



Racial Discrimination and Preterm Birth among African American Women: The Important Role of Posttraumatic Stress Disorder

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Abstract

Among African American infants, preterm birth (PTB) is the most frequent cause of infant mortality. In the United States, there remains a stark African American-Non-Hispanic White difference in PTB (< 37 weeks of completed gestation). When compared to Non-Hispanic White infants, African American infants have greater than three times the risk of preterm-related mortality. Prior research studies have examined whether traditional prenatal risk factors explain the African American-Non-Hispanic White difference in PTB. However identification of these factors fails to explain the disparity. The lack of progress in addressing the African American - Non-Hispanic White difference in PTB suggests that exposures to risk factors across the life-course may be vital to addressing the African American-Non-Hispanic White difference in PTB. One potential life-course risk exposure is racial discrimination, which has been shown to influence the increased risk of PTB among African American women. However, research is needed to reveal the mechanisms that underlie the association between racial discrimination and PTB.

Posttraumatic stress disorder (PTSD) may be one potential mechanism by which African American women's exposure to racial discrimination contributes to increased risk of PTB. This concept paper strives to advance our understanding of the increased risk of PTB among African American women. Recommendations are suggested to mitigate the impact of racial discrimination and PTSD on the PTB risk among African American women.

Keywords

Preterm Birth; Black Women; Posttraumatic Stress Disorder; Racial Discrimination

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ABSTRACT

Among African American infants, preterm birth (PTB) is the most frequent cause of infant mortality. In the United States, there remains a stark African American-Non-Hispanic White difference in PTB (< 37 weeks of completed gestation). When compared to Non-Hispanic White infants, African American infants have greater than three times the risk of preterm-related mortality. Prior research studies have examined whether traditional prenatal risk factors explain the African American-Non-Hispanic White difference in PTB. However identification of these factors fails to explain the disparity. The lack of progress in addressing the African American - Non-Hispanic White difference in PTB suggests that exposures to risk factors across the life-course may be vital to addressing the African American-Non-Hispanic White difference in PTB. One potential life-course risk exposure is racial discrimination, which has been shown to influence the increased risk of PTB among African American women. However, research is needed to reveal the mechanisms that underlie the association between racial discrimination and PTB. Posttraumatic stress disorder (PTSD) may be one potential mechanism by which African American women's exposure to racial discrimination contributes to increased risk of PTB. This concept paper strives to advance our understanding of the increased risk of PTB among African American women. Recommendations are suggested to mitigate the impact of racial discrimination and PTSD on the PTB risk among African American women.

Keywords: Preterm Birth; Black Women; Posttraumatic Stress Disorder; Racial Discrimination

INTRODUCTION

In the United States, despite improvements in obstetric care over the past six decades, there remains a African American-Non-Hispanic White difference in preterm birth [(PTB), defined as

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delivery at less than 37 weeks of completed gestation]. Among African American infants, PTB is the most frequent cause of infant mortality. When compared with infants of Non-Hispanic White mothers, African American infants have greater than three times the risk of preterm-related mortality (Mathews and MacDorman, 2013). In 2015, the rate of PTB was 13.4% for African American women compared with 8.9% for white women (overall rate of PTB was 9.63%) (Martin et al., 2017). Not only is PTB associated with poor health outcomes in the neonatal period, it also contributes to premature mortality and increased morbidity at later stages of the life-course (D'Onofrio et al., 2013; Swamy et al., 2008).

The purpose of this concept paper is to advance our understanding of increased risk of PTB among African American women. We start with a discussion of the difference in PTB rates among African American and Non-Hispanic White women. Second, we discuss the potential risk factors that contribute to the African American-Non-Hispanic White difference in PTB. Third, we explore the possibility that the African American-Non-Hispanic White difference in PTB may in part be due to experiences of racial discrimination among African American women. In addition, we suggest that posttraumatic stress disorder (PTSD) may be one potential mechanism by which experiences of racial discrimination affects African American women-Non-Hispanic White difference in PTB. Finally, we suggest recommendations designed to address the African American-Non-Hispanic White difference in PTB.

BACKGROUND

Traditional Risk Factors and the African American-Non-Hispanic White Difference in PTB

The causes of the African American-Non-Hispanic White difference in PTB are poorly understood, which explains why little reduction in the racial difference has been realized. Previous studies conceptualized the African American-Non-Hispanic White difference in PTB as a function of differential exposures to individual-level risk factors during pregnancy. However, knowledge of these risk factors has done little to eliminate the African American-Non-Hispanic White difference in PTB (Culhane and Goldengerg, 2011).

