolving with technology’s sophistication. For this reason, mHealth apps and social media present a unique opportunity to support the maternal health of Black women. Many users rely on these platforms to interact with family and friends, gather information, and share important information.

When looking at parents, 74% use social media to receive support from their friends on that platform (Duggan et al., 2015), and 79% agree that they obtain helpful parenting information. Almost half have received social media support regarding a parenting issue within the past month (Duggan et al., 2015). Prior research has highlighted that mothers are more consistently the primary decision-maker about the infant. Also, mothers prefer to receive information on weight, stress/depression, and parenting websites (Walker et al., 2017). Mothers also utilize online resources for health information about their babies and themselves (Walker et al., 2017). Also, women are more likely to seek advice and help from multiple sources, including social media (Duggan et al., 2015; Oden et al., 2010; Walker et al., 2017; Hämeen-Anttila et al.,
2014), whereas men are more likely to depend almost solely upon their spouses (Kendler, Myers, & Prescott, 2005).

Some research has specifically examined the role of social media for pregnant Black women. Facebook is the most utilized social media platform by Black women (Nielsen Company, 2017). However, it is unclear whether Black women trying to get pregnant, currently pregnant, or recently given birth utilize social media for health information and support. One qualitative study found that first-time African American mothers used social media for educational and social support and searched the internet for perinatal and parenting information (Asiodu et al., 2015). These individuals accessed social media through smartphones or computers, utilizing different websites and applications. However, many gaps persist within the literature about social media usage by moms during prenatal care, especially Black moms. Most research studies have focused on low-income mothers and lack detailed descriptions of Black moms’ social media preferences and health information about their babies and themselves.

Related to social media use and health care, social media can empower patients by providing them access to information and opportunities for discussions, which increases the patient’s involvement in clinical interactions (Colineau & Paris, 2010). With the information from social media platforms, patients can increase their knowledge about treatment options. Subsequently, they can become better equipped to communicate with their health provider since they better understand their condition (Wicks et al., 2010). Thus, patients may feel more confident in their physician relationship (van Uden-Kraan et al., 2008; Bartlett & Coulson, 2011). Patients feel better prepared for consultations as they are more informed about their condition and are more aware of better-quality questions (Bartlett & Coulson, 2011). Patients can
alleviate or share some of the burdens placed upon their healthcare providers throughout the
decision-making process by becoming specialists in their condition.

Patients’ social media use can also affect the healthcare provider and patient relationship
bidirectionally based on the provider’s perspective towards social media use for health
information. If providers are open to respectfully addressing the patients’ concerns regarding the
content they found on social media, this may improve regular communication between both
parties, harmonious patient-centered relationships, higher quality of care, and higher patient
satisfaction (Smailhodzic et al., 2016). However, if providers are dismissive of addressing their
patients’ concerns regarding the content found on social media, this may lead to changing
doctors, suboptimal interactions between patients and providers, and lower quality of care and
patient satisfaction (Smailhodzic et al., 2016). Studies found that people of color are more likely
to report lower satisfaction with health care provider interactions (Hall et al., 2015).

Overall, social media can be an immediate intervention to reduce maternal health
disparities. Social media can target multiple factors contributing to poor maternal health
outcomes: at the patient, provider, community, and system levels. It also plays a crucial role in
providing access to information, social support networks, and better preparing individuals for
patient-provider interactions. When using social media, it is essential to consider an individual’s
health literacy and eHealth literacy level (further explained in the next section). The literature
documents how health literacy impacts health outcomes and provider communication; however,
it is unclear how health literacy impacts social media usage for information and support
purposes. There is little known about the impact on social media usage and provider
communication regarding eHealth literacy. Health literacy and eHealth literacy remain unclear
how both impact communication about information found online.


G. Health Literacy and eHealth Literacy

Health literacy is a multidimensional construct that measures “the degree to which individuals can obtain, process, understand, and communicate about health-related information needed to make informed decisions” (McCormack et al., 2010). The Institute of Medicine considers health literacy to signify a “constellation of skills” required to effectively navigate healthcare settings and act on health care information (Nielsen-Bohlman et al., 2004; NNLM, 2021). These skills widely include the ability to understand documents and read and write prose (print literacy), use quantifiable information (numeracy literacy), and speak and listen efficiently (oral literacy) (Berkman, Davis, & McCormack, 2010). Adequate or higher health literacy levels empower individuals to navigate healthcare systems, effectively communicate with their providers, perform preventative and promote positive health behaviors, use evidence-based information for support during their decision-making process, and advocate for themselves wants or needs (Sørensen et al., 2012; NNLM, 2021).

Low health literacy is a significant problem in the United States. In 2003, approximately 36% of adults in the US had limited health literacy (Berkman et al., 2011). According to the Agency for Health Care Research and Quality Report, low health literacy is linked to a higher risk of death and more emergency room visits and hospitalizations (Berkman et al., 2011). Health literacy may not be linked to years of education or general reading ability. For instance, a person who functions sufficiently at home or work may have marginal or inadequate literacy in a health care environment. People with low health literacy use more health care services, have a greater risk for hospitalization, and have higher utilization of expensive services, such as emergency care and inpatient admissions (Nielsen-Bohlman et al., 2004). In 2003, approximately 36% of adults in the US had limited health literacy, costing up to $238 billion annually in
inefficiencies (Berkman et al., 2011; Vernon et al., 2007). Research has shown that rates of limited health literacy were higher among the elderly, minorities, individuals who have not completed high school, adults who spoke a language other than English before starting school, and people living in poverty (Berkman et al., 2011; Ferguson, 2008).

Health literacy directly impacts pregnancy from the perspectives of both the mother and the baby. It is essential to ensure mothers have adequate health literacy levels since it plays an essential role in achieving a healthy pregnancy (Guler et al., 2021). If a pregnant woman uses the health system for the first time because of her pregnancy, her utilization of the system may be negatively affected by having a lower health literacy level (Olander et al., 2018). Health literacy influences the use of health services. Therefore, a pregnant woman’s ability to obtain, understand, and use necessary health information and make appropriate health decisions for herself and her baby is affected by her health literacy level (Olander et al., 2018; Renkert & Nutbeam, 2001).

Furthermore, health literacy also determines how the woman will proceed in seeking solutions to both her own and her family’s health issues in the future (Crozier et al., 2009; Julie et al., 2011). Therefore, knowing about health problems and the understanding and comprehension levels of pregnant women who benefit from health services can increase the effectiveness of those health services and pregnant women’s health education. Since pregnancy is a period in which women benefit considerably from health services and are open to learning health-related information and behaviors, this period is an opportunity to increase their health literacy levels (Crozier et al., 2009; Ghanbari et al., 2012; Olander et al., 2018).

Several studies have examined health literacy in pregnant women and found that the prevalence of low health literacy ranged between 15% and 44% (Ferguson, 2008; Crozier et al.,...
In a study assessing the effect of maternal health literacy on prenatal care and pregnancy outcomes, pregnant women with high health literacy levels receive prenatal care earlier and more frequently (Kohan et al., 2007). Another study found that mothers with adequate health literacy had fewer premature and low-birth-weight babies than those with lower health literacy while also having lower neonatal death rates and higher breastfeeding rates (Ohnishi et al., 2005). Also, Guler and her colleagues found that pregnant women within their study who had inadequate health literacy levels had low knowledge about prenatal care (Guler et al., 2021). The relationships between women’s literacy levels, prenatal care and birth delivery at a health institution, and obtaining childhood vaccine information have also been highlighted in the literature (Mojoyinola, 2011; Simkhada et al., 2008; Baker et al., 2007; Wilson et al., 2006). These studies have successfully shed light on some of health literacy’s influence on both the mother and child. Failure to assess a mother’s health literacy level may result in misunderstandings of non-compliance with adequate prenatal care; failed communication can result in inadequate care, leading to adverse birth outcomes.

The 2003 National Assessment of Adult Literacy revealed that 58% of African Americans had basic or below basic health literacy, compared with 28% non-Hispanic Whites (Kutner et al., 2006). Even though this disparity has been highlighted within the health literacy literature, documentation of the health literacy levels among Black women is limited. However, evidence supports the argument that Black women generally have low health literacy levels since they experience significant adverse health outcomes associated with low health literacy levels within this population.
Various studies have documented the relationship between health literacy and maternal health outcomes. However, there is limited information on the relationship between health literacy levels on the internet and social media usage among pregnant women, especially Black women. In 2018, Dr. Chen and his colleagues found that lower health literacy levels (measured via the Newest Vital Sign) are associated with lower chances of using medical websites for health information and higher odds of using television, social media, blogs, or celebrity webpages. People with lower health literacy were less likely to trust health information from specialist doctors and dentists but more likely to trust television, social media, blogs/celebrity web pages, friends, and pharmaceutical companies (Chen et al., 2018). People with limited health literacy had higher rates of using and relying on social media and blogs containing lower quality health information than healthcare professionals (Chen et al., 2018).

**eHealth Literacy**

When it comes to the internet and social media, eHealth literacy is also essential. eHealth literacy refers to “the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to address or solve a health problem” (Norman & Skinner, 2006). eHealth literacy combines components of different literacy skills and applies them to eHealth promotion and care. There are six core skills: traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy. Each of these contributes to finding and evaluating the quality of health information online. A deficiency may result in inadequate health literacy and prevent individuals from accessing quality eHealth resources (Chesser et al., 2016). eHealth literacy is influenced by a person’s presenting health issue, education level, health status at the time of the eHealth encounter, motivation for seeking the information, and the technologies used. eHealth literacy is a process-oriented ability that
progresses over time as new technologies are introduced, and the personal, social, and environmental contexts change. It aims to empower individuals and enable them to participate in health decisions informed by eHealth resources fully.

One widely utilized validated instrument that measures eHealth literacy is the eHealth Literacy Scale (eHEALS), developed by Norman and Skinner (2006). eHEALS consists of eight items to measure consumers’ combined knowledge, comfort, and perceived skills to find, evaluate, and apply electronic health information to health problems (Norman & Skinner, 2006). This scale has demonstrated good internal consistency and provides valuable insight into self-reported skills when examining health information on the internet. Overall, there are minimal studies within the literature that assess the relationship between eHealth literacy levels and health outcomes. There is also a scarcity of eHealth literacy levels assessed among pregnant women. Only one study was identified within the literature to examine eHealth literacy among Black women. Although Brewer and her colleagues’ study population was small, most of the women within their sample were Black (70%) (Brewer et al., 2018). In Brewer et al., 2016, >90% of participants reported using some form of mobile technology with all utilizing these technologies within their homes, and overall, participants had high eHealth literacy (84.8% [39/46] with eHEALS score ≥26). The scarcity of eHealth literacy research warrants more studies in this area, especially for Black women.

Health literacy and eHealth literacy play an important role in provider communication and maternal health outcomes. With limited health literacy being higher among minorities and poor maternal health outcomes being higher among minority women, health literacy is an imperative factor that should be examined to assess its influence on maternal health disparities. Although there is limited data on eHealth literacy’s impact on health outcomes, eHealth literacy
examines vital aspects of an individual’s capacity to apply health information found online to their daily routines. Also, in efforts to utilize technology to its highest capabilities, many providers supplement their discussions with patients by providing online health information sources. An individual’s eHealth literacy level impacts their ability to process, evaluate, and utilize the information shared; therefore, it is crucial to examine its role in provider communication. With the high mobile phone ownership among Black women and only one study found that Black women have high eHealth literacy levels, it is important to examine further how eHealth literacy impacts maternal health disparities and provider communication.

**H. Conceptual Framework**

To better understand how to address the maternal mortality and morbidity disparities among Black women, we must first comprehensively understand their maternal care experiences and environmental interactions from preconception to post-partum pregnancy. The Socio-Ecological Model (SEM) framework has been utilized to understand how interactions with various social and behavioral environments influence health and health-related behavior (Stokols et al., 1996). The SEM consists of five levels: intrapersonal factors (biological/genetics, knowledge, attitude, skills, emotional or psychological states), interpersonal factors (relationships with family/friends, social networks and assistance), organizational factors (schools, worksites, social institutions), community factors (neighborhood characteristics, relationships among organizations) and policy factors (national, state, and local policies). Influences on behavior interact across various levels, and communication can occur at each level of the SEM. One level will affect the other levels’ functionality; thus, if there are issues in one level, it will bleed into and affect other parts of the SEM. As a result, solutions must be acted on multiple levels simultaneously to solve issues using the SEM. The Socio-Ecological Model has
demonstrated, in many diverse situations, that to secure the best results for people at risk, it is best to approach the situation while addressing all levels of the framework. Based on these factors, using this multi-faceted approach is a practical course of action to reduce maternal health disparities among Black women.

Social media can influence the interpersonal level by providing women a source to obtain answers to unaddressed questions and concerns, empowering them to become more engaged in the decision-making process for their care, educating them about pregnancy health, and sharing advocacy resources that can be utilized. It can influence the interpersonal level by providing women an opportunity to expand their current support system outside of their immediate friends and family as a resource for advice on pregnancy-related experiences. It can also impact communication with their provider and the overall patient-provider relationship. Social media pregnancy-related platforms grant women access to an entirely new and continuously growing social network (traditionally, the community level is considered physical, but the internet has added a new aspect to the community level) of other currently or recently pregnant women who are willing to provide support during all pregnancy phases. Organizations can also utilize social media to communicate with individuals directly, and policies surrounding various social media aspects can assist with addressing maternal health outcomes.

Social determinants of health play a vital role in addressing maternal health disparities. Dr. Howell proposed the Pathways to Racial and Ethnic Disparities in Severe Maternal Morbidity and Mortality model, demonstrating the various pathways by which racial and ethnic disparities influence severe maternal morbidity and mortality (see Figure 1). This model emphasizes the importance of social determinants and encompasses all levels of the SEM. Similar to the SEM, this model addresses critical “patient-level (interpersonal) factors (e.g.,
socioeconomic status, age, gender, behaviors, beliefs, motivations, knowledge, biology, genetics), community and neighborhood-level factors (e.g., social networks and built environment, or housing), provider level (through an interpersonal lens) factors (e.g., knowledge, implicit bias, communication) and system factors (e.g., access to high-quality care, structural racism, social and political policies, healthcare institutions)” (Howell, 2018).

Figure 1: Howell’s Conceptual Framework

Combining all these factors yield maternal health status, and including the presence of clinical comorbidities and pregnancy complications may or may not lead to severe maternal morbidity or mortality. The cycle of preconception, antenatal (prenatal), delivery, and postpartum care is closely related, and care at each phase throughout the continuum can impact poor maternal health outcomes. The social significance of race is indisputable. Racial disparities in maternal health have roots in inequalities in healthcare provision at the system level, the provider level, and the patient level. The Pathways to Racial and Ethnic Disparities in Severe Maternal Morbidity and Mortality model and Socio-Ecological Model will be used in this
proposed project to inform survey questions, content analyses questions, and when identifying practice recommendations for reducing maternal mortality and morbidity disparities among Black women. Since health information is often delivered verbally, especially during medical visits, communication skills are significant in obtaining and sharing health information, including listening, speaking, and negotiating. Individuals must navigate websites and other forms, such as print materials (e.g., brochures, fact sheets, and booklets). Most providers use these as supplements for their delivery of care. One’s ability to perform these tasks contributes independently to the principal concept of health literacy skills. At the same time, research has found a direct relationship between an individual’s health literacy skills and their health outcomes (Berkman et al., 2010); many factors may also facilitate this relation, including health status, attitudes, emotions, motivation, and self-efficacy, which are further affected by ecological influences.

Figure 2: Social Media Potential Influences on Socio-Ecological Factors for Obtaining Pregnancy-Related Health Information – Adapted from the Socio-Ecological Model and Pathways to Racial and Ethnic Disparities in Severe Maternal Morbidity & Mortality Framework
This study examined four-factor levels of the SEM and PRED model: patient factors or intrapersonal level, provider factors or interpersonal, community factors or community level, and organizational factors. Figure 2 displays a visual representation of the author adapting both models highlighted above to demonstrate how social media can influence all levels.

**1. Questions and Hypothesis**

The US is a high-income developed country that spends 16.89% of the gross domestic product (GDP) on healthcare expenditures (The World Bank, 2021). However, large disparities in maternal health and healthcare continue to grow, especially among Black women. With the recent growth in racial injustice movements, these events have allowed the racial disparities in maternal health to gain attention in the news, leading to meaningful conversations about reducing these disparities.

Poor maternal health outcomes are not merely a product of a Black woman’s health and behaviors; interpersonal relationships, community and society, and policies are all factors that influence maternal health as well. Using the SEM (Stokols et al., 1996) to view the interdependent relationships between all factors influencing outcomes can help identify multiple areas to improve poor maternal health.

