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The Impact of Social Support, Psychosocial Characteristics, and Contextual Factors on Racial Disparities in Hypertension between Black and White Women

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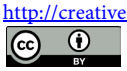

Abstract

Hypertension is a serious medical condition that is suffered more by Black women than other US groups. Because racial disparities in hypertension are not fully explained by behavioral or socioeconomic factors, we examine the impact of cultural and social factors on this disparity. We use Wave IV data from the National Longitudinal Study of Adolescent Health (Add Health) (Udry, 1998) to determine the effects of social support, psychosocial characteristics, and contextual adulthood factors on hypertension. Of all variables studied, the only factor that was statistically significant in explaining this disparity is body mass index (BMI), leaving much to be explained. We emphasize that health effects of racism and other stressors faced disproportionately by US Black women are not easily measured, therefore their effects on hypertension are less certain. Because these social factors have dangerous biological consequences, including effects on the cardiovascular system (Panza et al., 2019), we emphasize the importance of constructing better tools to assess interpersonal and structural discrimination and their specific health effects. This will advance a broader goal of learning more about the psychosocial effects of differential treatment on health, as well as alleviating forms of unequal race-based treatment and stress.

Keywords

Hypertension, Blood Pressure, Health Disparities, Racial Discrimination, Social Epidemiology

1. Introduction

Hypertension is a serious medical condition that affects men and women of all

racial and ethnic categories in the US. In fact, hypertension was considered a contributing or primary cause of death of 691,095 Americans who died in 2021. Almost half of American adults suffer from hypertension, and only one in four of those with hypertension have it under control (Centers for Disease Control and Prevention, 2014). Although Americans from all racial groups have experienced increasing rates of hypertension in recent years, the prevalence of hypertension among Black Americans is among the highest in the world, and significantly higher than that of Whites. For instance, the age-adjusted prevalence of hypertension among Black men is 57.2%, as compared to 50.2% among White men. An even more startling difference can be seen between Black women and White women, as the age-adjusted prevalence of hypertension among Black women is 56.7%, while the age-adjusted prevalence among White women is much lower at 36.7% (Ostchega et al., 2020).

In the US, the over-representation of Black women with hypertension is a major public health concern. As compared to whites, Blacks are diagnosed with hypertension at younger ages, and they tend to suffer greater mortality and morbidity related to hypertension (Abrahamowicz et al., 2023). Because hypertension is associated with so many adverse health outcomes, including arterial damage, coronary artery disease, heart failure, stroke, dementia, kidney failure, and premature death, such high rates of hypertension among Black women deserve attention. It is imperative to identify the social and contextual factors associated with the high prevalence of hypertension among Black women relative to their White counterparts. Successful identification of such factors could ameliorate racial disparities, not only in hypertension, but also in associated health concerns. This paper aims to add to a body of literature that identifies social, psychosocial, and contextual factors that attribute to health outcomes, namely Hypertension, in African American women.

The traditional and most prominent explanation among epidemiologists and health researchers for health disparities concerns socioeconomic status (SES). Studies repeatedly show that SES influences health, and blood pressure is no exception (Wang & Geng, 2019). In fact, because of this strong association, a majority of the research on blood pressure disparities in the US focuses on SES differences between groups. In the US, SES and race are also connected, as Blacks continuously fall behind Whites on virtually all measures of SES (Monnat et al., 2012). Because SES underlies many major determinants of health, including health care, exposure to unhealthy environments, health behaviors, stress, and access to health resources, it has been suggested that reducing SES disparities between racial groups will reduce racial disparities in health.

However, research repeatedly shows that the blood pressure gap between Black and White women remains after controlling for SES. For instance, Delgado et al. (2012) found that, among a sample of older Black and White women in the US, racial differences in rates of hypertension were reduced, but remained significant (odds ratio = 0.84) after adjusting for education and income. Other previous research shows a greater prevalence of risk factors for CVD, including hyperten-

sion, among Blacks than Whites at all education levels (Sharma et al., 2004). And Forde et al. (2020) found that, although many risk factors, including socioeconomic factors, are related to hypertension, they do not fully explain racial differences. This further indicates that higher blood pressure among Blacks cannot be completely attributed to disadvantaged SES status, as large differences persist after accounting for such influences.

Ample evidence indicates that racial disparities in hypertension are not due to SES disadvantages, and research shows that African American ancestry is not inherently related to (Non et al., 2012). Therefore, we argue that factors other than biology or SES must explain blood pressure differences between Black and White women. Specifically, we propose that differences in blood pressure between these two groups are likely due to social support, psychosocial characteristics, and contextual factors. Our approach does not treat race as a meaningful biological category or as just a proxy for SES. Instead, race is seen as a categorizing trait that, in the US, has historically reflected oppression and exploitation driven by social, political, and historical circumstances (Williams et al., 2016). These categories are associated with unhealthy contextual, social, and psychosocial factors that put Black Americans at higher risk of hypertension.

1.1. Social Support

Evidence linking social support to blood pressure

Social support encompasses both the quality and quantity of a person's social contacts and support (including emotional support). Research shows that low levels of social support are associated with all-cause mortality and other adverse health outcomes. And there is evidence that social support has specific effects on cardiovascular health (Birmingham et al., 2023), and high levels of social support are associated with lower risk of incident hypertension (Harding et al., 2022).

1.1.1. Social Ties

The quantity and quality of social ties impact mental health, physical health, health behaviors, and mortality risk. Compared to their more isolated peers, socially connected individuals tend to live longer and healthier lives. Several studies illustrate that low quantity or quality of social ties increases the likelihood of cardiovascular disease, atherosclerosis, recurrent our ocardial infarction, autonomic dysregulation, cancer, and hypertension (Uchino, 2006; Ertel et al., 2009). Racialized differences in social ties might be causal factors behind racial differences in cardiovascular disease.

1.1.2. Marital Status

Data show that married adults experience lower rates of mortality and morbidity than unmarried adults, and married individuals report greater satisfaction with life, more happiness, and lower risk of depression (Lawrence et al., 2018). But interestingly, this is a gendered effect, as research suggests that married men are less likely to have hypertension, while single and never-married women are less likely to have hypertension (Azizi et al., 2022). Among the benefits of marriage

in terms of regulating blood pressure, being married can help reduce certain risky health behaviors tied to increased blood pressure. Spouses can also help one another in managing their hypertension medication (Wu et al., 2012) making important dietary changes (Gallant et al., 2007) and encouraging healthy lifestyles (Gorin et al., 2008). Because US Black women are much less likely to be married compared to White women across multiple age groups (US Census Bureau, 2020), fewer Black women are to take advantage of the health-protective benefits of marriage.

