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The White-Black Disparity in Maternal Mortality and Morbidity: An Evaluation of Risk Factors

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The White-Black Disparity in Maternal Mortality and Morbidity:

An Evaluation of Risk Factors

by

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Abstract

Black expecting mothers are more likely to die from pregnancy-related issues than white expecting mothers. The literature acknowledged this disparity decades ago, and despite the awareness, this gap fails to close. The purpose of this thesis is to review the literature on the white-black disparity in maternal mortality and morbidity, identify racism and discrimination across multiple ecological systems as the primary risk factor, and suggest implications for social work practice. After establishing a common terminology surrounding pregnancy-related deaths and the maternal morbidity-mortality continuum, this thesis presents basic statistics and means of data collection about the disparity. Next, this thesis acknowledges risk factors for pregnancy-related death such as race, age, medical conditions, prenatal care, environment, and socioeconomic status. While a multitude of risk factors are identified, the evidence suggests that racism and discrimination in healthcare settings is primarily responsible for the inflated rate of black maternal mortality and morbidity. A theoretical framework will be established to further analyze the implications of racism on multiple ecological systems. This thesis concludes by recognizing existing interventions and providing recommendations for social workers regarding this healthcare disparity.

Background

For the past 50 years, expectant black mothers have been roughly three times more likely to die from pregnancy complications than white expectant mothers (Tucker et al., 2007). Researchers have long documented the white-black disparity in maternal mortality and morbidity (Tucker et al., 2007) with the literature acknowledging the disparity as early as the 1970s ("Embolism," 1985). Despite an apparent awareness of the disparity, the maternal mortality gap has not significantly closed since 1982 (Geller et al., 2004), and race continues to stand as a substantial risk factor for pregnancy-related death ("Embolism," 1985). In 2018, the United States ranked last in maternal mortality among developed nations (Beutler & Krishnamoorthi, 2018). Tucker et al. partially attributed the nation's poor ranking to racial disparities (2007). The literature clearly indicates a significant, persistent racial disparity in maternal mortality and morbidity. The purpose of this literature review is to examine risk factors for maternal mortality and morbidity, identify racism and discrimination across multiple ecological systems as a significant contributing factor, and suggest multi-level implications for social work practice.

Before exploring the roots of this maternal mortality disparity, it is necessary to establish the terms, measurements, and theories used to discuss it. The concept of maternal morbidity is difficult to observe because the literature defines it in several ways. One group of researchers created an algorithm to analyze Illinois' vital records data and identified medical risk factors such as diabetes, hypertension and eclampsia, and labor and delivery complications such as excessive bleeding and placenta abruption to indicate maternal morbidity (Rosenberg et al., 2006). State-mandated maternal death reports from ten hospitals in the University of Illinois Medical Center at Chicago (UIMC) recognize morbidity through the presence of diseases and preexisting health conditions, morbid events such as hemorrhage, and specific medical

procedures and interventions like Caesarian section and hysterectomy (Geller et al., 2004). An expectant mother may be considered “high risk” if she presents at least one medical risk factor or labor and delivery complication (Rosenberg et al., 2006). Alternatively, “severe morbidity” may refer to mothers who require a life-saving procedure during hospitalization at the time of delivery. While the definition varies, maternal morbidity is widely understood as any health condition attributed to or complicating pregnancy and childbirth that negatively impacts the expectant mother’s wellbeing or functioning (Chou et al., 2016).

Although researchers fluctuate in its definition, maternal morbidity is widely recognized as a public health problem, affecting roughly 1.7 million women annually (Geller et al., 2004). Roughly 60,000 women are diagnosed with high risk or severe morbidity annually in the United States (Howell et al., 2016). For every maternal death, more than 100 women experience severe maternal morbidity (Howell et al., 2016), and 43% of women experience some morbidity during their delivery hospitalization (Rosenberg et al., 2006). While preventing maternal mortality is critical for public health, this maternal healthcare issue includes morbidity as well.

Maternal death is more clearly identified by using the 630-676 International Classification of Diseases (ICD-9) codes on death certificates or checking “yes” in the recent pregnancy field on the death certificate (Rosenberg et al., 2006). As of 2017, the United States utilizes a standardized checkbox on death certificates to signify maternal mortality, providing researchers with comprehensive, nation-wide data (Chuck & Cox, 2018). Women can still experience pregnancy-associated or pregnancy-related death without dying during the event of childbirth. Pregnancy-related death may be described as death caused by complications of pregnancy, the chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the effects of pregnancy (Tucker et al., 2007). Other researchers define it as prenatal

and postpartum death from any cause, including those unrelated to pregnancy, to broaden the scope of maternal mortality surveillance (Rosenberg et al., 2006). There is some variation in the amount of time after childbirth that indicates maternal mortality. The Center for Disease Control (CDC) includes deaths one year postpartum, while the National Center for Health Statistics (NCHS) limits the classification of maternal death to 42 days postpartum (NCHS). Other institutions use the term pregnancy-associated death to describe death at 90 days postpartum (Geller et al., 2004). The definition of maternal mortality holds some subjectivity as well, but it is commonly regarded as death that was caused or aggravated by pregnancy (NCHS).

Researchers and medical professionals benefit from observing maternal mortality and morbidity on a continuum rather than as a dichotomy. Historically, mortality and morbidity were studied separately. Geller et al. found that this division caused physicians and researchers to overlook problems in obstetric care and neglect the progression from morbidity to mortality (2004). Clinicians and researchers view morbidity on a continuum to gain a more comprehensive understanding of maternal health and provide tailored intervention to mothers at different points along the spectrum. The continuum of maternal health begins at good health, progresses from mild to severe morbidity, recognizes “near misses” of maternal mortality, and ultimately ends in maternal death (Geller et al., 2004). There are limitations to this perspective and the threshold between each stage may be unclear. Geller et al. established a five-factor scoring system to help clinicians differentiate between each point. This system scores a woman based on the presence of organ system failure, intensive care unit (ICU) admission, extended intubation, transfusions of more than three units of blood, and surgical intervention (2004). Each factor can score up to three points, resulting in a highest score of 15, where a score greater than 8 indicated near miss from death (Geller et al., 2004). This numerical scoring system provides healthcare professionals

and the literature with a more detailed picture of the progression from good health to maternal death.