The Pathways to Racial and Ethnic Disparities in Severe Maternal Morbidity and Mortality model (PRED) considers how factors at all SEM levels influence maternal health status. This model also highlights the possibility of comorbidities and pregnancy complications that influence severe maternal morbidity and mortality throughout all pregnancy phases. Also, the model shows how maternal health disparities are deeply rooted in socioeconomic factors, structural and systematic racism, and implicit biases that are not easily solved overnight (Wilkins, Efetevbia, & Gross, 2019; Building US Capacity to Review Prevent Maternal Deaths,
Therefore, it is crucial to identify ways to help Black women better navigate the health care system and feel empowered to advocate for better health. One path to explore is social media’s role in educating Black women about maternal health.

Social media can influence all SEM levels because it provides the opportunity for an intended message to reach a potential audience relevant to each level of the model as described above. Social media can influence maternal health disparities by delivering meaningful health information to those most at risk for disparities. To utilize social media to its fullest potential, a user must have adequate skills to understand how to use social media to find information and understand and evaluate it. Health literacy and eHealth literacy skills are critical to navigating the social media health information environment. Thus, interventions that build such skills are also of value.

Given the potentially important role of social media in addressing maternal health disparities, this study explores key questions related to Black women’s social media use patterns and pregnancy-related content appearing on social media. Study results can guide stakeholders in effectively designing and disseminating social media information and creating interventions to build health literacy and eHealth literacy. This study seeks to address the following aims and research questions informed by the SEM and PRED models.

**Aim 1:** This aim intends to determine the frequency and nature of maternal health content, including issues related to Black women, in social media posts from accounts popular with mothers. Data will come from a content analysis of social media posts.

*Research Question 1a:* What is the frequency and content of maternal health social media posts from accounts popular with mothers?
Hypothesis: Maternal health is not a frequently discussed topic on accounts popular with mothers.

Research Question 1b: What is the frequency and content of social media posts addressing maternal health resources on accounts popular with mothers?

Hypothesis: The frequently used social media sites popular with mothers shared/posted very little content addressing maternal health resources. However, resources specific to health disparities or Black mothers are not shared or posted.

Research Question 1c: What is the frequency of diverse mothers used in images for maternal health-related social media posts from accounts popular with mothers?

Hypothesis: The frequently used social media sites popular with mothers do not share images of diverse mothers in their maternal health-related posts.

Research Question 1d: What is the frequency and content of maternal health social media posts specific to Black mothers from accounts popular with mothers?

Hypothesis: The frequently used social media sites popular with mothers do not share or post content specific to Black moms. Also, the maternal health posts identified would not address health disparities.

Aim 2: This aim seeks to determine the information sources of pregnant Black women, especially related to social media, and examine the relationship between their social media usage with their health literacy and eHealth literacy skills. Data will come from a survey of pregnant or recently pregnant Black women.

Research Question 2a: What sources of information are most often used by Black women for pregnancy information?
Hypothesis: Black women use their family, friends, the internet, and doctor as pregnancy information sources. They will most often use their family and friends.

Research Question 2b: What pregnancy-related topics do Black women most frequently seek on social media sites?

Hypothesis: Black women most frequently use social media to obtain information on birth delivery, their bodies, baby development, and gestational diabetes during pregnancy.

Research Question 2c: What is the association between health literacy and social media use during pregnancy?

Hypothesis: Health literacy levels will predict time spent using social media and purposes for using social media for information during pregnancy.

Research Question 2d: What is the association between eHealth literacy and social media use during pregnancy?

Hypothesis: eHealth literacy levels will predict time spent using social media and purposes for using social media for information during pregnancy.

Aim 3: This aim intends to determine Black women’s satisfaction with their providers’ guidance, support, and respect during their most recent pregnancy and examine the relationship between their social media usage and their satisfaction levels. Data will come from a survey of pregnant or recently pregnant Black women.

Research Question 3a: What is the association between Black women’s anticipatory guidance satisfaction levels with prenatal providers and their use of social media for pregnancy information during pregnancy?
*Hypothesis:* Women who have lower anticipatory guidance satisfaction levels with their prenatal care providers will use social media more for pregnancy information and support than pregnant Black women who have higher anticipatory guidance satisfaction.

*Research Question 3b:* What is the association between Black women’s support and respect satisfaction levels with prenatal providers and their use of social media during pregnancy?

*Hypothesis:* Women who have lower support and respect satisfaction levels with their prenatal care providers will use social media more for pregnancy information and support than pregnant Black women who have higher support and respect satisfaction levels.
CHAPTER 2

III. Maternal Health Posts Shared on Instagram: A Content Analysis of Accounts Popular with Black Pregnant Women

A. Background

Evidence has shown that Black birthing women are dying at disproportionate rates from pregnancy-related health issues and suffer from severe maternal illnesses compared to their White counterparts (Petersen et al., 2019). Black women also experience higher rates of pregnancy-induced deliveries and more frequently suffer from comorbidities such as chronic hypertension, asthma, placental disorders, gestational diabetes, pre-existing diabetes, and blood disorders compared to White birthing women as well (Howell et al., 2016). Existing comorbidities tend to be more prevalent and less well-managed amongst Black women, which increases their chance of pregnancy complications (Fryar et al., 2017). Black birthing women are also more likely to receive late (starting in the third trimester) or no prenatal care than their White counterparts (Martin et al., 2019). Recent findings demonstrate that gaps in maternal health knowledge exist among Black women, especially regarding postpartum complications (Adams & Young, 2022).

At the same time, birthing women are increasingly accessing digital information to supplement their maternal care. One study found that 97% of women use online sources during pregnancy (Lagan et al., 2010); meanwhile, other evidence has shown similarly high (>90%) proportions (Bjelke et al., 2016; Sayakhot & Carolan-Olah, 2016; Slomian et al., 2017; Jacobs et al., 2019). After visiting their pregnancy care providers, roughly 43% of birthing individuals searched the internet for topics discussed during their recent visit to complete the information received from their provider(s) (27%), verify the information received (12%), or a combination
of both (4%) (Ahmadian et al., 2020). Internet use during pregnancy can positively affect the decision-making processes of birthing women and increase awareness (Taştekin Ouyaba & İnfal Kesim, 2020).

Social media, in particular, have become an important source of health information for birthing women (Wright et al., 2019). Social media provide birthing women with access to an ample amount of pregnancy-related information, news, support groups (transnational), and overall social support (Baker & Yang, 2018; McCarthy et al., 2020). Social media has been linked to positive and negative influences on health (Giustini et al., 2018; Gabarron et al., 2021). Social media can extend access to those who may not easily find health information via traditional methods, such as younger people, ethnic minorities, and lower socioeconomic groups; it can also improve health knowledge and healthy behaviors (Chen & Wang, 2021). Chan & Chen (2019) found social media effective at promoting maternal well-being and increasing pregnancy knowledge. Another study found that about 89% used social media sites for questions and advice related to pregnancy and their role as a parent, and 84% considered social media friends a form of social support (Baker & Yang, 2018). An unpublished study revealed that a sample of 404 Black women reported using social media as a source for pregnancy-related health information, support, and sharing pregnancy information (George et al., ND), with about 90% using Instagram. This study also demonstrated that Black women in their sample often used social media to obtain pregnancy information about themselves and their babies (George et al., ND).

Despite the use of social media for pregnancy information among Black women, little is known about the content they are exposed to. Several recent studies have performed qualitative analyses of Instagram posts to examine pregnant women’s self-presentation of their bodies.
(Mayoh, 2019; Tiidenberg & Baym, 2017) and their experiences with miscarriage (Mercier et al., 2020), and morning sickness (Eagle, 2019). Although these studies examined Instagram content, none specifically looked at maternal health content available to birthing women.

Besides examining the maternal health content available on social media, looking at the use of diverse images on social media is important as well. Research suggests that existing racial and ethnic disparities in health-related knowledge among birthing women may be, in part, related to media representation (Myers et al., 2019). Research also shows a lack of diversity in some health care providers' social media accounts. For example, one study found a substantial underrepresentation of Black patients on plastic surgeons’ social media, especially for images on plastic surgeons’ Instagram accounts (Tirrell et al., 2021). Research examining the impact of diverse images on understudied health topics on social media is warranted (Fung et al., 2020). Equitable representation of patients on social media may be necessary to decrease patient barriers to healthcare for minority populations and improve physician engagement with diverse populations.

It is also important to consider that the lack of formal oversight on social media can potentially spread misinformation to users, as seen throughout the COVID-19 pandemic. A systematic review of misinformation on social media found that misinformation was most prevalent on Twitter and was most often seen with health topics related to smoking products, drugs, vaccines, and diseases (Suarez-Lledo & Alvarez-Galvez, 2021). Schaler & Wingfield (2021) acknowledge the need to control the dissemination of misinformation regarding the impact of the COVID-19 vaccine on future fertility due to misinformation’s ability to impact behavior. Not all social media users may possess the needed skills to evaluate whether a post is of high quality or contains inaccurate information. Millions of social media messages generated
by birthing women and organizations catering to birthing women on forums (Wexler et al., 2020) and social media accounts have not been evaluated, yet their popularity among birthing women continues to grow. Understanding the nature of maternal health content on social media is also essential to understanding whether and where misinformation appears.

This study conducted a content analysis to determine what pregnancy topics appear and whether diverse birthing women representation exists on Instagram accounts popular among birthing women. The main aims were to 1) identify the frequencies and examine the content of the maternal health topics, maternal health-related resources, and Black maternal health content shared on Instagram accounts popular with birthing women and 2) assess the frequency of diverse birthing women used in images shared on Instagram accounts popular with birthing women.

B. Methods

This content analysis examined Instagram posts related to maternal health on three parenting accounts popular amongst Black pregnant women. The following information was collected on all posts: post link, post text, publication date, number of likes, or views. Posts’ images and videos were viewed on each parenting account.

Sample Collection

JM collected posts from 5/1/2018 to 4/30/2019 for another study (Manganello et al., 2021). In that study, survey results identified the top five most commonly cited websites used for health, parenting, and child safety information among 580 parents in the United States with a child under the age of seven. Then, posts from social media accounts affiliated with those websites were collected. Three of those five accounts were selected for this study because they
were also popular with Black birthing women in a recent survey (George et al., ND). Research assistants and NG conducted the remaining data collection from May 2019 to Aug 2021. All Instagram posts were manually captured for the sample months and entered in an excel file with post information. Table 1 displays the counts of posts collected for the three chosen social media accounts popular with mothers throughout the entire period.

**Inclusion Criteria**

All posts had to appear on one of the three selected social media accounts from May 1, 2018 to April 30, 2021. Two research assistants and the first author screened all the social media posts during the designated timeframe to determine eligibility for the final sample. For a post to be considered maternal health-related, it had to address women’s health during any pregnancy phase (including preconception), prenatal, childbirth, or postpartum. Since unintended pregnancies increase a woman’s risk for pregnancy complications, the research team thought it was essential to include preconception health posts. We also further assessed whether the posts identified as maternal health-related addressed Black maternal health. The research team defined Black maternal health as the specific reference to the health of Black birthing women during any stage of pregnancy (including preconception), prenatal, childbirth, or postpartum.

**Exclusion Criteria**

We excluded posts that discussed the following topics if there was no mention of maternal health: baby names, parenting advice, religious practices during pregnancy, violence, sexual assault/abuse, suicide, traveling with a baby, health services, or medical treatment for a baby or toddler (such as referrals for pediatrician or clinics), fundraisers promotions, and general
parenting messages. All duplicate posts were removed from the sample. Also, any posts outside of the study period were excluded.

Coding Procedures

NG and JM developed the coding instrument. Authors RdL and MK provided their maternal child health expertise to enhance the topics/themes addressed in the coding instrument. These topics include diet and fitness, sleep-related tips and issues, prenatal or antenatal care (including prenatal screening and tests), labor and delivery, pregnancy complications, cesarean delivery, and more (see the appendix for a copy of the coding instrument). Coders assessed whether the posts shared maternal health resources. Maternal health posts that include images were coded for whether diverse mothers were present in the picture.

Reliability and Analysis

The first author and a research assistant were the coders for this content analysis. The two coders met to learn how to code the social media posts using the coding scheme. The two coders then independently coded ten posts for codes within the coding instrument in Nvivo 11 and assessed their level of agreement. Coders had an average percentage agreement of 92% and an average kappa value of 0.54. Coding conflicts were discussed, and the coding instrument was updated before moving on. The second coder then randomly coded 10% of the posts, and NG coded all remaining posts. Simple descriptive statistics were calculated for social media posts content by the three accounts separately and in aggregate form.

C. Results

A total of 4,572 Instagram posts were screened for eligibility (explained previously in the inclusion section; See Table 1 for a breakdown of posts collected). A final sample of 219
maternal health posts was identified. Overall, as time progressed, we observed all Instagram accounts sharing more maternal health-related posts except social media account 2 (See Figure 1). All social media accounts maternal health posts were informative (cited statistics/evidence), engaging, supportive, shared experiences of other birthing women, or a combination of the categories listed. Across all the accounts, posts that offered emotional support or asked to provide advice to future moms received the most likes. The maternal health content made by these parenting social media accounts performed well with their audience – yielding an average of at least 2,300+ likes on their maternal health posts. The most liked post from the entire sample belonged to social media account 1, which received over 30,000+ likes and addressed maternal well-being for frontline pregnant women working during the COVID-19 pandemic.

**Maternal Health Content**

Across all three parenting accounts, maternal health content represents 5% (219 out of 4,572 posts) of the content posted. The majority (87%, 191 posts) of the maternal health posts were found on social media account 1, 1% (2 posts) were on account 2, and 12% were on social media account 3. However, only 11% (191 out 1,702 posts) of all the content posted by account 1 over the three years was maternal health (See Table 1). Of all maternal health posts found amongst the three parenting accounts, Black maternal health accounted for 4% (9 out of 219 posts) of the maternal health topics addressed (Table 1 shows the breakdowns by social media account). Of all maternal health posts, about 30% (65 out of 219 posts) were concerning maternal body changes, 29% (63 out of 219 posts) were about maternal well-being, 16% (34 out of 219 posts) were about breastfeeding, 11% (23 out of 219 posts) were regarding cesarean delivery, and 8% (18 out of 219 posts) were about everyday pregnancy symptoms/experiences. Figure 2 displays a word cloud of all topics shared. Important issues such as pregnancy
complications and postpartum depression content were not discussed more than 13 times (≤6%) over the entire study period. The content posted did not discuss the need for advocates (only 2% of the posts addressed this). Lastly, there were almost no prenatal care discussions (1%).

**Black Maternal Health Content**

A total of nine (9) Black maternal health posts were identified. Each Black maternal health post addressed 1 to 6 topics per post. Although account 1 posted the most maternal health content, social media account 3 posted black maternal health content the most. The majority (6 out of 9 posts) of the Black maternal health content discussed pregnancy complications. Almost all (8 out of 9 posts) of the Black maternal health posts discussed at least two or more topics/issues. Posts mainly addressed pregnancy-related maternal mortality rates (4 out of 9 posts), labor and delivery complications (3 out of 9 posts), and Black women’s experiences with racism when receiving care (3 out of 9 posts). Other topics mentioned were doulas/midwives (2 out 9 posts), unconscious or unintentional biases experiences (2 out of 9 posts), being ignored or dismissed when receiving care (2 out 9 posts), the need for culturally appropriate care (2 out of 9 posts), Black health policy (2 out of 9 posts), the need for advocating (2 out 9 posts), breastfeeding challenges (1 out 9 posts), and the promotion of more Black pregnancy providers in practice (1 out 9 posts).

**Resources Shared**

A total of 102 posts shared links to resources. Account 1 posted the majority (77%, 79 posts) of the resources within the entire sample. Meanwhile, account 3 accounted for roughly 22% (22 posts) of the shared links sample. Account 2 was the only account to post a video and a link to resources. The most common topics that posted resources were posts related to
breastfeeding (17 out 102 posts), maternal body changes (16 out 102 posts), a cesarean delivery (13 out 102 posts), pregnancy symptoms/experiences (12 out 102 posts), and maternal well-being (10 out 102 posts). We also learned that resource links were posted in the description biography section of the social media accounts. This description biography section gets updated with the most current shared resource to match the most recent posting. All data collection occurred outside the study timeframe, which did not allow the authors to access the resources shared to assess the types of resources shared as planned.

Images

About 35% (69 out of 196) of the images that depicted people included diverse birthing women. Social media account 1 posted the most diverse images. Over the three years, we observed a gradual increase in the use of diverse birthing women within images posted by social media account 1 (See Figure 3). We also found that social media account 2 did not use any diverse birthing women within the images shared to accompany their maternal health posts; granted, their maternal health content sample size was small. The most frequent topics that posted images inclusive of diverse birthing women were breastfeeding (20 out of 69 posts), maternal well-being (19 out of 69 posts), maternal body changes (19 out of 69 posts), and cesarean delivery (9 out of 69 posts) posts.