Braveman and colleagues (2015) used population-based and birth certificate data to examine the contribution of various socioeconomic factors to the racial disparity in PTB. Study findings suggest that among the most socioeconomically disadvantaged African American and White women, there was no significant African American-Non-Hispanic White disparity in PTB. This finding suggests similarly high rates of PTB among African American and White women who are economically disadvantaged. However, there were significant African American-Non-Hispanic White differences within socioeconomically advantaged African American and Non-Hispanic White women. Such that, PTB rates improved with greater socioeconomic advantage only among Non-Hispanic White but not African American women (Braveman et al 2015). These findings suggest that socioeconomic differentials alone do not explain the African American-Non-Hispanic White difference in PTB.

Maternal prenatal health behavior, such as cigarette smoking, has long been associated with increased risk of PTB. Women who smoke during pregnancy have about 1.3 times the risk of PTB compared with non-smokers (Shah and Bracken, 2000). However, Non-Hispanic White women report greater rates of smoking during pregnancy than do African American women. In 2014, 12.2% of Non-Hispanic White women compared with 6.8% of Non-Hispanic Black women smoked during pregnancy (Curtain and Mathews, 2016).

Prenatal care has been the primary strategy to improve birth outcomes in the United States (Lu et al., 2003). Racial differences in early access to prenatal care exist. In 2016, 82.3% of Non-Hispanic White women began prenatal care in the first trimester compared 66.5% of Non-Hispanic African American women (Martin et al., 2018). Yet studies suggest that early prenatal care initiation (Lu and Chen, 2004) and prenatal care attendance (Thomas et al., 2014) fail to explain the effect of race on increased PTB risk.

In the United States, nearly 13% of adult women experience major depression during pregnancy (Stat et al., 2011; Gavin et al., 2005). Data from the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) revealed that past-year pregnant African American women were more likely to report major depression compared to Non-Hispanic White women (Strat et al., 2011). Physiologic pathways exist that link maternal depression during pregnancy to increased PTB risk. One pathway includes the dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, a stress-related interactive feedback system among the hypothalamus and the pituitary and adrenal glands (McEwen and McEwen, 2017), which is commonly caused by hypersecretion of corticotropin-releasing hormone (CRH), and observed in those with major depression (Arborelius et al., 1999). Additionally, CRH is present in human placenta and plays a role in initiating and coordinating fetal and maternal endocrine events involved in the onset of labor (Wadhwa et al., 2001a; McLean et al., 1995). Previous studies identified maternal depression during pregnancy as a potential risk factor for increased PTB risk (Grigoriadis et al., 2013; Grote et al., 2010), especially if women used antidepressant medications (Huang et al., 2014; Yonkers et al., 2012). There is conflicting evidence, however, whether race mitigates the association between maternal depression during pregnancy and risk of PTB (Ncube et al., 2017; Grote et al., 2010).

Genetic Explanation for the African American-Non-Hispanic White Difference in PTB

The lack of progress in explaining the African American-Non-Hispanic White difference in PTB despite adjustment for socio-demographic and behavioral factors have led some researchers to explore whether the genetic conception of “race” is an explanation for the difference (Fiscella, 2005). This approach to understanding the African American-Non-Hispanic White difference in PTB seeks to identify different frequencies of alleles responsible for PTB, which in turn suggests “preterm birth genes” may be identified in African American women (David and Collins, 2007). However, there is strong evidence against the existence of genetic “race” as an explanation for the difference (Collins and David, 2009; David and Collins, 2007). Secular changes in population birthweight distribution trends do not support genetic “race” as an explanation. Chike-Obi and colleagues (1996) examined Illinois state-wide birthweights for African American and Non-Hispanic White families over a generation. Over the period from 1950 to 1990, birthweights increased from 33 to 74 grams. This finding indicates birthweights change over brief periods of time, rather than over generations, suggesting underlying causes must be environmental and not genetic in nature. David and Collins (1997) used Illinois vital records for 1980-1995, to compare birthweights among three groups of women, US-born Whites, US-born Blacks, and African-born Blacks. The authors posited that birthweights would be similar among US-born White and US-born Black women, because US-born Blacks have significant European genetic admixture. They found birthweights among US-born Whites and African-born Black women were nearly identical, while US-born Black women’s infants weighed hundreds of grams less. Collins and colleagues (2002) also used Illinois vital statistics data to examine the race-specific birthweight distribution among three generations of female descendants of US-born and foreign-born Black and White women. For European and US-born White women, birthweight