Many measurements and databases are needed to scrutinize maternal mortality and morbidity. In the 1970s, the CDC's reproductive health information, death certificates, and autopsy information were primarily used to observe maternal death ("Embolism," 1985). The maternal mortality ratio, or the ratio of the number of maternal deaths to live births, is a crucial measurement to reference when exploring this disparity. NCHS used this measurement to calculate that black women died roughly 2.5 times more often than white women with 37.1 and 14.7 maternal deaths per 100,000 live births, respectively. The CDC developed the Pregnancy Mortality Surveillance System (PMSS) as a response to the stagnation in the maternal mortality ratio in hopes of heightening awareness of this persisting healthcare disparity. PMSS observes all pregnancy-related deaths in the United States, and it is used to identify the causes of maternal mortality that may be used for research (Tucker et al., 2007). The Nationwide Inpatient Sample, a federal database with records of maternal deaths from 2004 to 2011 (Mahmood et al., 2015) and maternal deaths identified through state-mandated maternal death reports are studied as well (Geller et al., 2004). Finally, the pregnancy-related mortality ratio is used to emphasize the fatality rates of various pregnancy complications. This ratio is calculated by multiplying the prevalence of a medical condition and the fatality rate for the condition (Tucker et al., 2007). These assessment tools are often combined to focus the lens on maternal mortality and morbidity.

The preventability component is another key element to this healthcare disparity. Researchers recognize that a significant proportion of maternal deaths and morbidities are preventable (Howell et al., 2016). Maternal mortality or morbidity is classified as preventable if

any action or inaction could have avoided it on the part of the healthcare provider, the healthcare system, or the patient. This preventability includes progression along the morbidity mortality continuum that was preventable, such as worsening of eclampsia. Within the ten hospitals within the UIMC Perinatal Network, 40.5% of maternal deaths were identified as preventable, 45.5% near-miss morbidities preventable, and 16.7% severe morbidities preventable (Geller et al., 2004). Millions of women's lives are threatened by a preventable condition, suggesting that supporting quality healthcare may be crucial in improving outcomes in maternal mortality and morbidity.

The persistent discrepancies in white-black maternal mortality and morbidity are widely observed, but fail to improve significantly. Maternal mortality and morbidity can be defined in multiple ways and are best understood on a spectrum. While the CDC, NCHS, PMSS, and recent streamlined, nation-wide maternal mortality data monitor this data, they fail to identify the causes of this healthcare disparity and recommend concrete solutions. Many maternal mortalities and morbidities are recognized as preventable, suggesting that healthcare and outside intervention may play a significant role. The research must target the driving forces behind this disparity and prescribe interventions across multiple ecological systems that begin to decrease the maternal mortality ratio for expectant black mothers.

Theoretical Framework

Understanding how racism operates at the individual, interpersonal, and institutional levels is necessary for achieving health equity (Largent, 2018). Bronfenbrenner's theory serves as a competent framework for observing the influences of racist interactions on human development through multiple ecological levels. Bronfenbrenner first introduced his ecological theory in the 1970s. This general ecological model consisted of two propositions. The first proposition claims

that human development takes place through reciprocal interactions between a person and their surroundings on a fairly regular basis. These specific repeated interactions in an individual's immediate environment are referred to as proximal processes. The second proposition states that the qualities of proximal processes are a function of the person and their environment (Bronfenbrenner, 1994). Modern Bronfenbrenner theory expands on these two propositions and utilizes the process-person-context-time (PPCT) model, combining the assumptions of the two original propositions with the interdependence of individual characteristics, contexts, and time to observe outcomes in human development (Tudge et al., 2009). This theory begins to lay a competent framework to explain the relationship between prolonged exposure to racism and disparities in maternal health outcomes.

While each component of the PPCT model is essential to Bronfenbrenner's theory, he argues that proximal processes are the most critical feature. Proximal processes are the repeated reciprocal interactions between people, objects, and symbols in the immediate external environment over an extended period of time. It is through these processes that individuals begin to understand their place in the world (Tudge et al., 2009). In the context of a racist environment, proximal processes characterized by racial discrimination may communicate that one's place in the world is defined by inferiority and oppression. The PPCT model supports that these oppressive interactions are relevant for developmental outcomes. Observing the relationship between an expectant black mother and repeated racist interactions is critical to understanding the white-black maternal health disparity.

Bronfenbrenner's PPCT model considers individual differences as a variable in human development as well. The most recent extension of his theory includes the role of genetics, evolving this theory into a bioecological model, suggesting that observing any biological

differences between white and black mothers is necessary for analyzing the disparity. While biology is an important piece, the person component of the model emphasizes that the personal characteristics individuals bring to social interactions influence proximal processes. The PPCT model defines three types of individual characteristics: demand, resource, and force. Demand traits, such as age, gender, and physical appearance, create certain expectations within interactions, and influence bias. Resource traits, such as past experiences, skills, intelligence, and access to resources within a process, play a role in the possible outcomes of proximal processes. Finally, force characteristics, such as temperament, motivation, and persistence, influence how an individual will behave within proximal processes. These individual characteristics shape developmental trajectories (Tudge et al., 2009). The ways the demand trait of race influences maternal mortality and morbidity and the influence of resource traits such as access to prenatal care and insurance will be covered in later sections.

The context component introduced the classic Bronfenbrenner ecological system, establishing the nested micro, meso, exo, and macro systems. The microsystem focuses on one individual and their immediate environment, with many proximal processes occurring at school, home, or work. The mesosystem contains the interactions between microsystems, such as exchanges between parents and teachers, or coworkers and neighbors. The exosystem houses external contexts that indirectly influence development, such as mass media and social services. The macrosystem is the space in which a group, culture, or greater social structure shares resources, beliefs, and opportunity structures (Tudge et al., 2009). Individuals are exposed to racism through each ecological system, so multi-level interventions could be useful in combating racist proximal processes. Bronfenbrenner's ecological systems do not directly align with the micro, meso, and macro levels of social work practice. Because of this inconsistency, an

observation of the multi-ecological nature of the disparity and its respective interventions is clearer than scrutiny of each ecological system.

