



## Original Article

# The influence of job stress, social support and health status on intermittent and chronic sleep disturbance: an 8-year longitudinal analysis

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## ABSTRACT

**Objective:** To determine the role of health status and social support in the relationship between job stress and sleep disturbance, for both intermittent and chronic sleep disturbance.

**Methods:** A total of 1946 mid-life adults completed three questionnaires spanning an 8-year time frame. Sleep disturbance was assessed at each time point, and participants were classified as experiencing intermittent, chronic or no sleep disturbance across this 8-year period. Independent variables included a range of job stress measures, social support, physical and mental health, and demographic characteristics. **Results:** After controlling for physical and mental health, perceived lack of job marketability increased risk of intermittent sleep disturbance (odds ratio (OR) = 1.33,  $p = 0.012$ ). No other job stress measures were associated with either intermittent or chronic sleep disturbance after adjusting for years of education, social support, and employment status. Poorer mental and physical health status, although significantly increasing odds for intermittent sleep disturbance, represented a significantly greater increase in the odds for chronic sleep disturbance over and above intermittent disturbance (OR = 0.96,  $p < 0.001$  for both SF-12 mental and physical health).

**Conclusion:** This population-based cohort study found little evidence that job stress had an independent effect on chronic or intermittent sleep disturbance independent of health, social support, and education. Risk profiles for intermittent and chronic sleep disturbance did not differ with regard to job stress; however, various demographic and social support factors were distinguishing factors. Health status, both physical and mental, also showed a significantly greater impact on chronic sleep disturbance than intermittent sleep disturbance. Karasek's model of job strain had little value in predicting sleep disturbance outcomes.

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## 1. Introduction

Sleep disturbance is experienced widely, with over 37% of the adult population experiencing difficulties initiating or maintaining sleep at any given time [1] and 6–8% meeting clinical criteria for insomnia [2]. Aside from causing significant distress and disease burden [3], sleep disturbance is a risk factor of both physical and mental disorders, including diabetes [4], coronary artery disease [5] and increased mortality in general [6,7], whilst mental health problems for which sleep disturbance elevates risk most commonly include depression [8–10] and anxiety disorders [11–13].

Alongside a number of other factors relating to demographics [14], psychological risk [15–19] and cognitive-behavioural profile

[20], there is some good evidence that job-related stress increases risk of sleep disturbance and insomnia. Although job stress impacts significantly on both physical [21] and mental health [22], sleep disturbance is one of the most common health impacts of occupational stressors [23]. Job-related factors such as working very long hours (>55 h/week) increase risk of sleep disturbance [24], and independent of lifestyle factors or working hours [25], job-related stress factors such as high job demands [26–28], low job control [25,26,28], work- and role-related conflict [29,30], low employment opportunities and physical working environment [30], job dissatisfaction [30] and perceived job difficulty [31] all have a significant negative impact on sleep. However, some studies have uncovered inconsistent effects, such as effort-reward imbalance having an effect on men but not women [32], whilst others, such as a cross-lagged study of the Swedish Longitudinal Occupational Cohort of job demands upon later sleep problems, suggest only

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small effects [33], the latter in contrast to the much stronger associations of job stressors on concurrent sleep problems often seen in both the academic literature [32] and lay press [34].

Evidently, there remain unanswered questions when it comes to how job stress relates to sleep disturbance, and this paper aims to address three such interrelated issues: (1) how different elements of job stress relate to the maintenance/chronicity of sleep disturbance; (2) how physical and mental health interact with job stress and sleep disturbance; and (3) the role that social support plays in these relationships.

First, how job stress relates to maintenance (or chronicity) of sleep disturbance requires further analysis. The chronicity of sleep disturbance increases risk of onset of mood and anxiety disorders and increases the risk of relapse [35,36]. Therefore, it is important to identify risk factors for chronic sleep disturbance separately, as chronic problems with sleep may indicate increased risk of mental health problems, above and beyond the risk of mental health problems associated with intermittent sleep disturbance. Furthermore, chronic insomnia may have different causes to intermittent insomnia, including chronic pain [37] and hormonal changes [38]. It is common for sleep disturbance to occur intermittently, precipitated by specific stressors and then remitting once these stressors either dissipate naturally or are adapted to [39]. Certain factors, however, increase the likelihood that sleep disturbance will become chronic. Such maintaining factors, as they are called, tend to be cognitive-behavioural in nature [40], such as holding dysfunctional beliefs about sleep [41] and engaging in maladaptive sleep-related behaviours [42]. A small amount of research, however, conducted by Jansson-Frojmark et al. [43,44] indicates that certain job-stress-related factors may also maintain sleep disturbance. Experiencing low influence over decisions and high work demands (also known as Job Strain, as per Karasek's classic demand-control model of job strain, the predominant theory of job stress [45]), for instance, may contribute to sleep disturbance becoming chronic [43]. This requires further exploration, especially taking health status into account.