distributions shifted toward higher birth weight distributions across the first to third generations of female descendants. Among US-born Black women, the birthweight distributions also shifted to higher birthweight distributions from the first to third generations. However, there was a smaller degree of birth weight gain between the second to third generations. Among foreign-born Black women, the birthweight distributions reflected the opposite intergenerational trend. The birthweight distributions for the female descendants (third generation) of foreign-born Black women (first generation) was less than those in the second generation. These findings suggest that the racial difference in birthweight distribution is not a function of genetic “race”. Rather the difference reflects the negative effects of life-long minority status, which are cumulative across life-course and have intergenerational effects

(David and Collins, 2007; Collins et al., 2002).

Stress during Pregnancy and the African American-Non-Hispanic White Difference in PTB

Stress during pregnancy has been a frequently studied psychological risk factor for PTB because maternal prenatal stress has the potential to adversely affect the intrauterine environment (Wadhwa et al., 2011). Stress during pregnancy may affect adverse birth outcomes, like PTB, in two ways. First, prenatal stress exposure may directly increase the risk of PTB by disrupting maternal immune, neuroendocrine, and inflammatory functioning processes which support healthy pregnancy (Coussons-Read, 2013; Wadhwa et al., 2011). Second, stress during pregnancy may indirectly affect offspring development by increasing the risk of maternal adverse health behaviors such as substance use (Woods et al., 2010) as well as increasing the risk of maternal depression during pregnancy – both of which have long-term effects on women and their families (Waters et al., 2014; Coussons-Read, 2013).

Biological evidence exists in support of stress and stress-related disorders increasing the risk of PTB (Cooper et al., 1996). Stress activates the HPA axis, which, for individuals with PTSD, is reflected by elevated central levels of corticotrophin-releasing hormone (CRH) (Harville et al., 2010; Wadhwa et al., 2001b). During pregnancy the placenta is a peripheral source of CRH, which is stimulated by fetal and maternal glucocorticoids and cytokines (Bremner et al., 1997; Baker et al., 1999). Over the course of pregnancy, the level of placental CRH increases, reaching the highest levels right before delivery (Wadhwa et al., 2001b). Placental CRH plays a central role in coordinating fetal and maternal endocrine events in human delivery (Wadhwa et al., 2001b). Placental CRH is sensitive to maternal stress. Maternal stress has been linked to maternal pituitary-adrenal hormone levels (maternal ACTH and cortisol) that have been shown to stimulate placental CRH secretion (Wadhwa et al., 2011). However, during the second and third trimester of pregnancy, African American women report lower levels of cortisol and CRH compared to non-Hispanic White women (Glynn et al., 2007; Holzman et al., 2001). This calls into question the role of CRH as a risk factor for increased risk of PTB among African American women (Glynn et al., 2007). In addition, the low levels of cortisol among pregnant African American women suggests dysregulation of the HPA axis which is consistent with those exposed to traumatic and chronic stress (Glynn et al., 2007).

Despite prior research, stress during pregnancy has been proposed as an explanation for the higher PTB risk among African American compared to Non-Hispanic White women, because African American women are more likely to be exposed to stress associated with poverty. In 2015, the poverty rate was 22% among African American women compared to 8.8% of Non-Hispanic White women (Semega et al., 2017). African American women are also more likely to live in disadvantaged communities, which are characterized as racially segregated with a high

concentration of poverty (Osypuk et al., 2009). Given this economic disadvantage, African American women are more likely to live in racially segregated communities, which compound the effect of individual-level poverty by exposure to distressed built environments, fragmented social networks, and limited health related resources (Kotharie et al., 2016; Derose et al., 2011; Williams and Collins, 2001).

Also, prenatal stress independent of socioeconomic status has been shown to predict adverse birth outcomes. Specifically, exposure to major life events, catastrophic events, chronic stress and neighborhood stressors have been linked to increased risk of PTB (Dunkle-Schetter, 2011; Giscombe and Lobel, 2005). There are, however, inconsistent findings as to whether stress during pregnancy contributes to the African American-Non-Hispanic difference in PTB (Borders et al., 2015; Lu and Chen, 2004).

