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Profiles of Sleep and Depression Risk among Caribbean Blacks

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Abstract

Sleep problems are associated with a host of psychiatric disorders and have been attributed to race disparities in health and wellness. Studies of sleep and mental health do not typically consider within-group differences among Blacks. Thus, our understanding of how the sleep-mental health relationship among Caribbean Blacks is limited. This study identified sleep profiles among Caribbean-born Blacks who reside in the United States. Latent class analysis and data from the National Survey of American Life Re-interview study were used to identify and compare the associations between “sleep quality classes,” sociodemographic factors, stress, and depression risk among Caribbean Blacks. Two sleep quality classes were identified – “good sleep quality” and “poor sleep quality” – with each class demonstrating a complex pattern of sleep experiences, and illuminating the association between sleep and depression risk. Findings provide insight into the influence of sociodemographic factors and social stressors on the sleep experience of Caribbean Blacks and the importance of considering within-group differences to better understand risk and resilience among Caribbean Blacks living in the United States. Findings also highlight the importance of screening for sleep problems in an effort to reduce the burden of depression experienced by this population.

Keywords

sleep quality; mental health; Caribbean Blacks; latent class analysis

Introduction

Sleep is a fundamental biological process that plays a critical role in the maintenance of mental and physical health. Sleep serves a restorative function for the brain and body, and is a source of physiological and psychological resilience. Insufficient or low quality sleep has been consistently associated with adverse health outcomes, including increased disease risk such as cancer (Verkasalo et al., 2005), diabetes (Knutson, 2010), and heart disease (Cappuccio, Cooper, D'Elia, Strazzullo, & Miller, 2011). Poor sleep is also linked to lower life expectancy and higher mortality (Gallicchio & Kalesan, 2009). With respect to mental health and psychosocial functioning, insufficient and poor sleep quality have been heavily associated with negative mood states (Minkel et al., 2012), cognitive decline (Spira, Chen-Edinboro, Wu, & Yaffe, 2014), decreased ability to regulate thoughts and behaviors (Shochat, Cohen-Zion, & Tzischinsky, 2014), and a host of psychiatric disorders including anxiety disorder and major depressive disorder (Paunio et al., 2015; Shanahan, Copeland, Angold, & Costello, 2014). All told, sleep problems are a significant impediment to health and well-being and have even been attributed to race disparities in health (e.g., Kingsbury, Buxton, Emmons, & Redline, 2013).

Several cohort and epidemiological studies conducted in the United States suggest that there are racial and ethnic differences in sleep quality and duration, with Blacks reporting worse sleep quality compared to Whites (Fuller-Rowell et al., 2016; Grandner, Williams, Knutson, Roberts, & Jean-Louis, 2016; Rutter, DeCoster, Jacobs, & Lichstein, 2011; Thorpe, Gamaldo, Salas, Gamaldo, & Whitfield, 2016; Whinnery, Jackson, Rattanaumpawan, & Grandner, 2014). However, studies of race disparities in sleep do not typically consider within-group differences among Blacks. Thus, our understanding of sleep behaviors and experiences among Caribbean Blacks, and more specifically, those born in the Caribbean and living in the United States, is very limited. Given that sleep behaviors and experiences are not random occurrences but are shaped by cultural and societal norms, it is important to consider the cultural context within which sleep disturbance, sleep quality, and other sleep-related behaviors occur. However, the lack of studies that include Caribbean Blacks among the study participants significantly limits our understanding of their risk for poor sleep, and consequently, the risk for psychiatric disorders and other health problems.

Importance of Studying Caribbean Blacks

The number of foreign-born Blacks living in the United States grew exponentially between 1960 and 2005, from 125,000 to 2,815,000 (Kent, 2007). While this population continues to grow and diversify, most Black immigrants currently living in the United States are from Caribbean countries (Kent, 2007; Logan, 2007). Despite more than a century of immigration from the Caribbean (Reid, 1939) to the United States and recent rapid population growth, we know little about Caribbean Blacks. Instead, more often than not, this socially and culturally unique population is either aggregated within the overall Black population or only studied

relative to African Americans (Vickerman, 2001). These trends in population growth and research design leave us woefully unaware of the life circumstances of a unique and growing population in the United States.

Racial Disparities in Sleep

Black adults are more likely than Whites to experience short sleep duration and poor quality sleep (Grandner et al., 2016; Ruitter et al., 2011). Compared to Whites, Blacks are more likely to sleep fewer hours (Krueger & Friedman, 2009). One study estimated that Blacks sleep roughly 35–60 minutes less per night than do Whites (Lauderdale et al., 2006). Blacks also have more sleep disturbance (Pigeon et al., 2011) and are more likely than Whites to have sleep apnea (i.e., disrupted breathing during sleep) and insomnia (i.e., difficulty falling or staying asleep; Kingsbury et al., 2013).

A small group of studies have examined sleep problems among Caribbean Blacks specifically. For example, one study that compared the sleep of non-Hispanic African and Caribbean immigrants to non-Hispanic white employees found that the African and Caribbean immigrants slept an hour less on average (Ertel, Berkman, & Buxton, 2011). Findings from other studies that examined intra-ethnic heterogeneity in sleep complaints (Jean-Louis et al., 2008) indicated that estimates of sleep complaints among African Americans and Caribbean Americans were 71% and 47%, respectively. Data from a second wave of this study indicated that English-speaking Caribbean women were more likely than other racial and ethnic groups (including African Americans) to report various types of insomnia, including difficulty initiating sleep, difficulty maintaining sleep, and early morning awakening (Adenekan et al., 2013). Finally, Cunningham and colleagues examined the modifying role of nativity status on racial and ethnic disparities in short sleep duration in a nationally representative sample of adults (Cunningham, Wheaton, Ford, & Croft, 2016). In addition to finding that short sleep duration was more prevalent among US-born Blacks than among US-born Whites, they also found that foreign-born Blacks had a higher likelihood of short sleep duration than foreign-born Whites.

Findings from these studies that considered within-group variation imply that reports of more sleep problems among African Americans may be confounded by the presence of foreign-born Blacks (i.e., Caribbean, African and others). More specifically, these studies that examine differences in sleep duration and quality between African Americans and Caribbean Blacks indicate that, overall, Caribbean Blacks report better sleep quality compared to African Americans. However, when both ethnicity and gender are considered, Caribbean Black women have poorer sleep quality than Caribbean Black men as well as other racial/ethnic and gender groups (Adenekan et al., 2013). Thus, extant findings of sleep quality among Blacks in the United States are inconclusive because intra-ethnic differences within the Black population are not regularly considered. More specifically, reported estimates of sleep complaints among African Americans might be overestimated or underestimated depending on the particular sleep profile of Caribbean Blacks and other Black ethnic groups that are often aggregated in non-Hispanic Black samples. Findings from intra-ethnic studies suggest that rigorous statistical analyses or interpretation of epidemiologic sleep data should consider the ethnic origin of study participants to understand the causes and consequences of

poor sleep for Caribbean Blacks, in particular (Cunningham et al., 2016; Ertel et al., 2011; Jean-Louis et al., 2008).

Sleep Quality and Mental Health

Short sleep duration and poor sleep quality are associated with an increased risk of developing psychiatric disorders, including major depressive disorder (Paunio et al., 2015), generalized anxiety disorder (Shanahan et al., 2014), post-traumatic stress disorder (Fan, Zhou, & Liu, 2017), and schizophrenia (Lunsford-Avery & A. Mittal, 2013). While most of the evidence indicates that poor sleep quality is a symptom of psychiatric disorders, there is also evidence that sleep disturbances can trigger mental disorders. Studies show that sleep deprivation causes some psychiatric disturbances by “rewiring” the brain’s emotional circuitry, resulting in psychological disturbances (Yoo, Gujar, Hu, Jolesz, & Walker, 2007).

