Review Article

Discrimination and sleep: a systematic review

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ABSTRACT

An increasing body of literature indicates that discrimination has a negative impact on health; poor sleep may be an underlying mechanism. The primary objective of this review was to examine existing studies on the relationship between discrimination and sleep to clarify (a) the potential role of discrimination in shaping population patterns of sleep and sleep disparities, and (b) the research needed to develop interventions at individual and institutional levels. We identified articles from English-language publications in PubMed and EBSCO databases from inception through July 2014. We employed a broad definition of discrimination to include any form of unfair treatment and all self-reported and objectively assessed sleep outcomes, including duration, difficulties, and sleep architecture. Seventeen studies were identified: four prospective, 12 cross-sectional, and one that utilized a daily-diary design. Fifteen of the 17 studies evaluated interpersonal discrimination as the exposure and the majority of studies included self-reported sleep as the outcome. Only four studies incorporated objective sleep assessments. All 17 studies identified at least one association between discrimination and a measure of poorer sleep, although studies with more detailed consideration of either discrimination or sleep architecture revealed some inconsistencies. Taken together, existing studies demonstrate consistent evidence that discrimination is associated with poorer sleep outcomes. This evidence base can be strengthened with additional prospective studies that incorporate objectively measured aspects of sleep. We outline important extensions for this field of inquiry that can inform the development of interventions to improve sleep outcomes, and consequently promote well-being and reduce health inequities across the life course.

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An estimated 50–70 million adults in the United States have disordered or insufficient sleep [1]. Sleep disorders and sleep deprivation have been found to increase the risk of a variety of adverse health outcomes including mood disorders [2], substance abuse disorders [3], central adiposity and obesity [4–6], immune function [7,8], diabetes [9,10], hypertension [11], heart disease [12,13], and mortality [14–17]. Sleep problems are also associated with increased functional impairment, including employee absenteeism, lower work productivity, and medical errors [18]. The Institute of Medicine reports that hundreds of billions of dollars each year are spent on direct and indirect costs associated with sleep loss and sleep disorders [1,18–20], and sleep health is a key goal of the U.S. Department of Health and Human Services' Healthy People 2020 [21].

Nationally representative and community-based studies in the US show that sleep characteristics vary by race and ethnicity [22–27],

immigration history [28], and socioeconomic status (SES) [23,25], with disadvantaged groups typically showing poorer sleep-related outcomes. For example, using objective assessments, the Coronary Artery Risk Development in Young Adults (CARDIA) study found that Black respondents had shorter sleep duration, poorer sleep efficiency, and greater sleep latency compared to White respondents [22]. In order to address the national burden of sleep loss and disorders, and racial/ethnic and socioeconomic inequalities in sleep health, it is critical to identify potentially modifiable risk factors for sleep problems among disadvantaged groups.

Discrimination – defined as differential or unfair treatment based on actual or perceived membership in a group [29] – can occur based on race/ethnicity, national origin, religion, gender, sexual orientation, SES, or other social factors, and it is increasingly recognized as a determinant of health across the life course [30–35]. Discrimination can occur at multiple levels, including institutional discrimination, which refers to unfair institutional policies or practices, as well as interpersonal discrimination, which typically refers to perceived discriminatory interactions within social encounters [35–37]. Building on initial discrimination and health research, there is now great interest in identifying the underlying mechanisms through which discrimination affects health. Insufficient or

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poor-quality sleep may be one pathway that connects perceived discrimination to physical and mental health problems [38,39], and a growing literature has documented sleep as a mediator of the relationship between stressors and health [40–43]. Experiences of discrimination could impact sleep directly through a variety of mechanisms, such as activating feelings of threat, arousal, vigilance [44], psychological distress (eg, depression, anxiety, cynical hostility, or anger) [45–47], or physiological changes (eg, hypothalamic pituitary adrenal axis dysfunction or sympathetic nervous system hyperactivation) [48] that impede high-quality sleep.

The primary aim of this study is to review existing studies of the relationship between discrimination and sleep, and to evaluate whether this association is maintained after adjusting for important confounders, as systematic consideration of this literature can elucidate the role of discrimination in shaping population-level patterns of sleep and sleep disparities. The secondary aim is to discuss important directions for research that can inform interventions.

1. Methods

We conducted a systematic review of all English-language articles published in PubMed, Web of Science, and EBSCO databases (PsychInfo, ERIC, CINAHL) from 1971 through July 2014. Our search strategy was informed by prior literature reviews on discrimination and health [30,32,49]. Medical Subject Headings (MeSH) of the National Library of Medicine and keywords were used to search PubMed, and a similar search was designed for the EBSCO databases (see Appendix for sample search strategy). We also searched reference lists of selected articles and relevant review articles for applicable studies. Studies identified in the database searches were assessed for relevance based on title and abstract, and selected studies were obtained in full and assessed for inclusion criteria. Studies were included if they analyzed perceived discrimination, unfair treatment, prejudice, or organization injustice in relation to one or more characteristics of sleep such as insomnia, poor sleep quality, or sleep duration. For each selected article, we extracted data related to the following: study design, sample size, sample age, geographic location, measurement of discrimination, measurement of sleep, covariates, and results.