The Effects of Racial Discrimination on Physical and Mental Health Outcomes

More recently, there is growing evidence that chronic stress exposure's impact on pre-pregnancy health status may better explain the African American-Non-Hispanic difference in PTB (Kramer et al., 2011; Lu and Haflon, 2003). Specifically, African American women experience high levels of chronic stress exposure across the life-course due in part to their exposure to racial discrimination (Dole et al., 2004; Mustillo et al., 2004). Therefore, racial discrimination may play a role in the excess risk of PTB among African American women (Hogue and Bremner 2005; Giurgescu et al., 2013). Although varied definitions exist, discrimination has been defined as, "...socially structured and sanctioned phenomenon, justified by ideology and expressed in interactions, among and between individuals and institutions, intended to maintain privileges for members of dominant groups at the cost of deprivation for others" (Krieger, 1999). Thus, racial discrimination comprises unequal treatment based on skin color and is commonly considered as racism (Alhusen et al., 2016).

Research findings have linked adverse mental health outcomes among African American women to their distinct location at the intersection of disadvantaged gender, racial, and class positions (Perry et al., 2012). Based on this research, African American women are subject to gendered racism, a unique form of oppression due to their particular social identities as African American and women (Thomas et al., 2008). For some African American women, gendered racial identity has greater salience compared to racial or gender identity separately, suggesting that racial and gender identity simultaneously contribute to psychological distress, including increasing symptoms of PTSD (Buchanan and Fitzgerald, 2008; Moradi and Subich, 2003). Gendered racism has also been identified as a component of the stress that may negatively affect birth outcomes. Jackson and colleagues (2001) designed a qualitative study to examine how college-educated African American women experienced racism. Study findings suggest that African American women are burdened by gendered racism, which, when combined with exposure to other forms of stress, may increase the risk of adverse birth outcomes (Jackson et al., 2001).

Prior research finds that racial discrimination, a chronic stressor, influences physical health outcomes (Okhomina et al., 2018; Berger and Sarnyai, 2015; Paradies et al., 2015; Sims et al., 2012; Rosenthal and Lobel, 2011). Specifically, when an individual perceives they have experienced a social stressor such as racial discrimination, it may trigger physiological responses that over time can elevate vulnerability to disease via metabolic, cardiovascular, and immune system changes (Berger and Sarnyai, 2015; Rosenthal and Lobel, 2011; Goosby and Heidbrink, 2013; McEwen and Seeman, 1999).

Evidence from well-designed studies suggests that racial discrimination is linked with symptoms of psychological distress and/or PTSD. In a recent meta-analysis (Pierterse et al., 2012), 66 studies published between January 1996 and April 2011 were systematically examined to determine the associations between racism and mental health symptomatology among a total sample size of 18,140 African Americans. Using a random-effects model, results showed a positive association between perceived racism and psychological distress, including depression, PTSD, and other psychiatric symptoms. These findings lend support to theorists who are calling for experiences of racism to be considered within the context of trauma (Helms et al., 2010; Carter, 2007).

Furthermore, in a large epidemiological study, Chou and colleagues (2012) investigated the association between perceived racial discrimination and DSM-IV mood, substance use, eating, and anxiety disorders - particularly PTSD. All data were collected between 2002 and 2003 for the Collaborative Psychiatric Epidemiology Studies (CPES), and the sample consisted of 4,539 participants. Of these, 793 were Asian, 951 were Hispanic, and 2,795 were African American. The measure used to assess perceived discrimination in CPES was the 9-item Frequency of Everyday Mistreatment subscale from the Detroit Area Study Discrimination Questionnaire (DAS-DQ) (Jackson and Williams, 1995). Results, controlling for age, gender, and annual household income, showed that African Americans reported a significantly higher degree of perceived racial discrimination and were more likely to experience PTSD than Asians and Hispanics (Chou et al., 2012).