Finally, the element of time plays a crucial role in human development. This theory establishes three ecological systems of time: micro, meso, and macro time. Micro-time describes what happens during a specific activity or a single interaction between individuals. Meso-time observes the extent to which activities occur with some consistency in the individual's environment. Macro-time, or the chronosystem, observes longitudinal change, historical context, and long-term social continuities (Tudge et al., 2009). Utilizing multiple perspectives of time expands the understanding of this disparity. Observing specific instances of racial discrimination, the influence of chronic race-related stress, and the history of hospital segregation sheds light on the current climate of a hospital environment for expectant black mothers.

The weathering hypothesis complements Bronfenbrenner's theory in pointing towards the driving forces behind the white-black maternal mortality and morbidity disparity. The weathering hypothesis proposes that a lifetime of exposure to social inequality and racial discrimination is a psychosocial and environmental hazard that negatively impacts an individual's health (Geronimus, 1996). Women's health deteriorates in detectable ways as a response to constant social and environmental stress. Chronic and repeated exposure to race-related stress can wear and tear on the body, resulting in an "allostatic load" on the body's adaptive functions (Lu & Halfon, 2003). The literature documents associations between allostatic load and immune suppression, cancer development, cardiovascular disease, and a dysfunctional immune-inflammatory response. For expectant mothers, the increased stress hormone in the body is correlated with preterm labor and increased susceptibility to infection (Lu & Halfon,

2003). The allostatic load that forms as a byproduct of racism could be a critical difference between white and black expectant mothers that perpetuates the maternal health disparity.

The weathering hypothesis shares many of the ideologies of Bronfenbrenner's theory. Repeated racist proximal processes result in the accumulation of race-related stress and allostatic load, thereby weathering the body. Weathering is characterized by the demand characteristic of race, and engaging Bronfenbrenner's theory considers the influences of resource traits such as access to healthcare and insurance in the accumulation of stress. Identifying the sources of racism-induced stress at multiple Bronfenbrenner ecological systems illustrate the multi-ecological nature of the allostatic load. Observing the continuity in racially discriminatory medical practice from the time of hospital construction to current medical practice reflects how the chronosystem and time introduce more stress as well. After accumulating this allostatic load, an expectant black mother may be weathered and more prone to progression along the morbidity-mortality continuum. Utilizing the weathering hypothesis and Bronfenbrenner's theory allows researchers to identify the many avenues of discrimination-induced stress and its impacts on maternal health and development.

Bronfenbrenner theorizes that proximal processes have a buffering effect on environmental differences in developmental outcome, and the effects of these processes are more potent than those of the environmental contexts in which they occur (Tudge et al., 2009). The influence of multi-system interventions could shift daily interactions between black women with their thoughts and feelings, their communities, and their healthcare providers. Introducing positive proximal processes and mitigating the impacts of racial discrimination through multi-level interventions could buffer race-related stress and contribute to more favorable maternal developmental outcomes.

Bronfenbrenner's bioecological theory provides several perspectives on the multiple systems that contribute to this disparity. The weathering hypothesis can describe how long-term exposure to racism and discrimination makes mothers more physically and psychologically vulnerable for childbirth and progressing along the mortality-morbidity continuum (Geronimus, 1996). While medical conditions, parity, age, marital and socioeconomic status, and insurance coverage are associated with maternal death, the racial disparity persists after controlling for these individual factors. Researchers thus argue that, at least in part, the stress associated with racial discrimination accumulates through multiple ecological levels (Lu & Halfon, 2003). In 2018, researchers identified institutional racism and increased susceptibility to health conditions as causes for this racial disparity (Chuck & Cox). Bronfenbrenner's bioecological theory, in tandem with the weathering hypothesis, illustrates how racism operates through multiple systems and contexts and increases susceptibility to the health conditions that are associated with allostatic load.

Risk Factors

Research observes a multitude of risk factors that are not solely responsible for white-black maternal mortality and morbidity differences. Maternal mortality and morbidity are medical concerns, and Bronfenbrenner's theory incorporates a bioecological component, so it is logical to review the influence of medical risk first. A 2004 study indicated that hemorrhage is a great threat to maternal health, noting it as a frequent diagnosis among severe morbidities, near-misses, and maternal deaths (Geller et al.). Hypertension is another common diagnosis among women experiencing severe maternal morbidity, impacting 47.5% of mothers in the study (Geller et al., 2004). Hypertensive diseases, often resulting in eclampsia and preeclampsia, are historical prenatal diagnoses and contributed to 17% of maternal deaths in the 1970s ("Embolism," 1985).

Eclampsia and preeclampsia continue to endanger expectant mothers. Among over two thousand maternal deaths from 2004 to 2011, 21% were associated with eclampsia and preeclampsia (Mahmood et al., 2015). Infections, including amniotic infection syndrome, severe maternal fever during labor, premature membrane rupture, and neonatal mortality from sepsis, may also influence progression through the maternal health continuum. There is a sea of medical conditions that initiate maternal morbidity and ultimately lead to death.

It is necessary to analyze the prevalence of these conditions among black and white mothers to understand the influence of biological and medical risk in the mortality-morbidity disparity. Although there are apparent differences in genetic susceptibility to diseases such as sickle cell, the genetic racial thresholds in birth outcomes is much less clear (Lu & Halfon, 2003). Black women are not more likely to receive a diagnosis for significant pregnancy complications, such as preeclampsia, eclampsia, and hemorrhage than white women. However, preeclampsia, eclampsia, abruption, placenta previa, and postpartum hemorrhage all have higher case-fatality rates or deaths per case for black women than white women (Tucker et al., 2007). Expectant black mothers diagnosed with pregnancy-induced hypertension were 9.9 times more likely to die than white women with the same diagnosis (Rosenberg et al., 2006). Black expectant mothers are significantly more likely to die from preeclampsia and eclampsia (Mahmood et al., 2015) and 4.7 times more likely to die from hemorrhage than white women with the same diagnosis (Rosenberg et al., 2006). Black women are not more genetically predisposed to pregnancy complications, and they are just more likely to progress along the morbidity continuum and ultimately die (Tucker et al., 2007).