1.1.3. Volunteer Activity

Recent research has shown that volunteering has a positive effect on both mental and physical health. For instance, it offers opportunities to enhance social networks, connectedness and social bonds (Milbourn et al., 2018). According to Sneed and Cohen (2013), older adults were at a significantly lower risk of developing hypertension if they performed 200 hours or more of volunteer service in the past year. And at a 4-year follow-up, participants who engaged in volunteer activities had 40% lower odds for incident hypertension than those who did not volunteer, and this association was independent of race, age, baseline health, sex, education, marital status, baseline blood pressure, and other variables. Studies show consistent racialized volunteering practices among Americans, whereas Whites are more likely than Blacks to volunteer (Wray-Lake & Hart, 2012).

1.2. Psychosocial Factors

Evidence linking psychosocial factors to blood pressure

The effects of psychosocial risk factors on health, and on blood pressure in particular, are well documented. Research shows that they may influence health either directly, through biological responses to stress, or indirectly, through health-related behaviors (Siegrist & Marmot, 2004; Cuevas et al., 2017). Studies generally indicate that favorable psychosocial conditions are related to better heath, while poor conditions are damaging to health and contribute to health inequalities (Kivimäki & Steptoe, 2018), and there is ample evidence that multiple psychological and social factors contribute to the onset of and trajectory of hypertension (Cuevas et al., 2017). In fact, emotional stress can induce a physiological response that triggers activation of the sympathetic nervous system, inflammation, and the hypothalamic-pituitary-adrenal axis (Spruill, 2010). When this occurs repeatedly, it is difficult for blood pressure to return to resting levels, and over time, this process is associated with increased blood pressure over time, higher circulating levels of catecholamines, and higher cortisol levels (Everson-Rose & Lewis, 2005).

Data show that Blacks in the US experience negative psychosocial influences more often than Whites. In fact, extant research suggests that racial differences in psychosocial stress, brought about by difficult conditions commonly experienced by Blacks in the US (Hill & Thayer, 2019), including denial of respect, experiences of loss or failure, lack of common dignity and courtesy, and being

perceived as inferior, may plausibly mediate associations between race and blood pressure (Cogburn, 2019).

1.2.1. Depression

Several studies have provided convincing evidence for the causal link between depression and hypertension. For example, using NHANES follow-up data, early research by Jonas, Franks, and Ingram (1997) found that anxiety and depression are associated with a markedly increased risk of hypertension among both Blacks and Whites. But the increase in risk was not equivalent, as it nearly doubled for Whites, but almost tripled for Blacks (Jonas et al. 1997). This was the first prospective study to show that anxiety and depression can predict hypertension many years into the future. In a subsequent study, Jonas and Lando (2000) found that hypertension was influenced by negative affect among several groups, but its predictive power was greatest among Black women. Other independent studies have provided support for increased risk of hypertension development among those with higher levels of depression (Alhawari, AlShelleh, Alhawari, Akiely, Abdallah, Hajjaj, Alkhalaileh, & AlRyalat, 2022).

1.2.2. Personality Characteristics

Extant research links hypertension with certain personality traits. For example, neuroticism, which is associated with coping style, has consistently been found to be associated with hypertension (Arroyave-Atehortua, Cordoba-Sanchez, & Cruz, 2023; Syk, Isaksson, Rasmusson, Ekselius, & Cunningham, 2021). Chronic anger often includes hostility, which consists of cynicism and mistrust. Hostility has predicted elevated blood pressure in various studies, and many have reported that it is an independent risk factor for coronary heart disease (Körösi, Vecsey-Nagy, Kolossváry, Nemcsik-Bencze, Szilveszter, Laszlo, Batta, Gonda, Merkely, Rihmer, & Maurovich-Horvat, 2019).

1.2.3. Perceptions of Discrimination

Research suggests that both the psychological and physiological responses to discrimination are comparable to those of other psychosocial stressors (Vines, Ward, Cordoba, & Black, 2017). For example, exposure to racist acts via viewing videos of discriminatory behavior in a laboratory setting is associated with psychological reactivity and increased cardiovascular responses among Blacks (Jones et al., 1996). People of color often encounter racial and ethnic discrimination in their daily activities, such as when they seek health care (Mays et al., 2017; Nong et al., 2020), attempt to purchase or rent a house (Kijakazi et al., 2019; McCargo & Choi, 2020), apply for jobs (Quillian et al., 2017) or public assistance (Barnes & Henly, 2018), and interact with law enforcement (Alang et al., 2017; Bui, Coates, & Matthay, 2018). These experiences, individually and cumulatively, cause physiological stress responses, and facing chronic exposure to these forms of racism can have serious negative effects on mental and physical health (Brondolo et al., 2011; Miller et al., 2021).

1.2.4. Religiosity

Research has detected significant associations between religious involvement and blood pressure (Cozier, Yu, Wise, VanderWeele, Balboni, Argentieri, Rosenberg, Palmer, & Shields, 2018). Higher degrees of religiosity and spirituality (Brewer, Bowie, Slusser, Scott, Cooper, Hayes, Patten, & Sims, 2022) and religious coping (Steffen et al., 2001; Cozier et al., 2018) are all associated with lower odds of hypertension. Further, people who indicate higher levels of religious involvement tend to have lower SBP and DBP and a decreased risk of hypertension (Buck et al., 2009; Skipper, Towns, Moye, & Rose, 2022). Others find that frequency of attendance at religious services inversely affects the odds of hypertension (Gillum & Ingram, 2006). Also, engaging in various religious activities, such as praying, are associated with lower blood pressure (Brasileiro, Prado, Assis, Nogueira, Lima, & Chaves 2017). Interestingly, studies find that this effect can be racialized, as church attendance and religiosity seem to be more likely to affect blood pressure for Black Americans compared to Whites (Brown, 2006; Oates, 2013).

1.3. Contextual Factors

Evidence linking contextual factors to blood pressure

Research suggests that enduring contextual, or environmental, stress is associated with the development of hypertension through a variety of pathways. Brown, Hill, and Lambert (2005) examined associations between intimate violence, community violence, and mental health among a group of urban Black women and found that exposure to community violence (witnessing and victimization combined) was significantly related to traumatic stress symptoms. They also found an interaction between intimate partner violence and community violence so that women with exposure to both types of violence had increased rates of traumatic symptoms, relative to women with exposure to only one type of violence. This suggests that exposure to violence in multiple contexts is extremely damaging to health (Brown et al., 2005).

Black people represent about 13% of the population in the United States, of which 61.2% are members of the middle class (Perry & Romer, 2020). As we discuss contextual factors, many of the Blacks in the middle class live in less segregated communities when compared to those in the lower class. In fact, many middle-class Blacks tend to live around less affluent whites as a result of residential economic discrimination, and structural discriminatory practices (Quick & Kahlenberg, 2019).