D. Discussion

This study aimed to identify how often and what type of maternal and Black maternal health topics and maternal health-related resources were posted on popular parenting Instagram accounts. We also wanted to determine whether these popular parenting accounts use diverse images within their posts. This study highlighted the lack of maternal health content available to birthing individuals on social media accounts popular within their population. Though we
observed an increase in maternal health content posted on two social media accounts, there was a lack of maternal health information. Our results also suggest that inclusive birthing women images remain limited but are more often used now than in earlier years.

One of the most striking findings was that information regarding important topics such as pregnancy complications and postpartum depression, which affect a significant number of birthing women per year, were rarely discussed on parenting accounts (George et al., ND). Although these topics are not “hot” or “clickbait” topics to yield significant user engagement, they are still important issues to highlight. Birthing women seek advice and pregnancy related information from various sources; therefore, it is essential for birthing and parenting social media accounts to share maternal health content regarding issues that affect birthing and parenting women each year. Yet, the majority of content focused on maternity clothing, personal care products, and life during pregnancy. A lack of maternal health content that addresses adverse pregnancy outcomes largely underserves and under prepares birthing women for possible birthing experiences they may unfortunately encounter. Findings also showcased that the pregnancy topics birthing women most frequently sought online and on social media (such as fetal development, diet and exercise during pregnancy, childbirth, pregnancy complications, and breastfeeding) were posted by these popular accounts (Sayakhot & Carolan-Olah, 2016; Javanmardi et al., 2018; Ghiasi, 2021; Ahmadian et al., 2020; Taştekin Ouyaba & İnfal Kesim, 2020). The frequency at which maternal health content was posted was underwhelming; however, there were promising indications of more maternal health content being shared as time went on.

There was no Black maternal health content posted on the selected parenting accounts prior to June 2020. This is troubling because posting content that addresses Black maternal
health and Black maternal health disparities is key to helping raise awareness of the existing inequities in maternity care. Also, social media can create an avenue to share educational materials and resources on healthy birthing specific to Black people to increase self-advocacy and overall knowledge. For society to appropriately address Black maternal health disparities, we must first educate others on Black maternal health issues and promote more open dialogue to comprehensively understand the maternal care experiences of Black women from preconception to postpartum. Stakeholders could share Black maternal health information on social media accounts to educate large audiences while requiring minimal work quickly.

Results show that a fair amount of diverse birthing images were used throughout the study period and that they increased over time. Prior research has found that racial and ethnic disparities in health-related knowledge may be related to media representation (Myers et al., 2019). Using more diverse images and culturally appropriate language on social media can potentially reduce existing racial and ethnic health-related knowledge gaps. Patient diversity on social media platforms may also expose providers to perspectives of a more diverse group of birthing women.

Recent increases in widespread discussions concerning maternal health disparities may have influenced content out forth by the social media accounts. For example, the American College of Obstetricians and Gynecologists partnered with Black Mamas Matter Alliance on Black Maternal Health Week in April 2020, and we observed Black maternal health content being shared on two parenting accounts for the first time in June 2020. Also, since 2018 many Black public figures have been using their platforms to share their maternal health experiences. As an example, politicians such as Vice President Kamala Harris and celebrities such as Serena Williams, Beyoncé, Allyson Felix, and Michelle Obama have been advocating for Black
maternal health improvement. These observations are consistent with prior health research, which shows that social media content posted by celebrities or non-health-related organizations is more likely to be shared or seen (Vasconcelos Silva et al., 2020; Nguyen et al., 2018). There have also been many summits, conferences, campaigns, listening sessions, and coalitions promoting helpful dialogues and interventions on how to improve maternal health within the US. Further research is needed to understand better whether the publicity of this topic has led to changes in social media coverage of maternal health disparities.

This study also supports the claims Oviatt & Reich made that “[social media] posts offering emotional support…are more likely to be shared, liked, or commented on” (Oviatt & Reich, 2019). Organizations could leverage their social media accounts to educate and increase engagement on their accounts, especially since they have seen successes from prior posts that have used this strategy. It is important to note that account 1 does have a separate Instagram account dedicated to Hispanic birthing women. Program developers and researchers could use this strategy to guide future social media interventions to promote health equity. Also, there are potential opportunities for inter-organizational and inter-sectoral collaborations among organizations with a large, engaged audience (the smallest audience size is 315k followers). Bonnevie and her colleagues demonstrated that creating and disseminating a culturally-appropriate digital intervention to promote positive pregnancy outcomes among at-risk women is feasible and does yield positive outcomes (Bonnevie et al., 2021).

One substantial yet easy change social media accounts can make is moving their posted links from their description bio to the caption of each posting, if possible. Nearly all resources posted by these accounts are frequently lost since the resource link is posted in the account bio section and is updated each time a new post that shares a resource link is added. Therefore,
relocating the links can enable pregnant moms to refer to resources at their preferred timing and not potentially miss helpful information regarding their pregnancy experiences. We would also like to issue a call to action to all social media outlets catered towards pregnant women, women seeking pregnancy, and women open to pregnancy to share more maternal health and Black-specific maternal health content to educate these women on existing maternal health disparities.

**E. Limitations**

Notably, there can be a selection bias in the organizations’ accounts selected for this study. The social media accounts were selected based upon their audience reach (Instagram following) and Black women indicating they used their accounts for pregnancy information seeking during their most recent pregnancy in our prior work. Also, the number of maternal health posts identified was not balanced. The names of the organizations’ accounts used for this study were not disclosed due to changes to Instagram’s privacy rules and social media research ethics (Hunter et al., 2018). Also, due to the timing of data collection, we were unable to access the links shared to examine the types of resources shared due to each link being posted in the organization’s description bio. Black maternal health posts within this sample were too small to conduct bivariate or further analyses. Another notable limitation is the difficulty of assessing an individual’s race visually. Lastly, the authors observed a moderate kappa value; since the percent agreement was high, the coders were well trained and had backgrounds in nursing and maternal health – the authors deemed the kappa value acceptable.

**F. Conclusion**

To our knowledge, this is the first study to provide a content analysis of maternal health (especially Black maternal health) content available to birthing women on Instagram for this timeframe. Our findings contribute to the emerging field of social media analysis and emphasize
the need for sharing more quality maternal health content. Targeting popular social media accounts to encourage them to promote more maternal health messages, including Black maternal health, could help disseminate important information given their large number of followers. Using this strategy might increase the likelihood of racial and ethnic minority social media users encountering the posted content. These efforts require innovative partnerships of health organizations, the technology industry, academia, and community stakeholders.
G. References


Vasconcelos Silva, C., Jayasinghe, D., & Janda, M. (2020). What Can Twitter Tell Us about Skin Cancer Communication and Prevention on Social Media?. *Dermatology (Basel, Switzerland), 236*(2), 81–89. [https://doi.org/10.1159/000506458](https://doi.org/10.1159/000506458)


**Acknowledgements:** The authors would like to thank Keiyanne Phillip and Haley Cowlin for their contributions to the data collection of this study. We would also like to thank Ronell Kirven for his contributions to the data analysis of this study.

**Funding Source:** SUNY Downstate Medical Center and the University at Albany SUNY Center Scale Award
H. Appendices

Table 1: Number of Instagram Posts by Social Media Account

<table>
<thead>
<tr>
<th>Social Media Account/Instagram Following</th>
<th>Number of Posts Collected</th>
<th>Average # of Likes a Post Received</th>
<th>Number of Maternal Health Posts</th>
<th>Number of Black Maternal Health Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account 1 (579k followers)</td>
<td>1702</td>
<td>3167</td>
<td>191</td>
<td>3</td>
</tr>
<tr>
<td>Account 2 (315k followers)</td>
<td>1040</td>
<td>1192</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Account 3 (948k followers)</td>
<td>1830</td>
<td>3771</td>
<td>26</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 1: Maternal Health Posts by Year and Social Media Account

Note: Year 1 = 5/1/18 – 4/30/19, Year 2 = 5/1/19 – 4/30/20, Year 3 = 5/1/20 – 4/30/21
Figure 2: Word Cloud of the Topics Discussed on all Instagram Accounts

The maternal health topics shared were concerning...

- Pregnancy symptoms/experiences
- Labor and delivery
- Breastfeeding
- Maternal body changes
- Maternal well-being
- Pregnancy complications
- C-section
- Post-partum depression
- Diet and fitness
- Pain management
- Need for advocates
- Prenatal care
- Personal care products
- Promotion of doula/midwives
- Sleep-related tips and issues
- Fertility treatments
- Baby growth and development

Note: Multiple topics can be addressed in a post.

Figure 3: Use of Diverse Birthing Women Images in Posts by Year and Social Media Account

<table>
<thead>
<tr>
<th>Year</th>
<th>Social Media Account 1</th>
<th>Social Media Account 2</th>
<th>Social Media Account 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Year 2</td>
<td>0</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Year 3</td>
<td>0</td>
<td>0</td>
<td>51</td>
</tr>
</tbody>
</table>

Note: Year 1 = 5/1/18 – 4/30/19, Year 2 = 5/1/19 – 4/30/20, Year 3 = 5/1/20 – 4/30/21
CHAPTER 3

IV. Social Media Use Among Black Pregnant Women: Does Health Literacy or eHealth Literacy Play A Role?

A. Background

In the United States, roughly 700 women die from pregnancy-related complications each year (CDC, 2019). According to the Centers for Disease Control and Prevention (CDC), for each woman who dies of pregnancy complications, at least 70 other women come close to death (CDC, 2020). Black women are three times more likely to die from pregnancy-related health issues than White women (CDC, 2019) and are more likely to suffer from maternal morbidity than their White counterparts (CDC, 2020; Howell et al., 2016). These disparities can be traced to numerous causes, including access to care, quality of care, implicit bias, and chronic disease prevalence (Howell, 2018). National birth delivery data have shown that Black women experience higher pregnancy-induced and chronic comorbidities such as chronic hypertension, asthma, placental disorders, gestational diabetes, pre-existing diabetes, and blood disorders than White women (Howell et al., 2016). Chronic diseases associated with an increased risk for pregnancy-related mortality are more prevalent and less well-controlled amongst Black women, putting them at a higher risk for complications (Fryar et al., 2017).

Deficiencies in access to information and support have influenced health disparities. Significant gaps in the access and use of health information online are linked to income, education, and ethnicity (Gilmour, 2007). In 2012, approximately 72% of US adult internet users searched online for health information (Fox & Duggan, 2013). Social media information can be presented in many formats, including text, videos, and images, which can deliver health information to audiences with a range of needs, including those with lower literacy. Social media
widens access for everyone, but especially individuals who may not easily access health information via traditional methods, such as younger people, ethnic minorities, and lower socioeconomic groups (Moorhead et al., 2013); it also has demonstrated it aids in changing health behavior (Chen & Wang, 2021). Individuals have used social networking sites to discuss health-related issues and complex information with health professionals (Colineau & Paris, 2010). Baker and Yang found that 43% of mothers within their sample used blogs to communicate with other mothers, 89% used social media sites for questions and advice related to pregnancy and their role as a parent, and 84% deemed social media friends a form of social support (Baker & Yang, 2018). Also, a meta-analysis found social media to effectively promote pregnancy weight control, gestational diabetes control, maternal well-being, and increasing pregnancy knowledge (Chan & Chen, 2019). However, very little information is available on how Black women use social media during pregnancy.

A systematic review of the uses, benefits and limitations of social media for health communication found that more social media users were African Americans than their White counterparts, belonged to lower-income households, and were females (Moorhead et al., 2013). As of April 2021, 91% of Black adults reported using the internet, with 77% of Black adults using social media (Pew Research Center, 2021). Black women have high ownership of mobile devices (80% own smartphones and 57% own a tablet), providing access to the internet, social media, and phone apps (Nielsen Company, 2017). Black women spend more time weekly using apps and browsing the web on smartphones (19 hours and 27 minutes on average) than other women (17 hours and 8 minutes on average) (Nielsen Company, 2017). However, whether and how Black women utilize social media for maternal health information and support remains unclear. Despite the critical role social media can play in maternal health (Chan & Chen, 2019),
only one study has examined social media use for health information and social support by Black women who are pregnant/postpartum (Asiodu et al., 2015).

Higher health literacy plays a role in yielding positive pregnancy health outcomes (Kohan et al., 2007; Ohnishi et al., 2005). Currently, no prior work examines eHealth literacy’s role in pregnancy health outcomes. These skills can also impact online health information seeking (Paige et al., 2017; Manganello et al., 2016), yet this relationship has not been widely studied for Black pregnant women. Health literacy measures “the degree to which individuals can obtain, process, understand and communicate about health-related information needed to make informed decisions” (Morris et al., 2006) and can impact pregnant women’s ability to find, comprehend, and use health information and make informed health decisions for herself and her baby (Olander et al., 2018; Renkert & Nutbeam, 2001). Limited health literacy has been associated with unhealthy behaviors during pregnancy among all women (Nawabi et al., 2021). Dr. Chen and his colleagues found that lower health literacy levels are associated with lower chances of using medical websites for health information and higher odds of using television, social media, blogs, or celebrity webpages (Chen et al., 2018; Paige et al., 2017). They also found that individuals with lower health literacy levels used and relied on social media and blogs containing lower quality health information than healthcare professionals’ information (Chen et al., 2018).

eHealth literacy is “the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to address or solve a health problem” (Norman & Skinner, 2006). This skill is shaped by a person’s health issue, education level, health status at “the eHealth encounter, motivation for seeking the information, and the technologies used” (Norman & Skinner, 2006). Ultimately, it intends to empower individuals and enable them to participate in health decisions informed by eHealth resources fully. There
seems to be a void within the literature of studies that examined the impact eHealth literacy has on all women’s maternal health outcomes or how eHealth literacy is associated with the use of online health information among Black women, specifically for maternal health. Comprehending Black pregnant women’s eHealth literacy levels is essential with the current high use of social media for health information amongst pregnant women combined with Black women’s vast access to social media – high-risk communities need to be equipped with the skills to find high-quality information on social media confidently.

Given the potential role of social media in informing Black women about maternal health and the lack of research on this topic to date, this project aimed to investigate the potential relationship between health literacy, eHealth literacy, and social media use for pregnancy-related topics among Black women. Since the intersection of social media, health literacy, and eHealth literacy may be an important component of reducing maternal health disparities, we investigated the following research questions:

**RQ1:** What sources of information are most often used by Black women for pregnancy-related information?

**RQ2:** What pregnancy-related topics do Black women most frequently seek on social media sites?

**RQ3:** What is the association between health literacy and social media use during pregnancy?

**RQ4:** What is the association between eHealth literacy and social media use during pregnancy?

**B. Methods**

This study used a cross-sectional survey. Although health disparities affect women of different races and ethnicities, given the continuously growing Black maternal health disparities within the U.S., combined with the known impact low literacy has on health outcomes (Berkman et al.,
2011), the focus was on Black women. The University at Albany’s Institutional Review Board approved this study (Protocol Number: 20X178).

**Recruitment**

Survey data was collected from participants in a panel maintained by CloudResearch, a third-party online participant recruitment company. CloudResearch oversaw participant incentives. The survey was programmed into Qualtrics and pilot-tested for errors by the University at Albany research team and our CloudResearch assigned contact. Once both parties agreed to launch the survey, CloudResearch distributed the live survey link to eligible participants based on the information available on their database. When eligible participants clicked on the Qualtrics survey link, they were immediately directed to an eligibility screener. If participants met the inclusion criteria, they were taken to the informed consent page and asked to consent to the study.

**Survey**

Data collection occurred from November 27th, 2020, to December 4th, 2020. Eligible participants self-identified as Black women, were at least 18 years old, spoke fluent English, resided in the United States, and were currently pregnant or had given birth within 12 months. The survey consisted of 41 questions and took about 15 minutes to complete. The survey sought to detect social media use patterns of Black women during their most recent pregnancy. Questions also assessed the communication of social media information with each participant’s networks. The appendix includes a copy of the survey questions used. Participants’ demographics and clinical characteristics were collected as well. Key variables and measures are described below.
**Demographics:** We collected each participant’s age, education level, income, employment status, ethnicity, marital status, and the number of parents in the household. We also collected self-reported clinical characteristics such as a history of pregnancy complications, pregnancy status, number of live births, and type of pregnancy provider.

**Health Literacy:** The Single Item Literacy Screener (SILS) was utilized to measure health literacy. SILS is a simple validated instrument designed to identify patients with limited reading ability who need help reading health-related materials (Morris et al., 2006). The screener inquires, “How often do you need to have someone help you when you read instructions, pamphlets, or other written materials from your doctor or pharmacy?”. Possible responses were 1= “never”, 2= “rarely”, 3= “sometimes”, 4= “often”, and 5= “always”. Scores greater than 2 were considered lower health literacy, indicating difficulty reading printed health-related material.