Genetic differences in race appear to play little to no role in the white-black maternal mortality disparity. Race is a socially determined construct, and there are no definite genetic

breaks between racial groups (Lu & Halfon, 2003). The influence of comorbidities, stress, and epigenetics play a greater role in the likelihood of death. Black women are more likely to present with preexisting comorbidities such as diabetes, cardiomyopathy, and obesity. Excess comorbidities among black women have been attributed to a significant portion of the disparity (Howell et al., 2016). Obesity, in particular, has been linked to the development of hypertension, infections, and prenatal diabetes ("Embolism," 1985). Brondolo et al. identified hypertension and cardiovascular disease as stress-related disorders (2009). The immunosuppression associated with weathering and allostatic load influences the development of infection, cardiovascular conditions, and hypertensive disorders in expectant black mothers (Lu & Halfon, 2003). It may be useful to begin researching epigenetics, or the influence of the environment on gene expression, in the context of racial disparities in maternal mortality as well. Further research is needed to observe how gene-environment interactions vary between white and black mothers (Lu & Halfon, 2003). While black women are not more genetically vulnerable to pregnancy-related conditions, entering pregnancy with comorbidities, a greater allostatic load, or alternative gene expression contribute to the racial differences. Medical risk alone can not explain the disparity (Rosenberg et al., 2006).

Other physical characteristics, such as age and parity, are important to consider when analyzing the risk factors for maternal morbidity and mortality. Researchers' findings on the influence of age are inconsistent. One study illustrates teenage mothers and women under 30 years old experiencing an elevated risk ("Embolism," 1985), while another study highlights women over 35 years old as high-risk (Rosenberg et al., 2006). Multiparous women, however, are consistently identified as at greater risk for pregnancy-related death (Rosenberg et al., 2006), where one to four previous deliveries are associated with a higher chance of death and severe

morbidity (Geller et al., 2004). Multiparous women portray higher rates of hemorrhage and hypertensive disease as well ("Embolism," 1985). These other biological factors certainly play a role in increasing risk for expectant mothers.

After considering several biological factors, the influence of social characteristics such as socioeconomic and marital status and place of residence provides more insight on the driving forces behind this disparity. Women with lower median household income show an elevated risk for morbidity and mortality (Howell et al., 2016). Being unmarried is identified as a risk factor for pregnancy-related death, and high-risk survivors of severe maternal morbidity are more likely to be married (Rosenberg et al., 2006). Women who live in the South ("Embolism," 1985) or urban residences (Rosenberg et al., 2006) appear to show higher rates of maternal death than women who do not as well. This points towards resource characteristics and larger ecological systems playing a role in this disparity. The disproportionate rate of maternal deaths in the South may be attributable to a larger population of black women or a more profound history of hospital segregation ("Embolism," 1985). Hospital segregation, along with the influence of economic access to quality healthcare, will be later discussed.

While an array of characteristics increase an expectant mother's risk, the white-black disparity in maternal morbidity and mortality persists despite the influence of these risk factors. Black women are approximately 3.7 times more likely to die and 8.5 times more likely to experience for pregnancy-induced hypertension after controlling for age, marital status, and location of residence. The maternal-mortality ratio continues to indicate a disparity after controlling for parity and socioeconomic status as well (Rosenberg et al., 2006). These individual factors make women more vulnerable to progressing through the morbidity-mortality continuum, but they do not fully expose the source of this disparity. These statistics indicate that individual

factors are not entirely responsible for the disparity and that the lens on this healthcare gap must include other factors and ecological systems.

Insurance plays a role in the disparity as well. Women without health insurance are more likely to progress along the morbidity-mortality continuum than insured women. Privately insured women have shown to experience a higher proportion of maternal mortality, and women insured with Medicaid are more likely to experience severe or high-risk morbidity (Geller et al., 2004). Contrarily, black women receive a lower quality of care, even with equal access to care and comparable insurance coverage as white women, suggesting that insurance coverage and available prenatal care alone does not determine a woman's quality of care (Tucker et al., 2007). White and black women are treated differently in the healthcare setting. While quality healthcare during the neonatal period can significantly protect women from progressing through the maternal morbidity-mortality continuum, intervening in the prenatal months alone is insufficient. The risk for maternal mortality and morbidity begins long before pregnancy. The literature may benefit from shifting towards the impact of institutionalized racism and discrimination to trace back to the roots of this disparity.

The Influence of Racial Discrimination

Turning towards the influence of historical and unwavering racial discrimination better explains the disparity than various demand and resource characteristics. Hundreds of today's hospitals were constructed under segregation and share a long history of institutionalized racism. Furthermore, many of these hospitals have shown to provide a lower quality of care (Howell et al., 2016). Forty-one percent of maternal deaths and forty-five percent of maternal near-miss morbidities have been identified as preventable (Geller et al., 2004), calling into question the reliability of the national healthcare system and the way it treats black patients. Even with equal

access to care, black women consistently receive a lower quality of delivery care than white women, pointing towards the demand characteristic of race, racism, and discrimination as significant contributing factors to the disparity (Tucker et al., 2007).

Lu and Halfon identified that racism could take on a multi-ecological form, presenting in internalized, personally mediated, and institutionalized ways (2003). Brondolo et al. expand on this idea, commenting that interpersonal behaviors express that a targeted group should be excluded or rejected, and institutional policies restrict access to opportunities and resources (2009). Racism can appear implicitly and explicitly across each of its ecological levels as well, giving racial discrimination multiple avenues to impact black mothers. Expectant black mothers face racism through a number of ecological levels. This multi-ecological exposure to racial discrimination creates a cumulative weathering effect that wears on the body, potentially further heightening health disparities (Lu & Halfon, 2003).

Researchers have studied the relationship between health disparities and discrimination for decades. In 1963, studies noted that racial discrimination in medical services contributed to black women's five-fold risk for maternal death compared to the risk for white women (Largent, 2018). A 2002 study evaluated the role of bias, discrimination, and stereotyping in the quality of healthcare delivery (Nelson). In this study, a team of researchers reviewed the relevant literature through roundtable discussions. They primarily noted that differences in healthcare occur in the context of broader historic and contemporary, social and economic, and healthcare system and provider inequalities. They ultimately concluded that the patient, provider, institutional, and healthcare system levels all play a role in the disparity. Because of the multi-ecological nature of racism and the healthcare system, observing the disparity across several systems may follow best practices.

