

**Interventions to Improve Pregnancy Related Mortality and Morbidity in Black Birthing
People: A Rapid Review of the Literature**

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BS, University of Pittsburgh, 2020

Submitted to the Graduate Faculty of the
Graduate School of Public Health in partial fulfillment
of the requirements for the degree of
Master of Public Health

University of Pittsburgh

2021

UNIVERSITY OF PITTSBURGH

GRADUATE SCHOOL OF PUBLIC HEALTH

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Abstract

Black birthing people are 3 to 4 times more likely than White birthing people to experience pregnancy related mortality. This disparity has existed for nearly six decades and is worse now than during slavery. Additionally, Black birthing are nearly twice as likely to experience pregnancy related morbidity. The Black-White disparity in pregnancy related mortality and morbidity has been a popular topic of discussion in recent years with the rise of concern about health equity. The public health significance of this is despite significant racial disparities in pregnancy related mortality and morbidity, the conversation has been focused on identifying causalities as opposed to implementing interventions. While there are interventions that exist at the state and local level, many of these do not have any reports on its efficacy for pregnancy related mortality and/or morbidity. This rapid review of the literature seeks to identify existing interventions that have been reported on. These interventions have been categorized as either economic, medical or social. Because of the pressing nature of this issue, this study suggests expanding the interventions that seem to have the most direct results. This includes expanding Medicaid to all 50 states and implementing obstetric hemorrhage safety bundles to any hospital/center where people give birth.

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1.0 Introduction

This paper will discuss topics commonly referred to as maternal mortality and maternal morbidity. However, in an effort to be inclusive of all gender expressions and identities, this paper will use gender neutral terms. Maternal mortality will be referred to as pregnancy related mortality (PRM). Maternal morbidity will be referred to as pregnancy related morbidity (PRMB). Severe maternal morbidity will be referred to as severe pregnancy related morbidity (SPRMB). This paper will also not use the words women or mother, the term used will be birthing people (BP).

PRM is often used as a marker of the health of a community. In the United States PRM has varied throughout the years increasing recently to a rate higher than most other high income nations. In 1987, PRM was 7.2 per 100,000 live births (CDC, 2020). As of 2018, the average pregnancy related mortality rate (PRMR) in the United States of America is 17.4 deaths per 100,000 live births (CDC, 2019). While PRMRs have continuously risen, racial disparities also remain an issue. The average PRMR among non-Hispanic Black BP is 40.8 deaths per 100,000 live births (CDC, 2019). Black BP's PRMR is 3.2 times higher than their White counterparts (12.7) (CDC, 2019). Black BP's PRMR has been 3 to 4 times higher than their White counterparts for over six decades (Singh, 2010).

While the racial disparities in PRMB are not as large, the two issues overlap. In 2014, the overall incidence of SPRMB was 144 per 10,000 live births- a near 200% increase over the last decade (CDC, n.d.). A study looking at a representative sample of discharges across the United States between 2012-2015 showed that the largest racial disparity in SPRMB existed between non-Hispanic Whites and non-Hispanic Blacks (Admon et al., 2018). Non-Hispanic Blacks

experienced an SPRMB rate of 231.1 per 10,000 births which were nearly twice as high as non-Hispanic Whites' rate of 139.2 (Admon et al., 2018).

The contributing factors for Black BP's disproportionately high PRM and PRMB rates has been a topic of research for decades. However, the research has been more focused on identifying causalities as opposed to what can be done about the problem in terms of treatment and/or prevention. At this point in time there is enough literature to start interventions to help Black BP. This study aims to identify what interventions have been implemented after years of researching the causalities. This study will do this by conducting a rapid review of the literature to identify what interventions exist to address pregnancy related mortality and pregnancy related morbidity rates of Black BP in the United States.

2.0 Background

2.1 Pregnancy Related Mortality and Morbidity in the United States

The Center for Disease Control and Prevention (CDC) defines pregnancy related mortality (PRM) as “the death of a woman while pregnant or within 1 year of the end of pregnancy regardless of the outcome, duration, or site of the pregnancy — from any cause related to or aggravated by the pregnancy or its management” (2019). Unfortunately, the United States is trailing behind other countries when it comes to the health of birthing people (BP) and PRM. In 2013, the United States ranked 60th in PRM worldwide (Hirshberg & Srinivas, 2017). The United States was one of only eight countries that rose in PRM rates- none of those other countries being high income nations (Hirshberg & Srinivas, 2017). Approximately 700 BPs die each year due to pregnancy in the United States (CDC, 2019). The leading causes of PRM are related to cardiovascular conditions such as hypertension disorders and hemorrhages (Hirshberg & Srinivas, 2017).

Debate continues about the contributing factors for high PRM in the United States. One of the most notable factors associated with the increase is the way PRM is identified. In 1999, the implementation of the International Classification of Diseases version 10 (ICD-10) expanded what would constitute a PRM (Creanga et al., 2014). Additionally, the United States added a pregnancy checkbox to the standard death certificates in an effort to expand the detection of PRM (Creanga et al., 2014). This and the United States’ slightly different definition of PRM could be a part of the reason why the United States ranks so low in comparison to other developed nations. Other countries’ definition of PRM aligns more with the ICD-10’s and the World Health Organization’s (WHO), which classifies a death as a PRM only until 42 days after

delivery (Hirshberg & Srinivas, 2017). Additionally, finding the true rate of PRM can be difficult when looking at different states and cities and how they report their numbers. Many regions that group together all causes of death of pregnant people in their count even if the death was not a direct result of the pregnancy itself. For example, a pregnant person who dies of a drug overdose or homicide would be grouped in with all other PRMs in that city. These numbers would all be grouped together in what is considered “maternal mortality.” Some city and states only report maternal mortality number as opposed to PRM which can create confusion on how many BPs are actually dying from pregnancy related complications.

The number of pregnancy related morbidities (PRMB) is higher than PRM and has also been on the rise. Approximately 50,000 BP each year are impacted by PRMB (Hirshberg & Srinivas, 2017). In 2014, The CDC had estimated a near 200% increase in the overall incidence of severe pregnancy related morbidity (SPRMB) over the last decade resulting in 144 severe morbidities per 10,000 live births. The CDC uses the ICD-10 to classify what is considered SPRMB (CDC, n.d.). As of 2015, there are 21 indicators of SPRMB (CDC, n.d.). This includes instances of acute myocardial infarction, aneurysm, eclampsia, and pulmonary edema (CDC, n.d.). Blood transfusions are the most common indicator of SPRMB (Callaghan et al., 2012). While other countries may not calculate the prevalence of PRMB, the United States still trails behind in key indicators of PRMB. For example, eclampsia exists in 7 in 10,000 births in the United States while other countries in Europe range from 1 to 9 cases per 10,000 births (Creanga et al., 2014).

2.2 A Brief History of Black Birthing People in the United States

United States' history of racism towards Black people is extensive, particularly when it comes to Black BP. This section will discuss the United States and its health system's transgressions against Black BP, including a brief review of these transgressions across time periods. The list of offenses committed against Black people during each time period could be a paper of its own. The offenses discussed will not be exhaustive and are meant to highlight those offenses that this paper considers most pertinent. The time periods referenced in this section include Slavery (1619-1865), Jim Crow (1865-1965) and Civil Rights (1955-1975).

During slavery, Black BP's value was based on their ability to work and breed children that would work or be sold to the highest bidder (Prather et al., 2018). They were often abused sexually and reproductively (Prather et al., 2018). It is estimated that 58% of enslaved BP had been sexually assaulted by a white man (West & Johnson, 2006). While Black BPs would birth children- willingly or unwillingly-, some of them were also expected to take care of their slave owner's children (West & Knight, 2017). A Black birthing person during slavery could give birth to a child, have that sold to another slaver, and then be expected to serve as a wet nurse to their slave owner's child (West & Knight, 2017). Wet nurses are people who take care of another person's children- typically infants- and breastfeed them with their own breast milk (West & Knight, 2017). Even beyond wet nursing, they could serve as an enslaved nanny to these children without ever being able to be a parent to their own child (West & Knight, 2017).

