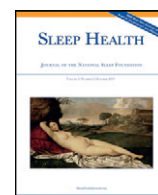




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Sickness absenteeism is associated with sleep problems independent of sleep disorders: results of the 2016 Sleep Health Foundation national survey

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ABSTRACT

Introduction: Sleep disorders are associated with sickness absenteeism (SA), at significant economic cost. Correlates of absenteeism are less well described in nonclinical samples.

Participants and methods: We determined the relationship between markers of inadequate sleep and SA in a sample of 551 working adults aged ≥ 18 years across Australia. We considered diagnosed obstructive sleep apnea (OSA) and insomnia symptoms, daytime symptoms, and sleepiness with respect to sickness absenteeism (missing ≥ 1 day of work in the past 28 days because of problems with physical or mental health).

Results: Sickness absenteeism was reported by 27.0% of participants and was more frequent in younger participants, university graduates, and those experiencing financial stress. Sickness absenteeism was independently associated with insomnia (odds ratio [OR] = 2.5, confidence interval [CI] = 1.5–4.0), OSA (OR = 9.8, CI = 4.7–20.7), sleep aid use (OR = 3.0, CI = 1.9–4.7), and daytime symptoms (OR = 3.0, CI = 2.0–4.6) and inversely associated with perception of getting adequate sleep (OR = 0.6, CI = 0.4–0.9). Associations persisted in the population free of insomnia and/or OSA.

Conclusions: In adults without clinical sleep disorders, sleep behaviors are contributing to sickness absenteeism. An increased focus at an organizational level on improvement of sleep hygiene is important to reduce lost work performance.

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Introduction

Sickness absenteeism is costly to business and is an indicator of poor health and well-being of workers,^{1,2} with absenteeism associated with chronic disease.^{3,4} Productivity losses and costs associated with sick leave account for an estimated \$32.5 billion annually in Australia.⁵ The absenteeism-related cost to employers and workers reflects a need to better understand modifiable behaviors which may contribute to sickness absenteeism.

Insufficient sleep is a plausible contributor to sickness absenteeism; indeed, even a short period of insufficient sleep is associated with adverse metabolic health outcomes.^{6,7} Insufficient sleep is also associated with obesity, type 2 diabetes, cardiovascular disease, and inflammation.^{7,8} Thus, it is plausible that insufficient sleep may contribute to higher rates of sickness absenteeism.

To date, there is no clear picture of the relationship between sleep problems and sickness absenteeism independent of sleep disorders such as insomnia and obstructive sleep apnea (OSA), both of which have previously established relationships with sickness absenteeism.^{9,10} Although a 2014 study of sickness absence and sleep duration revealed that sleep disturbance is associated with periods of sickness absence, this finding was limited to periods of medically confirmed leave > 10 days.¹¹ This provides insight into the

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potential impact of sleep disturbance on long periods of absence but does not clarify whether shorter periods of sickness absenteeism are associated with sleep disturbance. Further, such associations in workers without OSA or insomnia have received little attention, limiting our capacity to provide evidence-based advice on suitability of sleep education for the workforce to improve productivity and reduce costs associated with sickness absenteeism.

The primary aim of the present study was to determine the association between sleep behaviors and clinical sleep disorders with sickness absenteeism in a sample of Australian adults. The secondary aim was to determine whether these associations differed in those free of OSA and insomnia while accounting for important influencing factors including age, shift work (SW), and sociodemographic factors.

Participants and methods

Survey methodology

The survey was conducted in March 2016 in a national sample of 1011 adults (≥ 18 years) across Australia, with representativeness for age, sex, location, and an indicator of socioeconomic status.¹² Final analyses were conducted in participants who answered the sickness absenteeism question ($n = 551$ of 554 workers). Survey questions were drawn from the 2002 US National Sleep Foundation Sleep in Adults survey¹³ with some additional questions from the Australian 2010 survey.¹⁴ The survey was conducted online by the Survey Sampling International research organization using a 3-stage randomization process to minimize risk of bias and has been described previously.¹² The survey methodology was approved by The University of Adelaide Office of Research Ethics (H-2016-029).

Sickness absenteeism and indicators of sleep problems

Participants indicated the number of days in response to the question “In the past 4 weeks (28 days), how many days did you miss an entire work day because of problems with your physical or mental health?” Daytime symptoms were defined as experiencing ≥ 1 of 3 daytime consequences a minimum of 3 times a week, assessed by asking “In the past month how often have you....

1. experienced sleepiness that interfered with your daily activities,
2. felt fatigue or exhaustion, or
3. felt irritable or moody?”

