



Original Article

The association between sleep problems and perceived health status: A Japanese nationwide general population survey

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ARTICLE INFO

Article history:

Received 13 September 2011

Received in revised form 2 March 2012

Accepted 7 March 2012

Available online 19 May 2012

Keywords:

Perceived health status

Epidemiology

Sleep

Insomnia

Quality of life

Japan

ABSTRACT

Objective: Sleep problems in humans have been reported to impact seriously on daily function and to have a close association with well-being. To examine the effects of individual sleep problems on physical and mental health, we conducted a nationwide epidemiological survey and examined the associations between sleep problems and perceived health status.

Methods: Cross-sectional surveys with a face-to-face interview were conducted in August and September, 2009, as part of the Nihon University Sleep and Mental Health Epidemiology Project (NUSMEP). Data from 2559 people aged 20 years or older were analyzed (response rate 54.0%). Participants completed a questionnaire on perceived physical and mental health statuses, and sleep problems including the presence or absence of insomnia symptoms (i.e., difficulty initiating sleep [DIS], difficulty maintaining sleep [DMS], and early morning awakening [EMA]), excessive daytime sleepiness (EDS), poor sleep quality (PSQ), short sleep duration (SSD), and long sleep duration (LSD).

Results: The prevalence of DIS, DMS, and EMA was 14.9%, 26.6%, and 11.7%, respectively, and 32.7% of the sample reported at least one of them. At the complaint level, the prevalence of EDS, PSQ, SSD, and LSD was 1.4%, 21.7%, 4.0%, and 3.2%, respectively. Multiple logistic regression analyses revealed that DMS, PSQ, SSD, and LSD were independently associated with poor perceived physical health status; DIS, EDS, and PSQ were independently associated with poor perceived mental health status.

Conclusions: This study has demonstrated that sleep problems have individual significance with regard to perceived physical or mental health status.

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1. Introduction

Insomnia has been recognized as one of the most common difficulties in modern society. Epidemiological studies have reported that the prevalence of insomnia symptoms in the general population ranges from 17.3% to 48% [1–3] and is consistent when the insomnia criteria used are comparable.

The restorative function of sleep is undoubtedly essential for maintenance of both physical and mental health. Previous studies in several countries have indicated that insomnia is associated with perceived health [4–20]. Léger et al. [15] reported that the

severity of insomnia was correlated with perceived health, and Hajak [12] found that impairment of perceived health in individuals with severe insomnia was somewhat greater than that in individuals with long-standing physical illness.

Apart from insomnia, excessive daytime sleepiness (EDS) [9,17], short sleep duration (SSD) [18,21–23], long sleep duration (LSD) [18,21,23], and poor sleep quality (PSQ) [24] have also been associated with poor perceived health.

Several studies have suggested that sleep problems disturb both perceived physical and mental health [8,9,12,14–16], while recently it has been suggested that sleep problems have different effects on physical and mental health [11,17,20]. A cross-sectional study of older women suggested that sleep difficulty was significantly associated with poor perceived mental health, but not with poor perceived physical health [11]. A study of hypnotic medication use suggested that this was associated with deterioration of

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physical health, but not mental health [20]. A retrospective study found that insomnia was associated with changes in perceived mental health, but not with changes in perceived physical health [17].

With regard to the association between sleep problems and perceived health, most previous studies did not focus on the subtypes of sleep problems, i.e., difficulty initiating sleep (DIS), difficulty maintaining sleep (DMS), or early morning awakening (EMA). More recently, a 3-year follow-up study of an elderly population demonstrated that sleep-onset insomnia, but not other subtypes of insomnia, was a risk factor for depression [25]. A 12-year follow-up study of community-dwelling adults showed that sleep-maintenance insomnia, but not other subtypes, was a significant risk factor for the development of type 2 diabetes mellitus, suggesting that the consequences of various insomnia subtypes may differ [26]. Furthermore, few previous studies selected subjects from the general adult population; in most cases, the subjects were selected from a particular age group or community.

Here we conducted an epidemiological study of sleep problems and perceived health status in a large sample of the Japanese general adult population. We investigated the associations between sleep problems and perceived physical and mental health status, focusing on sleep problem subtypes. Our particular interest was focused on the associations of individual sleep problems with perceived physical and mental health statuses by adjusting for confounding relationships.