The relationship between depression and sleep problems is complex. Major depressive disorders list sleep problems among their core symptoms (American Psychiatric Association, 2013). However, studies have shown that sleep problems co-occur with, precede, and even predict depressive disorder. For example, a recent meta-analysis comprising 21 individual studies showed that initially non-depressed people with insomnia had a twofold risk to develop depression compared to people with no sleep difficulties (Baglioni et al., 2011). A study that examined the association of self-reported sleep quality with the onset of depression in a longitudinal population-based sample of twins found that poor sleep increased the risk for depression (Paunio et al., 2015). Specifically, the relative risk for depression was 5.5-fold among those respondents who experienced an onset of poor sleep and 3.6-fold among those reporting consistently poor sleep, compared to those who reported good quality sleep. The relative risk was even higher (4.5-fold) among those whose sleep quality deteriorated during the follow-up. Shanahan and colleagues assessed whether sleep problems predicted increases in the likelihood of meeting criteria for a psychiatric diagnosis over time in a representative population sample of youth from rural and urban areas (Shanahan et al., 2014). Controlling for a host of factors, including previous psychiatric disorder, sex, race, age, and comorbidity, findings indicated that sleep problems predicted high generalized anxiety disorder with depression symptoms. Follow-up analyses by individual sleep problems showed that difficulty falling asleep, early morning awakening, and exhaustion significantly predicted increases in generalized anxiety disorder with depression.

Mental Health among Caribbean Black Adults

Research on Caribbean Black adults in general and on mental health, in particular, has substantially increased with the advent of the National Survey of American Life that allows for both within-group and between-group comparisons of mental health status in the Black population. For example, research by Williams and colleagues (2007) found that non-Hispanic whites had a higher lifetime prevalence of major depressive disorder (17.9%) than both African Americans (10.4%) and Caribbean Blacks (12.9%); there was no significant difference in the prevalence rates of depression between African Americans and Caribbean Blacks.

With respect to rates of psychiatric disorders overall, they are roughly comparable for African Americans and Caribbean Blacks. However, a more complex picture is revealed when gender, ethnicity, and nativity differences are considered. For example, a prevalence study of psychiatric disorders among Caribbean Black immigrants and African Americans showed that Caribbean Black men in the United States had higher risks for 12-month rates of mood and anxiety disorders than African American men (Williams, Haile, et al., 2007). Caribbean Black women, however, had lower 12-month and lifetime risks for anxiety and substance disorders than African American women. Among Caribbean Blacks, men had higher rates of psychiatric disorders than women, and those from Spanish-speaking Caribbean islands had higher rates than those from other ethnic origins. Findings also provided support for the “healthy immigrant effect” which posits that Caribbean-born immigrants have better health than African Americans and US-born Caribbean Blacks. For example, those born in the United States had higher rates of psychiatric disorders than immigrants, and third generation immigrants had higher rates of mental illness than first and second generation Caribbean immigrants (Williams, Haile, et al., 2007). Findings from other studies also highlight the effects of generational status. Taylor and colleagues (2013) found that first-generation Caribbean Blacks were less likely than US-born Caribbean Blacks to have a lifetime co-morbid mood and anxiety disorder and also less likely to have a lifetime substance disorder or a lifetime suicidal attempt (Taylor, Nguyen, Sinkewicz, Joe, & Chatters, 2013). Similarly, Lincoln and colleagues (2007) found that first generation Caribbean Blacks had fewer depressive symptoms, but only for those Caribbean Blacks who had resided in the U.S. for 10 years or less (Lincoln, Chatters, Taylor, & Jackson, 2007). There are also ethnic differences in how mental health disorders are perceived among Black Americans. One study showed that generalized anxiety disorder (GAD) but not major depressive disorder (MDD) was associated with fair or poor self-rated mental health (SRMH) among African Americans. Among Caribbean Blacks, however, the opposite was true – MDD but not GAD was associated with fair or poor SRMH (Assari, Dejman, & Neighbors, 2016). This finding suggests that SRMH varies by ethnicity, and also highlights the importance of subjective assessments of mental health for better understanding how Black Americans perceive their risk for psychiatric disorders.

Studies that account for heterogeneity within the Black American population, such as those discussed above, demonstrate the importance of examining within-group differences to identify subpopulations most at risk for depression due to sleep problems. Without such an examination, high risk individuals would be difficult to identify because they are aggregated with the majority of the population, which may have lower risk. Given the growing numbers of Caribbean Black in the United States (Anderson, 2015), the link between poor sleep quality and the development of psychiatric disorders, and the goal of reducing racial health disparities, understanding the link between sleep quality and mental health among Caribbean Blacks is well warranted. In the current study, we examine self-reported sleep habits in a nationally representative sample of Caribbean Blacks born outside of, but currently residing in the United States. We relate various dimensions of the sleep experience to mental health with the goal of identifying and comparing the associations between sleep quality classes, sociodemographic factors, social stress, and depression risk among Caribbean Blacks. Given that previous research has found gender differences in sleep quality, an additional aim of

this study was to identify how sociodemographic and social stress correlates of sleep quality might vary by gender.

Methods

Sample

This analysis is based on data from National Survey of American Life: Coping with Stress in the 21st Century-Reinterview (NSAL-RIW). Both the original NSAL and the NSAL-RIW were collected by the Program for Research on Black Americans at the University of Michigan's Institute for Social Research. The NSAL sample has a national multistage probability design, which consists of 64 primary sampling units, 56 of which overlap substantially with existing Survey Research Center's National Sample primary areas (see Jackson et al., 2004, for a more detailed discussion of the NSAL sample). Data collection was conducted from February 2001 to June 2003, resulting in a total of 6,082 interviews with persons aged 18 years or older (3,570 African Americans, 891 non-Hispanic Whites, and 1,621 Blacks of Caribbean descent). The overall response rate for the NSAL was 72.3%. Final response rates for the NSAL two-phase sample designs were computed using the American Association of Public Opinion Research guidelines for Response Rate 3 samples (American Association for Public Opinion Research, 2006). The sample was drawn to represent the proportional national geographic distribution of African Americans.

The Caribbean Black sample was selected from two area probability sampling frames: the core NSAL sample and an area probability sample of housing units from geographic areas with a relatively high density of persons of Caribbean descent. Respondents were considered Caribbean Black if they indicated that they were Black and answered affirmatively when asked if they were of West Indian or Caribbean descent, said they were from a country included on a list of Caribbean area countries presented by the interviewers, or stated that their parents or grandparents were born in a Caribbean country.

All respondents in the original NSAL were invited to complete a self-administered follow-up questionnaire. The adult NSAL-RIW included additional measures of sleep quality that were not available in the original NSAL. Of the 1,621 Caribbean Black NSAL respondents who completed the original interview, a total of 695 completed the self-administered NSAL-RIW. The analytic sample includes 372 Caribbean Black respondents who were born outside of the U.S. and answered all relevant items used for this study. Data collections for the NSAL and NSAL-RIW were approved by the University of Michigan Institutional Review Board. Both data sets are available through the Inter-University Consortium of Political and Social Research at the University of Michigan.

Measures

Sleep Indicators.—There were seven indicators of sleep habits and experiences used in the analysis: restless sleep, sleep satisfaction, trouble falling asleep, use of sleep medication, sleep paralysis, hours of sleep per night, and whether the amount of sleep was perceived by respondents as enough. Restless sleep was assessed with an item indicating, “Please tell me how often you have felt this way during the past week. My sleep was restless.” Available

response categories ranged from *rarely or none of the time* (0) to *most or all of the time* (3). Sleep satisfaction was measured with the question, “How satisfied are you with your sleep?” Responses ranged from *very satisfied* (1) to *very dissatisfied* (4). Note that higher values of this variable denote less satisfaction with sleep. Trouble falling asleep was measured by the question, “Do you usually have trouble falling asleep?” Responses were recorded as either “Yes” or “No.” Use of sleep medication was assessed by the question, “During the past month, how often have you taken something to help you sleep?” Responses ranged from *never* (1) to *three or more times a week* (5). Sleep paralysis was assessed with the question, “How often have you had isolated sleep paralysis?” with response categories ranging from *never* (1) to *several times a month* (6). Hours of sleep per night and whether this amount of sleep was perceived as enough by respondents were measured by the following questions, “During the past month, excluding naps how many hours of actual sleep did you get at night on average? (This may be different than the number of hours you spent in bed.)” and “Is that enough sleep for you?” Open-ended responses were recorded for the former question, and a yes/no response schema was used for the latter question. To facilitate analysis and interpretation of results, all indicators were dichotomized.