This issue in healthcare may be first observed within small, personal ecological systems. Individual accounts from famous black women highlight the idea that wealth does not guarantee equal treatment during delivery hospitalization. A personal account from 23-time Grand Slam champion Serena Williams further suggests that quality of care for black women has little to do with access to care. With a net worth of $225 million, she can likely access premier hospitals and exceptional prenatal care ("Serena," 2019). She reported that doctors much disregarded her pain while she was suffering from a birth clot. Williams elaborated, "I think it is essential to speak up loud and clear and say, 'no this isn't right'" (Nash, 2019, p. 564). Her story speaks for institutionalized medicine's discounting of expectant black mothers' health and wellbeing.

Serena Williams is just one of the thousands of black patients who are diminished by healthcare professionals. Research reveals several ways that racial discrimination influences physician-patient relationships. Todd et al. found that black patients are significantly less likely to receive analgesic medications, and if given medication, receive a lower dose than white patients who self-report similar levels of pain (2000). Researchers observed fewer positive physician-patient interactions (Siminoff et al., 2006), fewer patient questions (Eggly et al., 2011), and less physician information (Gordon et al., 2006) in physician interactions with black patients than in interactions with non-black patients (Hagiwara et al., 2017). Racial discrimination directly impacts individual interactions between patients and healthcare providers.

Reviewing individual factors is the first step towards understanding this disparity, but a multi-system approach is necessary to understand the influence of larger ecological systems. Both black and white patients delivering in black-serving hospitals showed a higher risk of maternal mortality after controlling for patient characteristics. Similarly, hospitals that disproportionately care for black deliveries had higher severe maternal morbidity rates, and

severe maternal morbidity rates continued to remain higher for black women and large back-serving hospitals after adjustment for patient and hospital characteristics. These individual characteristics include the previously mentioned age, insurance coverage, location, annual income, comorbid conditions, parity, and pregnancy complications. The controlled hospital characteristics include teaching status, hospital ownership, bed size, urban or rural location, national region, and percentage of Medicaid deliveries. Overall, black women receive delivery care in a concentrated set of hospitals that provide a lower quality of care (Howell et al., 2016). Black patients receive less outpatient, hospital, and disease-specific care than white patients and experience higher barriers to interactions with the medical care system (Lu & Halfon, 2003). Primarily black-serving hospitals are disadvantaged on a broader ecological scale.

Howell et al. explore the influences of the greater healthcare system. Even with equal access to healthcare and insurance coverage, expectant black mothers experience a disparity in the hospital setting (2016). A small proportion of the nation's hospitals provide services for the majority of pregnant black women. The top 5% of hospitals with the highest proportion of black patients are classified as high black serving, the next 20% as medium black-serving, and the remaining 75% as low black serving. High and medium black-serving hospitals provide delivery services for 73.3% of black women. These medium and high black-serving hospitals more likely to be located in an urban area or the South, serve as a teaching hospital, be owned by the government, have a larger bed size and lower delivery volume, and perform a higher proportion of Medicaid deliveries than predominantly white-serving hospitals. This small concentration of hospitals generally provides a lower quality of care. High and medium black-serving hospitals perform worse than other hospitals on 12 out of 15 delivery-related indicators and had higher severe maternal morbidity rates. Women who deliver in high and medium black-serving

hospitals, including white women, showed higher severe maternal morbidity rates than those in low black-serving hospitals. White patients at high black-serving hospitals showed elevated rates of morbidity, suggesting that the causes of morbidity stretch beyond individual differences (Howell et al., 2016). There are evident inequalities in hospital care for black women.

Racial disparities in the healthcare system can be observed in prenatal care, as well. People of color are more likely to be uninsured, receive lower-quality care, face barriers to access to care, and have poorer health outcomes than white people (Nelson, 2002). Access to prenatal care, health insurance, and other healthcare services likely play a role in the persistence of this disparity. The lack of access to and use of obstetric care was identified as a risk factor for black mothers as early as the 1970s ("Embolism," 1985). Black women are still less likely to begin prenatal care in the first trimester and are generally less likely to receive adequate prenatal care than white women (Tucker et al., 2007). Women who died from pregnancy-related complications were more likely to receive late or no prenatal care, and high-risk survivors are more likely to have initiated prenatal care in the first trimester. Women with no prenatal care or late entry into prenatal care experienced 5.3 and 1.7 times greater risk than those who started in the first trimester, respectively (Rosenberg et al., 2006). The lack of adequate healthcare services available to expectant black mothers draws attention to an inadequate healthcare system. These barriers stem from the more significant problems in the healthcare system and rooted in deep-seated discrimination further back in the chronosystem.

Turning toward hospital history sheds light on the foundation of this disparity. Today's hospitals face a long history of institutionalized racism. The Hospital Survey and Construction Act of 1946, or the Hill-Burton Act, was a response to the need for hospitals after the Great Depression and WWII. The act was the most comprehensive hospital construction program in the

US and used federal grants to fund new facilities. After some persuasion from the South, the act included a separate-but-equal provision. The provision allowed the new hospitals built under this act to discriminate based on race as long as the hospitals provided comparable services for each group (Largent, 2018). This was the only federal separate-but-equal provision in the twentieth century that used federal money for racially discriminatory services.

Hospitals were openly segregated as late as the mid-1960s. The president of the National Medical Association, the largest organization for black physicians, from 1962 to 1963, explained, "The colored doctor is…denied participation in hospital staff membership…the Negro patient is discriminated against both in seeking hospital admission, and once he gets in, where he is placed at the hospital" (Largent, 2018, p. 715). Some black physicians tolerated discrimination because it did not prevent them from practicing medicine. However, other black physicians challenged the segregation through the court system. Lawsuits aiming to overturn this discriminatory policy began in 1958, but the separate but equal provision was not overturned until Simkins v Moses H. Cone Memorial Hospital in 1963 (Largent, 2018). This healthcare discrimination was established over several decades, and a multi-ecological intervention is needed to begin uprooting this historically racist framework.