**eHealth Literacy:** The eHEALS scale was used to measure eHealth literacy. eHEALS is an 8-item validated scale intended to measure consumers’ combined knowledge, comfort, and perceived skills to find, evaluate, and apply electronic health information to health problems (Norman & Skinner, 2006). Each item in the eHEALS uses a 5-point Likert scale to answer each question with response options ranging from 1= “strongly disagree” to 5= “strongly agree”. We modified the scale’s wording from “health information” to “pregnancy information” to alleviate confusion with the questions. A total score was calculated based on respondents’ answers; higher scores indicate higher eHealth literacy.

**Social Media**

**Social Media Activity:** Social media activity was measured by what social media platform women had a profile on and the frequency of use for each an (i.e., Facebook, Twitter, Instagram) on a 6-point Likert scale of 1 = “never” to 6 = “several times a day”. Scores less than 5 indicated
no frequent use of respective social media platforms. We also assessed the usefulness of the pregnancy information participants found on social media by asking them, “how useful has the pregnancy information found on social media sites been to help you make decisions about your pregnancy?”.

Social Media Use: The frequency of the nature of social media use during pregnancy was measured by six adapted items (Figure 1; Appendix 2). Questions were adapted from prior surveys (Bjelke et al., 2016; Hether et al., 2016). Response options were collected using a 5-point Likert scale ranging from 1 = “never” to 5 = “always”. A total score was calculated by combining the responses from all six items; higher scores indicated more social media use.

Social Media Use for Support: Participants were asked to indicate how often they used social media for getting and giving support. Support was measured using two adapted items. Questions (Figure 1; Appendix 2) were adapted from prior surveys (Bjelke et al., 2016; Hether et al., 2016). Response options were collected using a 5-point Likert scale ranging from 1 = “never” to 5 = “always”. A total score was calculated by combining the responses for both items; higher scores indicated more social media use for giving and getting support.

Sharing Pregnancy Information Found on Social Media: Participants were asked to indicate how often they shared the pregnancy information they found on social media with eight different individuals in their lives. Questions (Figure 1; Appendix 2) were adapted from a prior study (Dekker et al., 2016). Responses were collected using a 5-point Likert scale where 0= “not applicable”, 1= “never”, 2= “rarely”, 3= “sometimes”, and 4= “often.” “Not applicable” responses were excluded from the analysis, and a mean score was calculated for each question. Each individual with whom participants shared social media information was examined separately.
**Statistical Analysis**

Descriptive statistics were calculated for continuous (means and standard deviations) and categorical variables (frequencies and %). Independent sample t-tests, Pearson correlation, and chi-squares were performed to assess bivariate relationships between dependent (demographics and social media use) and independent variables (eHealth literacy and health literacy) when appropriate. Significance of α= 0.05 was used, and all tests were two-sided. Regression models were used to explore further whether observed bivariate interactions remained significant when controlling for up to four demographic characteristics: education level, age, the occurrence of pregnancy complications, and income. All demographic characteristics except age and pregnancy complications (due to its binary response option) were dummy variables coded. All analyses were completed using SAS version 9.2.

**C. Results**

The final sample consisted of 404 Black women (See Figure 1 for sampling). Within the sample, 52.7% were pregnant at study completion (See Table 1). Most (78.7%) women within the sample had at least one pregnancy before joining the study. The average age was 26.4 years, ranging from 18 to 40. Approximately 49.1% of the sample reported household income was less than $40,000. More than half (66.8%) of this sample indicated they were employed (full time or part-time). This sample’s education levels were very diverse; Table 1 displays the remaining demographics. This sample also had adequate health literacy (67.5%; SILS scores of ≤ 2) and high eHealth literacy (mean eHEALS score = 34.5, with a range from 19 to 40). Women with adequate health literacy had higher eHealth literacy scores than women with low health literacy (34.9 vs. 33.7, p=0.033, respectively). On average social media use scores in this study indicated that about 67.6% used social media for information seeking (mean scores were 20.27 out of 30),
and roughly 65.9% used social media for giving and getting support (mean scores were 6.59 out of 10). Results also indicate that, on average, women mostly shared the pregnancy information they found on social media with their partner/spouse (mean score of 3.28 out of 4), family or friends (mean score of 3.14 out of 4), and their doctor (mean score of 3.04 out of 4).

Sources of Information Use

Results suggested that nearly everyone in the sample owned or had access to a smartphone (99.5%). Approximately 85.4% of the women in this sample indicated they own a Facebook account, 60.9% own a Twitter account, and 89.8% own an Instagram account. During their most recent pregnancy, 71.6% indicated they used at least three social media sites to find pregnancy information. Besides using social media, the women within this sample indicated they always or often used their family (77.1%), friends (57.6%), books (51.9%), and pregnancy-related courses (47.4%) as a source for pregnancy information. Their least often utilized sources for pregnancy information were magazines (39.2%), community groups/organizations (36%), and religious leaders (28.8%).

Pregnancy-related Information Sought

More than 50% of Black women in this sample always or often searched social media for general pregnancy information regarding their bodies, sleep-related issues, and personal care products. Roughly 60% of the women within this sample always or often searched social media for pregnancy information related to prenatal care. More than 60% of the women searched social media for pregnancy information related to fetal growth, development, and delivery. Nearly 45.5% of the women in this sample indicated it was essential to have easy access to social media sites during their most recent pregnancy. About 81.9% of the entire sample found pregnancy information on social media sites useful or very useful to help them make pregnancy decisions.
Those who indicated that the pregnancy information they found on social media was useful to help them make pregnancy decisions were more likely to have higher eHealth literacy (mean difference=1.302, \(p=0.050\)) and health literacy than those who mentioned the information was not useful (\(\chi^2=4.556, \ p=0.033\)).

**Health Literacy**

Women who had low health literacy were more likely to use social media to obtain information on their body during pregnancy (mean difference=0.343, \(p=0.004\)), diet and fitness (mean difference=0.297, \(p=0.020\)), medications taken during pregnancy (mean difference=0.306, \(p=0.027\)), personal care products to use during pregnancy (mean difference=0.319, \(p=0.024\)), prenatal screenings and testing (mean difference=0.338, \(p=0.013\)), delivery (mean difference=0.331, \(p=0.010\)), pre-eclampsia (mean difference=0.491, \(p=0.002\)), and gestational diabetes (mean difference=0.485, \(p=0.002\)) compared to women with higher health literacy. Women with low health literacy reported more social media use (mean difference=2.028, \(p<0.001\)) and more social media use for giving and getting support (mean difference=0.726, \(p=0.003\); See Table 2) than women with high health literacy. Women with higher health literacy reported more sharing of the pregnancy information they found on social media with their nurse (\(\chi^2=7.068, \ p=0.029\)), doula (\(\chi^2=6.878, \ p=0.032\)), and childbirth educator (\(\chi^2=10.289, \ p=0.006\)) than women with lower health literacy. Regardless of health literacy, the social media activity was the same across platforms such as Facebook (\(\chi^2=1.052, \ p=0.305\)), Twitter (\(\chi^2=0.838, \ p=0.360\)), and Instagram (\(\chi^2=0.0571, \ p=0.811\)). Regression analyses showed the relationships between lower health literacy and social media use (\(F(4,387)=4.75, \ p=0.001\)) and social media use for getting and giving support (\(F(4,386)=4.45, \ p=0.002\)) during pregnancy remained significant when controlling for age and education. Therefore, lower health literacy increased these Black
women's likelihood of using social media and made them more inclined to use social media to give and get pregnancy support.

**eHealth Literacy**

Our results suggest that higher eHealth literacy increases the likelihood of women using social media to obtain general pregnancy information on their body during pregnancy (r=0.118, p=0.024), diet and fitness (r=0.188, p<0.001), sleep-related issues (r=0.182, p<0.001), medications taken during pregnancy (r=0.138, p=0.008), personal care products to use during pregnancy (r=0.110, p=0.035), and specific pregnancy topics such as prenatal screenings and testing (r=0.128, p=0.014), delivery (r=0.155, p=0.003), and their baby development/growth (r=0.222, p<0.0001). We found that women with higher eHealth literacy were more likely to report more social media use (r=0.107, p=0.039) and give and get support more from social media (r=0.197, p=0.0001) during pregnancy. Women who reported higher health literacy also reported more often sharing the pregnancy information they found on social media with their doctor (r=0.115, p=0.030), nurse (r=0.139, p=0.001), coworkers (r=0.160, p=0.004), and family or friends (r=0.201, p=0.0001; see Table 3). Women who indicated frequent Facebook use often had significantly higher eHealth literacy than those who did not use Facebook often (mean eHEALS score 35.07 vs. 33.46, p=0.006, respectively). However, there was no notable difference in eHealth literacy scores amongst those who reported frequent use of Instagram or Twitter. Separate regression models revealed that after controlling for age, education, the experience of pregnancy complications, and income, women with higher eHealth literacy were still more likely to report more social media use ($F,(7,353)=3.14, p=0.003$) and more use of social media for giving and getting support ($F,(7,352)=4.61, p<0.001$) during pregnancy.

**D. Discussion**
This study focused on Black women in the U.S. because existing literature lack key details regarding their social media use during pregnancy to inform social media maternal health interventions. Social media is used frequently and can provide various access to information and support. Study results confirm that Black women within this sample use social media as a source for pregnancy-related health information, support, and sharing of pregnancy information.

Several prior studies have examined health literacy in pregnant women and found that the prevalence of low health literacy ranged between 15% and 44% (Ghanbari et al., 2020; Ferguson, 2008; Crozier et al., 2009; Shieh et al., 2009). Our sample had similar rates of lower health literacy (32.5%). This study found that Black women with low health literacy are more likely to use social media and use social media more often for getting and giving support during pregnancy. This might be due to these women's need for on-demand accessible supplemental aid to understand their physical and mental health needs during pregnancy. Therefore, researchers and program developers need to create interventions that improve the quality of maternal health education and communication that reaches this population. Individuals exposed to false information and with lower health literacy and poor analytical skills may be unable to evaluate the accuracy of online information, especially found on social media, effectively. Health literacy interventions that enable an individual to further enhance their skills in accessing, understanding, analyzing, and applying health information are needed, especially since individuals within this study who have low health literacy levels tend to engage in higher social media use. Pregnancy is a period when women benefit significantly from engaging in health services and are considered open to learning health-related information and behaviors, leading to opportunities to increase their health literacy (Crozier et al., 2009; Ghanbari et al., 2012; Olander et al., 2018).
To our knowledge, this is also one of the first studies to measure eHealth literacy in a sample of pregnant Black women. Although this study sample had high eHealth literacy, our findings suggest that women with high eHealth literacy levels are more likely to report more social media use and give and get support from social media often during pregnancy than women with lower eHealth literacy. This observed relationship might be due to this sample’s high frequency of using social media and age range, which may influence their social media comfort levels. Brewer and her colleagues were the only existing study that used the eHEALS scale on Black women; our sample included more Black women than theirs (100% vs. 70%), but our findings of high eHealth literacy amongst this population were consistent (Brewer et al., 2018).

Existing studies have not examined knowledge levels regarding pregnancy complications among pregnant women in the U.S., especially among pregnant Black women. Several studies conducted in developing countries found low awareness of pregnancy warning signs (Mbalinda et al., 2014; Okour et al., 2012; Mwilike et al., 2018). One study, which occurred in the Midwestern U.S., found that women's perceived knowledge about pregnancy complications tends to be higher than their actual knowledge of pregnancy complications (Sheinis et al., 2018). Another study in the U.S. highlighted that significant knowledge deficiencies regarding common and severe health hazards associated with pregnancy persist despite education (Mellon et al., 2020). Given the potential roles of education and support in reducing disparities, increasing awareness of maternal health, and the capability to identify warning signs of pregnancy complications (Neighmond, 2019), along with providing more opportunities for social support (Hodnett et al., 2010), may be important ways to improve health outcomes for Black women. Social media can provide an opportunity to do this at an affordable price (Huesch et al., 2016). Recent federal legislation intends to increase low-income households’ access to the internet,
increasing the opportunity to use social media to provide health-related information. Combining this attempt to address the digital divide with properly equipping individuals with access and the needed skills to assess the quality and credibility (Taheri et al., 2021) would increase providers' and practitioners’ strides in achieving equity.

E. Limitations

We provided participants with the ability to skip any question they were not comfortable answering, but there was not a substantial number of skipped questions. This cross-sectional design does not allow for any causal inferences. This project was subjected to the possible occurrence of recall bias; since we allowed Black women who recently gave birth within the past year to join the study, it might have been difficult for them to remember the sources they utilized during their pregnancy precisely. Future studies can limit their study criteria to currently pregnant women only to reduce this bias. Finally, our sample was recruited from an online third-party survey company; therefore, participants' willingness to engage in research and savviness to use technology may have resulted in a biased sample. This issue may influence our external validity since our observed associations might not accurately represent the general Black pregnant woman population. Future studies can recruit non-survey panel participants.

F. Conclusion

A substantial number of Black women in our sample had lower health literacy. With our new knowledge regarding the link of low health literacy with higher social media use during pregnancy, developing tools or interventions that improve health literacy skills amongst this population is needed. Taking Black women's social media use patterns into account could be important for tailoring pregnancy health education and promoting health literacy among this population overall, developing organizational health policy, and allocating resources. Pregnancy
providers can make recommendations through social media accounts that use plain language and share high-quality, evidence-based pregnancy information. Future research should examine how social media can reduce existing maternal health disparities.
G. References


Gilmour J. A. (2007). Reducing disparities in the access and use of Internet health information. a discussion paper. International journal of nursing studies, 44(7), 1270–1278. DOI: 10.1016/j.ijnurstu.2006.05.007


**Funding Source:** SUNY Downstate Medical Center and the University at Albany SUNY Center Scale Award
H. Appendices

Figure 1: Study Eligibility Flow Chart
Table 1: Participant Characteristics

<table>
<thead>
<tr>
<th>Participant Characteristics (N=404)</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pregnancy Status</strong></td>
<td></td>
</tr>
<tr>
<td>Currently Pregnant</td>
<td>213 (52.72)</td>
</tr>
<tr>
<td>Gave birth within the past year</td>
<td>191 (47.28)</td>
</tr>
<tr>
<td><strong>Number of Previous Pregnancies (N=382)</strong></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>1.19 (1.51)</td>
</tr>
<tr>
<td>Range</td>
<td>0 - 10</td>
</tr>
<tr>
<td><strong>Experienced Previous Pregnancy Complications (N=403)</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>133 (33.00)</td>
</tr>
<tr>
<td>No/Do not know</td>
<td>270 (77.00)</td>
</tr>
<tr>
<td><strong>Education Level (N=401)</strong></td>
<td></td>
</tr>
<tr>
<td>High school/Vocational or technical degree or less</td>
<td>126 (31.42)</td>
</tr>
<tr>
<td>Some college</td>
<td>115 (28.68)</td>
</tr>
<tr>
<td>College graduate or higher</td>
<td>160 (39.90)</td>
</tr>
<tr>
<td><strong>Income (N=379)</strong></td>
<td></td>
</tr>
<tr>
<td>$39,999 or less</td>
<td>186 (49.08)</td>
</tr>
<tr>
<td>$40,000 to $79,999</td>
<td>131 (34.56)</td>
</tr>
<tr>
<td>$80,000 or more</td>
<td>62 (16.36)</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>154 (38.12)</td>
</tr>
<tr>
<td>Divorced, widowed, or separated</td>
<td>33 (8.17)</td>
</tr>
<tr>
<td>Never married</td>
<td>133 (32.92)</td>
</tr>
<tr>
<td>A member of an unmarried couple</td>
<td>84 (20.79)</td>
</tr>
<tr>
<td><strong>Employment Status</strong></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>162 (40.10)</td>
</tr>
<tr>
<td>Part-time</td>
<td>108 (26.73)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>75 (18.56)</td>
</tr>
<tr>
<td>Homemaker or student</td>
<td>59 (14.60)</td>
</tr>
</tbody>
</table>

Table 2: Health Literacy and Social Media Use Bivariate Analyses

<table>
<thead>
<tr>
<th>Social Media</th>
<th>High Literacy (N=272)</th>
<th>Low Literacy (N= 131)</th>
<th>Mean Difference</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Media Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (95% CI) Range</td>
<td>19.62 (18.90 - 20.34)</td>
<td>21.65 (20.77 – 22.52)</td>
<td>2.028</td>
<td>0.0005</td>
</tr>
<tr>
<td><strong>Social Media Use for Support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (95% CI) Range</td>
<td>6.35 (6.07 - 6.71)</td>
<td>7.08 (6.71 - 7.44)</td>
<td>0.726</td>
<td>0.003</td>
</tr>
</tbody>
</table>
### Table 3: Correlation Analysis of eHealth Literacy and Social Media Use

<table>
<thead>
<tr>
<th></th>
<th>Social Media Use</th>
<th>Social Media Use for Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Media Use</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Social Media Use for Support</td>
<td>0.74505 &lt;.0001 403</td>
<td>1</td>
</tr>
<tr>
<td>eHealth Literacy</td>
<td>0.10713 0.0392 371</td>
<td>0.19716 0.0001 370</td>
</tr>
</tbody>
</table>

Note: Correlation results are shown in the order of the sample correlation coefficient (r), p-value, and sample size used in the correlation analysis

### Figure 1: Social Media Use Measurement Instrument

<table>
<thead>
<tr>
<th>Measurement Topic</th>
<th>Items</th>
<th>Answer Choices (Scoring)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Media Use</td>
<td>I use(d) social media to read about people in the same situation as me</td>
<td>Always (5)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to get more information on the recommendations my provider gave me</td>
<td>Often (4)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to help me make decisions about my prenatal care</td>
<td>Sometimes (3)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to vent my frustrations with my pregnancy</td>
<td>Rarely (2)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to talk about sensitive pregnancy topics</td>
<td>Never (1)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to see if my experiences are ’normal’</td>
<td></td>
</tr>
<tr>
<td>Social Media Use for Support</td>
<td>I use(d) social media to seek support</td>
<td>Always (5)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to provide support to others by sharing my thoughts/experiences</td>
<td>Often (4)</td>
</tr>
<tr>
<td>Sharing Info from Social Media</td>
<td>How often have you talked to the following people about pregnancy information you found on social media?</td>
<td>Sometimes (3)</td>
</tr>
<tr>
<td></td>
<td>Doctor</td>
<td>Rarely (2)</td>
</tr>
<tr>
<td></td>
<td>Midwife</td>
<td>Never (1)</td>
</tr>
<tr>
<td></td>
<td>Nurse</td>
<td>Not Applicable (0)</td>
</tr>
<tr>
<td></td>
<td>Doula</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Childbirth educator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co-workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family or friends</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partner/spouse</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 4

V. Does Quality of Prenatal Care for Black Birthing Women Impact How They Use Social Media?

A. Background

Black women are more likely to die from pregnancy-related health issues and experience pregnancy complications than their White counterparts (CDC 2019; Howell et al. 2016). These mortality and morbidity disparities occur despite education levels and income (Petersen et al., 2019). Recent findings confirmed that race, ethnicity, health insurance, and education notably impact maternal mortality and severe morbidity (Wang et al., 2020). There is also a need for more comprehensive evaluations of how social determinants of health impact maternal outcomes.

