Literature Review of Research on the Impact of Racism and Associated Race-Related Stress on Adverse Pregnancy Outcomes Among Black Women in the United States

by

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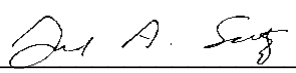

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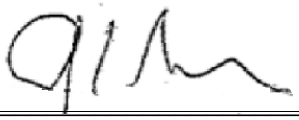

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Abstract

Background: Black women in the United States are three to four times more likely to experience a pregnancy-related death than white women, and infants born to Black women are dying at twice the rate of infants born to non-Hispanic white mothers. The racial disparities that we see in maternal and infant health cannot be explained away by factors such as poverty, access to care, physical health etc. Although Black women are more likely than white women to experience these risk factors, research shows that this does not fully account for the racial gap in outcomes. A growing body of research suggests that stress induced by discrimination plays a significant role in maternal and infant morbidity and mortality. This report aims to provide a comprehensive review of the literature surrounding the direct impact of race-related stress on adverse pregnancy outcomes, offer evidence based recommendations for interventions to eliminate this disparity, and present guidance for the direction of future research.

Methods:

Relevant articles published between 2008 and 2019 were obtained through an electronic database search. 2008 was chosen as the starting year for the search because of influential work demonstrating the importance of psychosocial factors that occur early in the life course for adverse pregnancy outcomes. In order to identify relevant research, a systematic search of the Google Scholar database was conducted crossing the keywords 'racial discrimination', 'stress' or 'racism' with the keywords 'adverse pregnancy outcome', 'prematurity', 'low-birth weight' and other similar derivatives. Titles and abstracts for all potentially relevant papers were reviewed and selected papers were followed up. English-language studies from the United States were included if: (1) The study population consisted of African American women only or African American women compared to white women (2) The study specifically mentions racism or racial discrimination in the abstract (3) Study objectives included examination of the relationship between race-related stress/exposure to racism and adverse pregnancy outcomes in Black women. (4) The study is of empirical nature (reviews were excluded). One reviewer extracted data and rated study quality. The search was stopped after page 10 due to failure to identify relevant articles after this page. A total of 10 studies were found to meet the inclusion criteria.

Results:

The results of this review revealed that while the majority of quantitative studies indicate a direct association between exposure to racism + resulting stress and adverse pregnancy outcomes, 3 out of the 8 studies only found such an association when in combination with an additional characteristic . None of the studies found no link at all between racism and adverse pregnancy outcomes, indicating that racial stress is likely an important component of racial disparities in adverse pregnancy outcomes. However, this factor alone cannot fully explain the disparity in pregnancy health outcomes.

Conclusion:

Disproportionately high numbers of pregnancies in Black women result in adverse outcomes. The psychosocial stress of racism likely contributes to this disparity. Evidence indicates that not

only is race-related stress a unique stressor, but it is also associated with a variety of adverse pregnancy outcomes such as preterm birth and low-birth weight.

Introduction

Maternal and infant health is a critical measure of a nation's health and development. Unfortunately, the United states is lagging far behind the progress of other developed nations. Despite spending more than any other country on hospital based maternity care, maternal and infant health outcomes in the United States lag far behind those of many other developed nations[i]. In 2015, the maternal mortality rate in the U.S was 26.4 per 100,000 live births compared with the average maternal mortality rate of 12 per 100,00 in other developed countries[ii]. A similar but less extreme gap is present in infant mortality rates as well. According to the 2018 America's Health Ranking Annual Report, the U.S infant mortality rate is 5.9 deaths per 1,000 live births, while the average rate of infant mortality among the OECD countries is only 3.9 per 1,000[iii].

Even more alarming is the fact that maternal and infant health is not improving at the rate of other comparable countries. In fact, maternal health in the United States is actually getting worse. Despite a global decrease in maternal mortality of 44% between 1990 and 2015, the United States saw an increase in maternal mortality during this same time period[iv]. This gives the United States the dishonorable distinction of being the only developed nation whose maternal mortality rates have increased since 1990[v]. The statistics become a bit more encouraging when examining infant mortality. Between 2000 and 2017, infant mortality in the United States decreased by 16%. However, this is a much slower rate of improvement than in other comparable countries who experienced an average 26% decrease in infant mortality[vi].