Chronic stressors, such as racial discrimination, can activate HPA axis pathways (McEwen and McEwen, 2017). The adaptation process in HPA axis pathways results in the efficient turning on and off of responses to stressors, leading to adaptation to anticipated and unanticipated events. With chronic stressors there is an excessive activation of this system, which alters the normal balance of the system and leads to wear and tear on the body (allostatic load) (McEwen and McEwen, 2017). Across the life-course, increased allostatic load accelerates cellular aging, which may increase individual vulnerability to stress-related health conditions (Rubin, 2016). Recall that racial discrimination and other chronic stressors, has been shown to activate HPA axis pathways thereby increasing allostatic load (McEwen and McEwen, 2017). Given this body of research, allostatic load has been presented as a biological pathway that explains how repeated exposure to chronic stressors, such as racial discrimination, contributes to poor health conditions among African Americans (Alhusen et al., 2016; Giurgescu et al., 2011).

Complementary frameworks to allostatic load have been proposed to explain the excess risk of adverse birth outcomes among African American women. Geronimus (1992) coined the term, “weathering” to explain why infants born to late adolescent African American females have a survival advantage relative to infants born to older African American women. The weathering hypothesis, holds that advancing maternal age is accompanied by deteriorating physical health due to the cumulative impact of repeated experience with socioeconomic disadvantage and political marginalization (Geronimus, 1992). Geronimus (1996) also found support for the weathering hypothesis among a population-based sample of African American and Non-Hispanic White women. African American women compared to Non-Hispanic White women experienced worsening health profiles between adolescence and young adulthood, which is considered an ideal period of the life-course to give birth. The worsening health profile contributed to increased risk of delivering low birthweight and very low birthweight infants. In light of Geronimus’ research, Hogue and Bremner (2005) posited that stress aging, a result of exposure to traumatic events in

early life and exposure to chronic stress, may affect African American females' ability to successfully handle the stress associated with pregnancy. Specifically, stress aging highlights that ongoing racial discrimination is a particular type of stress primarily experienced by African Americans. Exposure to racial discrimination experienced by African American women across their life-course increases the likelihood of stress aging, which is posited to influence the length of pregnancy via chronic health conditions (e.g., hypertension).

Racial Discrimination and PTB Risk

Considering the role of racial discrimination as a chronic stressor and its effect on health outcomes, perspectives such as allostatic load, weathering, and stress age suggest that African American women may be more susceptible to adverse birth outcomes because of the increased likelihood of experiencing racial discrimination across the life-course (Giscombe and Lobel, 2005). Some argue that racial discrimination is distinct from other forms of stress because it may have greater deleterious effects on health outcomes (Giscombe and Lobel, 2005). Prior research suggests that African American women who experienced childhood exposure to racism, both directly and indirectly, had increased diastolic blood pressure in between the second and third trimester, which predicted lower birthweight (Hilmet et al., 2013). Given what is known about racial discrimination and adverse health outcomes, a number of studies have examined racial discrimination as a risk factor for PTB. Some studies found racial discrimination to be a significant risk factor for PTB (Rankin et al., 2011; Slaughter-Acey et al., 2016; Mustillo et al., 2004; Dole et al., 2004), while others reported no association (Giurgescu et al., 2012; Mendez et al., 2014; Misra et al., 2010). The mixed findings may be due to study methodology, including the use of varied data collection instruments to assess racial discrimination as well as measurement of racial discrimination during different trimesters.

Posttraumatic Stress Disorder and PTB Risk

Posttraumatic stress disorder (PTSD) is a complex array of disruptive symptoms arising from an acute or chronic traumatic experience, such as violence, disaster, genocide, or slavery, directly or vicariously experienced or learned about by the afflicted person (Freidman et al., 2011). Women consistently report higher prevalence rates of PTSD (McLean et al., 2011; Mitchell et al., 2012). According to data from the National Comorbidity Survey Replication, prevalence estimates of lifetime PTSD in the United States are 9.7% for women and 3.6% for men (Mitchell et al., 2012). In their study of gender differences in anxiety disorders using data from the Collaborative Psychiatric Epidemiology Studies (CPES), McLean and colleagues (McLean et al., 2011) found that women had higher rates of lifetime diagnosis for PTSD. Women's experiences of trauma have been linked to a variety of negative mental health consequences, including PTSD. Estimates from community studies suggest that women experience PTSD following a traumatic event at two to three times the rate of men (Kimerling et al., 2013; Stein et al., 2000). In an investigation of gender differences in exposure to traumatic events and in the emergence of PTSD following exposure in the general population, Breslau (2001) found that the risk for developing PTSD following traumatic experiences was two-fold higher in women than in men. While not fully understood, current research suggests that women report more PTSD symptoms because they experience higher levels of associated risk factors than their male counterparts (e.g. depression, physical anxiety, sensitivity, helplessness) (Christiansen and Hansen, 2015).