Maternal health racial disparities are deep-rooted in healthcare inequalities at the patient, provider, and system levels. The Pathways to Racial and Ethnic Disparities in Severe Maternal Morbidity and Mortality showcases social determinants of health's vital role in impacting severe maternal morbidity and mortality (Howell, 2018). This model outlines the influence that patient, provider, community, and system-level factors, combined with comorbidities or pregnancy complications, can have on maternal health outcomes during pre- and post-pregnancy care. Social media should be considered as an additional factor since social media may impact patient, provider, community, and system-level factors highlighted within Dr. Howell’s Model.

Social media may influence patient factors (such as literacy, knowledge, beliefs, health behaviors, promote self-efficacy, and social support), provider factors (such as communication, cultural competence, and experience), community factors (such as social network and social comparison) and system factors (such as policies and satisfaction rates with quality of care).
Research has shown that social media can interact with social factors at four levels (intrapersonal, interpersonal, community, and policy) within the context of obesity for adults (Li et al., 2022). There is limited literature available that has studied and explained the role of social media at various levels of the socio-ecological model. Also, there is no literature available that examines how social media use can interact with multiple socio-ecological levels among pregnant women or in the context of maternal health.

Pregnant women are known to be high social media users to seek information, social or emotional support, and share information related to pregnancy (Smailhodzic et al., 2016; Zhu et al., 2019; Serçekuş et al., 2021). Studies have shown that social media can effectively change health behavior, promote maternal well-being, and increase pregnancy knowledge (Chen & Wang, 2021; Chan & Chen, 2019). Specific to Black women, researchers note that first-time Black mothers use social media for educational and social support (Asiodu et al., 2015), and more recent work discovered that Black women use social media to seek information, support, and share pregnancy-related information (George et al., ND). This recent work also shared that 71.6% of their sample reported using at least three social media sites to acquire pregnancy information (George et al., ND). George and her colleagues also found that about 60% of their sample always or often searched social media for pregnancy information related to prenatal care.

Early and consistent engagement in prenatal care increases the chances of having a healthy baby. Numerous studies have shown that women with no prenatal care or inadequate prenatal care (attending <50% of suggested visits) had a higher risk of preterm birth, low birth weight, and infant mortality compared to women who received adequate prenatal care (Cox et al. 2011; Bush et al. 2017). Black women are less likely to initiate early prenatal care than their White counterparts (10% of Black women vs. 4.5% of White women received late or no prenatal
care) (Martin et al., 2019). Also, Black birthing women's past experiences with racial discrimination, lack of provider support and respect, lack of high-quality provider guidance, and lack of engagement in shared decision-making during prenatal periods may contribute to this gap within prenatal care (NYSDOH, 2018; Gadson et al., 2017). A study also found that Black individuals are more likely to report lower satisfaction with healthcare provider interactions (Hall et al., 2015). The frequent engagement with the same provider during prenatal care offers multiple opportunities to build, restore, or improve trust within patient-provider relationships (Lori et al., 2011) and reduce barriers to prenatal care, especially among Black women.

With the evidence presented above and the gaps within the literature on Black pregnant women, we found it important to examine whether the quality of prenatal care for Black women drives or deters high reliance on social media for pregnancy-related information. The use of social media to obtain health information is continually growing and can play an important role in educating women about maternal health. At the same time, it is critical to note that social media can also spread misinformation. It is important to think about how providers can help guide social media use during pregnancy and post-partum care and address concerns or misinformation seen on social media. Prior work has found that it is unproductive and unpractical for physicians to ignore the relationship between social media, social determinants of health, and health and their impact on each other ( Forgie et al., 2021).

Given the significant maternal health disparities that currently exist, this study sought to 1) identify the quality of prenatal care Black women received during their most recent encounter, 2) assess whether the quality of the guidance received from their prenatal provider influenced how they social media use during their pregnancy, and 3) examine whether the quality of the
support and respect delivered by their prenatal provider about their concerns or decisions influenced how they social media use during their pregnancy.

B. Methods

Recruitment

Data were collected from participants in a national survey panel maintained by CloudResearch. CloudResearch oversaw participant incentives distribution and recruitment. All participants were subjected to an eligibility screener and informed consent. The University at Albany’s Institutional Review Board approved this study (Protocol Number: 20X178).

Survey

At the time of data collection, eligible participants self-identified as Black women, at least 18 years old, spoke fluent English, resided in the United States, and were currently pregnant or had given birth within the past 12 months. The survey took approximately 15 minutes to complete. The survey sought to examine this sample of Black women’s prenatal care satisfaction related to the guidance and support they received from their providers during their most recent pregnancy. Participants’ demographics and clinical characteristics were collected, as well. Key variables are described below.

Demographics: We collected participants’ age, education levels, income, employment status, ethnicity, marital status, health literacy (Morris et al., 2006), and eHealth literacy (Norman & Skinner, 2006). We also collected self-reported clinical characteristics such as a history of pregnancy complications, pregnancy status, number of live births, and type of pregnancy provider.
Prenatal Care Quality

The Quality of Prenatal Care Questionnaire (QPCQ) scale measures prenatal care information sharing, anticipatory guidance, sufficient time, approachability, availability, and support and respect. Results from the original validation study showed acceptable internal consistency reliability for the overall scale (Cronbach’s alpha = 0.96) and the six subscales (ranging from 0.73-0.93) (Heaman et al., 2014). As described below, two out of six subscales from the QPCQ were used for this study.

Anticipatory Guidance: The “anticipatory guidance” 11-item validated subscale (see Q20 in Appendix 2) from the QPCQ (Cronbach’s alpha = 0.90) was used to measure participants’ satisfaction with the guidance they received from their providers during their most recent pregnancy. This validated subscale assesses whether women are given enough information to make decisions about their prenatal care and how their prenatal care providers prepare and give women options for their birth experience (Heaman et al., 2014). The answer choices were based upon a 5-point Likert scale ranging from 1 = “strongly disagree” to 5 = “strongly agree.” A total score was calculated by combining the responses from all 11 items; higher scores indicated higher perceived quality of prenatal care guidance delivered.

Support and Respect: The “support and respect” 12-item validated subscale (see Q21 in Appendix 2) from the QPCQ (Cronbach’s alpha = 0.94) was used to measure participants’ satisfaction with the support and respect received during recent prenatal care services regarding their concerns and decisions (Heaman et al., 2014). A 5-point Likert scale was used for each item, and responses ranged from 1 = “strongly disagree” to 5 = “strongly agree.” A total score was calculated by combining the responses from all 12 items; higher scores indicated higher perceived quality of prenatal care support and respect delivered.
Social Media Use

Social Media Use: The frequency of the nature of social media use during pregnancy was measured by six adapted items (see Figure 2). Questions were adapted from prior surveys (Bjelke et al., 2016; Hether et al., 2016). Response options were collected using a 5-point Likert scale ranging from 1 = “never” to 5 = “always”. A total score was calculated by combining the responses from all six items; higher scores indicated more social media use.

Social Media Use for Support: Participants were asked to indicate how often they used social media for getting and giving support. Support was measured using two adapted items (See Figure 2). Questions were adapted from prior surveys (Bjelke et al., 2016; Hether et al., 2016; see Appendix 2). Response options were collected using a 5-point Likert scale ranging from 1 = “never” to 5 = “always”. A total score was calculated by combining the responses for both items; higher scores indicated more social media use for giving and getting support.

Sharing Pregnancy Information Found on Social Media: Participants were asked to indicate how often they shared the pregnancy information they found on social media with eight different individuals in their lives (Dekker et al., 2016). See Figure 2 for the adapted items used to collect this outcome. Responses were collected using a 5-point Likert scale where 0 = “not applicable”, 1 = “never”, 2 = “rarely”, 3 = “sometimes”, and 4 = “often.” “Not applicable” responses were excluded from the analysis, and the remaining responses were categorized into three groups (never and rarely were combined, sometimes, and often) for each question. Each individual with whom participants shared social media information was examined separately.

Data Analysis

Descriptive statistics for the sample were calculated. Categorical variables were described as n (%). Continuous variables were expressed as mean (SD). Categorical variables
were also dummy-coded, and one group was set as a reference group in each category. Pearson correlation, T-test, ANOVA, and multiple regression were performed when appropriate. Significance of $\alpha=0.05$ was used, and all tests were two-sided. Multiple regression models were used to test the associations between prenatal care quality and social media use. We explored whether observed interactions remained significant when controlling for up to five demographic characteristics: education level, age, health literacy, eHealth literacy, and type of provider. Dummy variables were created when appropriate. All analyses were completed using SAS version 9.2.

C. Results

Our final sample consisted of 404 Black women (see Figure 1). Roughly 52.7% of the women were pregnant at study completion within the sample. The average age was 26 years old, about 67.5% of the sample had high health literacy skills, and overall, this sample possessed high eHealth literacy. Almost half of the sample reported a household income of less than $40,000 (See Table 1). This sample’s average social media use scores were 20.27 out of 30, and their social media use for giving and getting support scores were 6.59 out of 10. Results indicate that Black pregnant and postpartum women most often shared the pregnancy information they found on social media with their partner/spouse (56.8%), family or friends (44%), their doctor (41.8%), and their nurse (30.4%) (See Table 2). A substantial amount (62.9%) of the sample reported not speaking with their provider concerning any pregnancy information they found on social media. Of those who did speak with their provider ($n=127$), most (67.7%) indicated their provider was very willing, and roughly 9.1% of the sample reported their provider was not at all or not very willing to discuss the pregnancy information they found on social media. Table 1 displays the demographics of the sample.
Respondents rated the quality of guidance received from their prenatal care provider as moderately good quality (mean(SD) item score: 3.86(0.85) – greater than 70%). The respondents’ rating of the quality of guidance received by their prenatal care providers did not differ based on their health literacy level (p=0.930). Black birthing and postpartum women who reported getting more guidance from their prenatal care provider also reported higher eHealth literacy (r=0.467, p<0.0001). Also, women who reported getting more prenatal care guidance from their provider also reported more social media use (r=0.246, p<0.0001) and more use of social media for giving and getting support (r=0.272, p<0.0001; See Table 3). Regression analyses indicated that women who reported getting more prenatal care guidance reported more social media use (F(7,264)=17.25, p<0.0001; adjR²=0.30) and more use of social media for giving and getting support (F(7,263)=17.46, p<0.0001; adjR²=0.30) when considering age, eHealth literacy skills, education, and type of provider who delivered their prenatal care (Table 4). Analyses of variances revealed that the effect of the quality of guidance received from their provider on how often they spoke to a doctor (F(2, 381) =11.35, p <0.0001), midwife (F(2, 302) =6.43, p=0.002), nurse (F(2, 368) =6.43, p=0.002), childbirth educator (F(2, 284) =3.98, p=0.020), family or friends (F(2, 385) =17.45, p<0.0001), coworkers (F(2, 333) =9.81, p<0.0001), and spouse or partner (F(2, 373) =5.76, p=0.003) about the information they found on social media was significant. In other words, the quality of guidance was associated with sharing the pregnancy information found on social media with others.

Respondents rated the quality of support and respect they received from their prenatal care provider as good quality (mean(SD) item score: 4.09(0.88) - >80%). Women with higher
health literacy had higher support and respect scores than women with lower health literacy (mean scores 4.16 vs. 3.96; p=0.029 respectively). Results show that women who reported getting more support and respect from their prenatal care provider also reported higher eHealth literacy (r=0.495, p<0.0001). We also found that Black birthing and postpartum women who reported getting more prenatal care support and respect from their providers also reported more social media use (r=0.110, p=0.027) and more use of social media for giving and getting support (r=0.149, p=0.003; See Table 3). Regression analyses indicated that women who reported getting more prenatal care support and respect reported more social media use ($F(7,265)=20.55$, p<0.0001; adj$R^2=0.33$) and more use of social media for giving and getting support ($F(7,264)=21.05$, p<0.0001; adj$R^2=0.34$) when considering age, eHealth literacy skills, education, and type of provider who delivered their prenatal care (Table 4). Analyses of variances revealed that the effect of the quality of support and respect received from their provider on how often they spoke to a doctor ($F(2, 382) =4.67$, p=0.010), midwife ($F(2, 303) =7.70$, p=0.001), doula ($F(2, 263) =3.87$, p=0.02), family or friends ($F(2, 386) =12.63$, p<0.0001), coworkers ($F(2, 334) =6.13$, p=0.002), and spouse or partner ($F(2, 374) =6.22$, p=0.002) about the information they found on social media was significant. In other words, the quality of support and respect was associated with sharing the pregnancy information found on social media with others.

**D. Discussion**

This study intended to identify a sample of Black women’s quality of prenatal care during their last pregnancy, specifically regarding the guidance, support, and respect received from health care providers. The study also sought to examine whether prenatal care was associated with social media use. Findings show that most of the sample reported moderate overall use of social media and moderate use of social media for giving and getting support. They also most
often shared the pregnancy-related information they found on social media with their
cartner/spouse, family or friends, and doctor.

Results found that for Black birthing and postpartum women, the average score for rating
their most recent prenatal care quality of guidance can be interpreted as moderately good
guidance throughout prenatal care. The average score for rating their most recent quality of
support and respect received can be interpreted as receiving a good amount of support and
respect during prenatal care. One recent study examined how the QPCQ validated scales perform
among Black women in the US (Dailey et al., 2022). Dailey et al. (2022) reported their
“Anticipatory Guidance” and “Support and Respect” scores to range between 4.05 to 4.27. This
study showed lower subscale scores, meaning worse prenatal care quality scores. This difference
could be due to the samples. Theirs was recruited from two prenatal care clinic sites, and ours
was an anonymous national online sample. Our results might have occurred due to the variation
in experiences with their prenatal care providers. Also, locality and timing of engagement in
prenatal care may have influenced these findings. Most importantly, it highlights room for
improvement regarding guidance and respect and support delivered to Black women during
prenatal care.

Results suggested that both quality of guidance and quality of support and respect were
linked with the frequency of sharing information found on social media with others. This might
be due to getting more quality guidance during prenatal may make these women feel more
confident and knowledgeable about the pregnancy information they encounter on social media,
which might make them feel inclined to share information they find helpful with others. Also,
women might feel more empowered to share their obtained pregnancy knowledge with others.
based on the amount of respect and support they received regarding their concerns and questions from their provider during prenatal care.

To our knowledge, this is the first study to examine the association between prenatal care quality and social media use. Quality of care was related to social media use. In other words, getting more prenatal care guidance was correlated with more social media use and more use of social media for giving and getting support among women in this study. Also, Black pregnant and postpartum women who reported a higher quality of prenatal care support and respect were more likely to report higher social media use and higher use of giving and getting support through social media. This might be due to the variations in the guidance and support and respect individuals in this sample might have received. It could be that patients are more engaged with information-seeking when receiving adequate prenatal care, but more in-depth research is needed to understand this relationship better.