The key outcomes of maternal and infant morbidity and mortality are indicative of the extent to which existing racial disparities within the United States can undermine overall progress for the nation. African American women and infants have the worst outcomes of any racial/ethnic group in the country. African American women from all income levels are dying from pregnancy related complications at 3-4 times the rate of non-Hispanic white women, and are twice as likely to experience severe maternal morbidity. Infants of Black mothers are dying at twice the rate of infants born to non-Hispanic white mothers.

Numerous research studies have been completed to evaluate the risk factors that could be causing this disparity in outcomes. Many social determinants of health such as poverty/low socioeconomic status, lack of access to prenatal care, poor physical health, and poor mental health have all been examined. While Black women are more likely than non-Hispanic white women to experience all of these risk factors, these factors alone were not found to fully account for the racial disparity in adverse pregnancy outcomes. We are left with the evidence that there is some other cause in addition to all of these other factors.

Research suggests that the stress induced by racism and discrimination has a significant role in adverse pregnancy outcomes in Black women[vii]. Black women live with a legacy of reproductive oppression and sometimes have a strong distrust of the healthcare system that can exacerbate existing disparities. For example, 22% of Black women report discrimination when going to the

doctor or clinic[viii]. While health care based discrimination is important, a growing body of research places emphasis on racial based stress of Black women over her entire lifetime[ix].

Evaluating the state of racial disparities in maternal and child health and effective methods to counter them is critical. This report aims to provide a comprehensive review of the literature surrounding the impact of race-related stress on adverse pregnancy outcomes, offer evidence based recommendations for interventions to eliminate this disparity, and present guidance for the direction of future research.

Methods

Relevant articles published between 2008 and 2019 were obtained through an electronic database search. The year 2008 was chosen as the beginning for the search because of influential work demonstrating the importance of psychosocial factors that occur early in the life course for adverse pregnancy outcomes[x]. In order to identify relevant research, a systematic search of the Google Scholar database was conducted crossing the keywords 'racial discrimination', 'stress' or 'racism' with the keywords 'adverse pregnancy outcome', 'prematurity', 'low-birth weight' and other similar derivatives. Titles and abstracts for all potentially relevant papers were reviewed and selected papers were followed up. English-language studies from the United States were included if: (1)The study population consisted of African American women only or African American women compared to white women(2)The study specifically mentions racism or racial discrimination in the abstract (3)Study objectives included examination of the relationship between race-related stress/exposure to racism and adverse pregnancy outcomes in Black women. (5) The study is of empirical nature(reviews were excluded). One reviewer extracted data and rated study quality. The search was stopped after page 10 of results due to a lack of relevancy after this page. This was determined once no studies on the page of search results matched the inclusion criteria. A total of 10 studies were found to meet the inclusion criteria.

Results

Study Characteristics

The final group of studies included two qualitative designs and eight quantitative designs. Of the eight quantitative studies, two examined structural/institutional racism, two examined lifetime exposure to racism, three examined perceived racism/discrimination, one examined the frequency and perceived stressfulness of racial *micro aggressions*, and 1 examined chronic worry about racial discrimination as exposure variables. The majority of studies(8) examined preterm birth as the primary adverse pregnancy outcome. One study used low-birthweight, and another used small for gestational age. A number of the studies also included potential mediators for the association between racism/discrimination and adverse pregnancy outcomes. These mediators include: two studies that used depressive symptoms, two studies that used stress, one study that used blood pressure, one study that used income inequality, and one that used coping behaviors.

