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Physical neighborhood and social environment, beliefs about sleep, sleep hygiene behaviors, and sleep quality among African Americans^{☆,☆☆,★}

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ABSTRACT

Objectives: African Americans (AAs) have a higher prevalence of sleep disorders than other racial/ethnic groups. However, little is known about the relationships among individual and neighborhood factors related to sleep quality in AAs. The purposes of this study were to (1) describe beliefs about sleep, sleep hygiene behaviors, and sleep quality among AAs; and (2) examine the relationships among sociodemographic characteristics, neighborhood environment, beliefs about sleep, sleep hygiene behaviors, and sleep quality. **Methods:** We conducted a cross-sectional study of 252 AA men and women in the Greater New Haven, CT, USA community. We assessed their sociodemographic characteristics, neighborhood environment, beliefs about sleep, sleep hygiene, and sleep quality with the following measures, respectively: the Neighborhood Environment Scale, the brief version of Dysfunctional Beliefs and Attitudes about Sleep, the Sleep Hygiene Practice Scale, the Pittsburgh Sleep Quality Index. We performed descriptive statistics, correlations and multiple hierarchical regression.

Results: About 72% of the participants (mean age: 53.88 ± 14.17 years, 77.8% women) reported experiencing sleep disturbance. People with poor sleep quality were more likely to report poorer neighborhood social environment (social cohesion), poorer overall neighborhood environment, more dysfunctional beliefs toward sleep, and poorer sleep hygiene than those who had good sleep quality. In the final multivariate model that controlled for a number of chronic comorbid conditions, neighborhood environment, beliefs about sleep, and sleep hygiene behaviors were significantly associated with sleep quality.

Conclusions: Future efforts are needed to improve sleep among AAs by considering both the individual's belief about sleep, sleep hygiene behaviors and neighborhood factors.

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Introduction

Poor sleep is linked to numerous physical and mental health outcomes including mood, cardiovascular and metabolic disorders.^{1,2}

Abbreviations: AAs, African Americans; AME, African Methodist Episcopal; BMI, body mass index; CBT, cognitive behavioral therapy; CI, confidence interval; DBAS, Dysfunctional Beliefs and Attitudes about Sleep; PSQI, Pittsburgh Sleep Quality Index; SD, standard deviation; SHPS, Sleep Hygiene Practice Scale; VIF, variance inflation factors.

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African Americans have a disproportionately higher prevalence of sleep disorders than other racial/ethnic groups.² Poor sleep and sleep disparities may contribute to other health disparities in heart disease, obesity, and diabetes in African Americans.^{1,2} Although the individual and social factors related to habitual sleep patterns have been increasingly studied in the general population, limited attention has been paid to habitual sleep patterns and the relationship between sleep-related cognition (beliefs about sleep), sleep behaviors (sleep hygiene practices), physical neighborhood and social environment and sleep quality among the high-risk group, African Americans.

Individuals' beliefs about their conditions or illnesses influence their health behaviors; for example, individuals with positive attitudes and beliefs toward diabetes have better diabetes self-management and adherence to diabetes treatment.³ Similarly, rigidly

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held beliefs or unrealistic expectations about sleep are associated with clinically significant sleep disorders such as insomnia among both community participants and hospital patients.^{4,5} Racial and ethnic groups tend to endorse different beliefs and attitudes about sleep⁶; for example, in one study African American women were more likely to report misperceptions about sleep and beliefs that suggested less understanding of the importance of good sleep for health than their White counterparts.⁷ However, in a meta-analysis, the relationship between race and sleep was confounded with levels of education with much lower educational levels among the African American.^{8,9}

Individuals' sleep-related beliefs and attitudes may contribute to their sleep behaviors. Sleep hygiene is defined as practicing behaviors that facilitate sleep and avoiding behaviors that interfere with sleep.¹⁰ Unhealthy sleep hygiene behaviors are associated with poor habitual sleep pattern and sleep quality.^{11,12} Although limited data are available on African Americans' sleep hygiene behaviors, one study showed that African American women are more likely to nap during the day to combat daytime sleepiness and are more likely to engage in activities other than sleep while in bed, including reading or watching TV, than white/European American women.⁷