In this study, 62.9% of Black pregnant and postpartum women within this sample reported not speaking with their provider concerning any pregnancy information they found on social media. A prior study found that birthing women did not talk about the information they obtained from the internet unless their provider initiated the discussion (Sayakhot & Carolan-Olah, 2016). It is important for prenatal care providers to become aware of the information pregnant women seek online and increase their knowledge about public social media accounts or websites birthing women use as sources for pregnancy information to be prepared to initiate discussions about social media use with their patients. Although social media provide easily accessible information, it can also disseminate misinformation. Pregnancy-related misinformation about healthy eating and physical activities while breastfeeding, advice related to fertility for individuals in non-heterosexual relationships, and anti-vaccination have been spread
via Facebook networks and online support groups (Snyder et al., 2020; Ruppel et al., 2017; Bradshaw et al., 2021). Therefore, when providers do not discuss pregnancy-related information found online with their patients, it misses the opportunity for providers to correct knowledge or alleviate anxiety, stress, or confusion. These discussions can become an opportunity to educate birthing women; providers can guide their patients on how to solicit quality resources online while simultaneously improving the patient-provider relationship.

Providers can play an important role by having a more open dialogue with their patients about how they use social media for their pregnancy information needs and encourage them to ask questions about the pregnancy information they found to obtain professional vetting or reassurance of the information found accuracy. It is crucial to identify whether the existing inequities in prenatal care have encouraged Black women to turn to social media or other sources for their pregnancy information and support needs. This is important given the misinformation women can encounter from non-medical sources of information. Examining this relationship can provide insight into how to adequately address Black women’s pregnancy information seeking and support needs. There have been reports of women not sharing pregnancy-related information obtained online with their providers (Ahmadian et al., 2020; George et al., ND). This may reflect their comfort with their provider, the quality of support and respect they received from their respective providers, and the priority of their concerns regarding the topic (i.e., fetal movements vs. nutrition) (Mackintosh et al., 2020; Larsson, 2009). Also, their need for a response to their concern or question, the perceived reliability of their online source, and whether the information obtained satisfied their information seeking needs (Mackintosh et al., 2020; Larsson, 2009) may impact their decision to share or not share information obtained from other sources with their
provider. Future qualitative studies can explore why pregnant women may choose not to discuss the pregnancy-related information they found online with their prenatal providers.

Providers are uniquely positioned to guide birthing women to high-quality, accurate information sources on social media. Also, it is essential to note that providers engaging in discussions and advising and assisting patients in obtaining access to pregnancy information on social media is a form of shared-decision making, which may increase the quality of prenatal care guidance delivered. Providers should engage in shared decision-making conversations with patients because some pregnancy-related sources might be better informed than others. Each source has its pros and cons that patients should evaluate to make the best-informed decision that best serves their needs, and providers can help navigate pregnant women through these decisions.

**E. Limitations**

We focused on the quality of prenatal care among Black women due to the negative experiences highlighted within the literature and their increased risk of pregnancy-related morbidity and mortality. The cross-sectional design used in this study does not permit causal inference. Recall bias should be acknowledged as a limitation of this study since we permitted women who recently gave birth within the past year to join the study and thus may have differential recall rates compared to the pregnant women in our study. There can be gaps within their memory of their entire prenatal care experience. Their social media use might not have been accurately reported for those who recently gave birth compared to their actual use. Future studies can constrain their inclusion study criteria to only currently pregnant women to reduce this recall bias. Our sample was recruited from an online third-party survey company; therefore, participants are already online, leading to a biased sample. This issue may influence our external
validity since our observed associations might not accurately represent all Black pregnant women in the United States. Additionally, we were unable to account for cultural, regional, or ethnic differences within our population of Black women since we selected a small national sample.

F. Conclusion

Prenatal care providers can utilize various components of the QPCQ validated scale to obtain feedback on their delivery of care to all their patients. These results can also examine whether disparities in the care delivered exist and can be used as an evaluation metric. It is eminent that birthing women are advised that information found on social media should never be considered a substitute for professional information and advice, and pregnant women should be cautioned not to take any action before consulting with their provider (De Santis et al., 2010). Providers can utilize their distinctive position to guide pregnant women to access high-quality, accurate information sources on social media. Future research can examine whether social media use impacts a birthing women's perspective on their quality of care.
G. References


**Funding Source:** SUNY Downstate Medical Center and the University at Albany SUNY Center Scale Award
### Table 1: Demographic Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pregnancy Status</strong></td>
<td></td>
</tr>
<tr>
<td>Currently Pregnant</td>
<td>213 (52.72)</td>
</tr>
<tr>
<td>Gave birth within the past year</td>
<td>191 (47.28)</td>
</tr>
<tr>
<td><strong>Number of Previous Pregnancies (N=382)</strong></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>82 (21.47)</td>
</tr>
<tr>
<td>1</td>
<td>141 (36.91)</td>
</tr>
<tr>
<td>2 or more</td>
<td>159 (41.62)</td>
</tr>
<tr>
<td><strong>Experienced Previous Pregnancy Complications (N=403)</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>133 (33.00)</td>
</tr>
<tr>
<td>No/Do not know</td>
<td>270 (77.00)</td>
</tr>
<tr>
<td><strong>Education Level (N=401)</strong></td>
<td></td>
</tr>
<tr>
<td>High school/Vocational or technical degree or less</td>
<td>126 (31.42)</td>
</tr>
<tr>
<td>Some college</td>
<td>115 (28.68)</td>
</tr>
<tr>
<td>College graduate or higher</td>
<td>160 (39.90)</td>
</tr>
<tr>
<td><strong>Income (N=379)</strong></td>
<td></td>
</tr>
<tr>
<td>$39,999 or less</td>
<td>186 (49.08)</td>
</tr>
<tr>
<td>$40,000 to $79,999</td>
<td>131 (34.56)</td>
</tr>
<tr>
<td>$80,000 or more</td>
<td>62 (16.36)</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>154 (38.12)</td>
</tr>
<tr>
<td>Divorced, widowed, or separated</td>
<td>33 (8.17)</td>
</tr>
<tr>
<td>Never married</td>
<td>133 (32.92)</td>
</tr>
<tr>
<td>A member of an unmarried couple</td>
<td>84 (20.79)</td>
</tr>
<tr>
<td><strong>Employment Status</strong></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>162 (40.10)</td>
</tr>
<tr>
<td>Part-time</td>
<td>108 (26.73)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>75 (18.56)</td>
</tr>
<tr>
<td>Homemaker or student</td>
<td>59 (14.60)</td>
</tr>
</tbody>
</table>

### Table 2: Results of How Often Black Women Share Pregnancy Information Found on Social Media

<table>
<thead>
<tr>
<th>Source</th>
<th>Often N (%)</th>
<th>Sometimes N (%)</th>
<th>Rarely or Never N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor (n=385)</td>
<td>161 (41.8)</td>
<td>122 (31.7)</td>
<td>102 (26.5)</td>
</tr>
<tr>
<td>Midwife (n=306)</td>
<td>64 (20.9)</td>
<td>94 (30.7)</td>
<td>148 (48.4)</td>
</tr>
<tr>
<td>Nurse (n=372)</td>
<td>113 (30.4)</td>
<td>126 (33.9)</td>
<td>133 (35.8)</td>
</tr>
<tr>
<td>Doula (n=266)</td>
<td>49 (18.4)</td>
<td>68 (25.6)</td>
<td>149 (56.0)</td>
</tr>
<tr>
<td>Childbirth Educator (n=288)</td>
<td>82 (28.5)</td>
<td>80 (27.8)</td>
<td>126 (43.8)</td>
</tr>
<tr>
<td>Family or Friends (n=389)</td>
<td>171 (44.0)</td>
<td>135 (34.7)</td>
<td>83 (21.3)</td>
</tr>
<tr>
<td>Coworkers (n=337)</td>
<td>66 (19.6)</td>
<td>125 (37.1)</td>
<td>146 (43.3)</td>
</tr>
<tr>
<td>Partner or Spouse (n=377)</td>
<td>214 (56.8)</td>
<td>86 (22.8)</td>
<td>77 (20.4)</td>
</tr>
<tr>
<td></td>
<td>Quality of Guidance Score</td>
<td>Quality of Support &amp; Respect Score</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------</td>
<td>-----------------------------------</td>
<td></td>
</tr>
<tr>
<td>Social Media Use</td>
<td>0.246**</td>
<td>0.110**</td>
<td></td>
</tr>
<tr>
<td>Social Media Use for Support</td>
<td>0.272**</td>
<td>0.149**</td>
<td></td>
</tr>
<tr>
<td>eHealth Literacy</td>
<td>0.467**</td>
<td>0.495**</td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.05 level
### Table 4: Multivariate Analysis Results of Prenatal Care Quality and Social Media Use

<table>
<thead>
<tr>
<th>Variables</th>
<th>Quality of Prenatal Care Guidance Received</th>
<th>Quality of Prenatal Care Support and Respect Received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>Lower</td>
</tr>
<tr>
<td><strong>Model 1</strong></td>
<td>β</td>
<td>Lower</td>
</tr>
<tr>
<td>Social Media Use</td>
<td>0.016</td>
<td>-0.000</td>
</tr>
<tr>
<td>Age</td>
<td>0.003</td>
<td>-0.012</td>
</tr>
<tr>
<td>eHealth Literacy</td>
<td>0.081</td>
<td>0.063</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS/Vocational/Technical or less</td>
<td>0.021</td>
<td>-0.193</td>
</tr>
<tr>
<td>College or higher</td>
<td>-0.050</td>
<td>-0.257</td>
</tr>
<tr>
<td><strong>Type of Provider</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family doctor</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Midwife</td>
<td>0.077</td>
<td>-0.031</td>
</tr>
<tr>
<td>OBGYN</td>
<td>0.084</td>
<td>-0.086</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Media Use for Support</td>
<td>0.049</td>
<td>0.010</td>
</tr>
<tr>
<td>Age</td>
<td>0.002</td>
<td>-0.013</td>
</tr>
<tr>
<td>eHealth Literacy</td>
<td>0.079</td>
<td>0.061</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS/Vocational/Technical or less</td>
<td>0.006</td>
<td>-0.208</td>
</tr>
<tr>
<td>College or higher</td>
<td>-0.067</td>
<td>-0.264</td>
</tr>
<tr>
<td><strong>Type of Provider</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family doctor</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Midwife</td>
<td>0.071</td>
<td>-0.036</td>
</tr>
<tr>
<td>OBGYN</td>
<td>0.083</td>
<td>-0.087</td>
</tr>
</tbody>
</table>
Figure 1: Study Flow Chart
**Figure 2: Social Media Use Measurement Instrument**

<table>
<thead>
<tr>
<th>Measurement Topic</th>
<th>Items</th>
<th>Answer Choices (Scoring)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Media Use</strong></td>
<td>I use(d) social media to read about people in the same situation as me</td>
<td>Always (5)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to get more information on the recommendations</td>
<td>Often (4)</td>
</tr>
<tr>
<td></td>
<td>my provider gave me</td>
<td>Sometimes (3)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to help me make decisions about my prenatal</td>
<td>Rarely (2)</td>
</tr>
<tr>
<td></td>
<td>care</td>
<td>Never (1)</td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to vent my frustrations with my pregnancy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to talk about sensitive pregnancy topics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I use(d) social media to see if my experiences are ‘normal’</td>
<td></td>
</tr>
<tr>
<td><strong>Social Media Use</strong></td>
<td>I use(d) social media to seek support</td>
<td>Always (5)</td>
</tr>
<tr>
<td>for Support</td>
<td>I use(d) social media to provide support to others by sharing my</td>
<td>Often (4)</td>
</tr>
<tr>
<td></td>
<td>thoughts/experiences</td>
<td>Sometimes (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rarely (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Never (1)</td>
</tr>
<tr>
<td><strong>Sharing Info from Social Media</strong></td>
<td>How often have you talked to the following people about pregnancy information you found on social media?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doctor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Midwife</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nurse</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doula</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Childbirth educator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co-workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family or friends</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partner/spouse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Often (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sometimes (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rarely (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Never (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not Applicable (0)</td>
</tr>
</tbody>
</table>
CHAPTER 5

VI. Summary of Findings

Black women are impacted by pregnancy related maternal morbidity and mortality at much greater rates than their White counterparts. Black pregnant women are more likely to disregard or engage in prenatal care later than White women. Social media has become a crucial source of pregnancy-related information among birthing women and has been effective at improving pregnancy knowledge. Yet, numerous gaps within the literature exist when it comes to social media use during pregnancy for this population. It is necessary to study how this tool can be used to address knowledge gaps and promote equitable maternal health among Black birthing women.

This dissertation project contains findings from three different studies, which used two study designs: a content analysis and a cross-sectional survey. The Aim 1 paper sought to count and analyze the general maternal health content, Black maternal health content, and maternal health-related resources shared on three popular Instagram parenting accounts. It also measured whether these accounts used diverse images when sharing their content. The Aim 2 paper was designed to identify Black women's information sources for pregnancy-related information, their experiences with social media, and whether eHealth literacy and health literacy impact social media use. Lastly, the Aim 3 paper aimed to understand the quality of prenatal care Black women obtained during their most recent encounters and how this care was associated with social media use.

The Aim 1 paper found that only about 5% of the three Instagram accounts popular with birthing women posts were related to maternal health. Although the sharing of maternal health content increased among two out of three social media accounts, there was still minimal content concerning general and Black maternal health. Results also suggested that posts include more
diverse images of birthing women in recent years (2020-2021) compared to earlier years (2018-2019 or 2019-2020).

The Aim 2 paper results suggested that Black women use social media to seek pregnancy information, give and get support, and share pregnancy-related information. Approximately 90% of the women in the study indicated they own an Instagram account, and over 70% reported they use at least three or more social media accounts to obtain pregnancy information. Black birthing women with low health literacy used social media more and were more inclined to use social media for support. Black women with higher health literacy reported sharing information online with others more. It was also observed that Black birthing women with higher eHealth literacy were more likely to use social media, often use social media for support, and often shared the pregnancy information they found on social media with others.

The Aim 3 paper found that Black birthing women rated their most recent quality of prenatal care guidance as moderately good. The quality of support and respect delivered by their provider during prenatal care was rated as good. Black birthing women who reported getting more guidance or support and respect from their prenatal care provider also reported higher eHealth literacy. Women who reported getting more prenatal care guidance from their provider also reported more social media use and more use of social media for giving and getting support. Also, Black pregnant and postpartum women who reported getting more prenatal care support and respect from their providers reported more social media use and more use of social media for giving and getting support. Black women getting more prenatal care guidance and support and respect were more likely to report sharing the information they found on social media with others.
VII. Limitations

One overall limitation of this project was the limited quantity of evidence available within the literature to serve as a comparison to refute or support findings. However, this lack of evidence suggests that this dissertation research fills a significant gap.

For the content analysis, one significant limitation is that content from only one social media platform was examined. The parenting accounts used in the study might have more content and user engagement on other platforms like Facebook, TikTok, and Twitter. Another limitation is that only three popular parenting accounts were examined. This may be a limitation because other parenting accounts not included in this sample may have posted more maternal health content. Also, due to changes to Instagram’s privacy rules and best practices in social media research ethics (Hunter et al., 2018), the names of the accounts used were not disclosed. Due to data collection timing and the location of where resource links were posted, resource links were unable to be viewed or coded appropriately because the links were not available to collect. With respect to reliability, a moderate kappa value was observed when assessing coding reliability; this kappa value was deemed acceptable due to a high level of simple (percent) agreement. Lastly, another limitation relates to the difficulty of accurately assessing an individual’s race visually in the social media images.

There were some key limitations of the cross-sectional study as well. The most substantial limitation was recall bias; there might be variations in participants’ memory of their experiences. This issue may increase or decrease the strength of the observed associations. Also, our sample was recruited from an online third-party survey company; therefore, participants' comfort level with technology and social media may be higher than the general population. This combined with the willingness to engage in online research, may result in a biased sample. This
issue may influence our external validity since our observed associations might not represent the general population of Black pregnant women. The cross-sectional study design does not allow casual inferences to be drawn. Lastly, it is important to note that reported social media use might not match actual utilization of social media in practice.

**VIII. Implications for Future Research and Practice**

The findings from all three studies advance research, offer ideas or strategies for information dissemination, inform future interventions, and provide practice recommendations.

**Implications for Future Research**

Aims 1 through 3 results contributed to the literature by providing information concerning maternal health content on social media, the use of social media during pregnancy for Black women, and how social media use may be linked with prenatal care. This dissertation provides both qualitative and quantitative implications for future studies.