Another key transgression against Black BP was the cruel experimentation that some were subjected to. The most notable was performed by James Marion Sims, the "Father of Modern Gynecology" and former president of the American Medical Association (Khabele et al., 2021). He used experimental surgeries on at least 14 enslaved black BPs without anesthesia (Khabele et

al., 2021). This is despite the fact that ether was considered a general anesthetic at the time (Harris, 1950). Because these BPs were slaves, they could not give consent to these procedures. While few of these BPs were actually identified by name, one person- Anarcha Westcott- had 29 unsuccessful surgeries performed on them by Sims before he successfully performed his first vesicovaginal repair (Khabele et al., 2021). These BPs were the foundation of Sims' success and they received no benefit from it. While Sims is one of the most notorious doctors that experimented on Black BPs, it was a practice that many others also participated in (Savitt, 1982). Black BPs were maimed like animals for the benefit of white people and the advancement of their health- a pattern that continues throughout United States history.

After the Emancipation Proclamation, medical mistreatment of Black BPs continued during the Jim Crow era. Sterilization was another way that Black BPs were dehumanized by the US health system. From the early 1900s up until the 1970s, 30 states endorsed formal eugenic programs that enforced sterilization (Kluchin, 2009). These programs coerced Black BPs into enduring sterilization procedures that unknowingly to many of them were irreversible (Schoen et al., 2005). In addition to being victimized by the US healthcare system, they were also victimized by the law. Black BPs were often the victims of rape and genital mutilation because laws in some states only protected White BPs from these crimes (Sommerville, 2004; Kennedy, 1998).

Jim Crow laws and Black Codes forced Black people into a poorer quality of life which resulted in Black BPs often receiving subpar and unequal medical care. Legal segregation allowed healthcare entities to deny care to Black BPs (Smith, 2005). However, even after the passage of the Civil Rights Act of 1964 forced hospitals to hire doctors that would serve all races, unequal treatment continued. Coerced sterilization continued and some Black BPs were threatened with the denial of medical care if they did not undergo sterilization (Randall, 1996). This trend continues

into the modern era whereas Black BPs are more likely than White BPs to be advised against childbearing and Black BPs of lower socioeconomic status are more likely to be recommended for intrauterine contraception- a highly invasive procedure (Thorburn, 2005; Dehlendorf et al., 2010).

All of these factors and more set the foundation for the state of Black BP health in the U.S. Black BPs have experienced a long cruel history in terms of sexual and reproductive health. The U.S. healthcare system has racism embedded into it that continues to evolve into the inequities that we witness today. This has caused Black BPs to rightfully mistrust the American healthcare system. It also allows the racism and implicit biases that still linger today to go unchecked.

2.3 Economic Factors of Black Pregnancy Related Mortality and Morbidity

In general, lower socioeconomic status (SES) correlates with poorer health outcomes. The reasoning for this is not always concrete and varies by health outcome. BP of low SES consistently have a higher risk of adverse pregnancies and birth outcomes. One study found that an increase in income inequality in a state was associated with an increase in PRM in Black BPs (Vilda et al., 2019). There was no such association found with White BPs (Vilda et al., 2019). While Black BP tend to be of a lower economic status than White BP, the differences in SES do not seem to fully explain the disparity in PRM or PRMB. While education status alone is not a predictor of income level, it is a strong predictor such that people of higher educational attainment have higher income levels. However, Black BPs with a college education have a PRMR five times higher than their White peers (CDC, 2019). Additionally, Black BPs with a college education have a PRM rate nearly twice as high as White BPs with less than a high school diploma (CDC, 2019). People

without a clear understanding of racial inequity mistakenly attribute health disparities to individual income status and fail to understand the larger nuance.

While individual income level plays a role in PRM and PRMB, insurance and state/local economic structures also play a role. For example, a study found that implementation/ growth of publicly funded programs like WIC was significantly associated with a decrease in mortality rates of Black BPs (Bekemeier et al., 2014). However, this study did not look at Black PRM or PRMB specifically. It also did not find this change decreases the disparity in mortality for Black and White BPs (Bekemeier et al., 2014). In terms of insurance, Black BPs are more likely to be recipients of Medicaid than White BPs (Markus et al., 2013). Because of this, Black BPs may have more limited options in care because Medicaid has lower reimbursement levels. Despite this, a study examining disparities in PRMB did not find differences in outcomes when comparing commercial insurance vs Medicaid (Howell et al., 2020). This trend remained even when stratifying these results by race (Howell et al., 2020). Also, the effects of the expansion of Medicaid have yet to be fully explored. Preliminary data suggests it has not had a significant impact on infant birth outcomes, but the impact on BP's birth outcomes is not yet understood (Howell, 2001). The expansion of Medicaid was a large step toward health equity in America, but a large portion of Americans remained uninsured. As of 2018, 11.5% of nonelderly Black Americans still remain uninsured (Artiga et al., 2020). This is in contrast to 7.5% of White Americans (Artiga et al., 2020). While Black Americans do not have the highest uninsured rates of racial minorities, the impact of not having insurance is still significant. Uninsured women are more likely to experience SPRMB and are less likely to seek out care (Carter et al., 2016; Creanga et al., 2014)

2.4 Medical Factors of Black Pregnancy Related Mortality and Morbidity

Medical factors are one of the most direct links between Black PRM and PRMB. Medical factors include but are not limited to the care that BPs receive by providers (i.e. treatments and medication), their physical health, and history of illnesses. Black BP have higher incidence rates than White BP for the vast majority of severe morbidity factors (Gadson et al., 2017). This includes factors like aneurysms and cardiomyopathy. While the reasoning for Black BPs having a higher rate SPRMB is still under debate, it can be speculated that this is, in part, due to Black BPs having poor health outcomes when it comes to chronic health conditions (Admon et al., 2018). Additionally, Black BPs have the highest rates of cesarean delivery (Valdes, 2020). While cesarean deliveries can be medically necessary, the overuse of them can lead to factors that exacerbate the birthing experience and lead to morbidity and mortality (Clark et al., 2008). One of these factors is postpartum hemorrhage. Postpartum hemorrhage is one of the leading causes of mortality and morbidity (Berg et al., 2005; Weinick & Hasnain-Wynia, 2011). It is also highly preventable with estimates stating 60% of cases or higher were preventable (Berg et al., 2005; Clark et al., 2008). For postpartum hemorrhages that required a blood transfusion, a study found that non-Hispanic Black BPs experienced a significantly higher risk of SPRMB than all other races examined (Gyamfi-Bannerman et al., 2018). This disparity also remained for cases that did not require a blood transfusion (Gyamfi-Bannerman et al., 2018).

Before even reaching the delivery room, there are discrepancies in the prenatal care of Black BPs. Black BPs are more likely to receive prenatal care later on in their pregnancy than White BPs (Bryant et al., 2010). This disparity can be influenced by socioeconomic factors and is unlikely to be due to health status or individual preference (Smedley, Stith, & Nelson, 2003). While adequate prenatal care has been significantly linked to improved infant outcomes, its effects on

BP's outcomes have not been fully established (Coley & Aronson, 2013; Carroli, Rooney & Villar, 2001). It can be speculated that prenatal care improves BP's health under the idea that healthy birthing person equals a healthy baby. This is supported by data showing that four or fewer prenatal visits were associated with PRM (Moaddab et al., 2016). Healthy birthing person equals a healthy baby is the concept that when the person carrying the baby is relatively healthy the infant they produce is healthy. This comes from the fact people with lower BMI, little to no chronic conditions, who exercise regularly and a plethora of other things have better infant outcomes. So, if adequate prenatal care results in a healthy baby, this may be because prenatal care produced a healthy birthing person.