Title	Author	Year	Population source	Participants	Measure(s) of Exposure	Outcome(s)

Racial Differences in Birth Outcomes: The Role of General, Pregnancy, and Racism Stress[xi]	Tyan Parker Dominguez	2010	prenatal clinic of a large, urban medical center in Los Angeles County or referral by private practitioners with admitting privileges to this medical center.	51 Black women, 73 white women	general	Birth weight
Institutional racism, neighborhood factors, stress, and preterm birth[xii]	Dara D Mendez	2013	stress and pregnancy study conducted from 1999 to 2004 in Philadelphia, PA (USA)	2,371 Black women, 300 white women	Redlining, residential segregation, discrimination, stress, neighborhood quality	Preterm birth
"It's The Skin You're In": African-American Women Talk About Their Experiences of Racism. An Exploratory Study to Develop Measures of Racism for Birth Outcome Studies[xiii]	Tyan Parker Dominguez	2008	women of childbearing age in San Francisco, Oakland, Berkeley, and Sacramento from May 2004 to April 2005	40 African American women	N/A(qualitative study)	N/A(qualitative study)
Racism in the form of microaggressions and the risk of preterm birth among Black women[xiv]	Jaime C. Slaughter-Acey	2016	women residing in Metropolitan Detroit, Michigan enrolled into the Life-course Influences on	1410 Black women	perceived racism through microaggressions, depressive symptoms, perceived stress	Preterm birth

			Fetal Environments (LIFE) Study			
Effects of social and psychosocial factors on risk of preterm birth in black women[xv]	Dawn Misra	2010	Women residing in Baltimore Maryland, and receiving prenatal care at one of three selected clinics or had delivered at the affiliated hospital with late, sporadic or no prenatal care	832 Black women	lifetime exposure to racism, stress level, depressive symptoms	Preterm birth
AFRICAN AMERICAN WOMEN'S EXPOSURE TO INTERPERSONAL RACIAL DISCRIMINATION IN PUBLIC SETTINGS AND PRETERM BIRTH: THE EFFECT OF COPING BEHAVIORS[xvi]	Kristin M. Rankin	2011	African American mothers delivering at Stroger Hospital of Cook County and University of Chicago Hospital in Chicago, IL between July 2001–June 2005	277 Black women	perceived racism(past year and lifetime), coping behavior in response to racial discrimination	Preterm birth
Lifetime Racism and Blood Pressure Changes During Pregnancy: Implications for Fetal Growth[xvii]	Clayton J. Hilmert	2013	U.S.-born African American pregnant women who participated in a study of stress and pregnancy at two major	39 African American women	exposure to childhood and adulthood racism in several life domains(direct and vicarious), maternal blood pressure at 18 to 20 and 30 to 32 weeks gestation	Preterm/low-birth weight

			medical centers in southern California (Los Angeles and Orange counties)			
Worry about racial discrimination: A missing piece of the puzzle of Black-White disparities in preterm birth?[xviii]	Paula Braveman	2017	cross-sectional California statewide-representative surveys	2,201 Black women, 8,122 white women	Chronic worry about racial discrimination	Preterm birth
African American Women's Views of Factors Impacting Preterm Birth[xix]	Carmen Giurgescu	2013	a medical center in Chicago	22 Black women	N/A(qualitative study)	Preterm birth
Joint Effects of Structural Racism and Income Inequality on Small-for-Gestational-Age Birth[xx]	Maeve E. Wallace	2015	Electronic medical records from singleton births to White and Black women in 10 US states and the District of Columbia	49,970 Black women, 71,788 white women	state-level indicators of structural racism, including the ratios of Blacks to Whites who were employed, were incarcerated, and had a bachelor's or higher degree, income inequality	small for gestational age birth

Study Results

Title	Results	Effect Size	Conclusion
Racial Differences in Birth Outcomes: The Role of General, Pregnancy, and Racism Stress	Perceived racism and indicators of general stress were correlated with birth weight and tested in regression analyses. In the sample as a whole,	The perceived racism lifetime score was a marginal predictor **($\Delta R^2 = .012$, $\beta = -0.12$, $p < .10$)** the childhood	These findings provide further evidence that racism may play an important role in birth outcome disparities, and they are among the first to indicate the significance of psychosocial factors that occur

