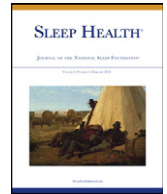




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Sleep duration, sleep quality, and sexual orientation: findings from the 2013–2015 National Health Interview Survey☆☆☆

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ABSTRACT

Introduction: This study identifies associations between sleep outcomes and sexual orientation net of sociodemographic and health-related characteristics, and produces estimates generalizable to the US adult population.

Participants/methods: We used 2013–2015 National Health Interview Survey data (46,909 men; 56,080 women) to examine sleep duration and quality among straight, gay/lesbian, and bisexual US adults. Sleep duration was measured as meeting National Sleep Foundation age-specific recommendations for hours of sleep per day. Sleep quality was measured by 4 indicators: having trouble falling asleep, having trouble staying asleep, taking medication to help fall/stay asleep (all ≥ 4 times in the past week), and having woken up not feeling well rested (≥ 4 days in the past week).

Results: In the adjusted models, there were no differences by sexual orientation in the likelihood of meeting National Sleep Foundation recommendations for sleep duration. For sleep quality, gay men were more likely to have trouble falling asleep, to use medication to help fall/stay asleep, and to wake up not feeling well rested relative to both straight and bisexual men. Gay/lesbian women were more likely to have trouble staying asleep and to use medication to help fall/stay asleep relative to straight women. Finally, bisexual women were more likely to have trouble falling and staying asleep relative to straight women.

Conclusions: Sexual minority women and gay men report poorer sleep quality compared with their straight counterparts.

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Introduction

Research has established clear associations among sleep deprivation, poor sleep health, and a variety of undesirable physical and mental health outcomes.^{1,2} In a recent comprehensive literature review on sleep and health², authors found that whereas the strength of association and magnitude may vary among studies, shortened sleep duration was consistently related to a host of adverse physical and mental health outcomes: poor general health/quality of life,³ poor cardiovascular health⁴ and metabolic health (ie, diabetes⁵ and metabolic syndrome⁶), increased mortality risk,^{7,8} depression and

other mental health conditions/symptoms,⁹ and decreased human performance and workplace/driving accidents.^{10,11} As evidence of an association between short sleep duration and poor health outcomes has grown and sleep duration has declined,¹² addressing the problem of inadequate sleep has become a national health objective. The US Department of Health and Human Services' *Healthy People* initiative added "Sleep Health" as a topic to its 2020 objectives, with 2 of the topic's 4 objectives focused on sufficient duration of sleep.¹³

One avenue for better understanding the relationship between sleep and health is identifying specific sociodemographic characteristics associated with shorter durations or poorer quality of sleep. These have included sex,¹⁴ race/ethnicity,^{15,16} age,^{14,17} marital status,¹⁸ education,¹⁸ having children in the household,^{18,19} work/employment,¹⁰ and urbanicity.^{15,16} Largely missing from these investigations, however, is sexual orientation.

We found only 4 studies that examined sexual orientation and sleep.^{20–23} The first study found that bisexual women had higher odds than heterosexual women of self-reporting inadequate sleep in ≥ 14 of the past 30 days. No such difference between lesbian and straight women, or among men by sexual orientation, was

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identified.²⁰ However, this study used a question that asked how many days (in the previous 30 days) the respondent felt that they had not gotten enough rest or sleep. Responses may reflect short sleep duration or excessive sleepiness, which may also result from poor quality sleep. This study also used survey data from only 10 US states. The second study²¹ used activity diaries kept over a 16-day period by a convenience sample of 53 British adults aged 18–49 years and showed that those who identified as homosexual awakened from sleep earlier than those who identified as heterosexual, and that homosexual men went to sleep later than heterosexual men, resulting in shorter overall sleep duration. This study did have notable limitations: it used a small convenience sample, it did not include bisexual adults or those ≥ 50 years, and it did not account for any sociodemographic or health-related covariates.²¹ The 2 most recent studies used US nationally representative survey data from the National Health Interview Survey (NHIS).^{22,23} The first examined men and women separately and found no differences in sleep duration by sexual orientation—but did not examine sleep quality.²³ The second also found no differences in sleep duration by sexual orientation.²² However, it found that homosexual and bisexual adults had poorer sleep quality than heterosexual adults, and women (regardless of sexual orientation) had poorer sleep quality than heterosexual men. As the first US national study to focus solely on sleep quality differences by sexual orientation, this study made an important contribution but was limited in that it used heterosexual men as the reference category in models that included both men and women. The significance of differences among women by sexual orientation was not presented, except for a note that bisexual women had greater odds of reporting difficulty falling asleep compared with straight women.²²

