Psychoneuroendocrinology 63 (2016) 10–16

Contents lists available at ScienceDirect

Psychoneuroendocrinology

journal homepage: www.elsevier.com/locate/psyneuen

Discrimination, mental health, and leukocyte telomere length among African American men

David H. Chae[a,*], Elissa S. Epel[b], Amani M. Nuru-Jeter[c], Karen D. Lincoln[d], Robert Joseph Taylor[e], Jue Lin[f], Elizabeth H. Blackburn[f], Stephen B. Thomas[g]

[a] Department of Epidemiology and Biostatistics, University of Maryland at College Park, School of Public Health, 2234 School of Public Health, College Park, MD 20742, USA
[b] Department of Psychiatry, University of California, San Francisco, School of Medicine, 3333 California Street, San Francisco, CA 94143, USA
[c] Divisions of Epidemiology and Community Health and Human Development, University of California, Berkeley, School of Public Health, 50 University Hall, Berkeley, CA 94720, USA
[d] University of Southern California, School of Social Work, 669 West 34th Street, Los Angeles, CA 90089, USA
[e] University of Michigan, School of Social Work, 1080 South University, Ann Arbor, MI 48109, USA
[f] Department of Biochemistry and Biophysics, University of California, San Francisco, School of Medicine, 600 16th Street, San Francisco, CA 94158, USA
[g] Department of Health Services Administration, University of Maryland at College Park, School of Public Health, 2234 School of Public Health, College Park, MD 20742, USA

ARTICLE INFO

Article history:
Received 18 May 2015
Received in revised form 2 September 2015
Accepted 2 September 2015

Keywords:
African American men
Leukocyte telomere length
Racial discrimination
Depression
Anxiety

ABSTRACT

African American men in the US experience disparities across multiple health outcomes. A common mechanism underlying premature declines in health may be accelerated biological aging, as reflected by leukocyte telomere length (LTL). Racial discrimination, a qualitatively unique source of social stress reported by African American men, in tandem with poor mental health, may negatively impact LTL in this population. The current study examined cross-sectional associations between LTL, self-reported racial discrimination, and symptoms of depression and anxiety among 92 African American men 30–50 years of age. LTL was measured in kilobase pairs using quantitative polymerase chain reaction assay. Controlling for sociodemographic factors, greater anxiety symptoms were associated with shorter LTL ($b = -0.029$, standard error [SE] = 0.014; $p < 0.05$). There were no main effects of racial discrimination or depressive symptoms on LTL, but we found evidence for a significant interaction between the two ($b = 0.011$, SE = 0.005; $p < 0.05$). Racial discrimination was associated with shorter LTL among those with lower levels of depressive symptoms. Findings from this study highlight the role of social stressors and individual-level psychological factors for physiologic deterioration among African American men. Consistent with research on other populations, greater anxiety may reflect elevated stress associated with shorter LTL. Racial discrimination may represent an additional source of social stress among African American men that has detrimental consequences for cellular aging among those with lower levels of depression.

1. Introduction

Racial disparities in health are well-documented and represent a serious public health concern in the US (National Center for Health Statistics, 2007). African Americans have an overall life expectancy of 73.6 years compared to 78.4 years for Whites. At age 65, African Americans can expect to die 1.2 years sooner compared to their White counterparts. Among those between 45 and 64 years of age, death rates from cardiovascular diseases are approximately twice as high for African Americans than for Whites. African Americans have more than twice the prevalence of diabetes (19.9% vs. 9.2%), suffer higher rates of diabetes-related complications and mortality, and experience earlier onset compared to Whites (Peek et al., 2007). African Americans also experience aging-related disability, functional impairment, and cognitive declines at earlier ages (National Center for Health Statistics, 2007). These data indicate that African Americans are at greater risk for leading causes of death and disability, experience aging-related diseases earlier in life and accelerated disease progression, accompanied by greater severity and worse consequences of disease.

A common thread underlying racial disparities across multiple health outcomes may be accelerated aging at the biological

* Corresponding author. Fax: +1 301 405 3575.
E-mail address: hdchae@umd.edu (D.H. Chae).

http://dx.doi.org/10.1016/j.psyneuen.2015.09.001
0306-4530/

level (Calado and Young, 2009). There has been emerging interest in telomeres, repetitive sequences of DNA capping the ends of chromosomes that generally shorten with increasing chronological age. Telomere length may provide insight on aging at the cellular level, which has been associated with physiologic deterioration resulting from heightened inflammation and oxidative stress (Monaghan, 2010). Shorter telomere length has been associated with several diseases, including cardiovascular diseases such as atherosclerosis, metabolic syndrome, osteoporosis, osteoarthritis, cognitive declines and dementias including Alzheimer's disease, in addition to mortality. Leukocyte telomere length (LTL) in particular has been posited as an indicator of general systemic aging of the organism; specifically, short LTL may be a risk factor for a number of aging- and stress-related diseases (Andrews et al., 2010; Zhu et al., 2011).