Demographic, social, and health correlates.—We included self-reported measures of age, gender, marital status, education, family income, racial discrimination, material hardship, and self-rated health. Gender (1 = male; 2 = female) and marital status (0 = separated, divorced, widowed, or never married; 1 = married or cohabiting) were dummy coded. Age and education were assessed in years and treated as continuous variables. Family income was coded in dollars. Missing data for family income and education were imputed using an iterative regression-based multiple imputation approach incorporating information about age, sex, region, race, employment status, marital status, home ownership, and nativity of household residents. Self-rated health was assessed on a scale of 1 (*poor*) to 5 (*excellent*) with the question, “How would you rate your overall physical health at the present time?” Self-rated health provides a simple, integrative patient-centered assessment for evaluating illness in the context of multiple chronic conditions. This measure has been shown to be a consistent predictor of onset of chronic conditions (Latham & Peek, 2013), functional health decline, and mortality (Mavaddat, Valderas, Van Der Linde, Khaw, & Kinmonth, 2014) controlling for sociodemographic characteristics, and numerous health risk factors known to predict mortality, such as morbidity status, hospitalizations, functional health, and physician-evaluated measures (Benyamini & Idler, 1999). Material hardship was measured using a summary score of seven items assessing whether respondents could meet basic expenses, pay full rent or mortgage, pay full utilities, had utilities disconnected, had telephone disconnected, were evicted for non-payment, and were unable to afford leisure activities in the past 12 months. Scores were summed into a composite measure; higher scores indicated greater material hardship ($\alpha = .76$). Racial discrimination was measured with a summary score of ten items of the Everyday Discrimination Scale (Williams, Yu, Jackson, & Anderson, 1997), which assesses experiences of individual discrimination during the past 12 months: being treated with less courtesy or respect; receiving poorer service; being perceived as less smart, dishonest, or not as good as others; and being feared, insulted, harassed, or followed in stores (Cronbach’s $\alpha = 0.88$). Response categories ranged from 1 (less than once a year) to 5 (almost every day), and discrimination scores ranged

from 0 to 50. After each discrimination item was a single item assessing the reason for each experience (e.g., race, age, gender, socioeconomic status). Respondents who attributed these discriminatory events to their race, ancestry, or skin tone were classified as having experienced racial discrimination in that instance.

Mental health.—Depressive symptoms were assessed using the 12-item version of the Center for Epidemiological Studies-Depression Scale (Radloff, 1977). This abbreviated CES-D has acceptable reliability and a similar factor structure compared to the original version (Liang, Tran, Krause, & Markides, 1989). Responses for the 12 items were coded as *rarely or none of the time* (0) to *most or all of the time* (3) and assess the extent to which in the last 30 days respondents: had trouble keeping their mind on tasks, enjoyed life, had crying spells, had restless sleep, could not get going, felt depressed, hopeful, happy, as good as other people, that everything was an effort, that people were unfriendly, and that people dislike them. The modified version used in this analysis omitted an item that assessed restless sleep, as this was used as a sleep indicator. Positive valence items were reverse coded, and the 11 items were summed resulting in a continuous measure; a high score indicates a greater number of depressive symptoms (Cronbach's alpha = 0.69).

Analysis Strategy

Bivariate analyses were conducted using Stata 13.1. Bivariate analyses were tested using the Rao-Scott χ^2 , which is a complex design-adjusted version of the Pearson Chi-square test, and complex design-adjusted F tests. Latent class analysis (LCA), conducted using Mplus (version 8), was used to identify sleep quality classes. LCA uses a person-centered approach to classify respondents into subgroups (i.e., latent classes or sleep quality classes) based on response patterns across a set of dichotomous class indicators (e.g., sleep indicators). Latent class logistic regression analysis, in which the identified sleep quality classes are regressed on demographic, social, and health variables, was used to determine correlates of sleep quality classes. This was conducted using the three-step LCA approach to avoid the inclusion of correlates in the class extraction process. In this approach, the LCA model is estimated first, and goodness of fit was determined using sample-size adjusted Bayesian Information Criterion (BIC) and Akaike's information Criterion (AIC). In the second step, a most likely class variable is created using the latent class posterior distribution obtained from step one. In the final step, the most likely class variable is used as a latent class indicator variable with uncertainty rates prefixed at the probabilities obtained in step two. During this step, we regressed the sleep quality classes on demographic, social, and health variables and gender interaction terms for the entire sample. Gender interactions were included to test for gender differences. We conducted a gender stratified analysis with the sleep quality classes regressed on demographic, social, and health variables to determine the nature of the gender differences identified by the significant gender interactions. Only interactions that were significant at the .05 level were included in the final regression analysis. Also, in this third step we estimated the association between sleep quality classes and depressive symptoms. Mean estimates of depressive symptoms were estimated for each sleep quality class and Wald tests were used to determine whether depressive symptoms scores differed between sleep quality classes. This step of the analysis controlled for age, gender, education, family income, marital status, and self-rated health. All control variables

were mean centered in this analysis to facilitate interpretation of the findings. All analyses used sampling weights and accounted for the complex multistage clustered design of the NSAL-RIW sample, unequal probabilities of selection, nonresponse, and poststratification to calculate weighted, nationally representative population estimates and standard errors.

Results

Table 1 presents descriptive statistics for the study variables. The sample was comprised of slightly more women (55%) than men, and the average age of respondents was 43 years. On average, respondents reported completing just over 13 years of formal education and an annual family income close to \$44,000. Slightly over half of the sample was either married or cohabiting (55%). The mean scores for racial discrimination, depressive symptoms, material hardship, and self-rated health are also reported in Table 1.

LCA indicated that the best-fitting model featured two (sleep quality) classes. The two identified sleep quality classes were “poor sleep quality” and “good sleep quality.” Figure 1 provides a visual summary of these results. The “poor sleep quality” class, which comprised 54% of the sample, was characterized by relatively low rates of sleep medication use, short sleep duration, low perception of receiving enough sleep, and low satisfaction with sleep. Those respondents assigned to the “poor sleep quality” class also had moderate rates of endorsement of restless sleep, trouble falling asleep, and sleep paralysis. The respondents in the “good sleep quality” class reported low rates of restless sleep, trouble falling asleep, and use of sleep medication; additionally, these respondents reported moderate rates of sleep paralysis, and high rates of satisfaction with sleep, hours of sleep, and the perception that they received enough sleep.

Bivariate analyses of key study variables (Table 1) indicated that the two sleep quality classes differed on racial discrimination, self-rated health, material hardship, and depressive symptoms. Respondents in the “poor sleep quality” class reported more experiences of racial discrimination, more material hardship, lower self-rated health and more depressive symptoms than respondents in the “good sleep quality” class.

Findings from the latent class logistic regression analysis are presented in Table 2. This analysis indicated that older respondents and respondents who had higher self-rated health were less likely to belong to the “poor sleep quality” class as compared to younger respondents and respondents who reported lower self-rated health. Conversely, racial discrimination and material hardship were positively associated with the “poor sleep quality” class. That is, respondents who reported more frequent experiences of racial discrimination and those who reported higher levels of material hardship were more likely to be in the “poor sleep quality” class than their counterparts. Respondents who were either married or cohabiting were also more likely to belong to the poor sleep quality class as compared to respondents who were not married or cohabiting. There were significant interactions between gender and age, marital status, and material hardship. These interactions revealed that while being younger age, married/cohabiting, and reporting higher levels of material hardship were associated with membership in the poor sleep quality class

for men, age, marital status, and material hardship were unrelated to sleep quality classes for women.

During the distal outcome LCA, Wald tests were conducted to test whether the mean depressive symptoms scores of respondents in the “poor sleep quality” class differed from those of respondents in the “good sleep quality” class. Figure 2 provides a visual summary of these results. The “poor sleep quality” class had significantly higher mean depressive symptoms scores than the “good sleep quality” class ($M = 6.26$ vs. $M = 3.03$).

