Psychosocial Factors and Hypertension
A Review of the Literature

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INTRODUCTION
Hypertension is a pervasive problem in the United States, with approximately a third of Americans reporting being diagnosed with hypertension by their physicians or taking antihypertensive medicine. Hypertension is an important risk factor for a variety of health conditions, such as cardiovascular disease, stroke, and kidney failure. Nevertheless, this burden is unevenly distributed in society, with black people having the highest prevalence of hypertension compared with their white counterparts. Despite improvements in increasing the awareness and treatment of hypertension, racial/ethnic differences in hypertension persist.

Growing evidence points to multiple psychological and social factors as contributors to the onset and trajectory of hypertension. Psychosocial factors that induce emotional stress can evoke a physiologic response mediated in part by activation of the sympathetic nervous system, inflammation, and the hypothalamic-pituitary-adrenal axis. Repeated activation of this system can result in failing to return to resting blood pressure levels. Psychosocial factors, such as hostility and job strain, have been found to be associated with higher circulating levels of catecholamines, higher cortisol levels, and increased blood pressure over time.

Prior reviews have identified several psychosocial indicators as potential risk factors for the onset of hypertension. This article reviews recent research on psychosocial factors and hypertension and contextualizes the findings within a health disparities framework. This article reveals that psychosocial factors, such as socioeconomic status, stressors (including race-related stressors), and emotional states, may contribute to hypertension risks.

Future research should investigate how psychosocial factors accumulate over the life course to contribute to hypertension disparities. Further research on psychosocial factors and hypertension can enhance the effectiveness of interventions to reduce hypertension risks in ethnic minority patients and communities.
and progression of hypertension. This article provides an overview of recent findings related to major psychosocial factors and hypertension. Because of space constraints, emerging work about psychosocial factors (eg, personality, sleep quality) cannot be fully discussed. Nevertheless, in presenting the major factors, this article highlights gaps in the extant literature that contribute to the limited understanding of the social determinants of the persistent racial/ethnic hypertension disparities and discusses directions for future research.

**Socioeconomic Status**

Socioeconomic status (SES) has long been identified as a risk factor for hypertension. A review by Spruill suggests a complex interaction of social, psychological, and behavioral factors contributing to unequal distribution of diseases. Compared with their high-SES peers, individuals of low SES are more likely to lack sociopolitical power and economic resources, thereby resulting in occupancy of educational, occupational, residential, and recreational environments that are less health enhancing. These factors lead to differential exposures to stressors (eg, unemployment, crime, and violence) and fewer resources (eg, recreation and physical activity) to cope with an accumulation of stressors that combine to contribute to greater risk of hypertension. In a recent meta-analysis, multiple indicators of SES (ie, income, occupation, and education) were associated with an increased risk of hypertension.

SES and race/ethnicity are closely intertwined. Contemporary racial/ethnic categories simultaneously capture unmeasured confounding for biological factors associated with ancestral history and geographic origins; factors linked to current and earlier psychological, social, physical, and chemical environmental exposures; as well as biological adaptation to these exposures. Racial/ethnic differences in SES are large and persistent, and likely contribute to racial/ethnic differences in hypertension. Recent national data reveal that black households earn 59 cents and Hispanics households 70 cents for every dollar of income that white households receive; moreover, black people have only 6 cents and Hispanics 7 cents for every dollar of wealth that white people have.

In addition, because of the persistence of a residual association between race and hypertension after controlling for modifiable risk factors and SES, other unmeasured explanatory factors likely contribute to hypertension disparities. Research suggests that a life-course perspective provides insight into the prolonged impact that early SES can have on blood pressure. Although most studies taking a life-course perspective are cross-sectional studies, they suggest that the accumulation of stress caused by SES positioning likely promotes health-damaging effects later in life. For instance, low childhood SES and childhood adversity are associated with higher risk of hypertension. Slopen and colleagues found that a positive neighborhood context may modify the relationship between childhood adversity and cumulative biological risk in adulthood. Importantly, because evidence suggests that racial/ethnic minorities have higher cumulative stress than white people, further research is needed to examine the extent to which race/ethnicity may moderate the association between the accumulation of stressors over the life course and hypertension.