	lifetime and childhood indicators of perceived racism predicted birth weight and attenuated racial differences, independent of medical and sociodemographic control variables. Models within each race group showed that perceived racism was a significant predictor of birth weight in African Americans, but not in non-Hispanic Whites.	vicarious subscore was a significant predictor **(ΔR 2 = .020, β = 0.15, p < .05)**	early in the life course for these specific health outcomes.
Institutional racism, neighborhood factors, stress, and preterm birth	There was an increased risk of preterm birth among those with high experiences of everyday discrimination, lived in nonredlined areas, and areas with high levels of segregation measured by the isolation index.	Among black women, living in a redlined area (where blacks were more likely to be denied mortgage loans compared to whites) was moderately associated with a decreased risk of preterm birth**.(Adjusted odds ratio = 0.8, 95% confidence interval: 0.6, 0.99).**	Residential redlining as a form institutional racism and neighborhood characteristic may be important for understanding racial/ethnic disparities in pregnancy and preterm birth.
"It's The Skin You're In": African-American Women Talk About Their Experiences of Racism. An Exploratory Study to Develop Measures of Racism for Birth Outcome Studies	Women reported experiencing racism (1) throughout the life course, with childhood experiences seeming particularly salient and to have especially enduring effects (2) directly	N/A-qualitative study	This exploratory study's findings support the need for measures reflecting the complexity of childbearing African-American women's racism experiences

	and vicariously, particularly in relation to their children; (3) in interpersonal, institutional, and internalized forms; (4) across different life domains; (5) with active and passive responses; and (6) with pervasive vigilance, anticipating threats to themselves and their children		
Racism in the form of microaggressions and the risk of preterm birth among Black women	among those with severe depressive symptoms, perceived racism was not associated with PTB. However, perceived racism was significantly associated with PTB among women with mild to moderate (CES-D score ≤22) depressive symptoms. Perceived racism was not associated with PTB among women with or without high amounts of perceived stress.	The predicted probability (PP) of PTB increased from a DLE-B score of 20 **(PP=0.14, 95%CI: 0.10–0.20),** peaked when the DLE-B score was 73 **(PP=0.21, 95% CI:0.17–0.26),** then decreased continuously as the DLE-B score increased.	Our findings suggest that racism, at least in the form of racial microaggressions, may not further impact a group already at high risk for PTB (those with severe depressive symptoms), but may increase the risk of PTB for women at lower baseline risk.
Effects of social and psychosocial factors on risk of preterm birth in black women	The preterm birth rate was 16.4%. In both unadjusted and adjusted models, exposure to racism over a woman's lifetime had no effect on risk of preterm	A three-way interaction between reported lifetime experiences of racism, depressive symptoms during pregnancy and stress during	Social and psychosocial factors may operate in a complex manner related to risk of preterm birth.

	birth in our sample. However, we found evidence of a three-way interaction between reported lifetime experiences of racism, depressive symptoms during pregnancy and stress during pregnancy on preterm birth risk. Racism scores above the median (more racism) were associated with an increased risk of preterm birth in three subgroups with the effect moderated by depressive symptoms and stress.	pregnancy showed an adjusted **Hazard ratio of 1.32-1.55** for preterm birth.	
AFRICAN AMERICAN WOMEN'S EXPOSURE TO INTERPERSONAL RACIAL DISCRIMINATION IN PUBLIC SETTINGS AND PRETERM BIRTH: THE EFFECT OF COPING BEHAVIORS	A greater percentage of African American mothers of preterm infants had high lifetime and past year exposure to racism in public settings than their peers who deliver term infants. Active coping, especially ''working harder to prove them wrong'' led to attenuated ORs	Odds ratios (OR) and 95% confidence intervals (95% CI) equaled **1.5 (0.9–2.8) for lifetime and 2.5 (1.2–5.2) for past year exposure**	African American women's exposure to racism in public settings is a risk factor for preterm birth; active coping behaviors weaken this relationship.
Lifetime Racism and Blood Pressure Changes During Pregnancy: Implications for Fetal Growth	Childhood racism interacted with diastolic blood pressure to predict birth weight. Specifically, women with two or more domains of indirect exposure to racism in	The racism by change in DBP interactions were significant in the analyses involving **childhood indirect racism (β=-.36, ΔR2 =0.12, p <.01), and childhood**	Future research should investigate a variety of direct and indirect pathways linking racism and prenatal maternal DBP changes to birth outcome