2.5 Social Factors of Black Pregnancy Related Mortality and Morbidity

One of the most pressing social factors that contribute to PRM and PRMB in the United States is racism. Whether that be implicit or systemic or interpersonal, this is an issue that Black BPs face that does not apply to their White counterparts. The adverse birth outcomes that Black BP experiences can be linked to racism and gendered stress (Lu et al., 2010). The stressors that Black BP face can create a physiological response that disproportionate exposes them to adverse birth outcomes (Lu & Halfon, 2003). The stress of racism can come from many places- including providers. A 2017 literature review found that 31 of 37 implicit bias studies found pro-White or anti-people of color sentiment from healthcare providers (Maina et al., 2017). A survey of 2,000 birthing people indicated that 40% of participants indicated that there were communication challenges with their provider during prenatal care and 24% reported discrimination during their hospital stay (Attanasio & Kozhimannil, 2015). The majority of the participants who cited this as

an issue were Black or Latino (Attanasio & Kozhimannil, 2015). This discrimination and implicit biases then manifest in the care Black BPs receive. Discrimination in Black and Latino was linked to higher rates of hypertension and diabetes (Attanasio & Kozhimannil, 2015). Also, in a Saha et al study (1999) Black and Latino people received worse care than the White counterparts on 40% of study measures.

The systemic products of racism also play a large role in the health of Black BP. Black people are more likely to be impacted by things such as poverty and access to education. This is one of the main contributors to Black BP being less likely to receive prenatal care (Creanga et al., 2015). Social barriers to accessing necessary prenatal health are more likely to be experienced by Black BPs than White (Beckmann et al., 2000). However, community health workers have been shown to help with prenatal care adherence when Black BPs are able to access it (deRosset et al., 2014; Viswanathan et al., 2012). Additionally, community health workers like doulas have been shown to improve the birth experience and decrease cesarean delivery but their impact on PRM or PRMB has not yet been examined (Mottl-Santiago et al., 2008; Kozhimannil et al, 2014). Unfortunately, many studies examining social factors and birth outcomes are focused on outcomes surrounding the infant and not the person that gave birth. There is still much work to be done to understand how social factors directly affect issues like PRM and PRMB.

3.0 Methods

This study is a rapid review of the literature to identify existing interventions that address pregnancy related mortality and severe maternal morbidity of Black BP in the United States. Information and peer reviewed articles were collected using three search engines: PubMed, PsychInfo, and Medline. This resulted in a total of six searches conducted across the three search engines. Study inclusion criteria include the following: published in English; an academic journal article, book, or published report; published after 2000; described an intervention that was implementation with a sample of people. Relevance was determined using study inclusion criteria and whether the article specifically addresses Black BP and their birth outcomes.

The same terms were used for all three search engines. The terms used were “African American”, “maternal mortality”, “interventions”, “trials”, “case-control study” and “program evaluation”. “Interventions”, “trials”, “case-control study” and “program evaluation” were used interchangeably in the search. Thus, the terms together in the search bar looked like so: African American AND maternal mortality AND (interventions OR trials OR case-control study OR program evaluation). “Maternal mortality” was then replaced with “maternal morbidity” and the search was run again for an additional three searches across the engines. While this study does not use the word “maternal”, the vast majority of existing literature still uses gendered language. For this reason, the word “maternal” was used in the search terms in order to encompass a larger number of studies.

For the maternal mortality searches, PubMed yielded 75 results. Medline yielded 25 results. PsycInfo yielded 36 results. After reviewing the article across the three search engines, a total of five articles were found to be relevant. For the maternal morbidity searches, PubMed yielded 36

results. Medline yielded 13 results. PsycInfo yielded 7 results. After reviewing the articles across the three search engines, three articles were found to be relevant.

The review process consisted of compiling all the search results together. First, the duplicate articles were removed. Then the title and abstracts were reviewed for relevance. Studies were not used if they examined the epidemiology of the issue such as regional trends or correlations with other factors. Those were considered to be examining the issue not examining interventions or possible solutions to the issue. After reviewing titles and abstracts, articles were examined in their entirety for relevance. Articles were excluded for multiple reasons. These reasons included but were not limited to only being an intervention proposal, birth outcomes were limited to the infant and did not include the mother, or not highlighting Black BP specifically. Below are two figures to give a representation of this process.

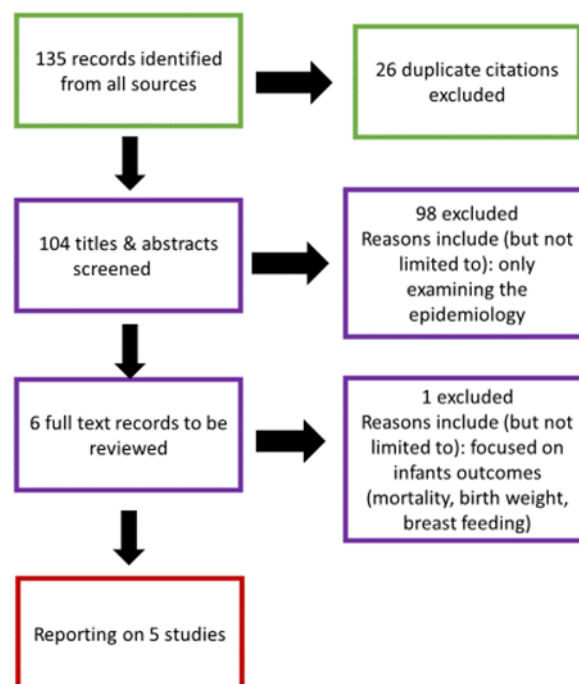


Figure 1. Flow Chart of Mortality Review Process

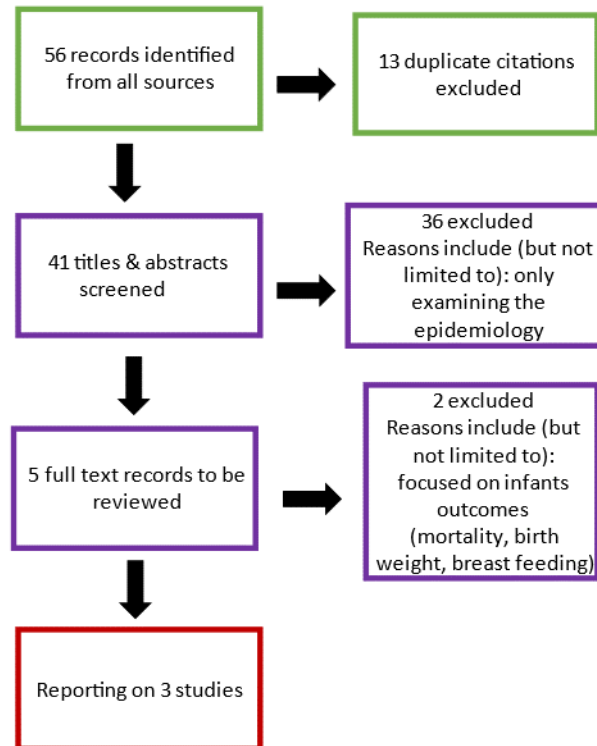


Figure 2. Flow Chart of Morbidity Review Process

3.1 Categorization

The articles in this review were placed into one of three categories based on the type of intervention they described. This was done to better examine the context researchers used to address the issue. This also allowed researchers to examine the quality of results within the context of the type of solution.

Economic. This category was defined as an intervention that has to do with the financial status of the participant or the financial status of the healthcare system itself. These examples could include but were not limited to providing the participant with financial assistance, providing the

hospitals/providers with financial assistance, or adjusting the insurance coverage/accessibility of participants.