2. Methods

2.1. Selection of subjects

The Nihon University Sleep and Mental Health Epidemiology Project (NUSMEP) was conducted in August and September, 2009. This study was part of an omnibus survey commissioned to a polling agency. A three-stage stratified sampling method was used. Municipalities were stratified into 31 units representing 12 geographical blocks and three types of city scale (metropolises, other cities, and towns and villages) in proportion to the population distribution in 2008. At the first stage, the target unit was randomly selected from 31 units. At the second stage, a total of 8000 houses were randomly selected from a digital house map of each target unit. At the third stage, the interviewer visited the houses and found that residents were present in 4738 of them. An individual aged 20 years or older was randomly selected from each house. Finally 2559 individuals gave oral informed consent and participated in the survey (response rate 54.0%), completing a face-to-face interview with a trained interviewer by reference to a panel-listed structural questionnaire. For the present report, we obtained the electronic data file for the relevant interview component, with no personal identifiers.

The study was approved by the ethics committee of the Nihon University School of Medicine.

2.2. Procedures

2.2.1. Perceived physical and mental health statuses

Perceived physical health status was assessed with the question: “What do you think about your physical health status?” (“very sufficient,” “sufficient,” “normal,” “insufficient,” or “very insufficient”). Perceived mental health status was assessed with the question: “What do you think about your mental health status?” (“very sufficient,” “sufficient,” “normal,” “insufficient,” or “very insufficient”). For each question, the responses “insufficient” and “very insufficient” were considered to indicate “poor perceived physical or mental health status”, and “normal”, “suffi-

cient”, and “very sufficient” were considered to indicate “good perceived physical or mental health status”, thus dichotomizing the responses for multiple logistic regression analysis.

2.2.2. Sleep problems

We drew up seven questions that allowed us to infer patterns of sleep disturbance in the subjects, with reference to the Japanese version of the Pittsburgh Sleep Quality Index (PSQI) [27,28]. The following questions about sleep experienced during the previous month were included in the questionnaire:

1. How often have you had difficulty falling asleep? (“not at all,” “less than once a week,” “once or twice a week,” or “three or more times a week”): difficulty initiating sleep (DIS).
2. How often have you woken up frequently at night? (“not at all,” “less than once a week,” “once or twice a week,” or “three or more times a week”): difficulty maintaining sleep (DMS).
3. How often have you woken up too early in the morning? (“not at all,” “less than once a week,” “once or twice a week,” or “three or more times a week”): early morning awakening (EMA).
4. How often have you had trouble staying awake while driving, eating meals, or engaging in social activity? (“not at all,” “less than once a week,” “once or twice a week,” or “three or more times a week”): excessive daytime sleepiness (EDS).
5. How often have you taken medicine to help you sleep (prescribed or “over the counter”)? (“not at all,” “less than once a week,” “once or twice a week,” or “three or more times a week”): hypnotic medication use.
6. How do you rate your sleep quality overall? (“very good,” “fairly good,” “fairly bad,” or “bad”): poor sleep quality (PSQ).
7. How many hours of actual sleep do you get at night?: sleep duration.

For questions 1–4, participants who answered “once or twice a week,” or “three or more times a week” were classified as having symptoms.

For question 5, participants who answered “less than once a week,” “once or twice a week,” or “three or more times a week” were classified as “taking hypnotic medication.”

For question 6, participants who answered “fairly bad” or “bad” were classified as having “PSQ”.

For question 7, participants who answered “less than 5 h” were categorized as having “short sleep duration (SSD)” and those who answered “more than 9 h” were categorized as having “long sleep duration (LSD).”

2.2.3. Sociodemographic characteristics

Variables analyzed included gender, age, educational achievement, marital status, and city scale. Age was divided into three groups: 20–39 years, 40–59 years, and 60 years of age and older. Educational achievement was divided into three groups: junior high school, senior high school, and college or higher. Marital status was divided into two groups: married and unmarried. City scale was divided into three groups: metropolises, other cities, and towns and villages.

2.3. Statistical analysis

Gender and age differences for the prevalence ratio obtained in the present study were examined using χ^2 test. Multiple logistic regression analyses were utilized to examine the associations between poor perceived physical or poor perceived mental health status and the number of insomnia symptoms. Finally, a series of logistic regression analyses was conducted to examine the association between poor perceived physical health status or poor

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