**Race-Related/Ethnicity-Related Stress**

**Discrimination**

Growing attention is paid to the ways in which race-related/ethnicity-related aspects of social experience may adversely affect health, such as discrimination. Discrimination can erode an individual’s health through negative psychological and physiologic responses and untoward health maintenance and behaviors. Nevertheless, the literature on discrimination and hypertension is riddled with inconsistent findings, partly caused by measurement issues and the shortage of longitudinal studies. For example, research from the Jackson Heart Study found that lifetime discrimination and the burden of discrimination were each modestly associated with increased hypertension prevalence. However, no association was observed between hypertension and a measure of current everyday discrimination. It is plausible that reports of current exposure to minor instances of discrimination might be related to short-term measured blood pressure change, whereas lifetime measures might more aptly capture the cumulative effect of discriminatory exposure on blood pressure risk over time. Not surprisingly, chronic discrimination is more consistently associated with ambulatory blood pressure than with resting clinic blood pressure.

Pathways through which discrimination might affect hypertension risk are multiple. Although prior research indicates that black people are more likely than white people to have a blunted blood pressure decline during sleep, emerging studies reveal that exposure to discrimination contributes to the increased levels of blood pressure and lack of blood pressure decrease among black people at night. Sleep disturbances are also
related to hypertension risk. Moreover, a recent review indicates that discrimination is positively associated with reported sleep difficulties, insomnia, and fatigue, thereby influencing hypertension risk.\(^\text{18}\) In other research, threat of exposure to discrimination versus actual exposure also affects hypertension risk, possibly via heightened vigilance.\(^\text{19}\) Experiences of discrimination have also been associated with lower levels of adherence and follow-up for multiple health conditions, and, if this pattern is also true of hypertension, it could contribute to greater severity and poorer course of hypertension.\(^\text{14}\) In light of these points, future studies should consider the multiple dimensions of discrimination and conditions that adversely affect blood pressure.\(^\text{17}\)

**Goal-striving stress**

There are other, more novel race-related risk factors that may also play a role. Goal-striving stress is a measure of thwarted aspirations. It is typically operationalized as the discrepancy between aspirations and achievement, weighted by the subjective probability of success and the level of disappointment experienced if goals are not reached.\(^\text{20}\) Analyses of a large national sample revealed that higher levels of goal-striving stress were associated with the prevalence of self-reported hypertension among white Americans, African Americans, and Caribbean black people, and race/ethnicity did not moderate the relationship between goal-striving stress and hypertension.\(^\text{20}\) Longitudinal research is needed to enhance the understanding of the timing of the development of goal-striving stress and how exposure and response to it may influence the onset and course of hypertension disparities. Relatedly, John Henryism, an active predisposition to succeed against all odds, is associated with high blood pressure among persons who lack the resources to facilitate success.\(^\text{21}\) Research is needed to better understand the conditions under which psychological risk factors and coping mechanisms such as goal-striving stress and John Henryism can affect the development and course of hypertension and the behavioral and biological mechanisms through which these processes occur.\(^\text{21}\)

**Internalized racism**

Self-stereotyping (or internalized racism) has been identified as another mechanism by which racism might adversely affect health. Limited research indicates a positive association between internalized racism and multiple health outcomes, including overweight/obesity and blood pressure.\(^\text{14}\) Other data show that internalized racism interacts with discrimination to predict increased risk of hypertension.\(^\text{22}\) Such that, in a sample of 91 African American men, increased hypertension risk was only evident for African American men who scored high both on discrimination and anti-black bias.