Medical. This category was defined as an intervention that addressed patient care of the participant. These examples could include but were not limited to prenatal care, delivery methods, and gynecological tools.

Social. This category was defined as an intervention that has to do with the social determinants of health. This category focused on three of the five social determinants of health as defined by Healthy People 2020. These were education, social and community context, and neighborhood and built environment (Office of Disease Prevention and Health Promotion, n.d.). Economics was given its own category as stated above.

4.0 Findings

The search results for mortality and morbidity will be discussed together. The interventions that address mortality often address morbidity and vice versa. The papers will be discussed by the group in which they were categorized. Some papers overlapped with another category, but for the purposes of this thesis, papers were put into the category that most defined that study. All findings are summarized in Table 1 and 2 below. A refresher for terms used in this study is also included for the reader's convenience in Table 3.

Table 1. All PRM Literature Reviewed

AUTHOR	AIM OF STUDY	DEMOGRAPHICS	METHODS	RESULTS
ECONOMIC				
BERNET, GUMU & VISHWASRAO (2020)	Examine whether changes in spending for maternal and infant public health programs effected mortality rates	All PRMs in Florida from 2001-2014	- Collected PRM data from FLHealthCHARTS.com - Collected spending from Department of Health - Used statistical models to map relationship between spending and PRM	10% increase in spending equals: 13.5% decrease in Black PRM rate 20% decrease in Black-White PRM rate disparity
ELIASON (2020)	Examine the differences in PRM for states that expanded Medicaid and those that did not	PRM in all 50 states + DC (Expanded: 31 states + DC vs Nonexpanded: 19 states)	- Classified PRMR by ICD-10 - Collected deaths from NCHS from 2006-2017 - Used difference-in-difference was used to map trends	- Expanded states have lower overall PRMR - Black PRMR decreased by 16.27 per 100,000 births
MEDICAL				
OLD ET AL. (2014)	Examine effect of nurse home visits on mortality for BP and children during over 20 years	Primarily Black BP in Memphis, Tennessee	- Four treatment groups - Group 1 and 2 were controls - Mortality rate was calculated for each group	- Treatment 3 had lowest mortality rate (.43%) - Control group mortality rate (3.7%)

Table 2. All PRM Literature Review (Continued)

SOCIAL				
FREY ET AL. (2014)	Use the Life Course Perspective to help communities create an action plan to alleviate adverse birth outcomes in Black community	Black communities in Milwaukee, Racine, Kenosha, and Beloit in Wisconsin	Two year planning period focused on - Engaging non-traditional partners - Developing a common language - Identifying a communication strategy to create community driven action plans	Lessons learned include: “Planning is doing” - Must be community driven - Acknowledgement of racism and its impact - Create a positive solution based narrative
MKANDAWIRE-VALHMU ET AL. (2018)	Assess the Milwaukee Birthing Project implementation of a community-based health promotion for improved birth outcome in Black BP	20 pregnant BP and 28 volunteer mentors in Milwaukee	- Conducted monthly meeting and interviews - Used Lifecourse perspective and postcolonial framework	- Live in community spaces lacking support - Created safe spaces of belonging and understanding - Create spaces that foster meaningful interaction - Wants to create safe supportive spaces for other women in the future

Table 3. All PRMB Literature Reviewed

AUTHOR	AIM OF STUDY	DEMOGRAPHICS	METHODS	RESULTS
ECONOMIC				
SNOWDEN ET AL. (2020)	Examine whether Minnesota's blended payment policy has any effect on cesarean use and morbidity	Medicaid fee-for-service beneficiaries who gave birth in MN, WI, IA, IL, OR, MT 2006-2012	- Established a single payment rate for uncomplicated births - Interrupted time series used to analyze changes - Cesareans and postpartum hemorrhage stratified by race	Over three years: - Cesarean use in Black BP - 2.88% - Postpartum hemorrhage in Black BP +1.2%
MEDICAL				
GELLER ET AL. (2004)	Create a scoring system to identify morbidity and differentiate those with near miss morbidity from those with severe but not life threatening conditions	186 BP at the University of Illinois Medical Center at Chicago (UIMC) (65% Black)	- Examined morbidities from 1995-2001 - Identified 11 key factors in decision making process - Narrowed factors to make an efficient scoring system	Five factors used: - Organ failure - ICU admission - Transfusions - Extended intubation - Surgical intervention When identifying near miss vs severe morbidity 100% sensitivity 93.9% specificity

MAIN ET AL. (2020)	Assess the efficacy of a hemorrhage quality improvement collaborative	Pregnancy related hemorrhages across 99 California hospitals 2011-2016	• Cross sectional study • Measured hemorrhage prevalence pre/post intervention • Prevalence stratified by race	Decrease in morbidity: • Overall: 3.6% • Black BP: 9.0% • White BP: 2.1% Decrease in Black-White disparity
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Table 4. Acronyms used

Term	Definition
PRM	Pregnancy related mortality
PRMB	Pregnancy related morbidity
PRMR	Pregnancy related mortality rate
PRMBR	Pregnancy related morbidity rate
SPRMB	Severe pregnancy related morbidity
BP	Birthing person/people

4.1 Economic

Monetary investment into people and/or communities is commonly thought of as a “quick fix” to deeply layered issues like PRM and PRMB. For example, in San Francisco a new project is giving Black and Pacific Islander \$1,000 a month in attempt to combat disparities in PRM and PRMB (Mitchell, 2020). Three studies in this review had economically based interventions. These interventions were all conducted at the state level. None of the studies sought out to impact an individual’s economic status. These studies focused on government spending/policy.

Bernet, Gumu & Vishwasrao (2020) conducted a study that used the spending patterns of the Florida state government as the intervention for PRM across the state. The spending that the paper focused on was the expenditure for public health programs. The public health programs of focus included the Pregnancy Outcomes program, Healthy Start, and Florida’s Women, Infant, and Children program (WIC). They examined spending patterns across all Florida counties from 2001 through 2014. They then gathered all PRM data and the corresponding demographic information from FLHealthCHARTS.com. They used this information to make predictive models (ordinary least squares and generalized method of moments). These models estimated X amount of spending equaled Y PRMR. These models estimated used increments of 10 to see its effects on the PRMR. A 10% increase in spending led to a 3.9% decline in the PRMR overall in the state (Bernet, Gumu & Vihwasrao, 2020). This 10% increase did not lead to any statistically significant changes in White PRM rate (Bernet, Gumu & Vihwasrao, 2020). However, a 10% increase created a 13.5% decrease in Black PRM rate (Bernet, Gumu & Vihwasrao, 2020). It also created a 20.0% decrease in the Black-White PRM disparity in Florida (Bernet, Gumu & Vihwasrao, 2020). All of these findings were statistically significant.

They also ran the model again examining the effects of other public health expenditures on the PRMR in the state. They did this for overall public health expenditures as well as special programs like immunization and tobacco control. No changes in any of these expenditures had a statistically significant effect on rates of PRM (Bernet, Gumu & Vihwasrao, 2020).