2. Results

2.1. Description of included studies

Our database search identified 453 records; after excluding duplications ($n = 96$), 17 articles were selected for further evaluation, and two additional studies were identified from reference sections. A total of 17 articles met inclusion criteria for this review (see Fig. 1 for flow diagram). The characteristics of the selected studies are presented in Table 1. The earliest study on discrimination and sleep was published in 2003 [50]. Twelve of the 17 studies were cross-sectional, three were observational prospective studies [50,56,62], one included a 9-day daily-diary component [46], and one included a natural experiment with an intervention [51]. The sample sizes ranged from 93 [54] to 10,039 [63], with a median of 1523 participants. Eleven of the 16 studies took place in the United States; the others were conducted in Finland [50], Brazil [55], Korea [58,63], Sweden [53], and the UK [56]. Only two of the 17 studies used samples comprising children or adolescents [55,61]. Across studies, three measured discrimination using a single item [39,55,59], while the majority used multiple-item scores. The majority of studies evaluated interpersonal discrimination, while one study assessed the impact of unfair treatment at the institutional level (a pay cut to all nurses) on sleep problems [51], and another study evaluated race-related vigilance (ie, the extent to which participants anticipated and prepared for racial discrimination) [64]. Some
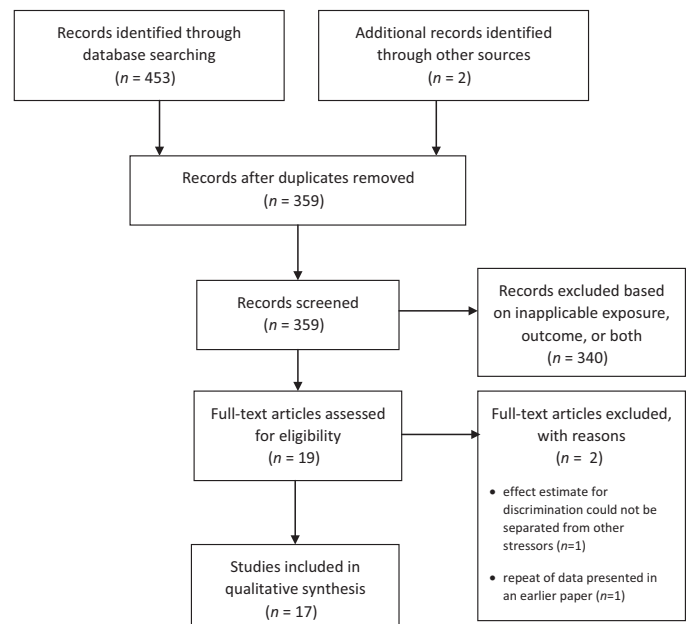

Fig. 1. Flow diagram.

studies specifically evaluated racial/ethnic discrimination [52,54,59–61,64,65], and others focused on unfair treatment in the workplace [50,51,56,58,63,65] or in health care [59].

Sixteen of the 17 studies evaluated self-reported sleep difficulties and/or daytime fatigue, and 12 of these studies exclusively relied on self-reported sleep outcomes. There was large variation in the self-report measures of sleep difficulties, ranging from single-item measures of sleep problems or daytime fatigue [39,53,55,59,63], self-reported sleep duration [61,65], to extensively validated scales such as the Pittsburgh Sleep Quality Index [46,52,62], the Epworth Sleepiness Scale [46], and the Multidimensional Fatigue Symptom Inventory-Short Form [54]. One study used actigraphy to measure sleep duration and efficiency [46], and four studies evaluated polysomnography (PSG)-assessed sleep outcomes [46,54,60,62], including duration, efficiency, sleep latency, wake after sleep onset (WASO), rapid eye movement (REM) sleep, light sleep, and Stages 3 and 4 sleep. All studies controlled for basic demographic characteristics, including age, sex, and race (if appropriate based on the sample), and nearly all studies adjusted for SES. Roughly half of the studies adjusted for mental or physical health or health behavior covariates (eg, body mass index or BMI, depression, cigarette smoking, alcohol use, physical activity) [46,50,54,56,58,60,62,63], and five studies adjusted for other psychosocial stressors in addition to discrimination [55,56,61,62,65].

2.2. Associations between discrimination and sleep outcomes

2.2.1. Self-reported sleep difficulties

All 16 studies that included a measure of self-reported sleep problems reported positive associations between discrimination and outcomes including sleep difficulties or insomnia [39,50–53,55–59,61–65] and fatigue [54,57,59]. The strongest evidence comes from the three prospective cohort studies [50,56,62] and the natural experiment [51]. For example, a study of 368 African American, White, and Chinese women from the Study of Women's Health Across the Nation (SWAN) Sleep Study found that chronic everyday discrimination (collected annually for four years and averaged) was associated with more sleep complaints, independent of financial strain and a variety of health characteristics, including depressive symptoms [62]. Similarly, among 5209 males and females