Stereotype threat is a term describing the activation of negative stereotypes in members of a stigmatized group that creates reactions, anxieties, and expectations that adversely affect psychological functioning and health.\(^\text{23}\) For example, in the work by Blascovich and colleagues,\(^\text{24}\) physiological arousal triggered by stereotype threat is associated with greater increases in blood pressure among African Americans than in European American students. Stereotype threat is also purported to trigger increases in anxiety and impairment of decision-making and self-regulation processes in a manner that increases aggressive behavior and overeating.\(^\text{25}\) Stereotype threat may be indirectly related to hypertension through weight changes and modulation of the neural hormonal system.\(^\text{26,27}\) In addition, stereotype threat can lead affected persons to delay seeking needed medical care, and to have poor adherence to recommended therapies and generally poor patient-provider relationships.\(^\text{14}\)

**Other Sources of Stress**

**Occupational stress**

Previous research suggests that working conditions that induce stress are associated with increased risk of hypertension.\(^\text{2,28}\) Occupational stressors can include hostile work environments (eg, threatened, bullied, or harassed by anyone while on the job), work insecurity (eg, worried about becoming unemployed), time pressures, work hazards, and other work conditions (eg, sedentary tasks, uncontrollable tasks).\(^\text{28}\) High job strain/stress (high job demand and low job control) is independently associated with hypertension, ambulatory blood pressure increase, and cardiovascular disease risk.\(^\text{29–31}\)

Occupations with high job demand and low job control (eg, servers and clerks) are commonly overrepresented among ethnic minorities.\(^\text{32}\) However, the relationship between job strain and hypertension has been mixed, particularly for black people. For instance, low decisional control has been found to be related to increased blood pressure reactivity among black people.\(^\text{33,34}\) However, a recent study using Health and Retirement Study data found no association between high job strain (as well as workplace discrimination) and hypertension among African Americans.\(^\text{35}\) Considering the paucity of epidemiologic studies examining...
the relationship between work-related stressors and hypertension among racial/ethnic minority workers, these results require replication using national data sets. Furthermore, other job strain domains, especially those that may be more salient for ethnic minorities (eg, stressors linked to unemployment and underemployment, job conflict, or financial strain caused by low wages) should be explored in this area of research.35

An important direction for future research is to more comprehensively assess the broad range of stressors that might affect hypertension risk. For example, with regard to work stress, studies need to go beyond assessing high demand and low control and assess conditions in work environments that are likely to vary by race, such as physical and chemical environmental hazards and occupational stressors linked to injury risk.36 Because research studies have assessed only a few domains of stressors, systematic attention needs to be given to understanding the contribution of a broader range of living conditions that could increase hypertension risk, including incarceration, which disproportionately affects black people. For example, the Coronary Artery Risk Development in Young Adults (CARDIA) study found that incarceration was associated with increased risk of incident hypertension 3 years later and greater end-organ damage related to hypertension.36 Incarceration is a type of stressful experience that exacerbates social disadvantage by placing many people on a pathway of low education, poor job prospects, and low income. These examples highlight the need to fully characterize all aspects of the social context that can negatively affect hypertension risk.

**Emotional States**

High levels of anxiety and depression symptoms are common in adults, often comorbid with chronic illnesses such as hypertension, and can have deleterious effects on individual health and quality of life. A meta-analysis of prospective studies found that depressive symptoms predict a 42% increased risk of hypertension.37 Similar to the findings for depressive symptoms, a meta-analysis of prospective studies found that anxiety symptoms were an independent risk factor for incident hypertension.38 However, many studies are limited by the lack of control for confounding factors, such as risk behaviors and related psychological factors (eg, anger), which may attenuate observed relationships between these emotional states and hypertension. Future research should adjust for all related factors to accurately assess the independent contribution of depression and anxiety to hypertension.

Consistent with prior research, recent evidence continues to document that anger and hostility are associated with increased hypertension risk.39 For example, using data from the Heart Strategies Concentrating On Risk Evaluation, researchers noted that high levels of hostility are associated with an attenuated nocturnal decline in blood pressure among black people and white people.40 Most research in this area has been limited to white men,39 which also limits the understanding of racial and gender differences in levels of exposures to these risk factors and the extent to which the effects of such exposures vary by social group. In addition, as noted by Trudel-Fitzgerald and colleagues, few prospective studies with up-to-date methodology have been conducted within the last decade. However, longitudinal analyses from the Jackson Heart Study show that African Americans with high anger-out (expressed rather than repressed anger) scores have a 20% increased risk of blood pressure progression compared with African Americans with low anger-out scores.41 Prospective studies are needed to identify the independent effect of anger (both experience and expression) on blood pressure in diverse population samples.