The second economic paper examined Medicaid expansion under the Affordable Care Act as the intervention. Eliason's (2020) paper focused on the PRMR of states that expanded Medicaid and compared them to the rates of the states that did not expand their Medicaid program by 2017. Thirty one states including the District of Columbia chose to expand their Medicaid program. Nineteen states did not. The study used the Underlying Cause of Death database from the National Center for Health Statistics (NCHS) from 2006-2017 to identify potential PRM. They used the ICD-10 codes to classify a death as a PRM or not. Per ICD-10 codes, a death more than 42 days after delivery was considered a late PRM. PRMR was calculated as the number of deaths per 100,000 live births for this study. This study also used a difference-in-difference model to examine the difference in PRM between the two groups. The study did not find any statistically significant difference in PRMR between the two groups prior to Medicaid expansion (Eliason, 2020). Overall, Medicaid expansion states had 7.01 fewer PRMs per 100,000 live births than non-Medicaid expansion states (Eliason, 2020). Additionally, states that expanded their Medicaid program experienced a slower rise in their PRMRs from 2006-2017 (Eliason, 2020). When results were stratified by race/ethnicity, the largest effect was seen in non-Hispanic Black BP (Eliason, 2020). Non-Hispanic Black BP had 16.27 fewer PRMs per 100,000 live births in Medicaid expansion states (Eliason, 2020). This is in comparison to 6.01 fewer PRMs for Hispanic BPs and 3.74 fewer PRMs for non-Hispanic White BPs (Eliason, 2020). All of the results stated above were statistically significant (Eliason, 2020).

In 2009, Minnesota's Medicaid program established a blended payment policy. This policy combines professional services and facility fees into a single payment for uncomplicated births (cesarean and vaginal). This was an effort to curb rates of cesarean section. Snowden et al. (2020) used this blended payment policy as their intervention and measured the cesarean and PRMB rates as their outcome of interest. They used six other states as their control group: Wisconsin, Iowa, Illinois, Oregon, Idaho, Montana. Their population of interest was Black and White Medicaid fee-for-service beneficiaries who gave birth from 2006-2012. They used the Medicaid Analytic Extract files to capture births from the desired time period and categorized them using the ICD-9. This resulted in 16,336 births in the policy group and 410,662 in the control group. They used a quasi-experimental approach to create an interrupted time series stratified by race. Over the three years after the policy was implemented cesarean births among Black BPs decreased 2.88% in Minnesota (Snowden et al., 2020). In the control states, there was a 1.92% increase (Snowden et al., 2020). In comparison, White BPs experienced a 1.32 decrease in cesarean births in Minnesota and a 1.56 increase in the control states (Snowden et al., 2020). When comparing Minnesota to the control states, the cesarean birth rates differed significantly for both Black and White BP (Snowden et al., 2020).

For overall maternal morbidity, there were no significant changes for either racial group or between states (Snowden et al., 2020). However, when examining just postpartum hemorrhages, it increased by 1.2% in Black BP in Minnesota as opposed to the 0.24% increase in control states (Snowden et al., 2020). White BP in Minnesota experienced a 0.48% increase in postpartum hemorrhages, and there was a .36% increase in control states (Snowden et al., 2020). When comparing Minnesota to the control states, the cesarean birth rates differed significantly for both

Black and White BP (Snowden et al., 2020). Also, Black BP's increase differed significantly from White BP's (Snowden et al., 2020).

4.2 Medical

Interventions in this category have to do with the medical treatment that BP received or the clinical practices used during pregnancy and/or postpartum. There are three studies that are medical interventions. One is about the amount/type of medical treatment BPs received. The other two are tools clinicians use during care for BPs.

Geller et al. (2004) created a tool that could be used to determine morbidity in BP. The paper did not explicitly state the effects of the tool on Black BPs vs White or other non-Black BPs. However, 65% of the sample was Black (Geller, 2020 “personal communication”) . For that reason, this study was included in this literature review. This study uses the birth records from the University of Illinois Medical Center at Chicago- a hospital that predominately serves Black and Hispanic people. The hospital has approximately 2,200 births a year (Geller et al., 2004). This study examined birth records from 1995-2001 and identified 339 potential subjects. This was done based on 1) disease/health conditions, 2) morbid events that are not disease specific but indicative of disease progression/severity 3) procedures or interventions (Geller et al., 2004). After being reviewed by a team of clinicians, 186 BPs were left and classified as near-miss morbidity or severe morbidity. The team of clinicians identified 11 key factors that were a part of their decision-making process. These are meant to be factors that clinicians can use in assessment without access to a patient's full medical record. These factors are listed in the table below from most to least important.

Table 5. Adaptation of Key Clinical Factors for Morbidity

Rank	Clinical Factor
1	Length of hospital stay (> 8 days)
2	Hospital admissions (≥ 1)
3	Blood loss ($> 1,500$ mL)
4	Organ dysfunction (≥ 2 systems)
5	Blood transfusion (> 3 units)
6	Surgical intervention
7	ICU admission
8	Temperature (≥ 105)
9	Extended Intubation (> 12 hrs)
10	Organ system failure (≥ 1 system)
11	Resuscitation

Researchers then identified 5 of the 11 factors that would be adequate to determine morbidity without having to the full list. These include: Organ system failure (> 1 system), extended intubation (>12 hours), ICU admission, surgical intervention, and blood transfusion (> 3 units) (Geller et al., 2004). The five-factor system only had a slightly lower specificity than using a greater number of factors. For the five-factor system, each factor received a score of 0 to 5. The number a particular factor receives corresponds with where the factor lies in the ranking of only the 5 factors list above. For example, if an extended intubation was performed that factor would receive a score of 4. If a factor did not play a role in the patient's treatment, it would receive a score of 0. For example, if an extended intubation was not performed, it would receive a score of 0. The sum of all five factors would be the score the patient received. The patient's score determined if they were a near miss or severe morbidity. This scoring system had 100% sensitivity and 93.9% specificity (Geller et al., 2004). Researchers were able to correctly identify all 22 patients classified as near miss by clinicians (Geller et al., 2004). They also identified 153 of the 164 patients classified as severe morbidity (Geller et al., 2004). The other 11 were misclassified as near miss (Geller et al., 2004).

Another study studied the efficacy of patient safety bundles on obstetric hemorrhages. Main et al. (2020) conducted a cross sectional study of 99 hospitals in California's hemorrhage quality improvement collaborative from 2011-2016. The patient safety bundle included 17 evidence based practices clinicians were supposed to practice in the event of obstetric hemorrhages. These are included in the table below.

Table 6. Adaptation of the Hemorrhage Safety Bundle Elements

Readiness Domain
Hemorrhage cart/including instructions cards for intrauterine balloons and compression stitches
Immediate access to hemorrhage medications (kit or equivalent)
Hemorrhage response team established (anesthesia, blood bank, advanced gynecological surgery, and other services)
Massive transfusion protocol established
Emergency release protocol established for O-negative and uncross-matched units of red blood cells
Protocol established for those who refuse blood products
Unit education to hemorrhage protocols
Regular unit-based drills with debriefs for obstetric hemorrhage
Recognition and prevention domain
Assessment of hemorrhage risk (prenatal, admission, and other)
Measurement of cumulative blood loss (formal and as quantitative as possible)
Active management of third stage of labor (standard protocol for oxytocin at birth)
Response Domain
Use of unit-standard, stage-based obstetric hemorrhage emergency management plan with checklists
Support program for patients, families, and staff for all major obstetric hemorrhages
Reporting and Systems Learning Domain
Establish culture of huddles to plan for high-risk patients
Post-event debriefing to quickly assess what went well and what could have been improved
Multidisciplinary reviews of all serious hemorrhages for system issues
Monitor outcomes and progress in process measures in perinatal quality improvement committee

The baseline analysis for this study included 54,311 BPs (5% Black) were evaluated. The post intervention analysis included 19,165 BPs for evaluation and had a similar percentage of Black BPs as the baseline. The baseline morbidity rate overall was 22.1% (Main et al., 2020). Black BP's morbidity rate was 28.6% (Main et al., 2020). White BP's morbidity rate was 19.8% (Main et al., 2020). After the introduction of the patient safety bundle, the overall morbidity rate fell to 18.5% by the end of the study (Main et al., 2020). Black BPs experienced a 9.0% decrease in morbidity rate-the largest decrease seen for any racial group (Main et al., 2020). White BPs only

experienced a 2.1% decrease (Main et al., 2020). This reduced the disparity between Black and White BPs from 1.34 to 1.22 (Main et al., 2020). Also, when controlling for socioeconomic factors like income and education, the disparity dropped from 1.22 to 1.07 (Main et al., 2020). All of these findings were significant.