Growing research also indicates that sleep is influenced not only by individual factors but also by one's physical neighborhood and social environment. A neighborhood with excessive ambient noise, light, and a high crime rate can negatively influence sleep.^{13,14} Characteristics of the neighborhood social environment, such as social cohesion and social support, could also affect sleep. In studies of the neighborhood social environment and sleep, lack of social cohesion was associated with short sleep duration, daytime sleepiness, and feeling unrested.^{15,16} Disadvantaged physical neighborhoods and social environments are associated with short sleep duration, poor sleep quality, and sleep disorders.^{17,18} In studies of multi-racial ethnic groups, the neighborhood disadvantage had a stronger influence on sleep among African Americans than among other racial/ethnic groups,¹³ even after controlling for individual income levels. However, most studies examining the relationships between sleep and neighborhood often omit other individual factors such as sleep cognitions (beliefs about sleep health) and sleep behaviors (sleep hygiene practices) that likely interact with each other. There is notably a lack of research describing individual sleep-related factors and neighborhood factors that influence sleep among African Americans, a population at high risk for sleep disorders and chronic conditions affected by poor sleep health.¹

Therefore, the purposes of this study were: (1) to describe beliefs about sleep, sleep hygiene behaviors and sleep quality among African Americans; and (2) to examine the relationships among individual factors (sociodemographic, beliefs about sleep, sleep hygiene behaviors), neighborhood environment and sleep quality.

Methods

Design, participants, and procedures

This current study is a sub-study of a cross-sectional study of African American men and women designed to understand obesity, obesity-risk behaviors (sleep, diet and physical activity) and the relationships of these factors with social networks.

Participants were recruited from the Greater New Haven area in Connecticut through flyers posted at African Methodist Episcopal (AME) churches and the Yale Center for Clinical Investigation (Yale's CTSA) website. Since the primary purpose of the parent study was to conduct sociometric social network analysis, we enrolled participants from three AME churches in the Greater New Haven area to examine church-based social networks. Eligibility criteria for participants included the following: (1) men or women over 21 years of age,

(2) self-reported Black or African American, and (3) able to speak and read in English. We excluded individuals who reported disabilities or acute/terminal conditions that affect daily physical activity (e.g., terminal cancer, dialysis), active psychiatric illnesses such as thought disorders, or self-reported illegal drug use in the past 6 months. After signing written informed consent forms, all participants completed the surveys and anthropometric measurements for the primary study and received a \$30 gift card. All study protocols were reviewed by the Yale University Institutional Review Board prior to study implementation.

Variables and measures

Sociodemographic Characteristics and Chronic Comorbid Conditions

Sociodemographic data were collected by self-report on: age, gender, race/ethnicity, marital status, educational level, employment status, and annual household income. Chronic comorbid conditions were asked by using the following questions: "Have you ever had any of the following heart conditions (heart failure, heart attack, angina, stroke)?" "Have your health care professionals told you that you have kidney failure?" "Do you have diabetes?" "Do you have high blood pressure (hypertension)?" "Do you have arthritis?" "Do you have the following lung problems (asthma, chronic obstructive pulmonary disease)?" "Do you have depression?"

Anthropometric characteristics

Body weight and height were measured three times using a portable electronic scale and stadiometer. Body mass index (BMI) was calculated as weight (kg)/height squared (m²). Percent body fat was estimated using the same digital scale that measures foot-to-foot bioelectric impedance. Waist circumference was taken at the narrowest part of the torso, at the end of a normal expiration. Hip circumference was taken around the buttocks in a horizontal plane at the level of maximal extension of the buttocks. The average of three measurements was calculated. Inter- and intra-observer reliability were checked.¹⁹

Neighborhood environment

Perceptions about the neighborhood environment were measured by the Neighborhood Environment Scale,²⁰ with six neighborhood dimensions: aesthetic quality (5 items), walking environment (7 items), availability of healthy foods (3 items), safety (3 items), violence (4 items), and social cohesion (4 items). For most subscales, responses for each item ranged from 1 (strongly agree) to 5 (strongly disagree). Responses for the scales on violence ranged from 1 (often) to 4 (never). Subscale scores were estimated by taking the average across all items within each dimension; a higher score indicated a worse neighborhood environment. The Neighborhood Environment Scale has good internal reliability with the Cronbach's alpha range of .73 to .83.²⁰ The Cronbach's alpha for the scale in our study was .93.

Sleep hygiene

The Sleep Hygiene Practice Scale (SHPS) was used to assess sleep hygiene awareness and practices.¹¹ The SHPS has 19 items which include sleep-related behaviors (napping, caffeine/alcohol intake), night time activities (exercise, phone conversation), and bedroom environment (noise, light, temperature and bed partner). Respondents report on the average number of days per week in which they engaged in these activities during the previous month. Frequency scores (number of days per week) were calculated for each item, and higher frequency scores indicated worse sleep hygiene practices. The total hygiene practice scores ranged from 0

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