PTSD has been identified as a risk factor for PTB among some (Yonkers et al., 2014; Shaw et al., 2014; Cook et al., 2004) but not all studies (Seng et al., 2011; Engel et al., 2005). For example, a registry study reported that women with PTSD as a result of the September 11, 2001

terrorist attacks had a greater than two-fold increased risk of PTB (Cook et al., 2004). In a more recent longitudinal, prospective cohort study of 2,654 women recruited before 17 weeks of pregnancy from 137 obstetrical practices, findings showed that risk of PTB was four-fold higher in women with a likely diagnosis or PTSD who also reported symptoms of major depression (Yonkers et al., 2014). This risk was both greater than, as well as independent of, anti-depressant and anxiolytic medication use.

A recent study examined the link between PTSD and spontaneous PTB in a retrospective cohort of 16,334 deliveries covered by the Veterans Health Administration from 2000 to 2012 (Shaw et al., 2014). The authors divided mothers with PTSD into those with diagnoses present the year before delivery (active PTSD) and those only with earlier diagnoses (historical PTSD). They also identified potential confounders including age, race, military deployment, twins, hypertension, substance use, depression, and results of military sexual trauma screening. Findings showed that mothers with active PTSD were significantly more likely to suffer spontaneous PTB than were those with historical PTSD, adjusting for covariates and comorbid psychiatric and medical diagnoses. The 35% increased odds of spontaneous PTB in those with active PTSD is clinically relevant and on par with risks such as advanced maternal age (older than 35 years).

African American Women and PTSD

Empirical evidence suggests that African Americans have higher rates of PTSD than other racial/ethnic groups (Roberts et al., 2011; Asnaani et al., 2010; Himle et al., 2009; Alim et al., 2006). In their cross-ethnic comparison of lifetime prevalence of anxiety disorder using population based data from the CPES, Asnaani and colleagues (2010) found that African Americans more frequently met criteria for PTSD than Non-Hispanic White, Hispanic Americans and Asian Americans. Similarly, data from the NESARC suggests that the lifetime prevalence of PTSD is highest among African Americans (Roberts et al., 2011). When African American respondents meet criteria for PTSD, they frequently endorse higher levels of overall mental illness severity and functional impairment as compared to Non-Hispanic Whites (Himle et al., 2009). Furthermore, research suggests that the risk of developing PTSD endures throughout the life-course for African Americans, whereas Non-Hispanic Whites are significantly less likely to develop PTSD after young adulthood (Himle et al., 2009).

While rates of current PTSD have been identified as being highest among women as compared to men and among African Americans, as compared to other racial/ethnic groups (Alim et al., 2006; Goldmann et al., 2011), lifetime PTSD rates appear to be highest among African American women. African American women not only experience a greater risk of PTSD at an earlier age as compared to Non-Hispanic White women, but that risk remains high and extends to a much older age. African American women also experience a significantly greater chance of PTSD as compared to their male counterparts. While counterintuitive given African American males have a higher risk for exposure to traumatic events, Alim and colleagues (2006) found that among the trauma-exposed population of African Americans, lifetime PTSD rates were approximately twice as common among African American women as compared to African American men. This gender difference in susceptibility to PTSD appears to be partially related to the fact that women are more likely to experience sexual assault, as this experience carries one of the highest risks for PTSD (Tolin and Foa, 2006). However, African American women are at greater risk for developing PTSD than their male counterparts even when exposed to a similar traumatic event (Tolin and Foa, 2006).

A population of African American women particularly susceptible to the impact of PTSD includes pregnant African American women. Among currently pregnant women, those with current PTSD were more likely to be African American, pregnant as a teen, living in poverty, with high school education or less, and living in higher crime areas (Seng et al., 2009). In an investigation of disparities in PTSD diagnosis during pregnancy, compared to Non-Hispanic White women, African American women had more trauma exposure, PTSD symptoms and diagnosis, comorbidity and pregnancy substance use, and were significantly less likely to utilize mental health treatment services (Seng et al., 2009). Seng and colleagues (2009) also found that while African American women did not appear to have a greater risk for onset of PTSD, they had a four-fold greater risk of remaining affected by PTSD at the time of pregnancy compared to Non-Hispanic White women. Potential explanations for this greater risk of PTSD in pregnancy include (1) African American women being less likely to receive mental health treatment and (2) African American women experiencing more lifetime trauma exposures compared to Non-Hispanic White women.