Discussion

In this study, we report on the associations between sleep quality classes and depression risk in a nationally representative sample of Caribbean-born Blacks residing in the U.S. This study is especially innovative because we used a wide variety of sleep measures to describe the sleep experience among an understudied population. Because sleep patterns are complex and multifaceted, we used LCA to identify “sleep quality classes” associated with specific sleep profiles. Findings revealed two sleep quality classes among this population – “good sleep quality” and “poor sleep quality.” Study participants were assigned to a sleep quality class based on their individual demographic, social, health, and sleep characteristics. Therefore, both categories are heterogeneous with respect to these characteristics. Findings from this study highlight the fact that conceptualizing sleep as a single dimension (e.g., quality or duration) or as a summed score does not fully capture the variation in the sleep experience within populations.

Findings indicated that younger men were more likely than their older counterparts to be assigned to the “poor sleep quality” class. This finding is consistent with other studies that report age, race and gender effects on sleep quality. For example, one study that examined the association between race/ethnicity and sleep quality in a large sample of men found that Black men had significantly shorter total sleep time, longer sleep latency, lower sleep efficiency, and less slow-wave sleep than White men, even after controlling for a variety of social status and health factors (Song et al., 2011). In a study of a large cohort of school children, where the influences of comorbidities are relatively small, Black boys had poorer sleep quality than White boys and girls and non-White girls (Spilsbury et al., 2004). Finally, one study that examined age-related changes in sleep quality over the life course found that younger age was associated with a sleep type referred to as “delayed sleepers.” This sleep type was characterized by modestly poor sleep across a range of domains, but a relatively high probability of poor scores on sleep latency (i.e., sleep onset), sleep quality and sleep disturbance (Gadie, Shafto, Leng, Kievit, & Cam-CAN, 2017). Younger age was also associated with the “poor sleeper” type which was characterized by poor or very poor sleep quality and sleep efficiency. However, this same study found that older adults are more likely to display inefficient sleeping, characterized by long periods spent in bed while not asleep. These findings suggest that lifespan changes in self-reported sleep are heterogeneous and partially independent and that specific patterns and components need to be taken into account simultaneously to fully understand age-related differences in sleep quality.

Caribbean Black men who were married or cohabiting were more likely to be members in the poor sleep quality class. Marriage is a key social relationship that tends to provide emotional support, social integration, material and other resources that are important inputs to health and wellness. However, the quality of the relationship matters a great deal for those who are married or cohabiting to reap the benefit from available resources and support. For example, one study reported that married and partnered adults had better actigraph-estimated sleep (an objective measure), but not self-reported sleep quality than unmarried adults (Chen, Waite, & Lauderdale, 2015). However, among those with spouses or partners, those who reported more negative marital quality reported more insomnia symptoms. In fact, the benefits of marriage for sleep for participants in this study came primarily from positive aspects of the marital relationship. In another study examining ethnic and socioeconomic factors related to sleep complaints, findings revealed that the highest likelihood of reporting sleep complaints among Hispanic/Latino, African American/Black and White men and women occurred among the unmarried (Grandner et al., 2016). However, Black/African American men were protected from sleep complaints if they were part of an unmarried couple. In light of our finding of poor sleep quality for married/partnered Caribbean Black men, it is important to consider the quality of the marital relationship. Findings from a study that used NSAL data to examine marital quality among African Americans demonstrate the deleterious effects of low marital satisfaction on mental health (Lincoln & Chae, 2010). Moreover, studies examining social relationships among Caribbean Blacks show that negative interactions with family is associated with major depressive disorder (Lincoln & Chae, 2012) and suicidal ideation in this population (Lincoln, Taylor, Chatters, & Joe, 2012). It is not entirely clear why unmarried status is protective for Black men. This is a question that should be explored in future research and could shed additional light on between and within-group differences in sleep quality.

We also found that those who reported poorer self-rated health were more likely to be in the “poor sleep quality” class. This finding is consistent with other studies that report negative effects of poor sleep quality on physical health, mental health, and psychosocial functioning (Cappuccio et al., 2011; Knutson, 2010; Minkel et al., 2012; Paunio et al., 2015; Shanahan et al., 2014; Spira et al., 2014; Verkasalo et al., 2005). Because poor sleep quality directly affects general health (Gadie et al., 2017), and people subjectively experience sleep quality as a fundamental part of overall general health, it is not surprising that respondents who reported poor sleep also rated their health as poor.

Material hardship (i.e., indicator of ability to meet basic necessities such as food or shelter) was associated with the “poor sleep quality” class for the men in our sample. This finding is consistent with previous studies which found that financial strain was linked with poor sleep quality (Hall et al., 2009). For example, one study found that ongoing financial strain was associated with sleep continuity disturbances in a heterogeneous sample of community-dwelling older adults (Hall et al., 2009). More specifically, respondents who reported experiencing ongoing financial strain took longer to fall asleep and spent an average of 88 minutes awake after sleep onset, as compared to 69 minutes of wakefulness among older adults who did not report ongoing financial strain. Another study of Black and White immigrant employees found that Caribbean Black immigrant employees with low socioeconomic status (as measured by education and income) had shorter sleep durations

than non-Hispanic White employees (Ertel et al., 2011). These findings highlight the need for research that enhances our understanding of the complex pattern of associations among ethnicity, immigrant status, gender, and sleep. We currently do not understand how structural, cultural, and economic factors combine to affect the sleep experience of Caribbean Black men, specifically. However, we can speculate that the discrepancy between their aspirations and actual standing can negatively impact their sleep quality. This might be the case for Caribbean immigrants regardless of gender, since the majority of whom migrate to the United States are in pursuit of a better life and economic opportunities compared with what is available in their country of origin (Basch, Glick Schiller, & Szanton Blanc, 1994). However, unrealized expectations might be especially salient for Caribbean Black men given the patriarchal nature of Caribbean households (Chevannes, 2001).

Finally, racial discrimination was associated with the “poor sleep quality” class for Caribbean Black women. This finding is consistent with a wealth of studies linking social stressors like racial discrimination to a range of physical and mental health outcomes (Pascoe & Richman, 2009; Pieterse, Todd, Neville, & Carter, 2012). Moreover, longer residence in the U.S. has been associated with the loss of protective factors against the effects of racial discrimination such as family support and protective cultural resources (Read, Amick, & Donato, 2005; Singh & Siahpush, 2002; Viruell-Fuentes, 2007). It has been suggested that Black Caribbean immigrants—because they are both Black and immigrant—experience more negative social experiences and inequalities in the U.S. than African Americans, U.S.-born Blacks or White immigrants (Vickerman M., 1999). Caribbean Black women must also contend with gender-based discrimination, and in some cases, discrimination on the basis of their skin tone from both within and outside their ethnic community (Borrell, 2006). The intersectionality of race, ethnicity, and gender can shape the perceptions of discrimination by Caribbean Black women, and also increase their level of exposure and vulnerability to this social stressor.

Notably, closer investigation of the sleep quality classes reveals likely further complexities of differences in the sleep experience. For example, the “good sleep quality” class shows relatively high conditional likelihood of good sleep across all domains except “sleep paralysis.” This is the one exception where respondents in the “good sleep quality” class are more similar to respondents in the “poor sleep quality” class. Sleep paralysis is a transient, semiconscious state of involuntary immobility that occurs immediately prior to falling asleep or upon waking. During this state, individuals are unable to move but are able to hear and are often able to open their eyes. Although sleep paralysis can be a benign experience for some individuals, for others the episodes can be frightening and often accompanied by vivid, waking dreams (i.e., hallucinations), chest pressure, and a subjective feeling of a presence nearby (Hufford, 2005). Hallucinations have been interpreted in a number of culturally specific contexts, with a variety of spiritual and supernatural explanations (Hufford, 2005). Sleep studies have linked sleep paralysis with conditions such as, hypertension, sleep apnea, stressful life events, and African descent (Sharpless & Barber, 2011). The factors associated with the occurrence of sleep paralysis in general, and among certain ethnic groups in particular, remain unclear. It is important to note that for the vast majority of the population sleep paralysis is very rare. This includes our sample where the majority of respondents have

never experienced sleep paralysis. Consequently, because it is a rare event, sleep paralysis does not fully differentiate poor and good sleepers.