The study also examined these rates by excluding those cases that received blood transfusions. Morbidity rates drastically dropped when excluding cases that had a blood transfusion (Main et al., 2020). The baseline morbidity rate was 6.9% and decreased to 5.6% after the intervention (Main et al., 2020). Black BPs morbidity rates decreased by 2.5% from 9.4%- the largest decrease out of any racial group (Main et al., 2020). However, the post intervention rate was still high relative to other racial groups. For example, White BPs morbidity rates decreased by 0.9% from 6.4% (Main et al., 2020). The Black-White disparity in morbidity rates excluding transfusions fell to 0.99 from 1.33 (Main et al., 2020). Additionally, this study identified cesarean delivery as the highest risk factor for morbidity.

The last medical study was a randomized clinical trial that lasted from 1991 to 2011. Old et al. (2014) conducted an intervention study in Memphis, Tennessee of 1138 primary Black BPs. Participants had to meet at least two of the following criteria: unmarried, less than 12 years of education, or unemployed. The BPs were randomly categorized into one of four treatment groups. The treatment groups are explained in detail below:

- Treatment Group 1 (T1): Free transportation to prenatal care appointments (n=166)
- Treatment Group 2 (T2): Free transportation to prenatal care appointments; developmental screening and referral services for a child up until the age of 2 (n=514)

- Treatment Group 3 (T3): Free transportation to prenatal care appointments; nurse home visits through pregnancy and two visits postpartum (n=230)
- Treatment Group 4 (T4): All things in T3; nurse home visits through up until child was 2; developmental screening and referrals services for a child (n=228)

T1 and T2 were combined to serve as a control group. Those in T3 and T4 had an average of 7 prenatal visits. T4 had an average of 26 post-natal visits. The outcomes of interest for this study were BP's mortality and infant mortality. For the purposes of this study, the focus will only be on BP's mortality. BP's mortality was classified as natural or external. Natural was what this paper considers PRM. External was due to non-bodily factors like homicide or drug overdose. T1 had 5 PRMs, T2 had 11, T3 had 1, T4 had 4 and there were 12 external mortalities overall (Old et al., 2014). While this paper is primarily concerned with PRM, the study in question only ran statistical analysis on mortality rates for both PRM and external combined or just external. The study ran three analysis on the all cause mortality results. The first analysis was the survival contrast of the control group's mortality rate (3.7%) vs T3's mortality rate (.4%) (Old et al., 2014). This analysis showed a significant difference between the two groups. The second analysis was the survival contrast of the control group's mortality rate (3.7%) vs T4's mortality rate (2.2%) (Old et al., 2014). This analysis did not show a significant difference between the two groups. The third analysis was a post-hoc survival contrast of the control group vs T3 and T4 combined. This analysis was statistically significant.

4.3 Social

Social interventions were interventions that intended to address the social determinants of health and/or widen community involvement in the health of Black BPs. It can be difficult to quantify the impact of a social intervention on a health outcome. Because of this, social interventions do not always receive the same level of attention as other types of interventions. The two social interventions in this review do not have statistical evidence of their impact on mortality or morbidity, but they are still a valuable addition to this review.

The first paper is based in Wisconsin's cities with the highest proportion of Black residents: Milwaukee, Racine, Kenosha, Beloit. Frey et al. (2014) describe the Lifecourse initiative which was the formation of four community collaboratives and their community action plan to alleviate adverse birth outcomes in the Black community. This initiative stemmed from Wisconsin's Partnership Program which was a collaboration between the University of Wisconsin School of Medicine and Public Health. The Partnership Program provided the initiative with a Twelve-point plan (in the table below) and a theoretical framework (the life course perspective) to establish each community's individual plans. The Lifecourse initiative had three long term goals: to "improve health and survival, improve the health status of African American women, and eliminate racial disparities in birth outcomes" (Frey et al., 2014). The birth outcome that the article talked about the most was infant mortality. However, the health outcomes of Black birthing people were also of secondary interest, so this paper was included in the review.

Table 7. Adaptation of Partnership Program's Twelve Point Plan

1	Provide inter-conception care to birthing people with adverse pregnancy outcome
2	Increase access to pre-conception care to Black birthing people
3	Improve the quality of pre-natal care
4	Expand healthcare access over the life course/ strengthening families and communities
5	Strengthen father involvement in Black families
6	Enhance coordination and integration of family support services
7	Create reproductive social capital in Black communities
8	Invest in community building and urban renewal/address social and economic inequities
9	Close the education gap
10	Reduce poverty among Black people
11	Support working birthing people and families
12	Undo racism

The completion of the communities' action plan took two years to come to fruition. This paper was primarily focused on the planning process. Each community had a steering committee of various stakeholders like researchers and community members that oversaw the planning process. Key parts of the planning process included engaging non-traditional partners, developing a common language and shared understanding, identification of communication strategy, and consensus building around community action plans (Frey et al., 2014). Below are the action plans created for each city.

Table 8. Adapted Community Action Plan

Milwaukee	Racine
Facilitate access to preconception, prenatal, inter-conception healthcare services	Promote community understanding of life course issues
Increase the capacity and utilization of quality of medical homes	Promote healthy behaviors and access to resources across the life span
Expand access to specialty care, including behavioral health and dental care	Expand programs to support pregnant and parenting women and their families
Develop a comprehensive network of fatherhood resources and supports	Expand programs that support father involvement with children and families
Increase relationship building skills and self-worth for Black men and their families	Expand, enhance and simplify health and human services systems integration
Increase the role that fathers play in the community	Examine and develop recommendations policies related for low income families
Increase access to education and employment opportunities for	Promote pathways out of poverty, such as EITC and transitional jobs
Kenosha	Beloit
Improve health care for Black women over the life span	Improve access to high quality, culturally competent prenatal care
Enhance group prenatal care and supportive networks	Expand health care access over the life course
Increase advocacy and community involvement	Support father involvement with children and families
Expand home visiting, prevention and services to new mothers and infants	Promote access to parenting education and family conflict resolution training
Expand programs that support father involvement with children and families	Promote culturally competent health and human service navigators
Combine community efforts to share knowledge and leverage resources	Increase employment opportunities and income support
Improve Black high school graduation rates	Increase Black involvement in leadership
	Strengthen cultural competency among service providers
	Work to close the education gap

The study then discussed the lessons learned from establishing and implementing this initiative. The researchers declared that “the life course perspective broadened the base of informed individuals and residents and altered public perception of the issue” and served as a useful funding framework (Frey et al., 2014). Researchers highlighted three particular challenges. The first was that the planning process took much longer than expected and extended their timeline by 6 months (Frey et al., 2014). Second, the initiative experienced difficulty with community engagement (Frey et al., 2014). Researchers had challenges involving the Black community and sustaining their participation throughout the long process (Frey et al., 2014). Third, each community wanted to address “undoing racism” and researchers had to appraise how it affected their planning process (Frey et al., 2014). However, they did not establish any specific plans to address racism (Frey et al., 2014).