**Recommendations for Future Studies**

Social media content analyses are becoming more popular as we learn more about how people use social media and its impact on their health behaviors (Mayoh, 2019; Tiidenberg & Baym, 2017; Mercier et al., 2020; Eagle, 2019). Numerous studies have conducted social media content analyses, but very few have been related to pregnancy. Even fewer have been conducted on maternal health, and none have been published on Black maternal health. Aim 1 highlighted the lack of maternal and Black maternal health information on popular parenting accounts on Instagram. A vast amount of information is shared on social media daily. Future content analyses can also be designed to provide a more comprehensive look at the content on social media about maternal health and maternal health disparities. Future analyses can also examine social media...
users’ reactions and engagement levels in the comments sections of maternal health and Black maternal health posts on various platforms such as Facebook, Instagram, Tik Tok, or Twitter. Also, future content analyses can consider examining maternal health content on popular Black birthing or parenting social media accounts on various platforms.

Future work can also consider revising their content analysis inclusion criteria to include more Instagram birthing or parenting accounts or expanding the social media platforms they wish to analyze beyond Instagram (other great examples include Facebook or Twitter). Studies using a social media platform other than Instagram could categorize the maternal health resources shared on birthing or parenting organizations’ accounts. Also, future content analyses of images on social media could assess the skin tone of birthing women instead of race; identifying skin tone is less subjective than race and ethnicity.

Extensive work concerning pregnancy information seeking has been done (Sayakhot & Carolan-Olah, 2016). However, there is very little information about Black birthing women’s information-seeking habits and preferred sources for pregnancy-related information. Aim 2 results provided an initial look at Black women's social media usage patterns. We learned that Black birthing women used at least three or more social media accounts to obtain pregnancy-related information. Future studies should consider conducting focus groups or semi-structured interviews with Black birthing women to illicit more detailed information on why Black women often use social media for information seeking and support during pregnancy. Also, future qualitative work can assess how Black women determine the quality and credibility of the information they encounter on social media and if they possess the skills needed to identify misinformation. This work can also identify why they might or might not discuss the information they found on social media with their prenatal care providers. More qualitative work can also
provide insight into Black women's likes and dislikes about social media and obtain their perspectives on the lack of Black maternal health information on the social media accounts or sites they use or share most often.

Future research can also examine whether Black women’s general pregnancy knowledge and preparedness for identifying pregnancy complications are impacted by the limited availability of maternal health content on social media. Future quantitative studies could consider enrolling pregnant women while engaging in prenatal care to obtain more accurate prenatal care quality results and social media use habits. Future studies can also recruit Black women from the same prenatal care provider, clinic, or even region to obtain a better local or regional representative sample. Other studies can collect maternal health status data to assess its relationship with social media use patterns.

Future studies can also consider assessing how social media use may impact birthing women obtaining prenatal care. It is also important to examine whether Black women's social media use impacts whether they seek doula or midwifery services since these services yield positive maternal and infant health outcomes. Research suggests that doula-assisted mothers are four times less likely to have a low-birth-weight baby, two times less likely to experience a birth complication involving themselves (the odds of having a cesarean delivery were 40.9% lower for doula-supported births) or their baby, and significantly more likely to initiate breastfeeding (Gruber et al., 2013; Kozhimannil et al., 2013). Also, midwifery-led care models have been known to yield greater maternal autonomy, lower intervention rates, and lower health system costs (Yu et al., 2020).

For measuring health literacy or eHealth literacy, other studies can consider using the Health Literacy Skills Instrument- Short Form - HLSI-10 (Bann et al., 2012) to replace SILS and the
Digital Healthy Diet Literacy - DDL-4 (Duong et al., 2020) to replace eHEALS. These measurement scales may capture a more accurate health and eHealth literacy measurement within a younger population. Other measurement tools could also be considered or even developed to be tailored to this population.

The original validation study of the QPCQ subscales used in Aim 3 had a limited number of Black women within its sample; this study provided insight into how the quality of guidance and quality of support and respect scales reliability performed within Black pregnant and postpartum women. Only one other study has tested how well this full scale performs amongst Black pregnant women (Dailey et al., 2022). Future studies can consider administering the QPCQ at local prenatal care providers' clinics at various timepoints throughout Black birthing women’s prenatal care to obtain accurate real-time ratings of the prenatal care received. This would provide the literature with more context on whether birthing women can objectively rate their prenatal care delivery while undergoing their experience. Future studies can also consider conducting qualitative interviews or focus groups to examine whether a birthing women’s social media use impacts their perception of prenatal care quality.

**Implications for Practice**

After conducting this project, practice recommendations can be made to individuals, providers, social media accounts, and organizations in accordance with the social-ecological model.

**Black Women**

Black birthing women can utilize social media to gain important information about maternal health, raise awareness of maternal health inequities, and advocate for change within their
community and elsewhere. They can also use social media to share their care concerns or experiences on social media with other birthing women to obtain verification of whether their experience is normal, obtain advice, and seek emotional peer support throughout all phases of pregnancy, from preconception to postpartum. It is also important that Black women discuss the pregnancy information they find on social media and their pregnancy care concerns and values with their providers. Their provider can be another resource they can utilize for pregnancy education and support.

**Providers**

Aim 3 results shared that many Black birthing women did not discuss the information they found on social media with their providers. Also, another study found that birthing women did not talk about the information they obtained from the internet unless their provider initiated the discussion (Sayakhot & Carolan-Olah, 2016). Therefore, providers can initiate conversations about social media use with their patients (Sayakhot & Carolan-Olah, 2016). Providers need to discuss pregnancy-related information found online with patients because this creates an opportunity for providers to reduce the spread of misinformation by correcting knowledge. Providers can use this same opportunity to alleviate anxiety, stress, or confusion caused by the information their patients encounter. As providers engage in these discussions with their patients, they need to consider the influential role they might have on their patient's behavior. COVID-19 misinformation has created “public physicians,” who are doctors who view a public presence as a large segment of their mission (Topf & Williams, 2021). Many of these providers feel that facing and correcting misinformation is a core part of their mission.

Engagement in discussions with patients to reduce the spread of misinformation can also become an opportunity to guide their patients on how to solicit quality resources online while
simultaneously improving the patient-provider relationship. To be prepared to initiate these conversations, providers would need to educate themselves about common social media accounts or websites birthing women use as sources for pregnancy information. Public health practitioners can reduce the burden this may place on providers by developing an infographic to inform and guide providers about the common social media accounts or websites birthing women use for pregnancy information.

Another informatics tool providers can utilize is Information RX. Information RX is a “second prescription pad given to providers to direct the patient to MedlinePlus content that helps explain the patient's condition – in English or Spanish” (Siegel et al., 2006). An evaluation of Information RX found that the program fosters dialogue between providers and patients, helps patients use the Internet more effectively, and favors patient education (Siegel et al., 2006). If prenatal care providers were to utilize a system similar to Information RX, patients could directly benefit from obtaining evidence-based information regarding their conditions, and providers could encourage the use of the program by asking patients questions about the information these women saw. Providers can also take communication skills training to learn effective strategies to better engage individuals in the shared decision-making process for obtaining health information online.

Aim 3 study's overall findings provided insights into the quality of guidance, support, and respect that some Black birthing women received during their prenatal care. Although results from both prenatal scales subscales were generally good, these ratings suggest that prenatal care delivery to Black birthing women can be enhanced. Prenatal care providers can use all or specific components of the QPCQ validated scale as an evaluation indicator to determine what areas of prenatal care delivery need improvement to better serve the birthing women within the
community they serve, especially Black birthing women. Findings from these subscales should be interpreted based on trimesters because birthing women’s prenatal care needs change as they progress through trimesters. After identifying the areas for improvement, the provider or clinic can make systematic changes to their care delivery and reassess the quality of prenatal care to examine whether the changes implemented made a significant impact. If their changes lead to improvements, they could share their practices with neighboring clinics or providers.

**Social Media Accounts**

Social media has been found to increase pregnancy knowledge (Chan & Chen, 2019). Yet, study results showed that there is a lack of maternal health information on popular parenting Instagram accounts. In this study, popular parenting social media accounts have large audiences (ranging from 315k followers to 948k followers). This provides a significantly large platform where potential opportunities for inter-organizational and inter-sectoral collaborations may occur to get maternal health information out. Sharing maternal health content on popular parenting social media accounts creates an opportunity to reach and educate potentially a large audience of individuals by simply sharing accurate maternal health posts.

Non-profit organizations can optimize social media’s vast reach to share available resources, provide support, and contribute to educating birthing women and recent mothers on pregnancy and post-partum topics. Aim 1 highlighted a lack of accessibility to revisit posts later to retrieve resource links. Birthing and parenting Instagram accounts can consider changing a common practice of inserting the resource links in the description biography section to relocating the resource links to the posts’ caption description section.
Organizations that seek to reduce maternal health disparities can know avenues of pregnancy information that women often on social media or create new ones to open discussions about maternal health disparities and Black maternal health. Social media accounts that deliver evidence-based information using health literacy practices may exist; however, more work needs to be done to identify such accounts and promote their use to Black women who are seeking pregnancy and are currently pregnant.

Birthing or parenting organizations, non-profits, governmental pregnancy programs, hospitals, and clinics can utilize their social media accounts to share educational health literate pregnancy information to raise pregnant women's awareness of pregnancy complications and their respective warning signs (Neighmond, 2019). They can also share more content about doulas and midwifery services (Taylor et al., 2019) and the benefits of utilizing these birthing services. Also, these organizations can use their social media platforms to educate birthing women and their families (especially Black women and their families) on engaging in early prenatal care and its links to positive birthing and maternal health outcomes (Bonnevie et al., 2022). These organizations need to consider and strategize how to compete or collaborate with social media influencers and popular social media accounts to get social media users to see accurate, evidence-informed maternal health and maternal health disparities content. Some successful social media campaigns have been reaching Black birthing women by targeting zip codes (Bonnevie et al., 2021; Bonnevie et al., 2022); this can be a viable option for organizations to consider attempting to reach birthing or Black birthing women on social media. Targeting social media accounts combined with mainstream social media accounts can be viable options for disseminating Black maternal health disparities and maternal health information. This could
increase racial and ethnic minority social media users' likelihood of encountering the posted content.

**Organizations**

Results from Aim 2 found that the majority of the Black birthing women in this study reported that the pregnancy information obtained on social media helped them make pregnancy decisions. Therefore, public health practitioners can utilize social media to share evidence-based information about pregnancy topics to inform and educate Black pregnant women. Public health practitioners or professional associations (such as the American College of Obstetricians and Gynecologists or the American Academy of Family Physicians) can develop a tool or guide that shares best practices for health literacy and constructing high-quality pregnancy-related content. A good example would be Massachusetts’ Local Board of Health: Social Media Toolkit for COVID-19 (Gualtieri et al., 2020). Developing a guide like this example but related to maternal health content will be useful for various audiences. This guide can then be disseminated to birthing and parenting organizations that share pregnancy-related content on social media platforms. Future non-profit or governmental pregnancy programs can develop digital interventions (possibly a social media campaign) that target Black women to promote healthy pregnancy behaviors, share information about issues pertinent to Black women, and encourage positive representations of Black women through images and videos shared as part of the intervention. Pregnancy digital interventions amongst Black women, especially social media campaigns, have been demonstrated to be feasible and yielded positive pregnancy outcomes (Bonnevie et al., 2021; Bonnevie et al., 2022).

Also, non-profit or governmental pregnancy programs can learn from social media influencers' strategies that have made them successful on social media platforms. Some advice
shared by physicians who are popular on social media was to “focus on one clear message at a
time (especially on TikTok where you have a maximum of 60 seconds) and to make that
message as engaging as possible” (Amclarnon, 2021). Also, “If the delivery is boring, it is too
easy for people to scroll onto the next video.” (Amclarnon, 2021). Personality and enthusiasm
are very impactful on social media. Therefore, whoever is delivering the messages must
authentically be themselves to be relatable to social media users.

Aim 2 results informed us that Black birthing women in the study sample most utilized
sources for pregnancy-related information besides social media were their family, friends, books,
and pregnancy-related courses. Providing these alternate routes to disseminating information to
this population can guide practitioners on how to appropriately deliver pertinent pregnancy
information to this hard-to-reach underserved population just in case their patient does not use
social media or prefers not to obtain information from social media. Hospitals and professional
organizations can update their prenatal care guidelines to be inclusive of social media
discussions.

From a health literacy perspective, public health educators, non-profit, or governmental
pregnancy programs can design training modules to teach pregnant women the needed skills to
identify high-quality, evidence-based information on social media and assess the validity of
content shared. Study results showed that Black birthing and postpartum women with low health
literacy more often use social media and give and get support from social media than women
with higher health literacy. Therefore, creating these training modules would be a great way to
mitigate misinformation. Public health educators, non-profit, or governmental pregnancy
programs can also design training modules to teach pregnant women health literacy and eHealth
literacy skills to better access, evaluate and use health information. These organizations can
apply Watkins & Xie’s (2014) findings from their systematic review of eHealth literacy interventions to guide the development of their training modules. Organizations can also use health literacy practices for developing information (ODPHP, 2020). Developing health literacy and eHealth literacy interventions is a direct route to reducing or preventing misinformation when birthing women obtain pregnancy information on social media. Also, the development of these interventions promotes maternal health knowledge equity. Black maternal health non-profits, coalitions, and advocacy programs can develop guides for both patients and providers to educate them about social media accounts or websites that discuss Black maternal health issues and educate women about pregnancy information they approve of.

**Conclusion**

Overall, this dissertation highlighted possible missed opportunities to utilize social media to reduce maternal health disparities. This project provided an initial look at ways social media can be used as a viable tool to promote maternal health equity. Findings from the three papers advance research, offer ideas or strategies for information dissemination, inform future interventions, and provide practice recommendations.

This dissertation comes at an appropriate historical time due to the recent increases in widespread discussions concerning maternal health disparities. As history unfolds, celebrities, public figures, politicians, healthcare organizations, professional associations, governments, the media, and individuals directly impacted by maternal health disparities engage in large-scale discussions on various platforms and in various settings to address this issue. For example, the American College of Obstetricians and Gynecologists partnered with Black Mamas Matter Alliance on Black Maternal Health Week in April 2020. Also, since 2018, many Black public figures have been using their platforms to share their maternal health experiences. As an
example, politicians such as Vice President Kamala Harris and celebrities such as Serena Williams, Beyoncé, Allyson Felix, and Michelle Obama have been advocating for Black maternal health improvement. There have also been many summits, conferences, campaigns, listening sessions, and coalitions promoting helpful dialogues and interventions on how to improve maternal health within the US. In addition, there has been an increase in funding mechanisms created at the local, state, federal, and non-profit levels to support work that seeks to reduce these health disparities.

Still, there are numerous gaps within the literature about maternal health, maternal health disparities, and especially Black maternal health. Given the widespread use of social media for health information, this work provided an essential initial look into exploring the role of social media in maternal health for Black women and offered ideas for future studies. Study results also provided some practical and feasible recommendations for how social media can be used to combat maternal health disparities. Social media is an innovative tool that can provide a cost-effective way to help reduce existing maternal health disparities, especially among Black women.
REFERENCES


https://doi.org/10.1371/journal.pmed.1001454

https://doi.org/10.1016/S0140-6736(17)30569-X

https://doi.org/10.1016/j.pec.2010.05.029

https://doi.org/10.1002/da.22210

https://doi.org/10.1080/10810730.2010.499985


https://doi.org/10.1016/j.midw.2016.06.020


https://doi.org/10.1177/15248399221083844

https://doi.org/10.1007/s10995-020-03068-1

http://reviewtoaction.org/Report_from_Nine-MMRCs


Moon, R. Y., Mathews, A., Oden, R., & Carlin, R. (2019). Mothers’ Perceptions of the Internet and Social Media as Sources of Parenting and Health Information: Qualitative Study. *Journal of Medical Internet Research*, 21(7), e14289. [https://doi.org/10.2196/14289](https://doi.org/10.2196/14289)


APPENDICES

Appendix 1 – Aim 1 Content Analysis Codebook

BLACK MOMS’ SOCIAL MEDIA USAGE STUDY CODEBOOK

PART 1: POST INFORMATION

1a. Date of post

PART 2: POST DETAILS (ONLY INCLUDE FOR THE ACTUAL POST)

If it says 1k, enter 1k. Don’t enter as 1000. Also, don’t use commas in numbers (so 1000 instead of 1,000).

2a_likes/views
2a. How many people ‘liked’ this post? _______
For videos, if you can only see views, put NA.

How many people viewed the post? _______
This is usually only used for Instagram videos, for all other social media posts put NA.

2b_others
2b_otherstext
2d. Were any other users mentioned in the post? (indicated by an @ typically; include even if the organization is using an @ to themselves)
1 Yes If yes, list here: ________________________________________________
2 No

Before you continue coding, look at the post and think about what the post is trying to tell you about. And what is it telling you to do?

2c_maintopic
2c. What is the main topic(s) of this post? You should pick the category (or categories) that BEST describe the topic(s).