As residential economic discrimination is problematic, Blacks in the US are at an increased risk of exposure to stressful environments, including disadvantaged neighborhoods that are entrenched with forms of hostility that are structurally driven. In fact, Blacks have higher overall lifetime rates of exposure to neighborhood violence than almost all other racial groups (Maly & Vallerand, 2018). One reason behind this racial difference is that levels of violence are higher in

areas that are disadvantaged and residentially unstable because such environments encourage criminal and violent acts. Also, these areas tend to lack social control mechanisms that normally discourage violent crime because it is difficult for these types of communities to organize around common goals and facilitate the control of violence (Peterson & Krivo, 2009). Thus, the disadvantaged neighborhood and residentially unstable areas that Black citizens live in are all faced with residential segregation and contemporary acts of racial discrimination, residential economic discrimination, and other social phenomenon driven by forces of structural racism such as gentrification, fewer options of opportunity, educational disparities and wealth gaps that further contributes to stressful environments (Quick & Kahlenberg, 2019). Consequently, many of these factors contribute to worsened health outcomes.

The traditional explanation for disparities in hypertension between Black and White women concerns differences in socioeconomic status and/or health behaviors. But, as indicated above, these disparities in blood pressure remain after controlling for such factors. More recent research on racial health disparities has begun to examine other variables, such as social support, religiosity, exposure to violence, stress, and access to health care. To our knowledge, no previous research has examined cross-sectional effects of social support, psychosocial characteristics, and contextual factors on disparities in hypertension between Black and White women in one model.

2. Materials and Methods

The traditional explanation for disparities in hypertension between Black and White women concerns differences in socioeconomic status and/or health behaviors. But, as indicated above, these disparities in blood pressure remain after controlling for such factors. More recent research on racial health disparities has begun to examine other variables, such as social support, religiosity, exposure to violence, stress, and access to health care. To our knowledge, no previous research has examined cross-sectional effects of social support, psychosocial characteristics, and contextual factors on disparities in hypertension between Black and White women in one model.

2.1. Measures

Hypertension. The dependent variable in this study is hypertension. In Wave IV, Add Health researchers collected several cardiovascular and anthropometric measures, including systolic blood pressure (SBP, mmHg) and diastolic blood pressure (DBP, mmHg). The study used a three-category measure of hypertension in our analyses, constructed from the JNC7 Categories used in Add Health. The hypertension variable is coded as 1 for Normal blood pressure (systolic < 120, diastolic < 80), 2 for Pre-Hypertension (systolic 120 - 139 or diastolic 80 - 89), and 3 for either Hypertension Stage 1 (systolic 140 - 159 or diastolic 90 - 99) or Hypertension Stage 2 (systolic above 159 or diastolic above 99). Missing val-

ues were recorded for respondents who refused to have their blood pressure read and for those with invalid readings.

Demographic Characteristics.

1) Race

Respondents self-identified their race in Wave I. All respondents not identified as non-Hispanic Black or non-Hispanic White were excluded from the study.

2) Sex

Respondents' sex was determined by the interviewers' assessment of each respondent. If the interviewer was unsure of the respondent's sex, the respondent reported his or her sex. Males were not included in the study.

3) Age

Respondent age was determined using the Wave IV interview completion date and date of birth variables. Because only the month and year of birth are available, 15 is used as the estimated day of birth to facilitate the calculation of age.

4) Adulthood SES

Adulthood Household Income. Adult household incomes were determined in Wave IV by respondents' self-reported incomes. Incomes were placed into the following categories, 1) Less than $20,000 2) $20,000 - $39,999 3) $40,000 - $74,999 and 4) $75,000 and more. A separate category for missing data was included because of the relatively large number of respondents (5.81%) with no reported adulthood household income.

Adult Education Level. Adulthood educational levels were self-reported in Wave IV, and responses were placed into the following categories, 1) less than high school, 2) high school degree or equivalent, 3) bachelor's degree, or 4) graduate or professional degree.

5) Proximate Determinants of Hypertension

Adult BMI. BMI at Wave IV was constructed with direct measures of height and weight, using the following formula, Weight in pounds/[height in inches × height in inches] × 703. Participants with BMIs of 30 or above were categorized as obese.

Adult Tobacco Smoking. Wave IV respondents were asked on how many of the past 30 days they smoked cigarettes. Responses were coded (0) if they did not smoke at all in the past 30 days and (1) if they smoked at least once.

6) Adult Social Support Factors

Marital Status. At Wave IV, respondents self-reported their marital status. A code of (1) indicates currently married, (0) indicates not being currently married.

Close Friends in Adulthood. At Wave IV, respondents indicated how many close friends they had, including people with whom they feel at ease, can talk to about private matters, and can call for help. A code of (1) indicates that the respondent had at least one close friend and a code of (0) indicates that the respondent had no close friends.

Adult Volunteer Activity. Participants who indicated at least some volunteer service within the past year in Wave IV were coded as (1), and those with no volunteer service were coded as (0).

Adult Employment. Participants who indicated that they worked at least 10 hours a week in Wave IV were coded as (1), and participants indicating less than 10 hours per week of work were coded as (0).

7) Adult Psychosocial Factors

Attractiveness of Personality. Wave IV attractiveness of personality was determined by interviewers' ratings. Respondents whose personalities were rated as very unattractive or unattractive were coded as (0) and those receiving a rating of average attractiveness, attractive, or very attractive were coded as (1).

Adult Depression. Depression scores for Wave IV were determined by adding scores from 9 items from the Center for Epidemiologic Studies Depression Scale (CES-D). These 9 items were chosen because they were consistent across Waves I, III, and IV. For each of the 9 items included in the study, respondents were asked to indicate how often certain things were true during the past 7 days. For instance, they were asked how often they enjoyed life, felt sad, and felt people disliked them. A score of (0) indicates that the respondent never or rarely felt this way, a (1) indicates that the respondent sometimes felt this way, a (2) indicates that the respondent felt this way a lot of the time, and a (3) indicates that the respondent felt this way most or all of the time. Scores for each of the 9 items were added together. Scores that were at least one standard deviation above the mean score for all respondents in each wave were considered above the cut-off for depression and coded as (1), while scores below this cut-off were coded as (0) (Fawcett, 2013).

Adult Religiosity. Wave IV religiosity scores were determined by adding scores for 3 items reflecting different dimensions of religiosity. Items include, How often do you pray privately, that is, when you're alone in places other than a church, synagogue, temple, mosque, or religious assembly?, How important (if at all) is your religious faith to you?, and How often have you attended church, synagogue, temple, mosque, or religious services in the past 12 months? For each of the 3 items, scores range from 0 to 3, with 0 indicating that the respondent never or rarely participates in such activities, and a 3 indicating that the respondent participates in such activities very frequently. Scores for each of the 3 items were summed and totals that were at least one standard deviation from the mean score for all respondents were considered above the cut-off for high religiosity and coded as (1), while scores below this cut-off were coded as (0).