Trudel-Fitzgerald and colleagues introduced 2 emerging psychosocial factors that should be considered within the larger literature of emotional states and hypertension: positive psychological well-being (PPWB) and emotion regulation. Growing evidence suggests that PPWB, such as optimism, life satisfaction, and emotional vitality, is positively associated with hypertension and cardiovascular health risk factors (eg, physical activity).39,42 However, the link between PPWB and hypertension has not been well established because of methodological and measurement issues (eg, the heterogeneity of hypertension measurements).39 Similarly, although vitality predicts hypertension onset, further research using a broader range of PPWB domains is needed to fully understand the influence of PPWB on hypertension. In addition, emotion regulation, which refers to the monitoring of a person’s emotional experiences and responses, may also influence physical health, including hypertension risk, but research in this area is limited by lack of diversity and longitudinal studies.39

**Social Relationships**

Social relationships serve as sources of emotional support (eg, empathy), informational support, and instrumental support. These positive aspects of
social ties have been shown to directly enhance health and to reduce the negative effects of stress-
ful experiences on health by enhancing the capacity
of individuals to cope with stress. These
processes are also likely to affect hypertension risk.2,5 For example, a study using National Health
Interview Survey data found that both emotional
support and social integration were independently
associated with decreased odds of hypertension.44
The study also suggested that emotional support
and social integration seemed to buffer the adverse
effects of low SES on hypertension.45 However, the
interrelationships between race/ethnicity, hyperten-
sion, and social relationships have not been
clearly elucidated. The limited available research
in this area indicates that race/ethnic differences
in hypertension are reduced among people who
receive social support, compared with those who
do not receive any form of support.45 Although
this study did not find an interaction effect between
marital status and ethnicity in predicting hyperten-
sion, the potential contribution of marital status, a
key component of social relationships, deserves
more concerted attention in research on hyperten-
sion. Marital status, similar to other measures of
social ties, can have both positive and negative
effects on health, particularly hypertension.2 How-
ever, inadequate attention has been given to exam-
ing the association between marital relationships
and other types of social ties and blood pressure
among ethnic minorities and their potential contri-
bution to hypertension disparities. This omission
is especially important given that black people
are less likely to be married than white people
and it is currently unclear whether other social rela-
tionships compensate for the lower levels of marital
ties among black people.

Other Research Priorities

The role of genetics in racial/ethnic differences in
hypertension remains as an ongoing debate. Although evidence suggests that polymorphisms
in the APOL 1 (Apolipoprotein L1) gene may contribute to hypertension propensity in black people,46
socioenvironmental influences are crit-
al. For example, research shows that, although
black people in the United States have higher rates
of hypertension than white people in European
countries such as Sweden and Italy, they have
lower prevalence levels than white people in other
countries such as Germany and Finland.47
Increasing evidence also suggests that epigenetic
modifications, caused by, for instance, childhood
development or chemical exposure, are important
contributors to the development of hyperten-
sion.48 However, there are only a limited number
of studies of epigenetic changes linked to hyper-
tension risk factors, and only blood rather than
the effector tissues have been examined, limiting
the present understanding of the contribution of
DNA methylation to high blood pressure.48 Future
studies should consider examining both blood
methylation and effector tissues to more fully un-
derstand the contribution of epigenetics to hyper-
tension disparities.