Importantly, studies have found that LTL may exhibit accelerated shortening due not only to physiologic conditions but also psychosocial stress, and therefore may be a pathway generating racial disparities in health. One study reported that African Americans have shorter LTL compared to Whites (Fitzpatrick et al., 2011). Others have found that whereas African Americans may initially have longer LTL, their rates of LTL shortening may be faster compared to Whites. For example, a cross- sectional study found a significant interaction between race and chronological age in predicting LTL, with a steeper inverse association between chronological age and LTL for African Americans compared to Whites (Hunt et al., 2008). Similarly, longitudinal studies have found that African Americans had a faster rate of LTL shortening compared to Whites (Diez Roux et al., 2009; Rewak et al., 2014). Racial differences in telomere trajectories may result from environmentally-induced and stress-related factors impacting LTL.

Along these lines, qualitatively unique psychosocial stressors that are particularly salient among African Americans may lead to accelerated LTL shortening in this population. Among these are experiences of racially-motivated discrimination. African American men in particular are susceptible to racial discrimination and prejudice in multiple domains. As highlighted in recent media reports and documented in research studies, African American men are disproportionately impacted by legally sanctioned forms of criminal profiling, and also receive harsher punishments in judicial contexts compared to their White counterparts after controlling for criminal history (Gelman et al., 2007; Stolzenberg et al., 2013). Companies have been found to improperly use background checks to exclude racial minority job applicants, and experimental studies have shown that prospective employers are less responsive to applications with "African American" compared to "White" names (Bertrand and Mullainathan, 2003; Dovidio and Gaertner, 2000). In addition to these more acute experiences of racial discrimination, African American men report high levels of everyday forms of unfair treatment, including instances of being treated with less courtesy and respect, or being perceived as less intelligent or being feared (Williams et al., 1997).

As a source of psychosocial stress, racial discrimination may exact physiologic tolls (Clark et al., 1999). However, findings on racial discrimination and physical health outcomes have been equivocal. For example, one study reported an inverse association between reports of racial discrimination and coronary artery calcification (Everage et al., 2012); another found an inverse association with hypertension among African American men, albeit non- significant (Roberts et al., 2008). An earlier study reported a U-shaped association, with working-class African Americans reporting no racial discrimination having the highest blood pressure (Krieger and Sidney, 1996). Other studies have reported null associations. A systematic review found that while there are stronger associations with mental and behavioral outcomes, almost two-thirds of studies examining racial discrimination in relation to physical health outcomes found no significant association (Paradies, 2006).

To explain these counterintuitive findings, other studies have suggested that the relationship between racial discrimination and health outcomes may be more complex, evincing interactive rather than direct relationships. The health implications of racial discrimination may be contingent on individual-level appraisals and psychological responses to the event. When perceived to be a social evaluative threat, racial discrimination may result in anxiety, engaging biochemical mechanisms associated with greater physiologic reactivity (Bosch et al., 2009; Dickerson et al., 2009). Indeed, studies have found evidence for associations with inflammation and other biomarkers of health (Friedman et al., 2009; Lewis et al., 2010; Szanton et al., 2012). Racial discrimination may also result in poorer self-concept and negative affective responses (Williams and Williams-Morris, 2000). These psychological factors have been shown to have biological consequences resulting in greater disease risk (Hansel et al., 2010; Steptoe et al., 2013). Accordingly, the association between self-reported racial discrimination and LTL may vary according to whether individuals exhibit negative mental health symptoms. For example, one study found that African Americans with a history of mood disorder and who reported high levels of racial discrimination were at greatest risk for cardiovascular disease (Chae et al., 2012). Studies have also found that higher levels of anxiety are associated with shorter LTL (Hoen et al., 2013; Shalev et al., 2014). Findings on depression and LTL have been mixed, however, with some studies finding that they are inversely related, and others finding no association (Hartmann et al., 2010; Hoen et al., 2011; Needham et al., 2015; Verhoeven et al., 2014).

The purpose of the current investigation was to examine whether symptoms of depression and anxiety are associated with LTL, and if these psychological factors moderate the association between racial discrimination and LTL in a sample of African American men. We hypothesized that poorer mental health as indexed by symptoms of depression and anxiety would be associated with shorter LTL; and that racial discrimination would be associated with shorter LTL among participants reporting higher levels of depression and anxiety.

2. Method

2.1. Sample and procedures

Data for this study were from the Bay Area Heart Health Study, a cross-sectional study of African American men predominantly in midlife residing in the San Francisco Bay area. A total of 95 participants were recruited between February 2010 and May 2010 from community outlets, through individual outreach, self-referral from posted advertisements, and referral from other participants. Venues included barbershops, churches, community events, and coffee shops. Eligibility criteria were: self-identification as an African American man; age between 30 and 50 years; US and parental US nativity; ability to read, write, and understand English; and absence of serious or unstable disease (e.g., cancer, HIV, hepatitis, tuberculosis).

All assessments were conducted by a trained research assistant in a private room located at a nonclinical setting (e.g., church or university room). Basic demographic questions were asked through a brief face-to-face interview, followed by a minimally invasive physical examination, which included the collection of dried blood spots (DBS). Four blood drops from finger prick, each approximately 50 μL, were placed on filter paper, allowed to dry, and stored at −80 °C. Computer-assisted self-interview was used to administer more sensitive questions, including measures of socioeconomic position, mental health, and experiences of racial discrimination.