Perceptions of Discrimination. Respondents' perceptions of discrimination in Wave IV were determined by responses to the item, in your day-to-day life, how often do you feel you have been treated with less respect or courtesy than other people? Responses indicating that the respondent never, rarely, or sometimes felt this way were coded as (0) and responses indicating that respondents felt this way a lot of the time, most of the time, or all of the time were coded as (1).

8) Adult Contextual Factor

Safeness of Neighborhood in Adulthood. Wave IV interviewers were asked, How safe did you feel when you were in the sample member's/respondent's neighborhood? Responses indicating that the interviewer felt very safe or moderately safe were coded as (0) and responses indicating the interviewer felt moderately unsafe or very unsafe were coded as (1).

2.2. Cross-Sectional Analysis

We conducted a series of multinomial logistic regression analyses to help explain disparities in hypertension between Black and White women in Wave IV. We named these cross-models A - F. We first regressed the three-category measure of hypertension on race, age, education level, and household income to determine the effect of race on blood pressure in Wave IV, after controlling for SES and basic demographic characteristics (Model A). Model B builds on Model A by including Wave IV measures of social support to determine if they diminish the effect of race on blood pressure. As these models were base models, we have moved them to the appendix of this paper.

For Models C and D, we regressed the three-category measure of hypertension on race, age, education level, and household income to determine the effect of race on blood pressure in Wave IV, after controlling for SES and basic demographic characteristics, included social support and psychosocial and contextual measures to determine if they explain some of the racial disparities in odds of hypertension. Model E includes all of these variables, including Wave IV SES, demographic traits, social support, psychosocial characteristics, and contextual factors in one model. Model F is identical to Model E, with the addition of proximate determinants of blood pressure, namely BMI and tobacco smoking.

2.3. Longitudinal Analyses

In order to examine possible life course effects on Wave IV hypertension, we constructed several multinomial logistic regression models through which we regressed three-category hypertension variable on social support, psychosocial characteristics, and contextual factors in both adolescence and, where possible, across multiple waves of Add Health data. We named these models AC-FC to indicate that they include cumulative factors, as opposed to models A4-F4 which include only factors from Wave IV. The first of these longitudinal analytic models is Model AC, which estimates the odds of hypertension in Wave IV by race, age, and both adult and adolescent measures of socioeconomic status (education and household income). The next longitudinal model (Model BC) builds upon Model AC by adding social support factors from Waves I and IV, as well as cumulative measures of social support. Models CC and DC are similar to Model BC, but instead of social support they include adolescent, adult, and cumulative measures of psychosocial and contextual factors, respectively, as predictors of Wave IV hypertension. Model EC predicts the odds of hypertension in Wave IV

by including all the factors in Models AC, BC, and CC. Finally, Model FC includes all variables from Model EC, plus the proximate determinants of blood pressure [BMI (cumulative measure of Waves II and IV) and tobacco smoking (cumulative measure from Waves I, III, and IV)]. Detailed findings for these models are not included in this paper but are available upon request.

3. Results

3.1. Descriptive Statistics

Adulthood characteristics

As shown in Table 1, almost three in four participants were White (n = 1434; 73.05%), and a little over a quarter were Black (n = 529; 26.95%). The average age among all women was 28.18 (SD = 1.81). Black women in the study tended to have lower levels of education, as 58.41% had only a high school diploma, compared to 52.58% of Whites. Also, 23.25% of Blacks had at least a bachelor's degree, compared to 29.36% of Whites. Almost one-quarter (24.20%) of Black adult women reported a total household income of less than $20,000, compared to less than 10% (9.69%) of Whites. Whites tended to earn much more than Blacks, as 35.77% reported a total household income between $40,000 and $74,999 and 29.71% reported incomes over $75,000, compared to just 28.36% and 13.99% of Blacks, respectively. Blacks were more likely than Whites to be obese in Wave IV (51.81% and 34.86%, respectively), but Whites were more likely than Blacks to have smoked in the past 30 days (35.24% and 24.32%, respectively).

Table 1. Adulthood characteristics of the Wave IV sample of black and white women.

	All Women N = 1963 (100%)	Black Women N = 529 (26.95%)	White Women N = 1434 (73.05%)
Mean Age	28.18	28.16	28.19
Socioeconomic Status			
Household Income Level			
Less than $20,000	267 (13.60)	128 (24.20)	139 (9.69)
Between $20,000 and $39,999	419 (21.34)	136 (25.71)	283 (19.74)
Between $40, 000 and $74,999	663 (33.77)	150 (28.36)	513 (35.77)
$75,000 or more	500 (25.47)	74 (13.99)	426 (29.71)
Education Level			
Less than High School	117 (5.96)	36 (6.81)	81 (5.65)
High School Degree or Equivalent	1063 (54.15)	309 (58.41)	754 (52.58)
Bachelor's Degree	544 (27.17)	123 (23.25)	421 (29.36)
Graduate or Professional Degree	239 (12.18)	61 (11.53)	178 (12.41)
Proximate Determinants			
BMI (Obese)	768 (39.43)	272 (51.81)	496 (34.86)
Tobacco Smoking (Not smoking within past month)	1318 (67.66)	392 (75.68)	926 (64.76)

Continued

Blood Pressure			
Hypertension			
Normal Blood Pressure: systolic < 120, diastolic < 80	958 (48.80)	219 (41.40)	739 (51.53)
Prehypertension: systolic 120 - 139 or diastolic 80 - 89	760 (38.72)	207 (39.13)	553 (38.56)
Hypertension I: systolic 140 - 159 or diastolic 90 - 99	187 (9.53)	72 (13.61)	115 (8.02)
Hypertension II: systolic 160+ or diastolic 100+	58 (2.95)	31 (5.86)	27 (1.88)
Social Support Measures			
Marital Status (Married)	835 (42.54)	134 (25.33)	701 (48.88)
Friends (Having at least one friend)	1895 (97.53)	500 (95.42)	1395 (98.31)
Volunteer Activity (Volunteering within past year)	829 (42.32)	189 (35.86)	640 (44.69)
Employment (Currently working at least 10 hours per week)	1537 (78.34)	407 (77.08)	1130 (78.80)
Psychosocial Measures			
Depression (Above cut-off score)	326 (16.62)	112 (21.12)	214 (14.92)
Attractiveness of Personality (Attractive personality; rated by interviewer)	1845 (94.04)	490 (92.80)	1355 (94.49)
Religiosity (Above cut-off score)	420 (21.47)	169 (32.13)	251 (17.55)
Perceptions of Discrimination (Experiencing daily discrimination)	466 (23.74)	151 (28.54)	315 (21.97)
Contextual Measures Environmental Safety (Living in unsafe home; rated by interviewer)	109 (5.93)	66 (13.78)	43 (3.17)