1. Birth control
2. Diet and fitness (cravings, healthy eating, etc.)
3. Sleep-related tips and issues
4. Prescription or over the counter medications
5. Substance use (opioids, alcohol, etc.)
6. Personal care products (tips for safe usage, warnings, recommendations, etc.)
7. Prenatal (Antenatal) Care (including prenatal screening and tests)
8. Baby growth and development
9. Breastfeeding
10. Labor and delivery (birthing expectations, warning signs of labor, etc.)
11. Birth defects
12. Common pregnancy symptoms and experiences (heartburn, headaches, etc.)
13. Pain management
14. Fertility treatments (IVF, IUI, etc.)
15. Maternal well-being (includes mindfulness, anxiety, mental health, tips for relieving stress, tips to promote general health well-being etc.)
16. Post-partum depression
17. Pregnancy complications
18. Maternal body changes (weight changes, stretch marks, etc.)
19. Promotion of doulas or midwives
20. Pregnancy loss
21. Sex during pregnancy
22. Resources or promotion of advocates
23. C-section
24. Vaccinations
66. Mention of general maternal health (such as ‘Healthy Pregnancy,’ “Stay Healthy while Pregnant,” etc.)
88. Other (ONLY use if the one main topic cannot be put into one of the above categories such as promotion for research studies, asking for advice)

2d_BlackMaternal Were any of these topics specific to black maternal health?
1. Yes
0. No

2e_SharedResources What resources were shared or recommended? This list corresponds to the list above but adds additional categories for specific types of resources. CHECK ALL THAT APPLY.
1. Support groups (In-person or online)
2. Article (including news or peer-reviewed)
3. Websites (Blogs included)
4. Magazine cover
5. Videos or podcast
6. Birthing education classes or resources
7. Reposting from another social media account (includes FB, Twitter, etc.)
8. Health education tools
9. Doula services or Midwifery care
10. Tips for picking birthing hospitals
11. Tips on questions to ask when choosing a provider
12. Tips on the warning signs of common pregnancy complications (preeclampsia, post-partum hemorrhaging, gestational diabetes, preterm labor, eclampsia, HELLP syndrome, hypertension, heart disease, peripartum cardiomyopathy, fibroids
13. Tips to obtain or support one who is need of therapy/mental health counseling
14. General tips
15. Other ___________________

2f_MMH_topic
2f. What is the topic mentioned in the post? You should pick the category (or categories) that BEST describe the topic(s).
1. Access to prenatal care
2. Breastfeeding challenges
3. Labor and delivery complications
4. Teenage pregnancy
5. Pre-eclampsia or eclampsia (signs of high blood pressure (hypertension))
6. Post-partum hemorrhaging
7. Preterm labor
8. HELLP syndrome
9. Fibroids
10. Gestational diabetes
11. Cardiovascular diseases
12. Maternal death (mortality) rates
13. Post-partum depression
14. Other pregnancy complications (such as miscarriages, pains, pregnancy loss)
15. Income
16. Homebirths
17. Doulas or midwives
18. Racism
19. Unconscious or unintentional biases
20. Promotion of representative doctors or OBGYN
21. Ignored or dismissed when receiving care
22. Culturally or linguistically appropriate care
23. Promoting minority health policy
24. Promote advocating
88. Other (ONLY use if the one main topic cannot be put into one of the above categories such as promotion for research studies, asking for advice)

*PART 3: PHOTO/IMAGE ONLY
This section ONLY refers to a photo or image shown with the post; do not consider any text on the photo when answering these questions. This section refers to a photo or image included with the post OR as part of a website preview. Images can include photos, flyers, infographics, cartoons, etc.). Anything that looks like an image, including a cartoon, etc., should be considered a photo or image and coded here. Do NOT include an image for a video (if you see an image with an arrow). That will be coded under the video. Here is an example of a photo in a weblink preview. You would code the photo of the weblink preview in this section.

3a_NWMomImage
3a. Does the image or cartoon contain a diverse mom in the post? In other words, if the post is about moms breastfeeding, is the mother in the photo appears to be a non-white woman?
   1 Yes
   0 No
   77 Not applicable
Appendix 2 – Aim 2 and 3 Survey Questions

First, we will ask you about your phone and Internet use.

Q1 Do you have your own cell phone?
   1. Yes
   0. No (SKIP TO Q2)

Q1a Is this cell phone a smartphone? A smartphone can access email, the internet, and phone apps.
   1. Yes
   0. No

Q1b How much, if at all, do you worry about being able to pay for your cell phone bill over the next few months?
   1. A lot
   2. Some
   3. Not too much
   4. Not at all

NEXT: We will be asking you several questions about how you use the internet.

PLEASE NOTE:
When we say internet, we mean websites you use for information. We do NOT mean search engines like Google. We do NOT mean social media sites like Facebook.

When we ask about pregnancy information, we mean any information about pregnancy. Some examples include symptoms, medication use during pregnancy, childbirth preparation, or doctor and insurance questions.

Q2 How much time do you currently spend using the Internet for PERSONAL use on a typical day? Please do NOT include time spent on social media.
[INSERT NUMERIC BOX, RANGE 0-24] hours [INSERT NUMERIC BOX, RANGE 0-59] minutes

For the following questions, we would like you to think about your most recent pregnancy when answering.

Q3 During your most recent pregnancy, have you used the internet to get pregnancy information? Please do NOT think about social media for this question.
   1. Yes
   2. No (SKIP TO Q6)

Q4 Please list the top 3 websites that you found most helpful for pregnancy information. You may include the name of the website or the name of the organization.

Please do NOT include social media pages here. Please do NOT enter “google” or other search engines here. While you may “google” or search for information before landing on a website, we want to know the names of the websites or names of organizations where you get the information.

Type in your answers.
   1. [INSERT TEXT BOX_1]
   2. [INSERT TEXT BOX_2]
   3. [INSERT TEXT BOX_3]
Next, please answer these questions about your experience using the internet to find pregnancy information.

<table>
<thead>
<tr>
<th>eHEALS Scale</th>
<th>Strongly agree (1)</th>
<th>Somewhat agree (2)</th>
<th>Undecided (3)</th>
<th>Somewhat disagree (4)</th>
<th>Strongly disagree (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5a I know <strong>how</strong> to find helpful pregnancy information on the internet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5b I know <strong>how</strong> to use the internet to answer questions I have about my pregnancy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5c I know <strong>what</strong> pregnancy information is available on the internet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5d I know <strong>where</strong> to find helpful pregnancy information on the internet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5e I know <strong>how</strong> to use the pregnancy information I find on the internet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5f I have the skills I need to understand the pregnancy information I find on the internet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5g I can tell the difference between high-quality and low-quality pregnancy information on the internet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5h I feel confident using information from the internet to make decisions about my pregnancy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NEXT: We are going to ask questions about your use of social media.

**PLEASE NOTE:** When we say **social media**, we mean social networking sites like Facebook, Twitter, Instagram, Pinterest, and Reddit.

Q6 How much time do you spend using social media for PERSONAL use on a typical day?  
[INSERT NUMERIC BOX, RANGE 0-24] hours [INSERT NUMERIC BOX, RANGE 0-59] minutes

Q7 Do you currently have a profile on Facebook?  
1. Yes  
0. No (SKIP TO Q8)

Q7a About how often do you use Facebook? Please select your best estimate.  
1. Several times a day  
2. Once a day  
3. 3-5 days a week  
4. 1-2 days a week  
5. Less than once a week  
6. Never

Q8 Do you currently have a profile on Twitter?  
1. Yes  
0. No (SKIP TO Q9)

Q8a About how often do you use Twitter? Please select your best estimate.  
1. Several times a day  
2. Once a day  
3. 3-5 days a week  
4. 1-2 days a week  
5. Less than once a week  
6. Never
Q9 Do you currently have a profile on Instagram?
   1. Yes
   0. No (SKIP TO Q10)

Q9a About how often do you use Instagram? Please select your best estimate.
   1. Several times a day
   2. Once a day
   3. 3-5 days a week
   4. 1-2 days a week
   5. Less than once a week
   6. Never

Q10 Do you currently have a profile on any other social media sites? Please select all that apply.
   1. TikTok
   2. Pinterest
   3. YouTube
   4. LinkedIn
   5. Google Plus
   6. Reddit
   7. Tumblr
   8. Other

For the following questions, we would like you to think about your most recent pregnancy when answering.

Q11 How important was it that you had easy access to social media sites during your most recent pregnancy?
   1. Very important
   2. Somewhat important
   3. Not too important
   4. Not at all important

Q12 How useful has the pregnancy information found on social media sites been to help you make decisions about your pregnancy?
   1. Very useful
   2. Useful
   3. Not very useful
   4. Not useful at all

Q13 Please list the top 3 social media accounts you found most helpful for pregnancy information.

Please do NOT enter “Facebook,” “Instagram,” or other social media sites here. While you may use Facebook or Instagram to get to social media accounts, we want to know the names of the actual social media accounts (such as group or organization accounts) where you get the information.

Type in your answers
   1. [INSERT TEXT BOX_1]
   2. [INSERT TEXT BOX_2]
   3. [INSERT TEXT BOX_3]

Q14 Have you used any of the following social media accounts to get pregnancy information during your most recent pregnancy? (Please select all that apply)

   □ Baby Center
   □ Mayo Clinic
   □ Web MD
   □ Parenting Magazine
   □ Parents Magazine
   □ What to Expect
   □ The Bump
Q15 Please read each statement below about social media use during pregnancy and select how often you used social media for each reason during your most recent pregnancy.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>I used(d) social media to read about people in the same situation as me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I used(d) social media to talk about sensitive pregnancy topics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I used(d) social media to vent my frustrations with my pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I used(d) social media to help me make decisions about my prenatal care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I used(d) social media to seek support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I used(d) social media to provide support to others by sharing my thoughts/experiences</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I used(d) social media to get more information on the recommendations my provider gave me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I used(d) social media to see if my experiences are 'normal'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q16 Please provide your best estimate for how often you have used social media to get information on the following topics during your most recent pregnancy.

<table>
<thead>
<tr>
<th>Health Topic</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General health topics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your body during pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet &amp; fitness during pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep-related issues during pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medications taken during pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal care products (skin/hair care products, makeup, nail polish, etc.) used during pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pregnancy specific topics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenatal care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenatal screenings &amp; Tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your baby’s growth and development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preeclampsia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-risk pregnancies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth defects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other pregnancy complications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q17 How often have you talked to the following people about pregnancy information you found on social media?
<table>
<thead>
<tr>
<th>Individual</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwife</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doula</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childbirth educator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family or friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner/spouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Only displayed if doctor is selected for Q17]

Q17a When talking with your doctor, how would you describe their response to the information you shared with them from social media?
1. Not at all willing to talk about the information
2. Not very willing to talk about the information
3. Somewhat willing to talk about the information
4. Very willing to talk about the information
5. I did not talk to my provider about any information I found on the social media

Q18 We are thinking about how we can help black women who are pregnant get accurate and helpful information about pregnancy. Please let us know if you think pregnant black women would be interested in the following:

<table>
<thead>
<tr>
<th></th>
<th>Very Interested</th>
<th>Somewhat interested</th>
<th>Not at all interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>A list of social media accounts that pregnant black women may find useful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A public social media account designed for pregnant black women to provide information and answer questions about pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A private social media account designed for pregnant black women to provide information and answer questions about pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An online support group for pregnant black women that is NOT hosted on a social media platform</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q19 Do you have any other ideas about a resource using social media sites that would be helpful for pregnant black women? ______________

NEXT: We would like to ask you about communication with your physician, midwife, or other health care providers during your most recent pregnancy.

PLEASE NOTE: You might have seen more than one health care provider for your care, but please think of the prenatal care you received overall when answering these questions. Please read each statement carefully and indicate how much you agree or disagree with it.

Measuring Satisfaction  

<table>
<thead>
<tr>
<th>Anticipatory Guidance (Cronbach’s Alpha = .85)</th>
<th>5 Strongly Agree</th>
<th>4 Agree</th>
<th>3 Neither Agree Nor Disagree</th>
<th>3 Disagree</th>
<th>1 Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q20a My prenatal care provider(s) gave me options for my birth experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20b I was given enough information to meet my needs about breast-feeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20c My prenatal care provider(s) prepared me for my birth experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20d</td>
<td>My prenatal care provider(s) spent time talking with me about my expectations for labor and delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20e</td>
<td>I was given enough information about the safety of moderate exercise during pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20f</td>
<td>I received adequate information about my diet during pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20g</td>
<td>My prenatal care provider(s) was interested in how my pregnancy was affecting my life</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20h</td>
<td>I was linked to programs in the community that were helpful to me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20i</td>
<td>I received adequate information about alcohol use during pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20j</td>
<td>I was given adequate information about depression in pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q20k</td>
<td>My prenatal care provider(s) took time to ask about things that were important to me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Support and Respect (Cronbach’s Alpha = .93)**

| Q21a | My prenatal care provider(s) respected me                                                      |
| Q21b | My prenatal care provider(s) respected my knowledge and experience                            |
| Q21c | My decisions were respected by my prenatal care provider(s)                                   |
| Q21d | My prenatal care provider(s) was patient                                                       |
| Q21e | I was supported by my prenatal care provider(s) in doing what I felt was right for me          |
| Q21f | My prenatal care provider(s) supported me                                                       |
| Q21g | My prenatal care provider(s) paid close attention when I spoke                                 |
| Q21h | My concerns were taken seriously                                                              |
| Q21i | I was in control of the decisions being made about my prenatal care                            |
| Q21j | My prenatal care provider(s) supported my decisions                                             |
| Q21k | I was comfortable with my prenatal care provider(s)                                            |
| Q21l | My values and beliefs were respected by my prenatal care provider(s)                           |

**NEXT:** We have some final questions for you about yourself.

**Q22** Besides the internet and social media, how often have you use(d) any of the following sources for pregnancy information during your most recent pregnancy?

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Books</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magazines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy-related courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious leaders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q23 How often do you need to have someone help you when you read instructions, pamphlets, or other written material from your doctor or pharmacy?
   1. Never
   2. Rarely
   3. Sometimes
   4. Often
   5. Always

Q24 How many prior pregnancies have you had that resulted in a live birth?
   (Numeric)

Q25 Please select C as your answer choice to this question.
   1. A
   2. B
   3. C
   4. D

Q26 Have you experienced any reproductive complications such as infertility, miscarriage, or stillborn in the past?
   1. Yes
   2. No
   3. Unsure

Q27 What type of health care provider(s) took care of you during your most recent pregnancy? Please select all that apply.
   1. Midwife (Certified Nurse Midwife, Certified Midwife, Certified Professional Midwife)
   2. Family doctor
   3. Obstetrician-Gynecologist doctor
   4. Maternal-Fetal Medicine doctor
   5. Other ______________

Q28 Did you delay or avoid prenatal or postpartum care within the past 6 months due to COVID-19?
   1. Yes
   2. No
   3. Not applicable

Q29 Do you think you are more at risk for pregnancy complications than women who are not black?
   1. Yes
   0. No
   Not sure

Q30 Do you think doctors treat you differently than women who are not black?
   1. Yes
   0. No
   Not sure

Q31 How old are you? (Numeric) Years

Q32 What is the highest level of education that you have completed?
   1. Less than high school
   2. High school
   3. Vocational or technical degree
   4. Some college
5 College graduate
6 Professional/postgraduate degree
7 Other ____________________________

Q33 What is your employment status?
1 Employed and work 35 hours or more per week in all jobs
2 Employed and work less than 35 hours per week in all jobs
3 Unemployed and looking for work
4 Unemployed and not looking for work
5 Homemaker
6 Student

Q33a Do you work for pay in a health-related position such as a doctor, nurse, hospital administrator, or employee in a health facility?
1 Yes
0 No

Q34 In the past 12 months have you received food stamps, also called SNAP, the Supplemental Nutrition Assistance Program, on an EBT card?
1 Yes
0 No
88 Don’t Know/Not Sure

Q35 What is your marital status?
1 Married
2 Divorced
3 Widowed
4 Separated
5 Never married
6 A member of an unmarried couple

Q36 Please select the choice below that describes your household (Knapp et a, Knapp et al2, Cunningham et all)
1 Single parent
2 Two parent
77 Other ____________________________

Q37 In politics today, do you consider yourself any of the following?
1. Republican
2. Democrat
3. Independent
4. Other party
5. No party
88. Don’t know/Not sure

Q38 Do you consider yourself belonging to any type of religion?
1. Yes
2. No
3. Don’t know/Not sure

Q39 Are you Hispanic, Latino/a, or Spanish origin?
1 Yes
2 No
88 Don’t Know/Not Sure
Q40 What was your total combined family income last year before taxes?
   1 Less than $20,000
   2 $20,000 to $39,999
   3 $40,000 to $59,999
   4 $60,000 to $79,999
   5 $80,000 or more
   88 Don’t know
   99 Prefer not to answer

Q41 What is the zip code where you currently live?