	childhood and increases in diastolic blood pressure between 18 and 32 weeks had lower gestational age adjusted birth weight than the other women. A similar pattern was found for direct exposure to racism in childhood	**personal racism (β=-.30, ΔR2= 0.07, p< .05)**	
Worry about racial discrimination: A missing piece of the puzzle of Black-White disparities in preterm birth?	Among Black and White women respectively, 36.9% and 5.5 % reported chronic worry about racial discrimination; rates were highest among Black women of higher income and education levels.	Chronic worry was significantly associated with PTB among Black women before **Prevalence Ratio(PR)(1.73, 95% CI 1.12–2.67) and after (PR 2.00, 95% CI 1.33–3.01)** adjustment for covariates. The unadjusted Black-White disparity in PTB **(PR 1.59, 95%CI 1.21–2.09)** appeared attenuated and became non-significant after adjustment for chronic worry **(PR 1.30, 95% CI 0.93–1.81);** it appeared further attenuated after adding the covariates **(PR 1.17, 95% CI 0.85–1.63).**	Chronic worry about racial discrimination may play an important role in Black-White disparities in PTB and may help explain the puzzling and repeatedly observed greater PTB disparities among more socioeconomically-advantaged women.
African American Women's Views of Factors Impacting Preterm Birth	Pregnant African American women encounter multiple physical,	N/A-qualitative study	Clinicians may use the results of this study to better understand women's perceptions of factors that affect preterm birth, to

	psychological, and social stressors. The four themes included knowledge of preterm birth, risk factors for preterm birth, protective factors for preterm birth, and preterm birth inevitability. The risk factors for preterm birth were health-related conditions, stressors, and unhealthy behaviors. Stressors included lack of social and financial support, interpersonal conflicts, judging, dangerous neighborhoods, racism, and pregnancy and mothering related worries. Protective factors for preterm birth included social support and positive coping/self-care		educate women about risk factors for preterm birth, and to develop programs and advocate for policies that have the potential to decrease health disparities in preterm birth.
Joint Effects of Structural Racism and Income Inequality on Small-for-Gestational-Age Birth	Structural racism indicators were associated with higher odds of SGA birth, and similar effects were observed for both races. The joint effects of racial and income inequality were significantly associated with SGA birth only when levels of both were high	In areas with high inequality levels, **adjusted odds ratios ranged from 1.81 to 2.11** for the 3 structural racism indicators	High levels of racial inequality and socioeconomic inequality appear to increase the risk of SGA birth, particularly when they co-occur

The results of this review revealed that while the majority of quantitative studies indicate a direct association between exposure to racism + resulting stress and adverse pregnancy outcomes, 3 out of the 8 studies only found such an association in subsets of the population where exposure to racism/racial stress was combined with an additional factor. The additional factors that were found to be significant were: mild to moderate depression symptoms, the interaction between depressive symptoms during pregnancy and stress during pregnancy, and diastolic blood pressure. None of the studies found no link at all between racism and adverse pregnancy outcomes, indicating that racial stress is likely an important component of racial disparities in adverse pregnancy outcomes. However, this factor alone cannot tell the whole story.

The study designs found in this review have a variety of limitations, the most important being inadequate measurements of racism exposure and limited generalizability.

The first study, Racial Differences in Birth Outcomes: The Role of General, Pregnancy, and Racism Stress, used a measure of racism exposure across general life domains that was loosely based on items developed by Krieger in 1990[xxi]. Additionally, their measure included an "other" category to capture as many types of experiences as possible, referred to specific periods of the life course to aid recall, and assessed racism indirectly experienced through a close other. While the addition of the "other" category is meant to capture a broader range of interpersonal experiences of racism, the study is still limited by not considering other types of racism exposures such as those that are structural or internalized. The study also lacks generalizability to all African American women because of exclusion criteria that created a healthier group of women than would be expected from a nationally representative sample.

A strength of the Institutional racism, neighborhood factors, stress, and preterm birth paper is that the authors consider both interpersonal experiences of discrimination as well as institutional measures of racism. Institutional racism was measured using redlining indices-denoting a Black-white disparity in mortgage loan denial, and residential segregation measures that were calculated using 2000 Census data. Interpersonal racism was assessed using questions about everyday experiences of discrimination and major experiences of discrimination. Participants were also asked to rate the frequency of their day-to-day experiences. The shortcoming of this measurement is the lack of inclusion of childhood or vicarious experiences of racism.