Second, although sleep disturbance increases risk of health problems, and vice versa, the combined impact of job stress, sleep disturbance, and health problems is unclear. There is no consensus as to whether the relationship between job stress and sleep disturbance is attributable to health status – be it physical or mental. To illustrate: job stress may lead to sleep disturbance because job stress is more likely to be experienced by people with a pre-existing physical or mental health problem (i.e., health is a confounder). Alternatively, job stress may increase risk of physical and mental health problems, which may in turn lead to sleep disturbance (i.e., health is a mediator). Although the current study is not designed to detect such differences, the extent to which mental and physical health status relates to job stress and sleep disturbance is examined.

Third, given that social support is a protective factor for sleep disturbance [26–28,30,43,46–48], the influence of social support on sleep disturbance in the context of job stress, taking health status into account is examined [49].

Using multinomial logistic regression analyses, and utilising data collected from a mid-life cohort at three time points over an 8-year period in order to ascertain maintenance/chronicity of sleep disturbance, the current study compared (1) people who experienced intermittent sleep disturbance with people who experienced no sleep disturbance, and (2) people who experienced chronic sleep disturbance with people who experienced intermittent sleep disturbance. Based on these two regression models, analyses examined (i) whether job strain and other elements of job stress were associated with maintenance/chronicity of sleep disturbance, (ii) whether the effects of job stress on sleep disturbance (both intermittent and chronic) could be explained by existing physical and mental health problems, and (iii) whether social support impacted on this relationship.

The present study sought to identify whether, and to what extent, social stressors had a long-term impact upon the presence of intermittent and chronic sleep disturbance. Specific study hypotheses are that (a) job strain will significantly contribute to the model predicting odds of chronic sleep disturbance compared with intermittent sleep disturbance whereas other elements of job stress will significantly predict the odds of intermittent sleep disturbance compared with no sleep disturbance. (b) Physical and mental health will account for a significant amount of variance in both models, potentially negating the influence of some of the other variables in the final model. (c) Positive social support (from both family and friends) will significantly decrease odds of sleep disturbance in both models, and negative social support (from both family and friends) will significantly increase odds of sleep disturbance in both models.

## 2. Method

### 2.1. Participants

The PATH Through Life Project is a longitudinal study examining the health and well-being of people in the community who were 20–24, 40–44 and 60–64 years of age at the beginning of the study [50]. Starting in 2001, each cohort has been followed up every 4 years over a total period of 20 years. Participants were sampled from the electoral rolls for the city of Canberra, Australia, and in the neighbouring town of Queanbeyan. Registration on the electoral roll is compulsory for Australian citizens. Results presented here concern the 40–44 cohort, from the first three waves of the study. This age cohort was chosen because it encompasses prime working age, and because data on job strain were only collected in this cohort. Data from the three waves were collected in 2001, 2004 and 2008. At the first wave, 2530 from the 40s group completed interviews. At the second wave, when participants were aged 44–48, 2345 (92.7%) completed interviews while at the third wave (ages of 48–52), 2172 (85.8%) completed interviews. Because job stress was the explanatory variable of primary interest, 253 participants who did not have employment at the time of the first assessment were excluded from the analyses. The remaining participants who completed all three interviews ( $n = 1946$ ) were included in the analysis sample. An additional 19 participants (1.0%) were excluded from the logistic regression analyses due to missing data on one or more independent variables. Approval for the research was obtained from The Australian National University's Human Research Ethics Committee and written informed consent was obtained from participants.

### 2.2. Procedure

Participants completed interviews at a convenient location, usually the participant's home or the Centre for Mental Health Research at the Australian National University. Most of the interview was self-completed on a palmtop or laptop computer. However, professional interviewers were required for physical tests, some cognitive tests and to obtain a cheek swab used for genetic testing.

### 2.3. Measures

The outcome measure was a three-category measure of sleep disturbance (none/intermittent/chronic) over the 8-year period. Sleep disturbance at each time point was indicated by the endorsement of two or more sleep-related items from the Goldberg Depression and Anxiety Scales [51]: 'Have you been sleeping poorly?', 'Have you had difficulty falling asleep?' or 'Have you been

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