Another issue of concern relates to the lack of
attention to, or the assumption of, nonheterogene-
ity within ethnic groups. Studies of black people
tend to cluster immigrant African and Caribbean
black people with US-born black people, regard-
less of acculturation status and country of origin.
White people are also viewed as monolithic with,
little attention given to recent eastern European
immigrants or groups from North Africa and the
Middle East that are grouped into the official
‘White’ category in the United States. Similarly,
studies cluster Hispanic people, regardless of
acculturation status, race, and country of origin,
potentially diluting the measurement of the differ-
ential impact of environment on hypertension
risk. Greater acculturation is associated with
increased hypertension risk, independent of age,
gender, race/ethnicity, education, smoking,
alcohol, physical activity, body mass index, and
diabetes.49 In addition, there is disconcertingly lit-
tle research about the determinants of hyperten-
sion risk in America’s indigenous populations
(Native Hawaiians and other Pacific Islanders and
American Indians and Alaskan Natives), despite a
higher prevalence of hypertension in these groups
compared with other ethnic groups.50 An
enhanced understanding of psychosocial risks
and resources associated with the historical and
contemporary conditions in which these groups
live, learn, work, play, and worship can facilitate
the identification of culturally sensitive intervention
strategies for hypertension.51

In addition, although other psychosocial factors,
such as sleep disturbances, were not covered in
depth in this article, their exclusion does not
diminish the value of their inclusion in future
research. For example, sleep quality and certain
personality factors (eg, neuroticism) may
contribute to hypertension risk.52 However, similar
to several other factors discussed, much of the evi-
dence comes from studies of white people, which
restricts understanding as to how they may
contribute to existing hypertension disparities.

Psychosocial Interventions

At present, lifestyle modifications remain the most
effective interventions to reduce hypertension risk.
Lifestyle modification, including increasing physical activity, reducing alcohol intake, and reducing sodium intake, through programs such as Dietary Approaches to Stop Hypertension (DASH), reduces hypertension risk. Although lifestyle modification is important, especially for black and Hispanic people, who have high rates of overweight/obesity and physical inactivity, making lifestyle changes is challenging for disadvantaged populations in the absence of comprehensive efforts to address the underlying social conditions that give rise to the risk behaviors in the first place. Socially disadvantaged groups face a multitude of stressors, coupled with limited resources, which can limit the effectiveness of interventions that are narrowly focused on the behavior without attention to the social conditions that initiate and sustain them.

Stress and depression management/interventions should be complementary additions to lifestyle modification. Evidence suggests that stress-reducing interventions, such as transcendental meditation, decreases diastolic and systolic blood pressures. To address race-related stressors, such as racial discrimination, Lewis and colleagues highlighted promising interventions that can reduce the effects of discrimination on health, such as religious involvement, values affirmation, forgiveness, and racism countermarketing.

Interventions addressing SES disparities at the neighborhood level are also important. Racial/ethnic and SES segregation in particular can increase the risk of morbidity and mortality through limited socioeconomic mobility, restrained access to health resources, exposure to toxins and environmental stressors (eg, violence), and weakened neighborhood social capital. Further research priority needs to be given to understanding the complex influence of poverty and racial segregation on health. Policies and interventions that improve neighborhood and housing quality, increase household income, and improve education can help to improve the health of socially disadvantaged populations. For example, randomized housing interventions (eg, Moving to Opportunity) showed that moving poor residents from high-poverty public housing apartments to lower-poverty neighborhood environments, with no health interventions, reduced obesity and diabetes risk 10 to 15 years later, an action that likely also influences blood pressure outcomes.

**SUMMARY**

Understanding hypertension disparities remains an important and complex issue in human health. There is a great need for further research to better understand and effectively address the role of psychosocial factors in the disproportionate burden of hypertension on racial/ethnic minorities. Taking a life-course perspective that captures the accumulation of risks over time may help address some of the questions about the effect of psychosocial factors on hypertension risk that still puzzle researchers. In addition, future research should address methodological limitations of the existing literature, including identifying and controlling for a broad set of core confounding factors, using appropriately accurate measures of blood pressure (eg, self-reported hypertension vs ambulatory blood pressure), and doing more longitudinal research. Addressing such issues could help disentangle existing complexities and generate new insights that can potentially greatly improve the effectiveness of interventions that seek to reduce hypertension disparities.

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