Similarly, both Racism in the form of microaggressions and the risk of preterm birth among Black women and effects of social and psychosocial factors on risk of preterm birth in black women failed to take into account childhood and vicarious experiences of racism. The study on microaggressions used the Daily Life Experiences of Racism and Bother (DLE-B) scale, which measures the extent to which daily racial microaggressions are perceived to occur and bother an individual during the index pregnancy and up to one year prior to the index pregnancy. The study on the effects of social and psychosocial factors utilized aspects of the Racism-Related Experiences (RRE) Scale and the Racism and Lifetime Experiences Scale (RALES) to capture experiences of racism 6 months prior to learning of the pregnancy and during pregnancy. This study additionally had an issue of generalizability as the study disproportionally included disadvantaged women who were at high risk of preterm birth.

Again, like many of the previously mentioned studies, a lack of inclusion of vicarious experiences and forms of racism that are not interpersonal were major limitations of African American Women's Exposure to Interpersonal Racial Discrimination in Public Settings and Preterm Birth: The Effect of Coping Behaviors and Worry about racial discrimination: A missing piece of the puzzle of Black-White disparities in preterm birth? The former of the studies assessed racism exposure using a modified version of the Perceived Racism Scale(PRS), while the latter of the two utilized responses to the question " Overall during your life until now, how often have you worried that you might be treated or judged unfairly because of your race or ethnic group?" Another limitation of this measurement of the exposure is that it had not been formally tested psychometrically prior to use in the study.

Joint Effects of Structural Racism and Income Inequality on Small-for-Gestational-Age Birth was one of only two studies that included measures of structural racism. Researchers obtained data on indicators of structural racism(Inequality in educational attainment, employment disparity, and disparity in incarceration) from various publicly available resources. The most significant limitation of this study is that the analyses only included measures from 10 states-most of which included births from a single hospital located in an urban center. Thus, there is limited generalizability outside the studied geographic locations and specifically in rural areas.

The Lifetime Racism and Blood Pressure Changes During Pregnancy: Implications for Fetal Growth paper assessed racism exposure at 22 to 24 weeks gestation with a standardized interview including measures adapted from a variety of previously published research. Their measure included subscales for direct and indirect exposure both in adulthood and childhood across multiple domains. However, this measure was not designed to detect the frequency or intensity of the individual's exposure to racism. Additionally, the small sample size of the study limits its generalizability.

Finally, "It's The Skin You're In": African-American Women Talk About Their Experiences of Racism. An Exploratory Study to Develop Measures of Racism for Birth Outcome Studies and African American Women's Views of Factors Impacting Preterm Birth were both qualitative studies, so they lacked a systematic measure of racism. Simply due to the nature of qualitative research, these studies had small sample sizes and findings are not generalizable to Black women at large.

The majority of studies only included 1 type of racism exposure, and only two of the studies accounted for a type of racism that was not interpersonal. Additionally, no measures adequately factored in the potential influence of gendered racism. Thus, there is extreme underrepresentation of the effects of structural and internalized racism in the literature. Additionally, there were issues with the measure of racism that was used not being designed to detect the frequency or intensity of the individual's exposure to racism as well as not measuring indirect racism exposure and racism exposure over the life course.

Discussion

Race-related stress refers to the psychological distress associated with experiences of racism. Racism is multidimensional in nature and occurs on three different levels: individual, institutional, and cultural[xxii]. While literature studying the effect of racism on racial disparities often focuses on individual level manifestations of racism such as health care discrimination or unconscious bias, it is the examination of all levels of racism over a lifetime that is key in understanding the impact that race-related stress has on the pregnancy outcomes of Black women in the United States.

Two studies done by Klonoff in 1999 are some of the first demonstrating racism as a unique form of stress. In the first study of 520 African Americans, Klonoff found that racism is more predictive of both physiological and physical symptoms of distress than general stressors, even after controlling for other variables such as age, income and gender. Additionally, a regression analysis showed that racial discrimination accounted for between 6% and 10% of unique variance in distress symptoms after SES and generic stressors were factored in. A second study examined a variety of different models to predict distress systems. It was found that only the model that included racial discrimination to predict symptoms of distress adequately fit the data. Furthermore, racial discrimination was the strongest predictor of distress, and accounted for 15% of the variance[xxiii].