Residual discrimination and structural racism continue to impact today's hospitals. Hospitals are still virtually segregated, with roughly a quarter of the nation's hospitals providing care for roughly three-quarters of all black deliveries. Because the South encouraged hospital segregation at the time of their construction, southern hospitals are especially susceptible to the impacts of deep-rooted racism. This historical segregation may also explain why living in the South continues to serve as a risk factor for maternal mortality (Howell et al., 2016). It is essential to recognize the role of hospital integration in narrowing racial gaps in maternal

mortality (Largent, 2018). The roots of hospital racism create the historical context for black maternal mortality to persist. Healthcare for all can not be achieved if structural racism persists (Ford & Airhihenbuwa, 2010).

The influence of civil rights can be observed throughout multiple ecological levels. At an interpersonal level, inequities are reflected in the character of patient-physician interactions during the discussion of treatment options. On a regional level, the continuing pattern of segregation in the use of health services, providers, corresponding to patterns of residential segregation, particularly the discrepancies in the South. Inequities also explained by racial discrimination by providers. Title VI of the 1964 Civil Rights Act makes it illegal for federal funds to contribute towards discrimination, thirty years since Medicare and Medicaid made these federal funds their major source of income, so the existing legislation clearly should never allow for racially discriminatory medical practice (Smith, 1998).

The literature has identified racist tendencies in the healthcare system for decades. Despite this awareness, a great deal of current maternal mortalities and morbidities are still preventable. The current healthcare system also takes the fault for many preventable events that contribute to women's progression along the maternal morbidity-mortality continuum. While patient factors are attributed to 13% to 20% of preventable events, healthcare system factors are linked to 33% to 47% of preventable health events. Additionally, one study established that Healthcare provider-related factors contributed to 90% of preventable morbidities, near-misses, and mortalities. Inappropriate or incomplete healthcare management was the greatest factor in morbidity progression, regardless of a woman's point along the continuum. This association between healthcare errors and progression along the continuum remains established after controlling for sociodemographic characteristics (Geller et al., 2004). Awareness is not sufficient

for protecting expectant mothers. Researchers and healthcare professions must develop specific interventions to eliminate preventable diagnoses and deaths.

The influence of the healthcare provider appears to be remarkably significant in preventable mortalities and morbidities. Changes in healthcare provider decision-making could reduce the severity of disease and complications experienced by high-risk women. Similarly, changes in provider behavior have a more significant impact on women at earlier stages along the continuum (Geller et al., 2004). Physicians estimate lower risk and spend less time planning and collaborating with other experts for individuals of certain racial and ethnic groups. Impairments in the patient-provider relationship undermine efforts to promote healthy behavior and close the maternal mortality gap (Brondolo et al., 2009). The impact of provider highlights both the importance of daily patient-provider interactions and the necessity of quality healthcare providers on a larger ecological scale.

The influence of racism-induced stress contributes to this disparity in several ways. Maternal stress can cause increased release of norepinephrine and cortisol and alter immune function, which leads to increased susceptibility to infection and inflammation, a suppressed immune system, an increased risk for cardiovascular disease, cancer, and autoimmune disorders (Lu & Halfon, 2003). Hypertension and cardiovascular disease are identified as stress-related disorders (Brondolo et al., 2009). This biological source of stress contributes to allostatic load, potentially increasing the impacts of weathering. Racism-induced stress may impact behavior, as well. Brondolo et al. observe a relationship between exposure to racism and risky health behaviors, such as smoking and substance use, reduced use of prenatal preventative behaviors, and nonadherence to prescribed medical regimens (2009). These behaviors may be driven by stress reactivity. While a racial disparity in resource characteristics plays a role in the quality of

care, weathering plays a role as well. Women who do have access to quality healthcare resources may not choose to use them as a result of the stress response and allostatic load. Black women are exposed to racist proximal processes through a number of avenues throughout their lives. This saturated exposure results in weathering and allostatic load, which may create both biological and behavioral risks for maternal mortality and morbidity.

The maternal mortality disparity exists even when maternal deaths are compared only to other pregnant women with severe morbidity, rather than just all delivering women, after adjusting for multiple individual factors (Rosenberg et al., 2006). Pointing towards racist practices and institutions sheds light on the persistence of this disparity. Expecting black mothers are exposed to racist proximal processes through multi-ecological contexts, heightening the potential impacts of weathering and allostatic load. The literature has acknowledged the damage of racist healthcare practice in maternal outcomes for decades, yet the disparity fails to close. "Challenge lies not in debating whether disparities exist…but in the developing and implementing of strategies to reduce and eliminate them" (Nelson, 2002). The literature must evaluate multi-ecological interventions to target each level of racism that plays into the maternal disparity.

Interventions

Research indicates a great need for interventions. In 2015, Mahmood et al. remarked that interventions should be directed towards vulnerable women to reduce the rates of maternal death. While the literature generally reveals few effective methods for closing this disparity, past research is suggestive of multi-level interventions. Developing a specific form of cognitive-behavioral therapy to target the individual's response to racism and to slow the acquisition of allostatic load may assist at the individual level (Brondolo et al., 2009). Organizing community

consortia and adapting the Perinatal Periods of Risk Model for maternal health may effectively target the community level. Finally, civil rights monitoring report cards could target greater racial inequities and healthcare limitations. While racial discrimination is difficult to measure, and although many limitations accompany each intervention, it may be a strong starting point for social work intervention in the white-black maternal mortality and morbidity disparity.

This intervention begins at the individual level. Brondolo et al. acknowledge that oppressive individuals and systems, not targeted populations, are responsible for the impacts of racism (2009). However, individual-based coping strategies may buffer race-related stress and thereby reduce the accumulation of allostatic load. They observe that developing a sense of pride and belonging to one's racial identity can encourage an individual to view their race and ethnicity as strengths. They also recognize the benefits of strong social support systems for individuals. Social support may not only validate the feelings of anger, shame, and anxiety surrounding exposure to racism, but also facilitate feelings of hope and motivation. Ultimately, the study concludes that no current individual coping strategy can ameliorate racism and identifies a significant need for additional research. Developing a specific intervention, perhaps an adapted form of cognitive-behavioral therapy, may target the individual's response to racial discrimination and slow the acquisition of allostatic load.