Almost half of the participants (48.8%) in the study had normal blood pressure, 38.72% were prehypertensive, 9.53% had stage 1 hypertension, and 2.95% had stage 2 (severe) hypertension (Table 1). As shown on Figure 1, Black women in the study were much more likely to meet criteria for both stage 1 and stage 2 hypertension I (13.61% and 5.86%, respectively) than Whites (8.02% and 1.88%, respectively). Also, White women were significantly more likely than Black women to have at least one close friend ($x^2 = 13.25$, $p < 0.001$), to volunteer ($x^2 = 12.30$, $p < 0.001$), to be married ($x^2 = 87.71$, $p < 0.001$), and to live in a safe neighborhood ($x^2 = 71.45$, $p < 0.001$). Whites were significantly less likely than Blacks to meet the criteria for depression ($x^2 = 11.02$, $p < 0.001$) and to perceive discrimination ($x^2 = 9.24$, $p < 0.01$). However, Blacks were significantly more likely than Whites to meet criteria for high religiosity ($x^2 = 48.46$, $p < 0.001$). And there were no statistically significant differences between Blacks and Whites in terms of being currently employed ($x^2 = 0.6706$, $p > 0.05$) or having an attractive personality ($x^2 = 1.96$, $p > 0.05$).

3.2. Results from Cross-Sectional Models

Model C included psychosocial factors, having an attractive personality (as rated by the interviewer), not meeting criteria for depression, meeting criteria for religiosity, and not feeling as though she is being treated with less respect than others daily. As shown in Table 2 and Table 3 (Model C), race remained a significant

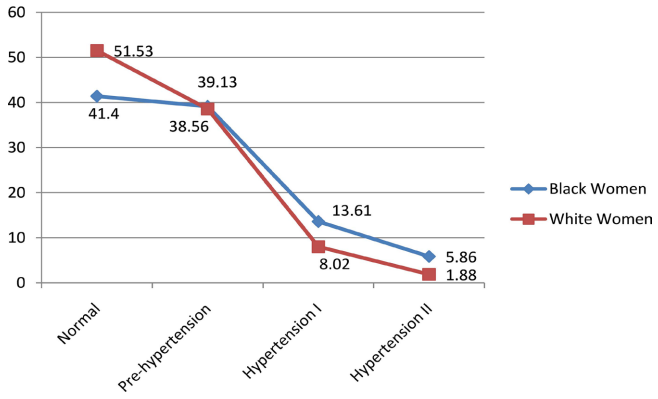

Figure 1. Racial disparities in the prevalence of hypertension in add health, Wave IV.

predictor of both prehypertension and hypertension. A couple of the psychosocial factors included in Model C were significant but weak predictors of blood pressure, although not in the direction expected. For instance, an unattractive personality was negatively associated with prehypertension. Also, depression was negatively associated with prehypertension (**Table 2** about here).

Prehypertension and hypertension disparities between Black and White women in Model A, which controls for age and SES, did not decrease, but actually increased, with the addition of psychosocial factors in Model C. As displayed in **Figure 2**, the OR for race in Model A is 1.213 (95% CI = 0.967 - 1.522) for prehypertension, compared to an OR of 1.261 (95% CI = 1.000 - 1.591) in Model C. Also, the OR for race in Model C was 2.446 (95% CI = 1.782 - 3.358) for hypertension, which is somewhat higher than the corresponding OR for race in model A (OR = 2.328, 95% CI = 1.707 - 3.176) (**Figure 2**).

Model D included the contextual factor, safeness of the neighborhood as rated by the interviewer. Safeness of the neighborhood was not a significant predictor of either prehypertension or hypertension (**Table 2** and **Table 3**). Further, as shown on **Figure 2**, the OR for race in Model D was 1.234 (95% CI = 0.970 - 1.570) for prehypertension, which was slightly higher than the OR for race in prehypertension in Model A. And the OR for race for hypertension in Model D was 2.376 (95% CI = 1.709 - 3.302), which was slightly higher than the OR for race for hypertension in Model A (OR = 2.328, 95% CI = 1.707 - 3.176). These values indicate that the association between race and hypertension and prehypertension actually increased slightly and remained significant in Model D, as compared to Model A.

Table 2. Coefficients from multinomial logistic regression models for prehypertension vs. normal blood pressure.

Parameter	Model A	Model B	Model C	Model D	Model E	Model F
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
Intercept	−2.2167** (0.800)	−2.4504** (0.821)	−2.236** (0.817)	−2.3064** (0.828)	−2.5878** (0.863)	−2.8012** (0.891)

Continued

Race[a]	0.1935 (0.116)	0.1736 (0.118)	0.2320* (0.117)	0.2100 (0.123)	0.2090 (0.129)	0.1501 (0.135)
Age	0.0571* (0.028)	0.0616* (0.0280)	0.0570* (0.028)	0.0604* (0.028)	0.0658* (0.029)	0.0656* (0.030)
SES						
Income[b]						
0 = less than $20,000	0.3050 (0.181)	0.2385 (0.188)	0.3160 (0.185)	0.3858* (0.189)	0.3546 (0.199)	0.2582 (0.206)
1 = $20K - $39K	0.1314 (0.150)	0.0842 (0.155)	0.1253 (0.151)	0.1419 (0.155)	0.0935 (0.164)	−0.0065 (0.168)
2 = $40K - $74K	0.3402** (0.129)	0.3324* (0.131)	0.3415** (0.131)	0.3397* (0.134)	0.3373* (0.337)	0.2501 (0.139)
Education[c]						
0 = Less than a high school degree	0.1761 (0.253)	0.1252 (0.261)	0.2862 (0.261)	0.1073 (0.264)	0.1706 (0.280)	−0.0681 (0.295)
1 = high school diploma or equivalent	0.2161 (0.158)	0.2073 (0.163)	0.2761 (0.162)	0.1946 (0.166)	0.2418 (0.174)	0.0247 (0.182)
2 = Bachelor's degree	0.0028 (0.168)	0.0297 (0.169)	0.0341 (0.170)	−0.0065 (0.177)	0.0570 (0.180)	−0.0206 (0.185)
Social Support Factors						
Marital Status[d]		0.1294 (0.109)			0.1217 (.0114)	0.1294 (0.119)
# Close Friends[e]		−0.1241 (0.333)			−0.0390 (0.348)	0.1451 (0.3655)
Volunteering[f]		0.0892 (0.105)			0.0893 (0.111)	0.1122 (0.114)
Employment[g]		0.1007 (0.126)			0.0837 (0.130)	0.1009 (0.135)
Psychosocial Factors						
Depression[h]		−0.4145** (0.142)			−0.3876** (0.147)	−0.4361** (0.153)
Personality Attractiveness[i]		−0.4811* (0.216)			−0.4076 (0.222)	−0.4347 (0.228)
Perceptions of Discrimination[j]		0.1188 (0.121)			0.1193 (0.126)	0.0654 (0.131)
Religiosity[k]		0.0345 (0.123)			0.0333 (0.133)	0.1072 (0.139)
Contextual Factors						
Safeness of respondent's home[l]				−0.1858 (0.226)	−0.1752 (0.232)	−0.2764 (0.241)