Thus, there is evidence to view race-related as a unique form of stress with perhaps a greater impact than other forms of stress and important implications on health. It is likely that racism has a biological impact on pregnancy outcomes through pathways involving stress. The most common explanation for this effect is that of weathering or allostatic load. Over time-adaptational responses to the psychosocial stressor of chronic racism may produce physiologic wear and tear, or allostatic load, which can erode the body's ability to regulate key biological systems[xxiv]. Another way to describe this process is premature aging due to stress.

It follows then that race-related stress, like other forms of stress should contribute to adverse pregnancy outcomes. This is exactly what the evidence from this review demonstrates.

Conclusion

In conclusion, disproportionately high numbers of pregnancies in Black women result in adverse outcomes. The psychosocial stress of racism likely contributes to this disparity. This review focuses on the outcomes of prematurity and low-birth weight because most Black infant deaths are related to preterm and low-birth weight deliveries. Thus, finding the reason for excess premature and low birth weight deliveries in Black infants is of great importance to public health. Evidence indicates that not only is race-related stress a unique stressor, but it is also associated with a variety of adverse pregnancy outcomes such as preterm birth and low-birth weight. More specifically, research has demonstrated racism experienced in childhood as a critical period in predicting adverse pregnancy outcomes. Additionally, the combination of sexism, racism, and the unique social roles of Black women appear to act in conjunction in what has been termed gendered racism to activate stress pathways and further contribute to racial disparities in pregnancy outcomes.

This is an issue that requires immediate intervention-not just for the sake of women and infants today, but for future generations as well. Via epigenetic programming of the neuroendocrine system during fetal development, maternal exposure to the chronic stress of racism during pregnancy may affect the health of their children through adulthood-compounding the effects of racism across generations[xxv].
Ultimately, the only complete solution to the issue of negative health outcomes resulting from the stress of racism is to make societal changes that eliminate racism and the systems of inequalities that are perpetuated as a result. However, there are interventions that occur on a smaller scale that have promise for mitigating the adverse effects of racism and discrimination.

A first step in beginning to address this issue involves increased education of health care providers as well as community members not only about the extent of racial disparities in adverse pregnancy outcomes, but also what we know about race-related stress as a contributor to that disparity. This conversation needs to be framed in such a way that addresses the relevancy of this issue to public health in general as opposed to simply the health of Black Americans. One way to do so is through education about the financial ramifications of the disparity. For example, the March of Dimes estimates the total societal cost of preterm births, including medical and educational costs, and costs associated with lost productivity to be at least $26 billion dollars per year[xxvi]. Additionally, greater awareness of factors that act in conjunction with race-related stress to produce adverse birth outcomes in Black women can allow for a more targeted health care approach. For example, understanding pregnant African American women's lifetime direct and indirect experiences with racism in combination with prenatal blood pressure may improve identification of highest risk subgroups within this population.

When evaluating what methods can be used to alleviate the burden that race related stress places on the pregnancy outcomes of Black women, social support is another factor that should be given a lot of weight. There is significant evidence that says the impact of stressors may be moderated by the social support that a woman receives. This could be accomplished through the establishment of hospital based group programming for pregnant Black women that would provide a sense of community and offer strategies to effectively cope with and reduce stress.

Future research on this topic needs to involve the development of a consistent and effective method for determining exposure to racism. This survey should be inclusive of the many forms of racism. While current research largely focuses on individual level racism, we are aware that cultural racism such as in the form of gendered racism as well as institutional racism can have an effect on pregnancy outcomes in Black women, thus these should be studied together. Furthermore, with childhood exposure being of such significance in adverse pregnancy outcomes, I believe that there is a need for a longitudinal study on the topic that also takes into account biological measures of stress.

Lastly, while a lot of evidence exists supporting the association between race-related stress and adverse pregnancy outcomes, a major shortcoming of this research is that studies often have very small sample sizes or consist of study populations that are not representative of Black women at large. Thus, future studies should include larger, geographically representative sample sizes.

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