Diversity training for medical workers and hospital staff are typical organizational and community approaches to combating racial discrimination, but they are often ineffective (Brondolo et al., 2009). "Targeted preventative community-based programs in the catchment areas that serve these high and medium black-serving hospitals may be an important step to reducing disparities" (Howell et al., 2016, p. 122). Like individual interventions, community approaches are lacking as well, but the Perinatal Periods of Risk Community Model (PPOR) and

community-based consortia may be a great place to start. While this intervention was initially geared to address infant health and low birth weight, social workers may consider adapting it for maternal health.

The World Health Organization (WHO) and CDC developed PPOR to analyze contributing factors for feto-infant mortality in developing countries. PPOR identifies determinants of fetal and infant deaths, such as prenatal and maternal care, and groups feto-infant deaths into four categories. The four categories are infants weighing more or less than 1500 grams, and infants who died in the neonatal and postnatal periods weighing less than 1500 grams (Besculides & Laraque, 2005). Once the deaths are categorized, the feto-infant mortality rate is calculated and utilized for further research. The death category that contributes most to the overall feto-infant mortality rate helped identify leading contributing factors. This foundation may serve the researchers and social workers who observe the maternal mortality disparity.

Peck et al. outline PPOR's six stages: readiness, data and assessment, strategy and planning, implementation of strategy, monitoring and evaluation, and investment (2010). Readiness assesses community engagement and willingness for community participation, identifies resources and critical personnel needed for implementation, and community readiness toolkit. In data and assessment, organizers obtain medical records and death certificates, categorize the deaths, create a "mortality map" to conceptualize the death continuum, and develop the periods of risk into potential responses. These responses may include referrals to a physician or a prenatal care regimen. Using strategy and planning, community organizers can complete community needs assessments and review the current literature to target the specific system that was identified in the etiology. Through these beginning steps, organizers develop a strategy for community intervention. The intervention is implemented, monitored, and evaluated.

Through investment, organizers address community stakeholders and assess their willingness to invest in long-term PPOR.

The farther along the morbidity-mortality continuum, the less opportunity there is for clinical control or effective intervention, making it essential to focus attention on keeping women from progressing along the continuum (Geller et al., 2004). The PPOR model may be easily adapted to intervene in maternal health by establishing points along the morbidity-mortality continuum as prenatal periods of risk. Similar to the four death categories of the original PPOR, the points system developed by Geller et al. could identify four objective points along the mortality-morbidity continuum (2004). Women can fall into the categories of 0 to 3, 4 to 7, 8 to 11, and 12 to 15 with a score above 8, indicating a near miss from maternal death. Through PPOR, healthcare professionals could design a prescribed regimen for expectant mothers in each morbidity category. This regimen can treat both the woman's current condition and work to prevent her from progressing into a more severe category. PPOR is a highly variable model and may look quite different in different communities with diverse needs and resources.

One team of researchers established a five-factor scoring system to facilitate differentiating between each point. This system scores a woman based on the presence of organ system failure, intensive care unit (ICU) admission, extended intubation, transfusions of more than three units of blood, and surgical intervention. Each factor can score up to three points, resulting in the highest score of 15, where a score greater than 8 indicated near miss from death (Geller et al., 2004). This numerical scoring system provides healthcare professionals and the literature with a more detailed picture of the progression from good health to maternal death.

Community-based consortia is a similar macro intervention that provides networking and collaboration opportunities for community members and organizational representatives.

Thompson et al. describe that community consortia, community members, and critical informants lead the change rather than outside organizers or researchers (2003). Social workers can support a community by tuning into its strengths and engaging its preexisting personnel and resources. A community-led project could provide black women affected by this disparity with the platform to take action. These consortia empower communities to build the capacity to serve its own members. Consortia goals often include strengthening service delivery systems, and engaging community members as leaders may ensure that decisions about healthcare delivery reflect community-felt need. This in-house style of intervention empowers communities to take charge of their own healthcare disparity and create lasting, sustainable interventions. Community projects may develop into more extensive continuous programs as raising conscientiousness about the disparity both within and outside the community. It may only be through this long-term community action that the maternal mortality and morbidity disparity begins to close. The community projects that result from the consortia may include maternal health promotional and educational campaigns, collaborations between organizations that value maternal health, and the creation of formal 501(c)(3) nonprofit agencies. Similar to PPOR, community-based consortia's loose framework allows this intervention to adapt to diverse communities and populations.

Finally, broad intervention and nationwide, culturally responsive healthcare is vital in closing the maternal mortality disparity (Brondolo et al., 2009). Social workers face a hospital system with deep roots in racism, and civil rights monitoring may be a great place to start holding healthcare accountable for their discriminatory practices. The Department of Education's Office of Civil Rights (ODR) conducts a biennial survey of public schools. The survey uses civil rights indicators to assess barriers to educational opportunities that students may face. This monitoring tool works to evaluate schools' compliance with the Civil Rights Act of 1964 and

Title IX, which prohibit discrimination based on race, along with several other individual characteristics. The data gathered from this survey serves as a valuable resource for educators, parents, researchers, and policymakers who work to ensure student equity and equality (CRDC, 2020). Social workers and healthcare professions may benefit from adapting ODR's monitoring process to evaluate the equality and equity of care for expectant black mothers.

A similar methodology for evaluating hospital ethics is in the works. A variety of report card approaches are currently being proposed to assure accountability, consumer choice, and goal-directed action. A reliable report card may incorporate several forms of measurement. The Office of Management and Budget's Directive 15 established a national standard for racial and ethnic definitions and is used in civil rights monitoring in the private and public sectors. The Healthy People 2000 initiative identified hundreds of indicators that are important to measuring health promotion and disease prevention. These indicators include death rates, adequacy and timing of prenatal care, poverty rates, and other obstetrical, oncological, and cardiovascular indicators. Combining these two measurements may begin to effectively measure the frequencies of race and quality of healthcare across the country. There is no way to systematically assess the civil rights problems that exist in healthcare services, their severity, or these problems, or the steps needed to mitigate them (Smith, 1998).