One key strength of our broad phenotypic assessment is that it allows for direct comparison of the different measures of sleep and mental health. Similar to previous studies documenting a sleep-mental health relationship, we found a strong association between poor sleep and depression risk among Caribbean-born Blacks in the United States. Sleep problems may increase risk for depression through its impact on emotion regulation and emotion reactivity (Baglioni, Lombardo, et al., 2010; Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010). Although researchers still question the function of sleep, sleep has known implications for the neuroendocrine stress system, and is generally seen as a restorative and adaptive process (Lim & Dinges, 2008; Meerlo, Sgoifo, & Suchecki, 2008). So, although sleep problems are directly and negatively associated with mental health, poor sleep quality could exacerbate the effect of other common risk factors on depressive symptoms by reducing the body's ability to adaptively respond to stressors (Hamilton, Catley, & Karlson, 2007). For example, a study using data from a nationally representative, longitudinal sample of U.S. adults found that the relationship between stress and depressive symptoms was strongest for participants who reported poor sleep quality (Leggett, Burgard, & Zivin, 2016). That is, stressful life events (i.e., violence, interpersonal loss, and financial strain) were associated with higher levels of depressive symptoms, especially during times when individuals were experiencing above average levels of stress, and during times when individuals reported worse sleep than was typical for them. Thus, it is possible that one explanation for the relationship between poor sleep and depression risk in our study involves the higher endorsement of experiences of racial discrimination and material hardship among respondents who were assigned to the "poor sleep quality" class.

Findings from this study should be considered within the context of its strengths and limitations. First, it is important to keep in mind that the associations found in this analysis cannot be interpreted as causal and other interpretations of our findings are possible. Poor sleep is a risk factor for developing depressive mood but also an established symptom and indicator of the severity of major depressive disorder (Baglioni et al., 2011; Maglione et al., 2012). Poor sleep quality may result from depressive mood as opposed to leading to depressive mood. Indeed, prior work has identified a bidirectional association between sleep problems and depressive mood (Jansson-Frojmark & Lindblom, 2008). Second, sleep is assessed using respondents' subjective assessments of their sleep experience, which may be subject to reporting bias. For instance, self-reports of sleep duration tend to overestimate time spent sleeping (Jackson, Patel, Jackson et al., 2015). However, participants may also underreport symptoms of poor sleep. In addition, while our measures of sleep can identify poor sleep among normal sleepers, we were not able to determine whether respondents had sleep disorders such as insomnia. Third, because the NSAL only surveyed noninstitutionalized, community-dwelling Caribbean Blacks who speak English, findings are generalizable only to this population. Fourth, data for the NSAL were collected in 2001 to 2003, and thus, might not reflect more recent changes in sleep problems or depression risk. However, we are confident in the findings, as they are consistent with those of more recent studies (as noted above). Moreover, despite its age, the NSAL is the largest nationally representative survey of mental health among Caribbean Blacks to date and it contains a

rich array of sleep variables that are essential to our purposes. Finally, although some sleep quality studies exclude shift workers from analyses, we were unable to identify and exclude shift workers from the current analysis, as the NSAL-RIW did not collect this information. Despite these limitations, this is the first study to identify sleep quality classes in a nationally representative sample of Caribbean-born Blacks residing in the United States. Another strength of this study is the use of information from seven indicators of sleep to identify those with both good and poor sleep quality. Sleep quality is often assessed with a single or limited set of measures which may not accurately capture the multidimensional aspects of the sleep experience. Thus, this study highlights the complexity of the sleep experience among Caribbean Blacks and how these patterns of sleep habits are related to depression risk. Given the link between poor sleep quality and depression risk, it is important for clinicians to screen patients for both conditions. Sleep problems do not have the same stigma that depression and other mental disorders have among many immigrant groups (Derr, 2015; Hacker, Anies, Folb, & Zallman, 2015). Thus, screening for sleep problems could offer promising opportunities for identifying risk for depression, referring patients into appropriate services and interventions, and reducing the burden from depression among Caribbean Black adults.

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References

- Adenekan B, Pandey A, McKenzie S, Zizi F, Casimir GJ, & Jean-Louis G (2013). Sleep in America: Role of racial/ethnic differences. *Sleep Medicine Reviews*, Vol. 17, pp. 255–262. 10.1016/j.smrv.2012.07.002
- American Association for Public Opinion Research. (2006). *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys* (4th ed). Lenexa, KS.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Assari S, Dejman M, & Neighbors HW (2016). Ethnic differences in separate and additive effects of anxiety and depression on self-rated mental health among blacks. *Journal of Racial and Ethnic Health Disparities*. 10.1007/s40615-015-0154-3
- Baglioni C, Battagliese G, Feige B, Spiegelhalder K, Nissen C, Voderholzer U, ... Riemann D (2011). Insomnia as a predictor of depression: A meta-analytic evaluation of longitudinal epidemiological studies. *Journal of Affective Disorders*, Vol. 135, pp. 10–19. 10.1016/j.jad.2011.01.011
- Baglioni C, Lombardo C, Bux E, Hansen S, Salveta C, Biello S, ... Espie CA (2010). Psychophysiological reactivity to sleep-related emotional stimuli in primary insomnia. *Behaviour Research and Therapy*, 48(6), 467–475. 10.1016/j.brat.2010.01.008 [PubMed: 20227678]
- Baglioni C, Spiegelhalder K, Lombardo C, & Riemann D (2010). Sleep and emotions: A focus on insomnia. *Sleep Medicine Reviews*, Vol. 14, pp. 227–238. 10.1016/j.smrv.2009.10.007
- Basch LG, Glick Schiller N., & Szanton Blanc C. (1994). Nations unbound: transnational projects, postcolonial predicaments, and deterritorialized nation-states. In *New York*. 10.1525/ae.1995.22.3.02a00330
- Benyamini Y, & Idler EL (1999). Community studies reporting association between self-rated health and mortality: Additional studies, 1995 to 1998. *Research on Aging*. 10.1177/0164027599213002