It is important to remember, however, that rates of PTSD in African American women may be underestimated because the definition of a traumatic event from the 1994 Diagnostic and Statistical Manual for Mental Disorders (DSM-IV-TR) identified to make the diagnosis of PTSD may have been interpreted too restrictively. For example, the DSM-V definition of trauma includes “actual or threatened death, serious injury, or sexual violence” (APA 2013). Currently, this situation has been improved by explicit revisions in the DSM-V and DSM-IV-TR (Friedman et al., 2011). According to the revised DSM-IV-TR and DSM-V, a qualifying exposure to a traumatic event may include, direct personal exposure, witnessing of trauma to others, indirect exposure to trauma experienced by family or close friends, and witnessing repeated or extreme exposure to aversive details of a traumatic event (Pai et al., 2017). Despite these necessary changes, what the diagnosis of PTSD in the DSM-V still fails to emphasize is the antecedent trauma may be chronic, not just acute, and primarily of long duration, such as repeated experiences of racial discrimination across the life-course as a result of intergenerational traumatic exposure to slavery and Jim Crow policies.

African American Women Experience High Rates of PTSD

Historical adversity of slavery, epigenetics, and genetics. From the standpoint of historical trauma theory, it is important to identify not only the proximate risk factors, but also the salient more distal risk factors for PTSD, such as the enduring mass trauma of slavery that was deliberatively and systematically inflicted on the majority of African Americans by a subjugating, dominant white population (Sotero, 2006). Slavery was not limited to a single catastrophic event, but continued for 246 years, followed to the present day by the explicit and/or implicit promotion and enactment of Jim Crow laws. The cultural and collective trauma of slavery and Jim Crow policies has reverberated across generations of African Americans and for many has derailed their natural life-course resulting in a host of physical and psychological conditions, as well as socio-economic inequities that persist across generations (Sullivan, 2013; Williams and Mohammed, 2009).

Te-Nehisi Coates (2017) describes the width and depth of enslavement in graphic terms in his book, “We Were Eight Years in Power,” a title referring to the end of Reconstruction and the return of white supremacist rule in the South:

“First conjure the crime – the generational destruction of human bodies - and all of its related offences – domestic terrorism, poll taxes, mass incarceration. But then try to

imagine being an individual born under the remnants of that crime, among the wronged, among the plundered, and feeling the gravity of that crime all around and seeing it in the sideways glances of the perpetrators of that crime..."

According to Ross and colleagues (2017), epigenetics refers to mechanisms (e.g. DNA methylation or histone acetylation) by which environmental exposures may influence the functional off-and-on expression of genes. A key feature of historical trauma theory is that the psychological and emotional consequences of slavery, such as PTSD, are transmitted to subsequent generations through biological, environmental, and social pathways. Vicarious traumatization ensues not only by means of collective memory, storytelling, and oral traditions, but also becomes "embodied" in the offspring of subsequent generations by epigenetic and genetic mechanisms. A neuroscience perspective on the epigenetic and genetic processes underlying PTSD gives empirical force to the argument that historical adversity predicts high rates of PTSD in those who were enslaved and in their offspring (Ross et al., 2017).

For example, early childhood neglect or trauma (*and by extension, the adverse experiences of slavery*) can epigenetically program an individual's stress system, leading to the dysfunctional regulation of the HPA axis and to the maladaptive, prolonged, "sensitized" responses to stressors encountered later in life. Recent evidence suggests that these epigenetic mechanisms may be able to act across generations whereby environmental exposures in one generation may affect gene expression in offspring leading to susceptibility to trauma (Dias et al., 2015; Yehuda et al., 2014).