Additional recommendations may be useful in mending the broken healthcare system. Fostering healthy and bidirectional relationships between patients and providers may improve maternal outcomes (Nelson, 2002). On a larger scale, introducing publicly funded health programs and limiting provider economic incentives to exacerbate health disparities could further close the disparity (Nelson, 2002). Healthcare providers may further encourage the use of prenatal care and discuss these services in the context of stress reactivity. Implementing a stricter

federal standard for clinical practice may ensure that treatments and procedures are uniform and based on the best available science. Integrating community health workers, social workers, and non-medical personnel who can help patients navigate the healthcare system and promote preventative care may further foster good maternal outcomes (Nelson, 2002). The Black Lives Matter movement may consider shifting its focus from police brutality and expand to include advocating for black mothers (Nash, 2009). Finally, emphasizing the principle of culturally responsive healthcare in medical education could reinforce the need for healthcare equality (Brondolo et al., 2009) There is a multitude of measures healthcare and social workers could take to begin closing the maternal mortality-morbidity disparity through multiple ecological systems.

Social workers can mobilize several interventions to begin reducing the white-black disparity in maternal mortality and morbidity. They can adapt individual coping skills and stress responses to ameliorate the influence of racist proximal processes and the accumulation of allostatic load. They can work to develop a more effective cognitive-behavioral therapy to combat race-related stress. They can empower communities to mobilize their resources to create lasting change through PPOR and community-based consortia. They can promote effective civil rights monitoring and work to uphold the Civil Rights Act and Title IX throughout the nation. This multi-ecological healthcare disparity may be met with multi-ecological interventions. However, this review is an imperfect assessment of both problem and solution. Additional research is necessary for creating significant, long-term improvements in maternal mortality and morbidity for expectant black mothers.

Limitations

This review faces several limitations, beginning with the terms and concepts that serve as the foundation for this disparity. The maternal mortality-morbidity continuum is considerably subjective. While instruments such as the five-factor scoring system help identify thresholds, mortality and morbidity are difficult to operationalize, creating obstacles for a further quantitative study. Similarly, racial discrimination lacks a concrete definition and unit of measurement. Racism's multi-system nature makes it challenging to study in isolation, and its impact is dependent on other stressors. For example, researchers may consider how a low socioeconomic status heightens the effects of racism (Brondolo et al., 2009). Finally, the research lacks a standardized measurement for weathering. Because these variables are so intangible, the direct etiology of this disparity may be difficult to deduce. Further research may benefit from strengthening the correlations between racial discrimination, weathering, and the mortality-morbidity disparity through all feasible qualitative and quantitative studies.

The literature lacks a precise, comprehensive data set as well. When retroactively analyzing medical records, it can be impossible to determine whether or not a woman's reported medical conditions were preexisting or occurred during pregnancy, making it more challenging to determine which conditions could be attributed to weathering. The maternal-mortality ratio may contribute to flawed data. This ratio is comparing maternal deaths per 100,000 live births, therefore disregarding the number of occasions when both mother and child do not survive. Maternal mortality and morbidity reporting is insufficient, as well. Obstetric complications and medical conditions are sometimes under or over-reported, altering the analysis of risk (Rosenberg et al., 2006), and the reporting of conditions and deaths could differ by race (Tucker et al., 2007). The United States did not begin institutionally measuring maternal mortality until

2017, potentially giving researchers little time or information to observe the disparity on a national scale (Chuck & Cox, 2018). Reliable data collection would strengthen the literature on this disparity.

Bronfenbrenner's ecological theory and the weathering hypothesis helps explain the disparity, but this theoretical framework is incomplete. Not all elements of the process-person-context-time model directly connect to weathering and the maternal disparity. The four major components of the model help explain this disparity, but not every characteristic or contextual and chronological ecological system of the theory is applicable. While Bronfenbrenner and the weathering hypothesis show a promise in explaining the forces behind this disparity, they fail to show a direct causal relationship. Other theories may complement this theoretical framework. Spence and Eberstein use the life-course perspective in conjunction with the weathering hypothesis to interpret the relationship between childbearing age and maternal mortality (2009). The life-course perspective also recognizes that allostatic load does not begin at pregnancy and considers the ways stress impacts development starting at birth (Lu & Halfon, 2003). This theoretical framework may better illustrate the long-term acquisition of stress, but lacks an emphasis on the impact of proximal processes and multi-ecological systems. Researchers may benefit from including a vast range of theories in their future studies of this disparity.

Perhaps the greatest limitation is the absence of preexisting interventions for the disparity. Individual counseling may become more beneficial in targeting weathering once a form of racism-focused psychotherapy is developed. PPOR and community-based consortia may allow individuals and their communities to identify and address expectant mother's needs in different points along the maternal mortality-morbidity continuum. However, PPOR was initially designed as an intervention for infant mortality and would need to be formally adopted for

mothers. These interventions require a great deal of leadership, organization, and resources, and may not function as a practical intervention for all communities. Civil rights report cards and monitoring are still underdeveloped. There are some forms of measurement in place that may serve as a model, but researchers must find a way to standardize evaluating ethical practices in healthcare settings.

Multiple biological, sociological, and contextual factors are not solely responsible for this racial disparity; however, it is not an exhaustive review of contributing factors. Future studies must explore the influence of personal characteristics such as age, parity, marital and socioeconomic status, resources, and temperament and their impact on maternal health and weathering. There is considerable research on the influence of these factors for fetal and infant healthcare disparities, but the body of knowledge for maternal healthcare disparities is not nearly as extensive (Thomas et al., 2019). Additionally, research is needed to understand why preexisting interventions for racial discrimination, particularly diversity training, are often ineffective in reducing discriminatory behavior (Brondolo et al., 2009). Further research is also needed to identify which strategies are most effective in addressing race-related maltreatment and mollifying its associated stress. The research has indicated the presence of a racial disparity in maternal mortality and morbidity for decades. It is time for researchers to turn away from acknowledging the disparity and towards identifying its etiology and building effective interventions specifically geared towards the white-black disparity maternal mortality and morbidity.

Finally, this lens is limited to the social work profession. Other tools that may reduce the white-black maternal health disparity, such as the allostatic load index, are more appropriate for the medical field. Social workers may understand that racial discrimination serves as a great

contributing factor for maternal mortality and morbidity. They understand that expectant black mothers can experience racism through a number of ecological systems. They observe that chronic stress, allostatic load, and weathering are physical and psychological health risks. Finally, they recognize the significant gap in available data and effective interventions for this racial healthcare disparity and gear their research and practice towards filling these gaps.

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