Continued

Proximate Determinants	
BMI[m]	1.0618** (0.114)
Tobacco Smoking[n]	0.0446 (0.123)

*p< 0.05; **p < 0.01; a: White is the reference category; b: At least 75 K is the reference category; c: Graduate or professional degree is the reference category; d: Currently married is the reference category; e: At least one friend is the reference category; f: Volunteer activity within past year is the reference category; g: Currently employed is the reference category; h: Not meeting criteria for depression is the reference category; i: Very attractive and attractive is the reference category; j: Never or rarely experiencing discrimination is the reference group; k: Meeting criteria for religiosity is the reference category; l: As rated by the interviewer; Very safe or moderately safe is the reference category; m: Not Obese is the reference category; n: No tobacco smoking within the past month is the reference category.

Table 3. Coefficients from multinomial logistic regression models for hypertension vs. normal blood pressure.

Parameter	Model A	Model B	Model C	Model D	Model E	Model F
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
Intercept	−7.4959** (1.217)	−7.7753** (1.248)	−7.5912** (1.237)	−7.1786** (1.260)	−7.6153** 1.312	−7.8400** (1.372)
Race[a]	0.8450** (0.158)	0.8109** (0.162)	0.8946** (0.162)	0.8653** (0.168)	0.8676** (0.176)	0.7359** (0.186)
Age	0.1890** (0.041)	0.1951** (0.042)	0.1881** (0.041)	0.1775** (0.043)	0.1863** (0.044)	0.1799** (0.046)
SES						
Income[b]						
0 = less than $20,000	0.3543 (0.261)	0.2592 (0.270)	0.3438 (0.266)	0.4511 (0.276)	0.3565 (0.290)	0.2206 (0.299)
1 = $20K - $39K	−0.0235 (0.233)	−0.1149 (0.241)	−00.0313 (0.235)	0.0351 (0.243)	−00.0680 (0.253)	−00.3169 (0.264)
2 = $40K - $74K	0.2143 (0.202)	0.1979 (0.203)	0.2277 (0.203)	0.3167 (0.210)	0.3089 (0.211)	0.1535 (0.218)
Education[c]						
0 = Less than a high school degree	−0.0840 (0.423)	−0.0060 (0.436)	−0.0793 (0.430)	−0.4372 (0.471)	−0.3582 (0.491)	−0.6657 (0.509)
1 = high school diploma or equivalent	0.5270* (0.255)	0.5972* (0.263)	0.5063* (0.257)	0.4371 (0.266)	0.5054 (0.278)	0.1890 (0.294)
2 = Bachelor's degree	0.1826 (0.274)	0.2772 (0.279)	0.1601 (0.275)	0.1473 (0.286)	0.2272 (0.292)	0.1262 (0.304)
Social Support Factors						
Marital Status[d]		0.1556 (0.165)			0.1709 (0.174)	0.1910 (0.181)
#Close Friends[e]		0.1478 (0.425)			0.1594 (0.452)	0.4707 (0.477)

Continued

Volunteering[f]	−0.0765 (0.157)		−0.1220 (0.165)	−0.0346 (0.172)
Employment[g]	0.2357 (0.180)		0.2191 (0.188)	0.2593 (0.196)
Psychosocial Factors				
Depression[h]	−0.2052 (0.199)		−00.1182 (0.207)	−00.1953 (0.216)
Personality Attractiveness[i]	−00.3871 (0.318)		−3508 (0.332)	−00.4720 (0.351)
Perceptions of Discrimination[j]	0.01742 (0.173)		0.1041 (0.184)	0.0718 (0.189)
Religiosity[k]	0.1830 (0.184)		0.1430 (0.198)	0.2035 (0.209)
Contextual Factors				
Safeness of respondent's home[l]		0.0394 (0.295)	−00.0299 (0.304)	−00.1855 (0.317)
Proximate Determinants				
BMI[m]				1.5717** (0.169)
Tobacco Smoking[n]				0.0812 (0.182)

*$p < 0.05$; **$p < 0.01$; a: White is the reference category; b: At least 75K is the reference category; c: Graduate or professional degree is the reference category; d: Currently married is the reference category; e: At least one friend is the reference category; f: Volunteer activity within past year is the reference category; g: Currently employed is the reference category; h: Not meeting criteria for depression is the reference category; i: Very attractive and attractive is the reference category; j: Never or rarely experiencing discrimination is the reference group; k: Meeting criteria for religiosity is the reference category; l: As rated by the interviewer; Very safe or moderately safe is the reference category; m: Not Obese is the reference category; n: No tobacco smoking within the past month is the reference category.

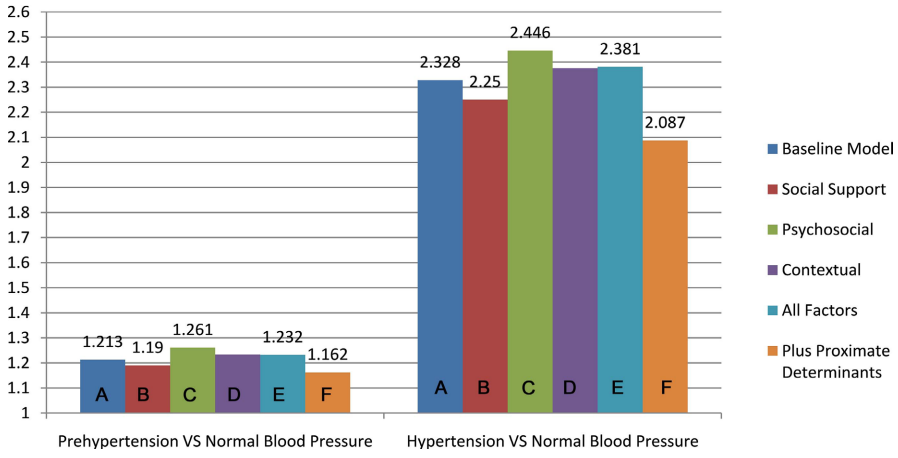

Figure 2. Odds ratios for race in multinomial logistic regression models A to F.

