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A community-oriented framework to increase screening and treatment of obstructive sleep apnea among blacks



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ABSTRACT

Objective: Obstructive sleep apnea (OSA) is a leading sleep disorder that is disproportionately more prevalent in minority populations and is a major risk factor for cardiovascular disease (CVD) morbidity and mortality. OSA is associated with many chronic conditions including hypertension, diabetes, and obesity, all of which are disproportionately more prevalent among blacks (ie, peoples of African American, Caribbean, or African descent).

Methods: This article reviews studies conducted in the United States (US) that investigated sleep screenings and adherence to treatment for OSA among blacks. In addition, guidelines are provided for implementing a practical framework to increase OSA screening and management among blacks.

Results: Several studies have documented racial/ethnic disparities in adherence to treatment for OSA. However, despite its public health significance, there is a paucity of studies addressing these disparities. Further, there is a lack of health programs and policies to increase screening and treatment of OSA among blacks and other minority populations. A practical framework to increase the number of blacks who are screened for OSA and treated appropriately is warranted. Such a framework is timely and major importance, as early identification of OSA in this high-risk population could potentially lead to early treatment and prevention of CVD, thereby reducing racial and ethnic disparities in sleep-related CVD morbidity and mortality.

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1. Introduction

Published reports indicate far worse health outcomes for blacks (ie, peoples of African American, Caribbean, or African descent) than any other racial/ethnic groups in the US [1–3]. Blacks experience disproportionately higher mortality rates in all leading causes of death; 40% of blacks die prematurely from cardiovascular disease (CVD) compared with 21% of whites [4]. The coronary heart disease mortality rate among blacks is estimated to be 73% higher relative to age-matched whites [5,6]. Plausibly, mortality rates are higher among blacks because their diseases are detected at a more advanced stage and are often complicated by coexisting conditions [5].

Obstructive sleep apnea (OSA) is an important public health challenge that is responsible for cardiovascular mortality and all-cause mortality [7,8]. Evidence suggests it is an undertreated chronic condition among blacks [9–14]. OSA is a strong CVD risk factor, es-

pecially when associated with hypertension [14], the most important contributor to the ethnic mortality gap between blacks and whites [15]. OSA is also associated with obesity and diabetes [16–19], two highly prevalent diseases among blacks. Untreated OSA leads to cardiovascular morbidity [10–14], automobile accidents [12,20,21], cognitive deficits [22,23], excessive daytime sleepiness [24], excess mortality [11,25,26], and psychosocial sequelae [27,28]. Fortunately, OSA treatment with positive airway pressure (PAP) may reduce risk for CVD, as one prospective study has shown that PAP treatment reduces CVD risk by 64% among patients with mild-to-moderate OSA [29]. A recent study found that continuous positive airway pressure (CPAP) was more effective in reducing CVD markers than the control group and sleep education with supplemental oxygen among patients 45–74 years of age. The primary outcome measure was a 24-h mean arterial blood pressure [30]. OSA is amenable to improvement through tailored behavioral interventions that combine education, social support, and PAP therapy, which may be particularly vital in managing OSA among blacks.

Effective behavioral interventions are needed to increase the number of blacks receiving adequate OSA screening and treatment. However, at the community level, researchers and practitioners lack practical guides for the implementation of such studies. This

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paper offers a review of the literature to identify studies conducted in the U.S. that investigated sleep screenings and adherence to treatment for OSA among blacks. We also provide a practical community-oriented framework to increase the number of blacks who are screened for OSA and treated appropriately. A framework such as this is timely and of major importance, as early identification of OSA in this high-risk population could potentially lead to early treatment and prevention of CVD, thereby reducing racial and ethnic disparities in sleep-related CVD morbidity and mortality.

2. Review of the literature

2.1. Racial/ethnic disparities in sleep apnea

Observational studies suggest that OSA is disproportionately more prevalent among blacks compared with other racial and ethnic groups. A case-control family study comparing 225 blacks and 622 whites showed 31% of blacks had OSA relative to 10% of whites [9]. Blacks usually present with OSA at a younger age, and OSA is more severe in older blacks [9,31]. A home sleep study performed among community-dwelling adults [32] showed that blacks were 2.5 times more likely to have an apnea-hypopnea index of 30 or higher compared with whites [31]. A cohort study of 5301 participants showed that blacks had a significant burden of OSA risk based on a modified version of the Berlin Sleep Questionnaire [33]. However, the authors noted that objective measures are needed to determine whether the findings support a genuine OSA diagnosis. Some have argued for an investigation for candidate genes that influence sleep apnea [34]. Of note, one study found two separate single-nucleotide polymorphisms (SNPs) that could influence the development of OSA among blacks compared with whites [35].