The second paper was a product of the initiative discussed above and was based in Milwaukee. Mkandawire-Valhmu et al. (2018) aimed to “implement a health promotion intervention tailored for pregnant [Black people] living in the poorest zip codes of the city”. The background specifically cited infant mortality rates as a part of the motivation for the study. Conversely, the results of the study were a qualitative analysis of the experience of Black pregnant people. For this reason, this study was included in the review. This particular part of the initiative was called the Milwaukee Birthing Project that ran for two years. It was an educational mentorship program. Community mentors were referred to as Sister Friends and the BP were referred to as Little Sisters. There were 28 Sister Friends and 20 Little Sisters. Little Sisters ranged from 21 to 34 years old. 16 Little Sister stayed in the program through delivery and 14 postpartum. Sister Friends were older Black BPs from 40-60 years and had experiences that mirrored Little Sisters’. They also received training from project staff on the project’s purpose and how the lifecourse

perspective impacts pregnancy and childbearing. Mentors and mentees were encouraged to meet twice a month and keep regular contact via text and email. Sister Friends and Little Sisters were to attend monthly 90 minute sessions conducted by project staff or guest speakers. The session covered issues surrounding birth outcomes like stress, preterm labor, breastfeeding, nutrition, and healthy relationships.

Researchers used the lifecourse perspective and postcolonial feminism as the framework for data collection and analysis. Data collection consisted of focus groups and interviews of 4 Sister Friends and 13 Little Sisters as well as field notes from the monthly sessions (Mkandawire-Valhmu et al., 2018). Researchers focused on five areas of thematic analysis: community spaces lacking support, safe spaces of belonging and understanding, spaces that fosters meaningful interactions, and safe support spaces for other women in the future (Mkandawire-Valhmu et al., 2018). Little Sisters felt that they had stressful relationships and lacked supportive social networks (Mkandawire-Valhmu et al., 2018). They expressed a lack of childcare for their other children and having partners that were incarcerated (Mkandawire-Valhmu et al., 2018). The birthing project created a sense of a support network for them (Mkandawire-Valhmu et al., 2018). Little Sisters felt like the group allowed to be with other BPs that had common experiences and created a sense of belonging (Mkandawire-Valhmu et al., 2018). The following quote is from a Little Sister: “I love my big sister. She brings me joy, happiness. When I first met her, it’s like we connected. And I’ve never had that feeling - literally had that feeling when I met a big sister, cause my big sister’s not in my life, or my brothers; they all stay out of town and stuff. So that really touched me, like ‘I’ve got a big sister, seriously?’” (Mkandawire-Valhmu et al., 2018). Another participant expressed that the project created a space to help them with their communication and networking skills (Mkandawire-Valhmu et al., 2018). Also, participants stated that they wanted to pay this

experience forward and create this kind of environment for other women in the future (Mkandawire-Valhmu et al., 2018).

5.0 Discussion

This rapid review of the literature sought to identify what interventions exist to improve PRM and PRMB in Black BP. Black BP have had PRM rates 3 to 4 times higher than White BP for over six decades (Singh, 2010). While the Black-White disparity for PRMB is not as large, it is also a consistent disparity. Unfortunately, the PRM and PRMB rates have continued to rise over the year. Black BPs, being the most at risk racial group, are uniquely disadvantaged by this. This study aimed to examine targeted efforts to help this population. By improving PRM and PRMB rates in this population, it is likely to improve overall PRM and PRMB rates nationally. Interventions were categorized as economic, medical, or social each category providing a different perspective for approach Black PRM and PRMB.

Overall, the economic interventions seemed to be most successful. All interventions were done at the state level and did not affect individual socioeconomic status. One study showed that increased spending to public health programs that target BPs and families like WIC significantly improved Black PRM as well as the disparity between Black and White PRM rates (Bernet, Gumu & Vihwasrao, 2020). The other two economic interventions examined the impact of change to Medicaid. The expansion of Medicaid resulted in a lower PRM rate and slower growth rate in PRM overall in states that chose to expand (Eliason, 2020). The expansion of Medicaid also uniquely affected Black BPs by producing 16.27 fewer PRMs per 100,000 live births in states that chose to expand (Eliason, 2020). The decrease was more than twice as large as any other racial group studied (Eliason, 2020). The other study examined the effects of establishing a blended payment policy for the state's Medicaid program. This study had modest yet conflicting results. While cesarean deliveries decreased by nearly 3% for Black BP, postpartum hemorrhages increase

a little over 1% (Snowden et al, 2020). The difference in percentages while significant was a relatively small improvement in comparison to the other economic paper examined. The results also conflict with the current understanding of cesarean deliveries and postpartum hemorrhages. These results warrant further investigation of the efficacy of a blended payment policy.

Of the three medical interventions, only two of them measured their effects on PRM or PRMB. Two medical interventions focused on morbidity and the other mortality. The Geller et al. (2004) study created a tool to detect near miss morbidity in BP. The majority of participants in this study were Black, and the study's tool was determined to be effective in identifying morbidity (Geller et al., 2004). However, the study did not show how effective this tool would be in eliminating or decrease PRMB. There were also no follow up studies found in the literature. The other study examining morbidity did show substantial decreases when using an intervention for obstetric hemorrhages- a leading cause of PRM and PRMB. The study showed that patient safety bundles for obstetric hemorrhages decreased Black PRMB by 9% (Main et al., 2020). It also significantly decreased the disparity between Black and White PRMB (Main et al., 2020). The one medical study that examined mortality showed modest yet significant improvements. This study examined all cause mortality in BPs, so the data does not reflect the impact on PRM alone. It showed that BP that had nurse home visits through pregnancy and two visits postpartum had significantly lower all cause mortality rates than the control group (Old et al, 2014).

The two social interventions reviewed did not have any quantitative results on mortality or morbidity. This is not uncommon of social intervention which sometimes prefers to focus on qualitative measures than quantitative ones. One social intervention focused on the formation of community based committees that created action plans to alleviate adverse birth outcomes in the Black community (Frey et al., 2014). The paper focused on the formation of the committee and its

plan while citing challenges like keeping stakeholders engaged and “undoing racism” (Frey et al., 2014) The following social intervention was a product of these community action plans. The mentorship and education program for pregnant Black BPs created a sense of belonging and educational attainment for participants (Mkandawire-Valhmu et al., 2018). It also informed researchers of other issues BP may face like lack of safe environment and social support outside of the mentor group (Mkandawire-Valhmu et al., 2018).

5.1 Limitations

The number of articles included in this review is small. This review used only three search engines with a limited number of search terms. This could have limited the number of articles we found to be relevant to this review. Additionally, the social interventions did not give a quantitative measure on how they might have improved PRM. While this review respects the value of qualitative measures and their impact on the pregnancy/birthing experience, it is necessary to know how effective the interventions are on PRM and PRMB. Social interventions are typically long-term concerted efforts that require multiple follow up visits. Some social interventions may not have the capacity to conduct these numerous follow ups and sustain cohorts long enough to accurately measure PRM.

This study also acknowledges the existence of other initiatives to improve Black BP’s health in the United States. This includes organizations like Healthy Start and Centering Pregnancy. There have also been legislative pushes to increase interventions like the Preventing Maternal Deaths Act of 2018. However, the effectiveness of these strategies on BP health has yet to be explored in the scientific literature. Literature that does exist to measure the effects of programs

like those mentioned above is almost solely focused on the baby. The literature will say it is examining adverse birth outcomes but limits those outcomes to preterm births or low birth rates as opposed to PRM and PRMB. Part of this disconnect could be due to the fact that PRM is still a relatively rare occurrence. PRM does take years to accurately measure whereas outcomes pertaining to infants do not.

5.2 Conclusions

The literature on existing interventions for PRM and PRMB for Black BPs is extremely limited. This is disheartening because the severity of the issue is not new and has actually worsened over time. The disparity between Black and White PRM is worse now than it was during slavery. It is not an individual-level socioeconomic issue. The literature that does exist leans toward viewing it as a more systemic issue that requires structural change. The economic expansion of Medicaid and funding for public health services produced relatively large improvements to Black BP's health. The quality improvement collaborative in California required a restructuring of hemorrhage care across the state that also produced widespread results for nearly all racial groups, especially Black people.