White is the reference category

Model E included all of the social support, psychosocial, and contextual factors included in Models B, C, and D. Almost none of the social support, psy-

chosocial, or contextual factors in the model were significant predictors of prehypertension or hypertension. The only significant predictors among these factors of prehypertension were personality and depression. As shown in Table 2, an unattractive personality was significantly associated with lower odds of prehypertension (OR = 0.665, 95% CI = 0.430 - 1.028). Also unexpectedly, meeting the criteria for depression was negatively and significantly associated with prehypertension (OR = 0.679, 95% CI = 0.509 - 0.905).

The inclusion of all of the social support, psychosocial, and contextual factors in Model E actually increased the ORs for race, as compared to the ORs for race in Model A. As displayed on Figure 2, the OR for race for prehypertension in model A was 1.213 (95% CI = 0.967 - 1.522), as compared to the somewhat higher 1.232 (95% CI = 0.958 - 1.586) OR in Model E. The OR for race for the model predicting hypertension in Model E was also somewhat higher than the OR for race predicting hypertension in Model A [2.381 (95% CI = 1.686 - 3.364) and 2.328, (95% CI = 1.707 - 3.176), respectively)]. These slight increases in the ORs for race from the models in A to the models in E indicate that even after controlling for social support, psychosocial, and contextual factors, Black women were still more likely than White women to suffer from prehypertension and hypertension.

The final model in the was Model F, which included all of the factors included in Model E, plus selected proximate determinants of blood pressure, BMI and tobacco smoking. The likelihood ratio chi-square of the model was 227.4039 ($p < 0.001$), meaning that the model as a whole fit significantly better than a null model. Chi-square difference tests revealed that this model is a better fit for the data than any of the previous models (A - E).

As in all of the previous models, age was a significant predictor of prehypertension and hypertension in Model F (Table 2 and Table 3). Although none of the social support, psychosocial, or contextual factors in the model were significantly predictive of hypertension, depression remained a significant predictor of prehypertension. As shown in Table 2, meeting criteria for depression was significantly and negatively associated with prehypertension (OR = 0.647, 95% CI = 0.479 - 0.872).

Smoking tobacco was not a significant predictor of either prehypertension or hypertension (Table 2 and Table 3). On the other hand, BMI was the strongest and most significant predictor of both prehypertension and hypertension in all of the models. In fact, those with BMIs considered as obese were 2.892 times more likely to have prehypertension, compared to those with lower BMIs (OR = 2.892, 95% CI = 2.314 - 3.614). And meeting criteria for obesity was strongly and significantly associated with a nearly fivefold increase in the odds of hypertension (OR = 4.815, 95% CI = 3.455 - 6.711).

As was the case in Model A, the OR for race for prehypertension in this model was not significant (OR = 1.162; 95% CI = 0.892 - 1.514). Interestingly, even after controlling for select social support, psychosocial, and contextual factors, as well as BMI and tobacco smoking, race remained a significant predictor of

hypertension in Model F. Table 3 shows that being Black, as compared to being White, was significantly associated with having hypertension. Further, the OR for race in Model F was only slightly lower than the OR for race in Model A [2.087 (95% CI = 1.450 - 3.005) and 2.328 (95% CI = 1.707 - 3.176), respectively]. This indicates that the racial disparities in hypertension remained strong, even after controlling for social support, psychosocial, and contextual factors, and BMI and tobacco smoking.

These analyses suggest that the only factor included in the models that explained even a small portion of the racial differences in prehypertension or hypertension was BMI. In fact, after controlling for adulthood social support factors (Model B), psychosocial factors (Model C), contextual factors (Model D), all factors (Model E), and all factors and BMI and tobacco smoking (Model F), racial disparities in hypertension and prehypertension remained largely unchanged, relative to the disparities observed in Model A, which controlled only for SES and age (see Figure 2).

3.3. Results from Longitudinal Models

Because of the lack of reduction in racial disparities in blood pressure produced by the cross-sectional models examining adulthood factors, we estimated another series of multinomial logistic regression models that examine how adolescent and cumulative factors influence racial disparities in hypertension.

Detailed findings are not presented here, but as in all cross-sectional models, race was significantly associated with hypertension in the longitudinal models. Similarly, even after controlling for longitudinal measures of social support, psychosocial, contextual factors, BMI, and tobacco smoking, Black women were still 1.18 times more likely than White women to have prehypertension and over two times more likely to suffer hypertension. Specifics on adolescent and cumulative measures and findings used in the analyses are available upon request.

4. Discussion

The purpose of this study was to examine the effects of social support, psychosocial characteristics, and contextual adulthood factors on hypertension. In this nationally representative sample of young American adults, we found that the prevalence of prehypertension, hypertension I and hypertension II was higher among Black women than White women. Despite the substantial differences in SES between the two racial groups, adjustment for current SES did not account for racial differences in blood pressure. And adjustment for other factors associated with blood pressure did not substantially diminish racial disparities in blood pressure either.

Although adulthood social support factors helped diminish slight amount of racial disparities in blood pressure, the association between race and blood pressure remained largely unchanged after adjustment for social support (Model B). None of the psychosocial factors (Model C) reduced blood pressure disparities;

in fact, they caused them to widen. In all, only the model including BMI helped explain a non-negligible portion of the disparities in prehypertension or hypertension between Black and White women. Indeed, of all the variables considered in our analyses, the only three that clearly and consistently affected the odds of hypertension were race, age and BMI. So, being Black, as opposed to being White, increased age, and being obese, rather than having a lower BMI, were all positively and significantly associated with blood pressure.

High BMI is a major cause of hypertension. Many studies, including this one, have shown strong associations between overweight and obesity, and increased risks for prehypertension and hypertension. Interestingly however, even after controlling for BMI, Black women remain at greater risk than White women for prehypertension and hypertension. Other research (Fei, 2017) has found that Blacks have higher prevalence of hypertension than Whites at every level of BMI, possibly suggesting the importance of race-specific BMI cutoffs to more accurately assess obesity-related risks of hypertension across groups. Young et al. (2018) also reported that, controlling for BMI, Blacks had significantly higher blood pressures than Whites. These findings indicate complex relationships between race, blood pressure, and obesity that should be examined more thoroughly. The stronger association between obesity and prehypertension among Whites in our study suggests that factors other than BMI are affecting blood pressure among Black women, putting them at higher risk of prehypertension than their White counterparts at the same BMI level.

Extant research shows that various social support factors, including greater functional social support (Harding et al., 2022) and frequent contact with friends (Gorman & Sivaganesan, 2007), are negatively associated with blood pressure. Others have reported that volunteering is significantly associated with lower blood pressure among Whites, with no such association among Blacks (Tavares et al., 2013). Research also shows that psychosocial factors, including depression (Troxel, 2003; Zhong et al., 2017), and perceived lifetime discrimination (Forde et al., 2021), and contextual factors, such as violent neighborhoods (Clark et al., 2007), are linked with hypertension. The fact that these factors did not diminish racial disparities in prehypertension or hypertension in our study suggests that other social support factors may be important to consider. For instance, these models do not include a measure of relationship or marital quality.