2.2. Racial/ethnic disparities in sleep apnea screening

We searched PubMed database from 2000 to 2014 to identify studies to enhance our understanding of OSA screening and adherence to continuous positive airway pressure (CPAP). Although OSA is a threat to public health that disproportionately affects blacks [9], no systematic study has documented adherence to recommended OSA screening and treatment at the community level, where most blacks could be reached to address health-related issues. Only 38% of patients were found adhering to the physician's recommendations for a sleep evaluation [36] based on the evidence from a retrospective chart review. Of the patients who underwent a polysomnography, 91% received a positive diagnosis of OSA [36]. These findings are important, given the evidence suggesting that blacks are less likely to adhere to OSA treatment [37–39].

Traditionally, screening for OSA has necessitated a nocturnal polysomnographic study, measuring sleep architecture, airflow and ventilatory effort, peripheral oxygen saturation, electrocardiogram, body position, and periodic limb movement [40]. Although no single factor has been identified to contribute to poor OSA screening rates among blacks, a broad array of issues encompassing access to health care, health-care delivery, and individual behavior and attitudes toward treatment and care are plausible explanatory factors [3,41]. However, we should note that generally detection and treatment of OSA have been problematic, albeit more challenging in minority populations [41]. National estimates indicate that only 25% of people with symptoms of OSA sought a medical examination from 2005 to 2008 [42]. In addition, some have estimated that patients may have to wait up to 10 weeks to undergo polysomnographic screening. [41]. It is believed that the number of accredited sleep centers is far below what is needed, and few of those sleep centers are located in sleep disparity communities. Apparently, with the increasing availability of in-home sleep testing devices, as well as the

Table 1

Required elements of focus groups for cultural and linguistic tailoring of sleep health information to blacks.

| Elements of Focus Groups | |
|--------------------------|---|
| Format | Group session |
| Size | 8–12 per session |
| Length | 1.5–2 h |
| # of sessions | 3–4 |
| Participants | Similar characteristics |
| Forms of data | Conversation |
| Data collection | Transcription |
| Moderator | Uses semi-structured interview guide |
| Analysis | Identify trends and patterns in sleep perceptions, attitudes, and beliefs |

demand to use in-home sleep testing to reduce health-care costs [43], access to the diagnosis of OSA is more readily available, but may not have an adequate penetration effect on minority communities. Moreover, although these tools are useful, some patients with OSA still require in-laboratory titration study [44]. To our knowledge, there is only one study that investigated the feasibility of in-home sleep testing in 75 urban blacks. The authors concluded that in-home sleep testing is feasible [45], but this feasibility study did not assess adherence to treatment or comorbidities, limiting definitive conclusions. As such, it remains unclear whether in-home sleep testing addresses disparities in accessing adequate sleep care. Similarly, with the expansion of Medicaid through the Patient Protection and Affordable Care Act, it is plausible that more blacks will benefit and could have increased access to vital diagnostic testing, including sleep screenings. However, access to health insurance alone is not sufficient to encourage the uptake of OSA screening [46].

A few widely used and validated screening questionnaires are available to assess OSA risk including the Berlin [47] and the STOP-Bang [48]. Another validated measure is the Apnea Risk Evaluation System (ARES™) questionnaire [49], which includes questions on sleep patterns, daytime functioning, and the Epworth sleepiness scale. The ARES™ questionnaire can be self-administered [49], and has been used by our research group in nonclinical settings. Conceivably, all of these screening questionnaires can be easily scored and transformed to an electronic data capture system for research studies. In doing so, providers must consider other factors including feasibility and efficiency of administering these questionnaires.

Given the paucity of data on OSA screening and current attitudes toward sleep apnea, in our previous work [50], we conducted five focus groups (see Table 1 for focus group guidelines) in order to delineate further some of the barriers preventing or delaying adequate sleep care among blacks. Focus groups are recommended when there is little known about a particular phenomenon of interest [51]. We found that a major barrier to sleep apnea screening is related to the environment itself, as is routinely required in current clinical practice (ie, sleeping in a hospital overnight) [50]. Other barriers included a lack of information on OSA and mistrust of the health-care system [50,52]. Large-scale studies are essential to corroborate these findings and test the effectiveness of innovative interventions to address such concerns.

2.3. Racial/ethnic disparities in adherence to PAP treatment

In our review relating to adherence to treatment, we found 91 articles, 86 were excluded because they did not report data on the race/ethnicity of the study patients, and one study was excluded because its target population was Chinese patients. Of the 91 articles reviewed, 86 were excluded as they did not report data on the race/ethnicity of the study patients, and one study was excluded as its focus group was Chinese patients. The study findings

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