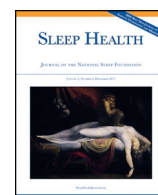




Contents lists available at ScienceDirect

Sleep Health

Journal of the National Sleep Foundation

journal homepage: sleephealthjournal.org

Burden of disease due to sleep duration and sleep problems in the elderly

Erica I. Lubetkin, MD, MPH^{a,*}, Haomiao Jia, PhD^b

^a Department of Community Health and Social Medicine, CUNY School of Medicine, 160 Convent Avenue, H313J, New York, NY, USA

^b Department of Biostatistics, Mailman School of Public Health and School of Nursing, Columbia University, 617 West 168th Street, New York, NY, 10032, USA

ARTICLE INFO

Article history:

Received 23 June 2017

Received in revised form 3 November 2017

Accepted 8 November 2017

Available online xxx

Keywords:

Sleep problems

Elderly

Quality-adjusted life year (QALY)

Health-related quality of life (HRQOL)

ABSTRACT

Objectives: The Centers for Disease Control and Prevention emphasizes conceptualizing sleep as a healthy behavior. Although a large literature exists documenting the morbidity or mortality of suboptimal sleep, fewer investigations have examined the burden of disease in a single number combining morbidity and mortality. This study examined the morbidity, as measured by health-related quality of life (HRQOL), mortality, and quality-adjusted life years (QALY) due to suboptimal (inadequate or excessive) sleep.

Design and participants: We ascertained respondents' HRQOL scores and mortality status from the 2005 to 2008 National Health and Nutrition Examination Survey (NHANES) with mortality follow-up data through December 31, 2011 for respondents aged 65 and older ($n = 2380$). We estimated mean QALY according to duration of sleep, minutes to fall asleep, number of sleeping problems, and daytime impact.

Results: More than one third of participants reported a suboptimal sleep duration. Short sleep duration had a greater adverse impact on morbidity, with reductions in HRQOL, while long sleep duration had a greater adverse impact on mortality. Compared to participants who reported between 7 and 9 hours of sleep per night, mean QALYs were significantly lower among participants who slept 10 or more hours a night (7.8 QALY; decrease of 9.8 QALY).

Conclusions: This study confirmed the association between suboptimal sleep and greater burden of disease among the elderly US population. Our findings provide support for treating sleep as a healthy (health risk) behavior, thereby having implications for primary care providers and public health surveillance.

© 2017 National Sleep Foundation. Published by Elsevier Inc. All rights reserved.

Introduction

According to the Centers for Disease Control and Prevention (CDC), the average sleep duration decreased and the percentage of adults sleeping six or fewer hours in a 24-hour period increased by 31% between 1985 and 2012.¹ Because of the decline in sleep duration and the abundant evidence that suboptimal sleep is associated with increased morbidity and mortality, the CDC has advocated public health surveillance of sleep difficulties,² issuing a call to increase the awareness of sleep as a healthy behavior.³ On a similar note, the current iteration of Healthy People now includes the topic of "Sleep Health."⁴

The American Academy of Sleep Medicine and Sleep Research Society recently issued a consensus statement that between 7 to 9 hours of sleep were appropriate to achieve optimal health in adults between the ages of 18 to 60.⁵ When examining excessive sleep,

however, the members hesitated about cautioning against too much sleep, given the lack of a readily available biologically plausible pathway in which long sleep duration might be associated with poor health. For older adults, the National Sleep Foundation (NSF) recommends that adults 65 years and older sleep between 7 to 8 hours per night.⁶ The upper limit of sleep duration is based on evidence that both short and long sleep duration are associated with adverse effects in this age group.⁶

A number of studies have reported that sleep duration resembles a U-shaped curve, with the lowest mortality and morbidity at approximately 7 to 8 hours of sleep per night.⁵ Systematic reviews of prospective studies have indicated that both inadequate and excessive sleep are associated with increased risk for all-cause mortality in adults, including the elderly.^{7–9} Regarding morbidity, extreme sleep durations are associated with lower scores of health-related quality of life (HRQOL) as, compared with persons who slept 7 hours, older adults who slept 5 or fewer hours or 10 or more hours a night had lower SF-36 scores.¹⁰ Multiple studies have illustrated that both short and long sleep durations are associated with

* Corresponding author.

E-mail address: lubetkin@med.cuny.edu (E.I. Lubetkin).

comorbidities such as depression, poor cognition, obesity, type 2 diabetes, and cardiovascular disease, including hypertension, coronary heart disease, and stroke.^{11–14} Furthermore, excessive daytime sleepiness has been associated with increased mortality for men and women,^{15–17} and daytime sleepiness has been shown to be an independent risk factor for stroke and other vascular events.¹⁷

The elderly population in the United States is projected to double between 2012 and 2050.¹⁸ A recent analysis using data from the 2014 Behavioral Risk Factor Surveillance System (BRFSS) indicated that 74% of adults 65 and older sleep seven or more hours a night.¹⁹ Compared to younger persons, the elderly are more likely to experience sleep disturbances, given the changes in sleep architecture along with a higher prevalence of medical, psychiatric, and cognitive conditions.²⁰ Among the community-dwelling elderly population, sleep disturbances are associated with increased frailty as well as an increased risk of falls.^{21–23} Falls are the leading cause of fatal and non-fatal injuries for adults aged 65 and older and a fall is a strong predictor of future nursing home placement among older adults living in the community.²⁴ With regard to screening and surveillance, although a large literature exists documenting the morbidity or mortality of inadequate or excess sleep, fewer investigations have examined both the morbidity and mortality of suboptimal sleep in one study. Furthermore, to date, no studies have examined the total burden of disease using a single number (QALYs) that reflects all aspects of health. A single number would be especially useful, given that too little or too much sleep may have differential impacts on morbidity and mortality. For example, too little sleep may have impact morbidity more than mortality while too much sleep impact mortality more than morbidity.^{5,25} A single number would enable direct comparisons to be made of the overall burden attributed to different diseases and health risk behaviors. Additionally, measuring QALYs facilitates population health surveillance, cost-effectiveness analyses, and the calculation of economic costs due to sleep disturbances.^{26,27}