- Bonnet MH, & Arand DL (2003). Clinical effects of sleep fragmentation versus sleep deprivation. *Sleep Medicine Reviews*, Vol. 7, pp. 297–310. 10.1053/smr.2001.0245
- Borrell LN (2006). Self-reported hypertension and race among Hispanics in the National Health Interview Survey. *Ethnicity and Disease*.
- J. CL, W. MA, C. X, P. S, A. C & L. P (2015). Objective and subjective sleep duration among Whites, Blacks, Hispanics, and Chinese adults in the United States. *Sleep*, Vol 38, p. A429. Retrieved from <http://www.journalsleep.org/Resources/Documents/2015AbstractSupplement.pdf%5Chttp://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed17&NEWS=N&AN=71876483>
- Cappuccio F, Cooper D, D’Elia L, Strazzullo P, & Miller M (2011). Sleep duration predicts cardiovascular outcomes: a systematic review and meta-analysis of prospective studies. *Eur Heart J*, 32(12), 1484–1492. 10.1093/eurheartj/ehr007 [PubMed: 21300732]
- Chen JH, Waite LJ, & Lauderdale DS (2015). Marriage, relationship quality, and sleep among U.S. older adults. *Journal of Health and Social Behavior*. 10.1177/0022146515594631
- Chevannes B (2001). *Learning to be a man: Culture, socialization and gender identity in five Caribbean communities*. Kingston, Jamaica: University of the West-Indies Press.
- Cunningham TJ, Wheaton AG, Ford ES, & Croft JB (2016). Racial/ethnic disparities in self-reported short sleep duration among US-born and foreign-born adults. *Ethnicity and Health*, 21(6), 628–638. 10.1080/13557858.2016.1179724 [PubMed: 27150351]
- Derr AS (2015). Mental Health Service Use Among Immigrants in the United States: A Systematic Review. *Psychiatric Services*. 10.1176/appi.ps.201500004
- Ertel KA, Berkman LF, & Buxton OM (2011). Socioeconomic status, occupational characteristics, and sleep duration in African/Caribbean immigrants and US white health care workers. *Sleep*, 34(4), 509–518. 10.1093/sleep/34.4.509 [PubMed: 21461330]
- Fan F, Zhou Y, & Liu X (2017). Sleep disturbance predicts posttraumatic stress disorder and depressive symptoms: A cohort study of Chinese adolescents. *Journal of Clinical Psychiatry*, 78(7). 10.4088/JCP.15m10206
- Fuller-Rowell TE, Curtis DS, El-Sheikh M, Chae DH, Boylan JM, & Ryff CD (2016). Racial disparities in sleep: the role of neighborhood disadvantage. *Sleep Medicine*. 10.1016/j.sleep.2016.10.008
- Gadie A, Shafto M, Leng Y, Kievit RA, & Cam CAN. (2017). How are age-related differences in sleep quality associated with health outcomes? An epidemiological investigation in a UK cohort of 2406 adults. *BMJ Open*, 7(7). 10.1136/bmjopen-2016-014920
- GALLICCHIO L, & KALESAN B (2009). Sleep duration and mortality: a systematic review and meta-analysis. *J Sleep Res*, Vol. 18, pp. 148–158. Retrieved from <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=ovftj&NEWS=N&AN=00061050-200906000-00002>
- Grandner MA, Williams NJ, Knutson KL, Roberts D, & Jean-Louis G (2016). Sleep disparity, race/ethnicity, and socioeconomic position. *Sleep Medicine*, Vol. 18, pp. 7–18. 10.1016/j.sleep.2015.01.020
- Hacker K, Anies M, Folb BL, & Zallman L (2015). Barriers to health care for undocumented immigrants: A literature review. *Risk Management and Healthcare Policy*. 10.2147/RMHP.S70173
- Hall MH, Matthews K. a, Kravitz HM, Gold EB, Buysse DJ, Bromberger JT, ... Sowers M (2009). Race and financial strain are independent correlates of sleep in midlife women: the SWAN sleep study. *Sleep*, 32(1), 73–82. 10.5665/sleep/32.1.73 [PubMed: 19189781]
- Hamilton NA, Catley D, & Karlson C (2007). Sleep and the affective response to stress and pain. *Health Psychology*, 26(3), 288–295. 10.1037/0278-6133.26.3.288 [PubMed: 17500615]
- Hufford DJ (2005). Sleep Paralysis as Spiritual Experience. *Transcultural Psychiatry*, 42(1), 11–45. 10.1177/1363461505050709 [PubMed: 15881267]
- Jackson JS, Torres M, Caldwell CH, Neighbors HW, Nesse RM, Taylor RJ, ... Williams DR (2004). The National Survey of American Life: A study of racial, ethnic and cultural influences on mental disorders and mental health. *International Journal of Methods in Psychiatric Research*, Vol. 13, pp. 196–207. 10.1002/mpr.177
- Jansson-Frojmark M, & Lindblom K (2008). A bidirectional relationship between anxiety and depression, and insomnia? A prospective study in the general population.

- Journal of Psychosomatic Research, 64(4), 443–449. 10.1016/j.jpsychores.2007.10.016;10.1016/j.jpsychores.2007.10.016 [PubMed: 18374745]
- Jean-Louis G, Magai C, Casimir GJ, Zizi F, Moise F, McKenzie D, & Graham Y (2008). Insomnia symptoms in a multiethnic sample of American women. *J. Women's Health*, 17(1), 15–25. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/18240978>
- K. KL (2010). Sleep duration and cardiometabolic risk: A review of the epidemiologic evidence. *Best Practice and Research: Clinical Endocrinology and Metabolism*, Vol. 24, pp. 731–743. 10.1016/j.beem.2010.07.001
- Kent MM (2007). Immigration and America's Black Population. *Population Bulletin*, 62(4), 3–17.
- Kingsbury JH, Buxton OM, Emmons KM, & Redline S (2013). Sleep and its Relationship to Racial and Ethnic Disparities in Cardiovascular Disease. *Current Cardiovascular Risk Reports*, Vol. 7, pp. 387–394. 10.1007/s12170-013-0330-0
- Knutson KL (2010). Sleep duration and cardiometabolic risk: A review of the epidemiologic evidence. *Best Practice & Research Clinical Endocrinology & Metabolism*, 24(5), 731–743. 10.1016/j.beem.2010.07.001 [PubMed: 21112022]
- Krueger PM, & Friedman EM (2009). Sleep duration in the united states: A cross-sectional population-based study. *American Journal of Epidemiology*, 169(9), 1052–1063. 10.1093/aje/kwp023 [PubMed: 19299406]
- Latham K, & Peek CW (2013). Self-rated health and morbidity onset among late midlife U.S. adults. *Journals of Gerontology - Series B Psychological Sciences and Social Sciences*. 10.1093/geronb/gbs104
- Lauderdale DS, Knutson KL, Yan LL, Rathouz PJ, Hulley SB, Sidney S, & Liu K (2006). Objectively measured sleep characteristics among early-middle-aged adults: The CARDIA study. *American Journal of Epidemiology*, 164(1), 5–16. 10.1093/aje/kwj199 [PubMed: 16740591]
- Leggett A, Burgard S, & Zivin K (2016). The Impact of Sleep Disturbance on the Association Between Stressful Life Events and Depressive Symptoms. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 71(1), 118–128. 10.1093/geronb/gbv072
- Liang J, Tran TV, Krause N, & Markides KS (1989). Generational differences in the structure of the CES-D scale in Mexican Americans. *Journals of Gerontology*, 44(3). 10.1093/geronj/44.3.S110
- Lim J, & Dinges DF (2008). Sleep deprivation and vigilant attention. *Annals of the New York Academy of Sciences*, 1129, 305–322. 10.1196/annals.1417.002 [PubMed: 18591490]
- Lincoln K, Chatters L, Taylor R, & Jackson J (2007). Profiles of depressive symptoms among African Americans and Caribbean Blacks. *Social Science & Medicine*, 65(2), 200–213. [PubMed: 17449157]
- Lincoln KD, Taylor RJ, Chatters LM, & Joe S (2012). Suicide, negative interaction and emotional support among black Americans. *Social Psychiatry and Psychiatric Epidemiology*, 47(12). 10.1007/s00127-012-0512-y
- Lincoln Karen D., & Chae DH (2010). Stress, marital satisfaction, and psychological distress among African Americans. *Journal of Family Issues*, 31(8), 1081–1105. 10.1177/0192513X10365826
- Lincoln Karen D., & Chae DH (2012). Emotional support, negative interaction and major depressive disorder among African Americans and Caribbean Blacks: Findings from the National Survey of American Life. *Social Psychiatry and Psychiatric Epidemiology*, 47(3), 361–372. 10.1007/s00127-011-0347-y [PubMed: 21293846]
- Logan JR (2007). Who Are the Other African Americans? Contemporary African and Caribbean Immigrants in the United States. In Shaw-Taylor SA, Tuch Y. and (Ed.), *The Other African Americans: Contemporary African and Caribbean Immigrants in the United States* (pp. 49–68). Lanham, Boulder, New York, Toronto, and Plymouth: Rowman & Littlefield Publishers, Inc.
- Lunsford-Avery JR, & Mittal A., v., (2013). Sleep dysfunction prior to the onset of schizophrenia: A review and neurodevelopmental diathesis-stress conceptualization. *Clinical Psychology: Science and Practice*, 20(3), 291–320. 10.1111/cpsp.12041
- Maglione JE, Ancoli-Israel S, Peters KW, Paudel ML, Yaffe Md K., Ensrud KE, & Stone KL (2012). Depressive symptoms and subjective and objective sleep in community-dwelling older women. *Journal of the American Geriatrics Society*, 60(4), 635–643. [PubMed: 22428562]