While these studies are relatively new, there is a clear path on where to start improving Black PRM and PRMB. The fact that it has not been done is a grave disservice not only to the Black community but also to the academic community that aspires to help them. There are numerous conversations that theorize and hypothesize what is the root cause of PRM and PRMB in the Black community. It has been a topic of research for decades. There needs to be a bigger push to concretely identify what is actually beneficial to this population. The evidence is already

there to identify where we should start making interventions. However, the few interventions that are widespread like Healthy Start have done a disservice to Black BPs by solely focusing their outcome measurements on babies. We, as a society, have allowed the narrative of healthy birthing person producing a healthy baby to give way to wanting a healthy birthing person solely to produce a healthy baby. The narrative should be that we want a healthy birthing person because we want health individuals in society. Baby's value has been placed above the birthing person and it is evident in the literature (or the lack there of).

PRM is a relatively rare occurrence in comparison to outcomes like preterm birth and infant mortality. It is understandable that there would be less literature on BP health outcomes than infant related birth outcomes. However, it does not explain or excuse how large the gap currently is. There are other ways to help close this gap. PRMB is not as rare as PRM. Each year 50,000 BP experience PRMB. It is common enough that interventions to improve it should be more widespread than they are. It is especially critical because an untreated PRMB can easily turn into a PRM. The amount of effort being put into creating and analyzing interventions to improve Black BP's health (and Black BP's health alone) is nowhere near what it needs to be given that Black BPs have experienced over six decades of disproportionately high death rates and centuries of racism. They deserve to be the center of the conversation.

5.3 Future Directions

While the current state of PRM and PRMB intervention research leaves much to be desired, there is momentum in the right direction. In a recent press release from the National Institute of Health (NIH), they have highlighted a \$21 million grant to support "new research examining racial

and ethnic disparities in pregnancy-related complications and deaths” (“NIH to fund research of racial disparities in pregnancy-related complications and deaths”, 2020). This grant is supposed to last five years and has been given to six institutions (“NIH to fund research of racial disparities in pregnancy-related complications and deaths”, 2020). Two of the studies are examining potential underlying cause of PRM/PRMB in Black BPs. However, the description in the press release explicitly states these studies intend to create an intervention based off their findings. The other four studies highlight Medicaid expansion/access and patient safety bundles as interventions.

These areas of interest also showed promise based off the literature included in this review. States that expanded Medicaid showed substantial improvement in PRM rates for Black BPs. Expanding Medicaid to the remaining states could result in even more dramatic improvement. The states that have not expanded Medicaid have some of the highest rates of Black PRM. Tennessee’s Black PRM from 2017-2018 was 57.8 per 100,000 live births (“2020 Tennessee Annual Maternal Mortality Report”, 2020). For comparison Ohio, a state that did expand Medicaid, had a pre-expansion rate of 29.5 deaths per 100,000 live births (“Racial Disparities in Pregnancy-Related Deaths in Ohio 2008-2016”, 2020). States like Tennessee would extremely benefit from the expansion not only in terms of Black PRM, but also a plethora of other health problems. However, political divides have impeded the progress of improving health outcomes across this country. Under the Biden administration, this may change. The American Rescue Plan Act of 2021, the first COVID relief bill of the Biden administration, offers additional federal funding for two years to states that expand Medicaid for the first time (McCausland, 2021). States may see this as an opportunity to adopt expansion. Wyoming may be the first state to seize this opportunity. Wyoming, a notoriously Republican lead state, recently passed a Medicaid expansion bill through their house to be sent to their senate (McCausland, 2021). This shows a potential shift in how

Republican legislators feel about expansion. Now is the window of opportunity for grassroots efforts to renew their advocacy for expansion in key Southern and Midwestern states.

Advocacy for political change is not only vital to reducing racial disparities in pregnancy related conditions, but overall health in general. There are too many people who think health and healthcare should remain apolitical. This fallacy prevents substantial change from happening. The social determinants of health have been a central topic in healthcare for the past decade. It has proven that health is not only individual but structural. Structural change in America is political. It is often politically left leaning. If improving the health of people, particularly vulnerable populations like Black BPs, requires advocating for more liberal policies, so be it. Now is a critical time for people in public health and healthcare to be extremely vocal about their support for Medicaid expansion. Saving people's lives should not be a partisan issue, but we unfortunately live in a society that it is. People who made careers out of saving lives and improving health outcomes should be the most vocal. The brunt of advocacy should not fall on the vulnerable population that is being affected. They should be supported by the doctors, nurses, public health workers, and other groups of people who claim to carry about their health.

Unfortunately, policy change can take years to take effective. A more immediate solution would be implementing patient safety bundles. The most pertinent patient safety bundle is the obstetric hemorrhage safety bundle- also referred to as postpartum hemorrhage safety bundle. Obstetric hemorrhages are one of the leading causes of PRM and PRMB (Berg et al., 2005; Callaghan, Creanga & Kuklina, 2012). It is also suggested that obstetric hemorrhages are highly preventable with some studies stating over 50% of cases are preventable (Della et al., 2011; Geller et al., 2014). The obstetric hemorrhage safety bundle used in the Main et al. (2018) study was established by the National Partnership for Maternal Safety. This is comprised of representative

from the American College of Obstetricians and Gynecologists, Society for Obstetric Anesthesia and perinatology, American College of Nurse-Midwives, American Association of Blood Banks, Association of Women's Health, Obstetric and Neonatal Nurses, American Congress of Obstetricians and Gynecologists, and the American Academy of Family Physicians (Main et al., 2015). As stated in the results, it goes over domains concerning readiness, recognition and prevention, and response (Main et al., 2015; Main et al., 2018). The full patient safety bundle also includes another section covering reporting and systems learning which "focus[es] on systems improvement that should be implemented by every unit." (Main et al., 2015). Bundles are intended to highlight necessary, evidence-based improvements to improve a certain outcome. They are not a reinvention of techniques, but more of a revamping of them to improve efficiency and success.

The Main et al. (2018) study has showed promise in reducing Black PRMB well as the disparity in Black-White PRMB. While this is the only study on obstetric hemorrhage safety bundles and Black BPs, the efficacy of these bundles in terms of morbidity shows promise. Two studies stated that this patient safety bundle has enabled them to properly identify risk of a hemorrhage (Bingham, Scheich, & Bateman, 2018; Joseph & Wilson, 2020). However, the bundles efficacy on mortality and morbidity rates is still to be determined. There have been two state wide initiatives to determine obstetric hemorrhage safety bundle's efficacy. In California, the initiative was done across 99 hospitals and resulted in a 20.8% decrease in morbidity (Main et al., 2017). In New York, the initiative was done across 113 hospitals (Goffman et al., 2019). This initiative did not see significant improvement in morbidity or mortality (Goffman et al, 2019). They state this may be due to low hemorrhage rates and a short time period (1 year) (Goffman et al., 2019). They intend to continue with the initiative and expect better outcomes in the future (Goffman et al., 2019).

While obstetric hemorrhage safety bundles are relatively new, they show promise to significantly improve outcomes in morbidity and mortality. This is an initiative that should be adopted by birthing facilities across America. It does require some retraining on the part of providers, but it is not a reinvention of the wheel. It is improving upon the practices that many facilities already do. This could be a more immediate start to curbing morbidity and mortality rates in America.

Obstetric hemorrhage safety bundles and expanding Medicaid are just the beginning. Black BPs are in a crisis in America. They deserve a full force effort to curb the adverse birth experiences they continue to have. The two initiatives mentioned in this review are where society can start right now. There are layers of systemic racism that still need to be addressed and dismantled. However, that is not an issue that is going to be solved over night or maybe not even in the next decade. Obstetric hemorrhage safety bundles implementation and Medicaid expansion can happen right now. Improvements in Black BP mortality and morbidity could probably be seen in the next five years. This the direction America should be heading. Black birthing people's lives are depending on it.

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