Adequate sleep ≥ 3 nights per week was determined with the question “In the past month how often have you felt you got adequate or satisfactory sleep?” Sleep aid use was determined with “How frequently do you use the following sleep aids specifically to help you sleep?” (1) Over-the-counter or store-bought sleep aids; (2) sleep medication prescribed by a physician; (3) alcohol, beer, or wine; (4) an eye mask or ear plugs; or (5) melatonin. For questions on adequate sleep and sleep aid use, response options included (1) rarely or never, (2) a few nights a month, (3) a few nights a week, and (4) every or almost every night. Sleep aid use was analyzed using 2 approaches: (a) using at least 1 of the 5 sleep aids ≥ 3 nights a week (prescribed and nonprescribed) and (b) using prescribed sleep medication only ≥ 3 nights a week.

Respondents were asked to estimate usual sleep duration on the night preceding work and nonwork days in hours and minutes. Short sleep duration on work days was categorized as ≤ 5 hours per night according to categories used in existing published literature.^{15–17} Excessive daytime sleepiness was determined as ≥ 11 on the Epworth Sleepiness Scale (ESS).¹⁸ Self-reported physician-diagnosed medical conditions were recorded. Body mass index was calculated from self-reported height and weight;

overweight and obesity were classified according to World Health Organization criteria.

Diagnosed OSA was determined with “Have you been diagnosed with sleep apnoea with an overnight sleep study?” Possible undiagnosed OSA was subsequently defined in those reporting “no”/“don't know” as (1) witnessed breathing pauses at least 3 times a week or (2) witnessed breathing pauses a few times per month with loud snoring at least 3 times a week. Insomnia was classified with the *International Classification for Sleep Disorders-3* criteria as follows¹⁹: (1) sleep initiation or maintenance problems at least 3 times a week (≥ 1 of difficulty falling asleep, waking a lot during the night, waking too early, can't get back to sleep), (2) adequate opportunity and circumstances to sleep (“Does your current work schedule or typical weekday routine, including your duties at home, allow you to get enough sleep?”), and (3) daytime consequences at least 3 times a week (≥ 1 of sleepiness interfered with activities, felt fatigue/exhaustion, felt irritable/moody).

Sociodemographic characteristics included sex, age (10-year categories), gross household income, highest education level obtained, and financial stress (assessing a participant's family money situation and ability to save). SW was determined with the question “Thinking about the past 3 months, which of the following best describes your work schedule?” Options included regular day, evening, or night shift, rotating or “other.” Responses were categorized as either day work (regular day) or SW (all shift types) for analysis. Work hours were obtained by the question “On average, how many total hours per week do you work at a job for which you are paid?” and categorized to reflect part time (≤ 35 hours per week), full time (35–44 hours per week; in line with Australian Bureau of Statistics definition of full-time work), and long hours (45+ hours per week).²⁰

Data were analyzed using IBM SPSS version 24.0 (IBM Corporation, Armonk, NY). Differences in distribution of study participant characteristics by absenteeism status were determined with the Pearson χ^2 statistic or Mantel-Haenszel test of trend. A series of logistic regression models determined associations of sickness absenteeism with each of the primary independent sleep disorder/behavior/perceptions variables adjusted for age, SW, financial stress, and education. Subsequent models determined the contribution of sleep problems to sickness absenteeism in a population free of OSA and insomnia.

Results

Representativeness of the study sample

Characteristics of the workers in this sample were compared with data from the Australian Bureau of Statistics (ABS) from August 2016.²⁰ Representativeness of the workers in this sample to current Australian estimates was confirmed with a comparable percentage of male respondents (cohort, 52.3%; ABS, 53.7%), age (cohort: 18–44, 59.2%; 45–64, 35.4%; 65+, 5.4%; ABS: 15–44, 60.5%; 45–64, 35.6%; 65+, 3.8%), and full-time workers (cohort, 45.2%; ABS, 46.0%). Workers with a bachelor's degree or higher were slightly overrepresented in our cohort (43.2%) compared with national data (31.8%). This is consistent with findings from the overall survey sample of $n = 1101$.¹²

Sickness absenteeism (missing ≥ 1 work day in the past 4 weeks) was reported by 27.0% ($n = 149$) of the eligible sample; 7.3% reported missing 4 or more days. Sickness absenteeism was associated with younger age, tertiary education, and financial stress (Table 1). Sickness absenteeism was also more common in shift-workers, but this was not statistically significant. No significant associations were seen for sex or work hours. All specific health conditions except arthritis and hypertension occurred with significantly increased frequency in those reporting sickness absenteeism compared with

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