- Mavaddat N, Valderas JM, Van Der Linde R, Khaw KT, & Kinmonth AL (2014). Association of self-rated health with multimorbidity, chronic disease and psychosocial factors in a large middle-aged and older cohort from general practice: A cross-sectional study. *BMC Family Practice*. 10.1186/s12875-014-0185-6
- Meerlo P, Sgoifo A, & Suchecki D (2008). Restricted and disrupted sleep: Effects on autonomic function, neuroendocrine stress systems and stress responsivity. *Sleep Medicine Reviews*, Vol. 12, pp. 197–210. 10.1016/j.smr.2007.07.007
- Minkel JD, McNealy K, Gianaros PJ, Drabant EM, Gross JJ, Manuck SB, & Hariri AR (2012). Sleep quality and neural circuit function supporting emotion regulation. *Biology of Mood & Anxiety Disorders*, 2(1), 22. 10.1186/2045-5380-2-22 [PubMed: 23216889]
- MONICA ANDERSON. (2015). 6 key findings about black immigration to the U.S. | Pew Research Center. Retrieved from Pew Research Center website: <http://www.pewresearch.org/fact-tank/2015/04/09/6-key-findings-about-black-immigration/>
- Ohayon MM, & Shapiro CM (2000). Sleep disturbances and psychiatric disorders associated with posttraumatic stress disorder in the general population. *Comprehensive Psychiatry*, 41(6), 469–478. 10.1053/comp.2000.16568 [PubMed: 11086154]
- Pascoe EA, & Richman LS (2009). Perceived Discrimination and Health: A Meta-Analytic Review. *Psychological Bulletin*, 135(4), 531–554. 10.1037/a0016059 [PubMed: 19586161]
- Paanio T, Korhonen T, Hublin C, Partinen M, Koskenvuo K, Koskenvuo M, & Kaprio J (2015). Poor sleep predicts symptoms of depression and disability retirement due to depression. *Journal of Affective Disorders*, 172, 381–389. 10.1016/j.jad.2014.10.002 [PubMed: 25451441]
- Pieterse AL, Todd NR, Neville HA, & Carter RT (2012). Perceived racism and mental health among black american adults: A meta-analytic review. *Journal of Counseling Psychology*, 59(1), 1–9. 10.1037/a0026208 [PubMed: 22059427]
- Pigeon WR, Heffner K, Duberstein P, Fiscella K, Moynihan J, & Chapman BP (2011). Elevated Sleep Disturbance among Blacks in an Urban Family Medicine Practice. *The Journal of the American Board of Family Medicine*, 24(2), 161–168. 10.3122/jabfm.2011.02.100028 [PubMed: 21383215]
- Radloff L (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385–401.
- Read JG, Amick B, & Donato KM (2005). Arab immigrants: A new case for ethnicity and health? *Social Science and Medicine*, 61(1), 77–82. 10.1016/j.socscimed.2004.11.054 [PubMed: 15847963]
- Reid IA (1939). *The Negro Immigrant, His Background, Characteristics and Social Adjustment*. New York, NY: Arno Press.
- Ruiter ME, DeCoster J, Jacobs L, & Lichstein KL (2011). Normal sleep in African-Americans and Caucasian-Americans: A meta-analysis. *Sleep Medicine*, Vol. 12, pp. 209–214. 10.1016/j.sleep.2010.12.010
- Shanahan L, Copeland WE, Angold A, & Costello EJ (2014). Sleep problems predict and are predicted by emotional distress and oppositional defiant disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, [in press].
- Sharpless BA, & Barber JP (2011). Lifetime prevalence rates of sleep paralysis: A systematic review. *Sleep Medicine Reviews*, Vol. 15, pp. 311–315. 10.1016/j.smr.2011.01.007
- Shochat T, Cohen-Zion M, & Tzischinsky O (2014). Functional consequences of inadequate sleep in adolescents: A systematic review. *Sleep Medicine Reviews*, Vol. 18, pp. 75–87. 10.1016/j.smr.2013.03.005
- Simon Bryce-Laporte R., & Simon Bryce-laporte R. (1972). Black Immigrants: The Experience of Invisibility and Inequality The Experience of Invisibility and Inequality. *Source Journal of Black Studies*, 3(1), 29–56. 10.1177/002193479402400403
- Singh GK, & Siahpush M (2002). Ethnic-Immigrant Differentials in Health Behaviors, Morbidity, and Cause-Specific Mortality in the United States: An Analysis of Two National Data Bases. *Human Biology*, 74(1), 83–109. 10.1353/hub.2002.0011 [PubMed: 11931581]
- Song Y, Ancoli-Israel S, Lewis CE, Redline S, Harrison SL, & Stone KL (2011). The Association of Race/Ethnicity With Objectively Measured Sleep Characteristics in Older Men. *Behavioral Sleep Medicine*. 10.1080/15402002.2012.636276

- Spilsbury JC, Storfer-Isser A, Drotar D, Rosen CL, Kirchner LH, Benham H, & Redline S (2004). Sleep behavior in an urban US sample of school-aged children. *Archives of Pediatrics and Adolescent Medicine*. 10.1001/archpedi.158.10.988
- Spira AP, Chen-Edinboro LP, Wu MN, & Yaffe K (2014). Impact of sleep on the risk of cognitive decline and dementia. *Current Opinion in Psychiatry*, Vol. 27, pp. 478–483. 10.1097/YCO.0000000000000106
- Stamatakis KA, Kaplan GA, & Roberts RE (2007). Short Sleep Duration Across Income, Education, and Race/Ethnic Groups: Population Prevalence and Growing Disparities During 34 Years of Follow-Up. *Annals of Epidemiology*, 17(12), 948–955. 10.1016/j.annepidem.2007.07.096 [PubMed: 17855122]
- Taylor RJ, Nguyen AW, Sinkewicz M, Joe S, & Chatters LM (2013). Comorbid Mood and Anxiety Disorders, Suicidal Behavior, and Substance Abuse Among Black Caribbeans in the U.S.A. *Journal of African American Studies*, 17(4), 409–425. 10.1007/s12111-012-9237-y
- Thorpe RJ, Gamaldo AA, Salas RE, Gamaldo CE, & Whitfield KE (2016). Relationship between physical function and sleep quality in African Americans. *Journal of Clinical Sleep Medicine*. 10.5664/jcsm.6180
- Verkasalo PK, Lillberg K, Stevens RG, Hublin C, Partinen M, Koskenvuo M, & Kaprio J (2005). Sleep duration and breast cancer: a prospective cohort study [In Process Citation] *SO - Cancer Res* 2005 Oct 15;65(20):9595–600. *Cancer Res*, 65(20), 9595–9600. [PubMed: 16230426]
- Vickerman M (1999). *Crosscurrents: West Indian Immigrants and Race*. New York, NY: Oxford University Press.
- Vickerman M (2001). Tweaking a Monolith: The West Indian Immigrant Encounter with “Blackness.” In Foner N (Ed.), *Islands in the City: West Indian Migration to New York* (pp. 237–256). Berkeley, Los Angeles and London: University of California Press.
- Viruell-Fuentes EA (2007). Beyond acculturation: Immigration, discrimination, and health research among Mexicans in the United States. *Social Science and Medicine*, 65(7), 1524–1535. 10.1016/j.socscimed.2007.05.010 [PubMed: 17602812]
- Whinnery J, Jackson N, Rattanaumpawan P, & Grandner MA (2014). Short and Long Sleep Duration Associated with Race/Ethnicity, Sociodemographics, and Socioeconomic Position. *Sleep*. 10.5665/sleep.3508
- Williams DR, Yu Y, Jackson JS, & Anderson NB (1997). Racial differences in physical and mental health: socioeconomic status, stress, and discrimination. *Journal of Health Psychology*, 2, 335–351. [PubMed: 22013026]
- Williams David R., Haile R, González HM, Neighbors H, Baser R, & Jackson JS (2007). The mental health of Black Caribbean immigrants: Results from the National Survey of American Life. *American Journal of Public Health*, 97(1), 52–59. 10.2105/AJPH.2006.088211 [PubMed: 17138909]
- Yoo SS, Gujar N, Hu P, Jolesz FA, & Walker MP (2007). The human emotional brain without sleep - a prefrontal amygdala disconnect. *Current Biology*, Vol. 17. 10.1016/j.cub.2007.08.007