The objective of this study is to continue addressing this gap in the literature by examining differences in sleep duration and sleep quality among gay/lesbian, bisexual, and straight adults using data from a US national survey. Our study extends the results of Chen and Shiu's²² research by using a larger sample that includes an additional year of data with more statistical power for analysis and conducting analyses for women separately to permit comparisons among women by sexual orientation. It also includes an additional outcome—use of medication to help fall/stay asleep—to further illuminate the association of sexual orientation and sleep problems. Consistent with previous studies on this topic, our study controls for a variety of sociodemographic and health-related characteristics that have been identified as being associated with sleep duration and quality. We hypothesize that gay men will be less likely to meet National Sleep Foundation (NSF) recommendations for sleep duration. This expectation is based on the 2 previous studies which used NHIS data in which the results for men trended in that direction but did not reach significance.^{22,23} However, with the additional statistical power available in this study, we expect those differences to be significant. We also hypothesize that sexual minority men and women will both have a higher likelihood of reporting poor sleep quality compared with their straight counterparts, as previous studies have found sexual minority adults more likely to report risk factors for poor sleep quality.

Participants and methods

Data

Data from the NHIS were used for the analyses. We combined 3 years of data, from the 2013 to 2015 NHIS, covering 102,989 adults ≥ 18 years (46,909 men; 56,080 women). The NHIS is a multipurpose health survey that is nationally representative of the civilian, non-institutionalized US population. It operates continuously throughout the year, with data files released annually. The survey uses a multistage area probability sample design and is administered using computer-

assisted personal interviewing, with telephone interviewing permitted to complete missing portions.²⁴ Analytic variables were drawn from the NHIS Household Composition, Family Core, and Sample Adult Core components. In the Household Composition module, basic demographic/relationship information is collected on all household residents. The Family Core module (administered separately to each family in the household) collects information on all family members and covers topics included as covariates in our analyses: sociodemographic characteristics, family food security, health status, and activity limitations. In addition, 1 “sample adult” from each family is randomly selected to complete the Sample Adult module, answering for themselves unless physically or mentally unable to do so (in which case a knowledgeable family member serves as a proxy respondent). The annual final response rates for the Sample Adult modules ranged from 61.2% in 2013 to 55.2% in 2015.²⁴ All survey questions related to sleep duration, sleep quality, and sexual orientation were included in the Sample Adult module.

Measures

Sleep duration

Adults were asked, “On average, how many hours of sleep do you get in a 24-hour period?” Responses were combined with adult's age to create an indicator measure of whether NSF recommendations for sleep duration were met. These age-specific recommendations suggest 7–9 h/d for adults 18–25 years, 7–9 h/d for adults 26–64 years, and 7–8 h/d for adults ≥ 65 years.¹⁷ Other recommendations/classifications were considered, such as getting “sufficient sleep” as defined in *Healthy People 2020* Objective SH-4 as ≥ 8 h/24-h period for adults 18–21 and ≥ 7 h/24-h period for adults ≥ 22 years.¹³ However, multivariable analyses yielded similar results to those using the measure based on NSF recommendations.

Sleep quality

For 3 of the 4 measures of sleep quality, adults were asked, “In the past week, how many times did you (a) have trouble falling asleep, (b) have trouble staying asleep, and (c) take medication to help you fall asleep or stay asleep?” For each of these questions, responses were combined to create an indicator for ≥ 4 times in the past week. The final measure of sleep quality was an indicator variable for whether an adult reported waking up not feeling well rested ≥ 4 days in the past week. This was created by subtracting from 7 the response to the survey question that asked, “In the past week, on how many days did you wake up feeling well rested?” Consistent with prior research, the threshold of ≥ 4 times/days in the past week was used as a conservative measure of poorer sleep quality.^{19,22}

Sexual orientation

Adults were classified into sexual orientation categories using the survey question, “Which of the following best represents how you think of yourself?” Responses for men included gay; straight, that is, not gay; bisexual; something else; and I don't know the answer. For women, responses included lesbian or gay; straight, that is, not lesbian or gay; bisexual; something else; and I don't know the answer. As in previous studies of sexual orientation and health using the NHIS,^{25–27} adults answering “something else” or “I don't know the answer” or who refused to answer the question were omitted from the analyses. Cognitive testing and methodological evaluation of the NHIS sexual orientation question have been discussed at length elsewhere.^{28,29}

Covariates

A number of sociodemographic and health-related characteristics were included as covariates in the multivariable analyses based on a review of the scientific literature. Sociodemographic characteristics

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