Our models also do not account for John Henryism, a style of coping used to deal with psychosocial and environmental stressors such as racism and career problems common among goal-oriented Blacks who lack resources such as financial or emotional support needed for success (Nguyen et al., 2021). Other studies have linked John Henryism to stress and increased blood pressure (Holt-Lunstad et al., 2008), while other studies do not support such a link (Barajas et al., 2019). Other research reports a prevalence of higher blood pressure among those experiencing John Henryism in lower resource neighborhoods compared with those of higher resource neighborhoods (Brody, Yu, Miller, Ehrlich, & Chen, 2018). It is likely that other measures of social support, as well as other

aspects of psychosocial health and environmental context, are behind some of the racial differences in blood pressure.

The lack of substantial reductions in racial disparities in the odds of prehypertension and hypertension, even after accounting for social support, psychosocial characteristics, contextual factors, and proximate determinants (BMI and smoking), could suggest that simply being a Black woman in the US is associated with poorer health, including increased blood pressure. It is widely known that Black women generally face more pressures, stresses, and obstacles than their White counterparts. They experience more interpersonal, institutional, structural, disciplinary, and ideological racism than most other women (Collins, 2009; Alson, Robinson, Pittman, & Doll, 2021). In fact, the term misogynoir was developed by Bailey to describe the specific distrust, hatred, dislike, aversion to, and prejudice directed toward Black women in the United States (Bailey, 2021).

Various forms of racism work together to legitimize and to reinforce inequality and unfairness in all domains in society. For instance, racism institutionalized in the educational system, healthcare system, legal system, and so on, place Black women at a disadvantage in educational attainment, income, and other social determinants of health (Hill, Ndugga, & Artiga, 2023). This fosters a stressful living environment for Black women, producing psychological and physiological effects related to racism and the minority and subordinate status held by many Black women in the US. In other words, racism in each domain, and in society as a whole, may have a cumulative effect on the health and well-being of Black women, likely increasing blood pressure and other stress-related symptoms. So, simply being a Black woman in US society is arguably unhealthy due to interpersonal and structural racism and its insidious effects. The health effects of racism are not easily measured by social science research, which is possibly why racial blood pressure disparities have yet to be explained.

Biological explanations for racial differences in health have generally been dismissed by social scientists, but this study suggests that some of these explanations should be taken more seriously. Over the past few decades, biological research has begun to transform the debate on the origins of health disparities. Relatively recent evidence, including research linking low birth weight to increased risk of cardiovascular disease, has led to new ideas about the effects of the prenatal environment on adult health (Leeson et al., 2001). It is now known that the prenatal environment, along with economic, social, and nutritional factors of pregnant women, affect the adult health of unborn children. Such evidence suggests that some disease etiology may be traced to the intersection of biology and the environment. This type of factor is triggered by the environment and manifests as developmental plasticity in the function and structure of tissues, organs, and biological systems (Kuzawa & Sweet, 2008; Schell et al., 2020).

Because these factors implicate changes in early developmental processes, they can have longer-lasting impacts on adult biology and health than the adulthood environment, which is often transient. Tracking adult disease risk to prenatal and early childhood origins generates new theories about the causes of human

biological variation, including that related to race and health (Kuzawa & Sweet, 2008). According to the Barker hypothesis, the effects of prenatal and neonatal factors, such as low birthweight and slow fetal growth, as well as postnatal development, are influenced by environmental factors and developmental paths that precede and follow them (Gowland, 2015).

These processes can help illuminate how early life exposures, such as stress, can produce a phenotypic memory that persists through the life-course to influence adult physiological function, health, and risk for disease (Jirtle & Skinner, 2007). Such findings are beginning to reframe the study of biology and health as life-course phenomenon, with early life and life-course environments and experiences of prior generations, affecting adult outcomes (Kuzawa & Sweet, 2008; Gowland, 2015).

Further, research in epigenetics is demonstrating that environmental factors can modify epigenetic processes, thereby impacting epigenetic marks and downstream patterns of genetic expression in particular cells and cell lineages. This line of research shows that, by linking maternal and intergenerational experience with fetal biology, stressors, such as psychosocial and financial stress or imbalanced nutrition, can alter biological settings in children, with long-term health implications. These effects can include physiological responses to stress and blood pressure regulation (Kuzawa & Sweet, 2008) and even depression (Park et al. 2019). So, the study of epigenetics indicates that, in addition to the chronic and cumulative health impacts of social environments, there is a strong motivation to consider a developmental influence and intergenerational impacts on patterns of adult health disparities (Kuzawa & Sweet, 2008), including those related to blood pressure and hypertension. It is likely that such processes are behind some of the health disparities seen between Black and White women.

5. Conclusion

Stress is a major contributor to the development of hypertension, and in the United States, Black women tend to live more stressful lives than do White women. Social support, psychosocial factors, and contextual factors can be direct contributors to stress and physiological reactions to stressful experiences, and they can also serve to mitigate and moderate other life stressors. Further, all these factors influence one another. It is also crucial to explore risk factors for hypertension and other cardiovascular diseases that affect different groups differently. For instance, recent research suggests that lifelong discrimination is a major chronic stressor and that it is linked with hypertension in Black Americans, but not so much in other minoritized racial groups. Discrimination can come in many forms and from many sources, such as institutional racism, structural racism, and interpersonal racism, each with different impacts on physical health. Further, not everyone has the same resources and support factors to help deal with the effects of discrimination. It is possible that actual and perceived discrimination are especially harmful to Black women because they might be more

densely intertwined into their lives, and they might experience them at more and varied levels. For instance, Blacks in the United States are especially susceptible to perceiving and experiencing workplace racial discrimination (Gallup, 2020), discrimination in hiring practices (Restaurant Opportunities Centers United, 2020), discrimination in house appraisals (Kamin, 2020), discrimination in health and health care (Ndugga & Artiga, 2021), and a host of other sources. So, establishing the precise effects of perceiving discrimination on health is difficult and complicated because many types of discrimination carry with them effects that impact health and health resources.

Social and structural discrimination in the U.S., for example, Blacks, women, and people in poverty are more likely to experience physiological responses to discrimination and environmental factors, like air and water pollution, that can contribute to poor cardiovascular health. That is, because different groups, such as intersectional minorities (i.e. Black women in the US), are exposed to and affected by social, structural and environmental factors differently, research that targets differential influences and their impacts on health among each group is necessary to reduce poor health among all US social groups. It will not be possible to effectively combat dangerous health disparities until we can better understand the numerous and complicated factors involved in these inequalities on an individual, as well as an intersectional basis.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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