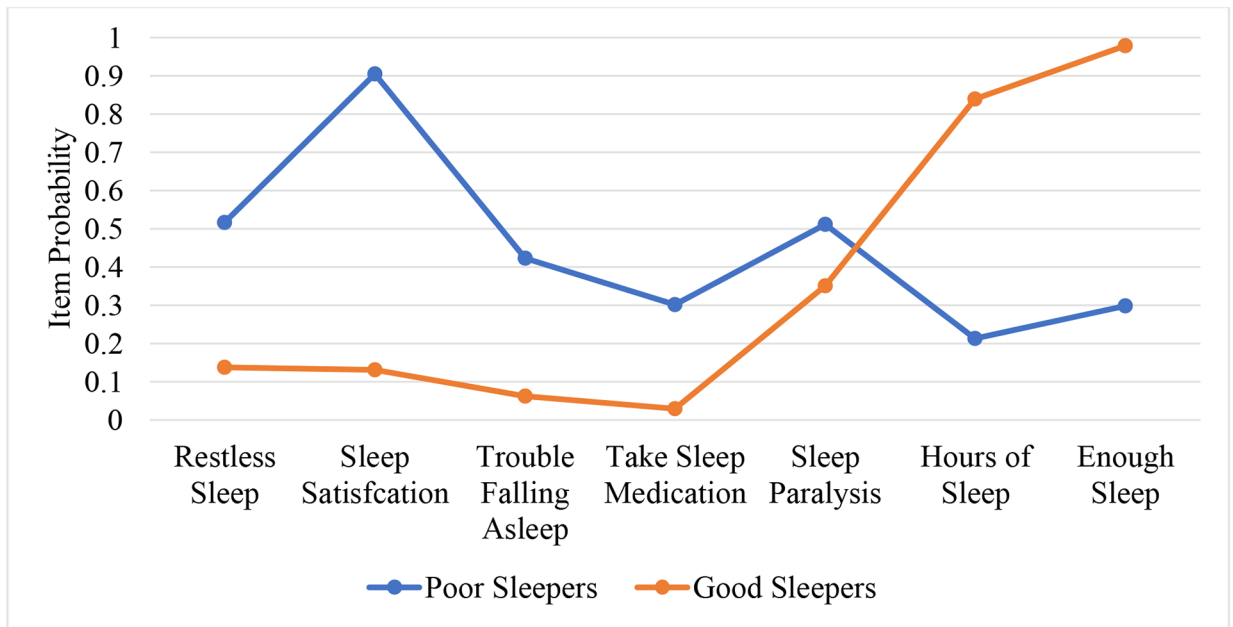


Figure 1. Conditional item probability profile of sleep classes.

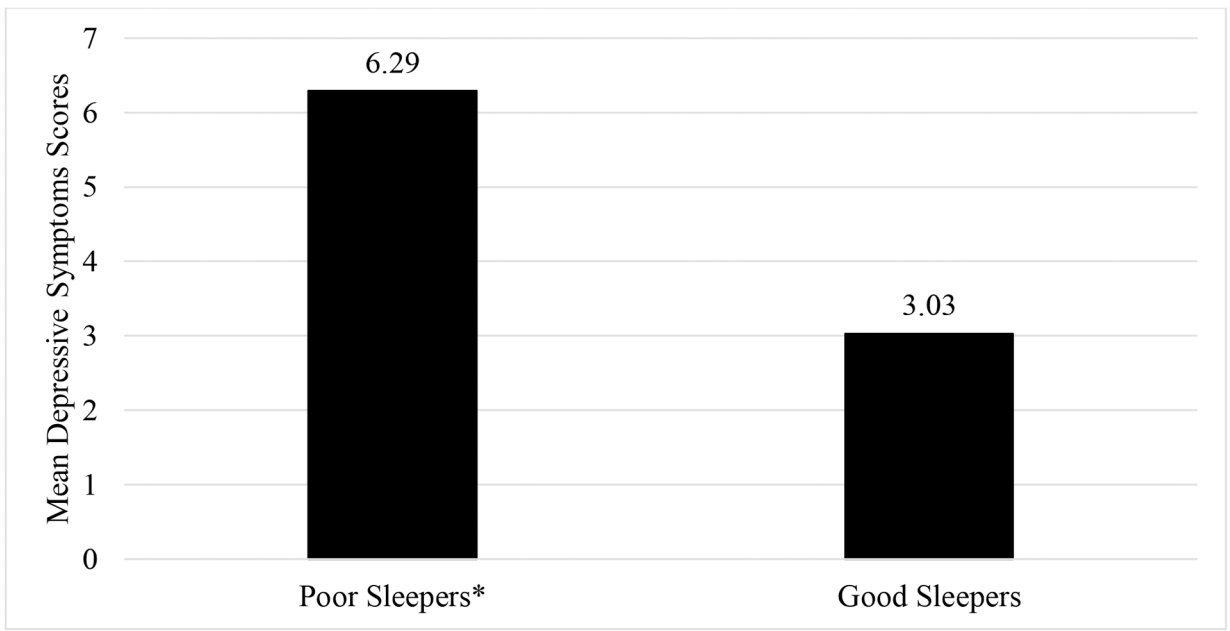


Figure 2. Mean depressive symptoms scores by sleep quality class. Asterisk indicate statistically significant differences.

Table 1

Bivariate Relationships between Demographic, Social, and Health Correlates and Sleep Types among Caribbean-born Blacks in the National Survey of American Life-Reinterview

	All Respondents (N = 372)	Poor Sleep Quality Class (n = 216)	Good Sleep Quality Class (n = 156)	Test
Age	42.69 (15.11)	42.31 (14.65)	43.21 (15.76)	$F = .32$
Gender				$\chi^2 = .14$
Men	131 (44.95)	66 (43.54)	65 (46.65)	
Women	241 (55.05)	150 (56.46)	91 (53.35)	
Education	13.38 (2.71)	13.36 (2.72)	13.41 (2.70)	$F = .04$
Family Income	43933.76 (41575.35)	44126.60 (46032.74)	43666.76 (34610.29)	$F = .01$
Marital Status				$\chi^2 = .82$
Separated/Divorced/Widowed/Never Married	202 (44.57)	122 (47.65)	80 (40.89)	
Married/Cohabiting	170 (55.43)	94 (52.35)	76 (59.11)	
Racial Discrimination	6.01 (8.40)	6.78 (8.87)	4.92 (7.58)	$F = 4.25^*$
Self-Rated Health	3.63 (1.05)	3.47 (1.03)	3.87 (1.02)	$F = 13.53^{***}$
Material Hardship	.89 (1.43)	1.10 (1.59)	.60 (1.12)	$F = 11.11^{***}$
Depressive Symptoms	4.86 (4.49)	5.65 (4.76)	3.76 (3.83)	$F = 16.75^{***}$

Note: Percentages, presented within parentheses, and N are presented for categorical variables. Means and Standard Deviations, presented within parentheses, are presented for continuous variables. Percentages are weighted and frequencies are unweighted.

*
 $p < .05$,

 $p < .001$

Table 2

Latent Class Logistic Regression Analysis of Sleep Types on Correlates

	Poor Sleep Quality Class vs. Good Sleep Quality Class		
	All Respondents	Men	Women
	Logit (SE)	Logit (SE)	Logit (SE)
Age	-.15 (.04)***	-.13 (.06)*	-.01 (.02)
Gender			
Men ^a		--	--
Women	-.69 (.83)	--	--
Education	.06 (.12)	-.11 (.21)	-.01 (.09)
Family Income	.01 (.03)	.07 (.04)	-.00 (0.03)
Marital Status			
Separated/Divorced/Widowed/Never Married ^a			
Married/Cohabiting	4.75 (1.62)**	2.97 (1.37)*	-.31 (.32)
Racial Discrimination	.11 (.04)**	.03 (.08)	.14 (.04)***
Self-Rated Health	-1.04 (.25)***	-2.25 (.95)*	-.80 (.22)***
Material Hardship	1.99 (.57)**	1.44 (.38)***	.19 (.15)
Gender*Age	.07 (.02)**	--	--
Gender*Marital Status	-2.44 (.86)**	--	--
Gender*Material Hardship	-.83 (.33)*	--	--
<i>N</i>	352	127	225

SE = Standard Error.

^aReference Category.

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.