In addition, considerable evidence from recent studies suggests that PTSD is highly heritable, with a heritability rate of about 40% to 50% (Almli et al., 2015; Guffanti et al., 2013; Logue et al., 2013; Nievergelt et al., 2015; Xie et al., 2013). Emerging evidence (Guffanti et al., 2013) suggests PTSD may be more heritable among women with evidence from animal models and human correlational studies suggesting connections between sex-linked biology and PTSD vulnerability, which may extend to the disorder's genetic architecture. These substantial results come from genome-wide association study of PTSD in a sample of primarily African American women from the Detroit Neighborhood Health Study and were tested for replication in an independent cohort of primarily white women from the Nurses' Health Study II. In sum, African American women have higher rates of PTSD than do other racial/ethnic groups in the United States (Roberts et al., 2011; Asnaani et al., 2010; Himle et al., 2009; Alim et al., 2006) and there are significant, potent epigenetic and genetic risk factors that are derived from the historical adversity of slavery that contribute to the development of PTSD (Ross et al., 2017; Sotero, 2006).

CONCLUSION

Recent articles featured on NPR have focused the public's attention on how racial discrimination may be a factor in the increased risk of PTB among African American females. *How Racism May Cause Black Mothers to Suffer the Death of Their Infants*, argues there is growing consensus within the medical field that racial discrimination experienced by African American mothers over their life time helps to explain why there is such a large racial disparity in PTB. This article, and others in the same vein, highlight the fact that socioeconomic class and educational attainment do not protect African American mothers from having higher rates of PTB than do their white peers; a middle-class, college-educated African American woman is more likely than a Non-Hispanic White woman with a high school degree to give birth prematurely. The consensus of the researchers quoted in this article and others is that it is the increased level of stress

hormones caused by racial discrimination that is to blame for the African American-Non-Hispanic White difference in PTB (Chatterjee, 2018).

This conceptual paper is intended to help practitioners and policy makers gain a broader perspective on the link between PTSD and the African American-Non-Hispanic White difference in PTB, and to aid in the development of research designed to explore the role of PTSD as it relates to racial discrimination and PTB among African American women.

In the present paper, we examined the literature that explored the association between racial discrimination and increased risk of PTB among African American women. Despite numerous studies that document an association between racial discrimination and physical health outcomes (Okhomina et al., 2018; Stepanikova et al., 2017; Berger and Sarnyai, 2015; Paradies et al., 2015; Sims et al., 2012; Rosenthal and Lobel, 2011), there are mixed findings regarding the association between racial discrimination and the increased risk of PTB (Slaughter-Acey et al., 2016; Mendez et al., 2014; Giurgescu et al., 2011; Rankin et al., 2011; Misra et al., 2010; Mustillo et al., 2004; Dole et al., 2004). In an effort to explain the association between exposure to racial discrimination and the excess risk of PTB among African American women, we examined whether PTSD plays a role. Prior studies have reported that PTSD is a risk factor for PTB (Yonkers et al., 2014; Shaw et al., 2014; Loveland et al., 2004). However, to our knowledge, none of the prior studies examined whether PTSD disproportionately increased PTB risk among African American women compared to Non-Hispanic White women. Given the emerging literature that documents the PTSD-PTB association and the higher risk of PTSD among African American women, we posit that PTSD may in part influence the association between racial discrimination and increased risk of PTB among African American women.

Although the proposed hypothesis is not directly tested in this paper, we believe that future research is needed to produce empirical evidence that addresses the role of PTSD in the association between racial discrimination and increased PTB risk among African American women. To date, there are no studies. Given the potential of PTSD to increase the risk of PTB among women in general, we encourage health professionals to implement mandatory universal screening for prenatal PTSD. Universal screening is a key element in identifying women at risk for prenatal PTSD, as well as those women at risk for psychiatric comorbidities, including anxiety and maternal depression that may increase the risk of PTB (Grigoriadis et al., 2013; Grote et al., 2010). It will be important to ensure that once screenings have taken place, appropriate treatment can be provided for mothers who screen positive for PTSD. Our proposed hypothesis in this paper highlights the pivotal role that racial discrimination plays in the occurrence of PTSD and the link to increased risk of PTB among African American women. To address racial discrimination, strategies are needed to mitigate the impact of social factors that are a function of racial discrimination in the lives of African American women. For example, federal and local governments must make investments to increase the amount of and improve access to affordable and livable housing, healthy built environments, equitable funding for K-12 public education, and affordable health care (Lu et al., 2018). By addressing these social factors, as well as others, the health and mental health outcomes of African American women will improve, leading to a subsequent reduction over time of the racial difference in PTB.

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