The aim of this study is to estimate HRQOL, mortality, and the total burden of disease (HRQOL + mortality) attributable to sleep problems for U.S. adults aged 65 years and older. In estimating burden of disease, we calculated mean quality-adjusted life years (QALY) throughout the remaining lifetime according to respondents' self-reported sleeping habits and estimated the decreases in QALY for those with a satisfactory amount of sleep as compared to insufficient or excessive sleep. To complement duration of sleep, we examined impact (HRQOL, mortality, and total burden) due to participants' self-reported time to fall asleep and the type and number of sleeping problems. Finally, in order to understand the daytime impact of sleep problems, we examined items related to daytime function, including participants feeling unrested during the day, feeling excessively or overly sleepy during the day, and having difficulty carrying out certain activities due to being too sleepy or tired. Based on the literature, we hypothesized that inadequate or excessive sleep would be associated with a greater QALY loss, as compared to optimal levels of sleep. We hypothesized that a greater QALY loss would be noted in participants who reported taking a longer amount of time to go to sleep as well as participants having a greater number of sleep problems. We also hypothesized that daytime symptoms of unrest or sleepiness would be associated with a greater QALY loss, as compared to no daytime symptoms.^{7–17}

Participants and methods

Participants and data source

Our analyses used de-identified data produced by federal agencies in the public domain; data were downloaded from the Centers for Disease Control and Prevention Website (<ftp://ftp.cdc.gov/pub>). The NHANES is an ongoing survey of random samples from the non-

institutionalized civilian population of the United States²⁸ With the use of the design weight and adjustment for noncoverage and nonresponse, the distribution of respondents was representative of that of the U.S. general population.²⁸

Sleep related variables

The NHANES included a series of questions that intended to assess sleep disorders. *Sleep duration* was assessed with the survey item, “How much sleep do you usually get at night on weekdays or workdays?” and responses were coded in whole numbers. Sleep duration categories were also computed. Based on the literature, we categorized sleep as being short (≤ 6 hours), normal (7–9 hours) or long (≥ 10 hours). We also categorized the number of *minutes to fall asleep* into three categories: 15 minutes or less, 16 to 30 minutes, and more than 30 minutes. Examining sleep problems, participants were categorized according to having a *self-reported sleep problem*, including sleep apnea, insomnia, restless legs, and “other,” as well as according to the number of sleep problems. With regard to *daytime function*, we categorized the items “in the past month, how often did you feel unrested during the day, no matter how many hours of sleep you have had” and “in the past month, how often did you feel excessively or overly sleepy during the day” as “no” (never, rarely, and sometimes) or “yes” (often or almost always). Finally, we simplified a set of eight items assessing if the participant generally has *difficulty carrying out certain activities* because he/she is too sleepy or tired. For these items, responses were categorized according to two categories “no” (don't do this activity for other reasons, no difficulty, and yes, a little difficulty) and “yes” (yes, moderate difficulty and yes, extreme difficulty) if the participant reported “yes” to any of these items.

Morbidity

We ascertained respondents' HRQOL scores and mortality status from the 2005–06 and 2007–08 cohorts of the National Health and Nutrition Examination Survey (NHANES) Linked Mortality File.^{28,29} The NHANES included four core Healthy Days measures, which ask respondents to rank their general health from 1 (excellent) to 5 (poor) and to report numbers of their physically unhealthy days, mentally unhealthy days, and days with activity limitation during the past 30 days.³⁰ These measures cannot calculate QALY directly because they are not preference-based.^{30,31} Thus, a previously constructed mapping algorithm based on respondents' age and answers to these four questions was used to obtain values of the EQ-5D index, a frequently used preference-based HRQOL measurement, to calculate QALY.³¹ This algorithm provides valid estimates of EQ-5D scores for respondents,^{31,32} and the bias of estimated EQ-5D has been estimated to be less than 1% of that using the actual EQ-5D questions.³²

Mortality

The NHANES Linked Mortality File was created by the National Center for Health Statistics (NCHS) by linking the NHANES respondents to the National Death Index (NDI).²⁹ The respondents in this analysis had mortality follow-up through December 31, 2011. We included only respondents aged 65 years and older, yielding a total sample size of 2380.

Total burden of disease: Quality-adjusted life years

Quality-adjusted life years (QALY) is a health outcome measure that weights life-years lived with preference-based HRQOL scores.³³ Preference-based HRQOL, also called health utility value, is a summary score that assesses the values of one health state vs. another state. The value is anchored at 0 for death and 1 for perfect health,³⁴

Download English Version:

<https://daneshyari.com/en/article/7271729>

Download Persian Version:

<https://daneshyari.com/article/7271729>

[Daneshyari.com](https://daneshyari.com)