International Journal of Industrial Ergonomics 43 (2013) 257–263

Contents lists available at SciVerse ScienceDirect

International Journal of Industrial Ergonomics

journal homepage: www.elsevier.com/locate/ergon

Self-reported sleep disorders/disturbances associated with physical symptoms and usage of computers

Leena Korpinen [a,b,*], Rauno Pääkkönen [c]

[a] Environmental Health, Tampere University of Technology, Tampere, Finland
[b] School of Medicine, University of Tampere, Tampere, Finland
[c] Finnish Institute of Occupational Health, Tampere, Finland

ARTICLE INFO

Article history:
Received 8 November 2011
Received in revised form
29 December 2012
Accepted 7 May 2013
Available online 13 June 2013

Keywords:
Sleep disorders
Sleep disturbances
Symptoms
Questionnaire
Computer

ABSTRACT

The aim of our work is to study self-reported sleep disorders/disturbances associated with physical symptoms and usage of computers, and to analyse physical symptoms of different groups, usage of desktop computers, usage of portable computers or mini-computers, and background information. The study was carried out as a cross-sectional study by posting a questionnaire to 15 000 working-age persons. The responses (6121) included 1016 (16.6%) respondents, who reported that they suffered quite often or more often sleeping disorders/disturbances during the last 12 months. Of those respondents 708 (69.7%) were employed. In statistical analyses comparisons have been done between: 1) workers with quite often or more often sleep disorders/disturbances and without and 2) employed and unemployed persons with quite often or more often sleep disorders/disturbances. When comparing employed persons with and without sleep disorders/disturbances we found significant differences in self-reported physical symptoms and mental symptoms. In addition, there were differences in the usage of desktop computers at leisure. In the future it is important to take into account that persons with sleep disorders also have other differences e.g., in symptoms as persons without sleep disorders. Situations can also be quite different if a person is in employed or unemployed.

Relevance to industry: Sleep disorders/disturbances are quite common symptoms that have their effect on the productivity and well-being of industrial workers. A large-scale questionnaire offers a good reference for evaluating the prevalence of the self-reported sleep disorders/disturbances associated with physical symptoms and usage of computers.

1. Introduction

Sleep disorders/disturbances disturbances, such as chronic insomnia, are common problems in populations of Western industrialised countries (Koskenvuo et al., 2010). For example according Buscemi et al. (2005) and Ohayon and Partinen (2002) 10–35% of persons suffer from insomnia symptoms. Sleep disorders/disturbances have been shown to be associated with many health risks and medical conditions (Buscemi et al. , 2005); Healey et al., 1981; Vahtera et al., 2007).

Swanson et al. (2011) studied how sleep impacts work performance and how work affects sleep in individuals not at-risk for a sleep disorder and assessed work performance outcomes for individuals at-risk for sleep disorders. Their study included insomnia, obstructive sleep apnea (OSA) and restless legs syndrome (RLS). In addition they characterized work performance impairments in shift workers (SW) at-risk for shift work sleep disorders relative to SW and day workers. Based on the answers of the 1000 Americans, who worked 30 h or more per week, they classified 37% of respondents as at-risk for any sleep disorder. They found that presenteeism was a significant problem for individuals with insomnia symptoms, OSA and RLS when they compared results with respondents not at-risk. In addition other research groups fould that reduced productivity and absenteeism are the most widely work performance impairments in individuals with insomnia (Daley et al., 2008; Erman et al., 2008; Godet-Cayre et al., 2006; Kleinman et al., 2009; Leger et al., 2002, 2006; Ozminkowski et al., 2007; Walsh et al., 2007). Leger et al. (2002) also reported that occupational accidents were more common among French employees characterized as experiencing severe insomnia as compared with matched good sleepers.

* Corresponding author. ELT, Environmental Health, Tampere University of Technology, P.O. Box 589, 33101 Tampere, Finland. Fax: +358 3 3115 3751.
E-mail address: leena.korpinen@tut.fi (L. Korpinen).

0169-8141/$ – see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.ergon.2013.05.004

Sleep complaints are connected to cardiovascular disease (Schwartz et al., 1999; Wolk et al., 2005). In some publications the hypothesis that the chronic insomnia is an independent risk factor for cardiovascular disease has been tested and some positive findings have reported (Mallon et al., 2002; Nilsson et al., 2001; Schwartz et al., 1998). Spiegelhalder et al. (2011) investigated also the association between primary insomnia, defined as subjectively reported sleep disturbance in the absence of any other pathology or substance intake, and alterations in polysomnographically determined nocturnal heart rate (HR) and heart rate variability (HRV). They evaluated 104 participants (58 with primary insomnia, 46 healthy controls). They summarized that a lower wake-to-sleep HR reduction as well as a lower standard deviation of RR intervals (SDNN) were found in subjectively reported insomnia, while resting HR and frequency domain measures of HRV were normal. They also found that a reduced parasympathetic activity compared to healthy controls.

Urponen et al. (1988) studied self-evaluations of factors promoting and disturbing sleep in Finland. Their aim was to describe the factors which middle-aged urban people in Finland perceived as promoting or disturbing sleep. They showed that the quality of sleep is determined by numerous factors such as social and psychological factors, health status, external sleeping conditions, lifestyle and living habits. For men the most important factor which disturbed falling asleep or quality of sleep was work-related pressure and fatigue (20%) and in the women's ranking work problems appeared third (Urponen et al., 1988). Ohayon and Sagales (2010) reported that in Spain 20.8% of those sample reported at least one insomnia symptom occurred at least three nights per week. The prevalence in women was 23.9% and in men 17.6% and it increased with age. In addition, other research groups found that sleep complaints tend to be more prevalent among women and older people, the widowed and divorced, and among those in lower socioeconomic positions (Arber et al., 2009; Ribet and Derriennic, 1999; Roth and Roehrs, 2003; Sekine et al., 2006).

Lallukka et al. (2010) studied how physical working conditions, psychosocial working conditions and work–family conflicts are associated with sleep complaints, and whether health behaviours explain these associations. They used questionnaire surveys collected in 2001–2002 among 40–60-year-old employees of the City of Helsinki in Finland. They found that physically strenuous working conditions, psychosocial job strain and work–family conflicts can increase sleep complaints (Lallukka et al., 2010).

In another Finnish study (Perkiö-Mäkelä et al., 2006), 3122 persons (51% male and 49% female) ages 25–64 were interviewed by phone. The interviewed group was the same as Finnish work-aged population in general; 70% employed and 8% unemployed. According to the interviews: 48% of the participants had pain in the neck–shoulder, 32% had pain in the arms and shoulder, 28% had hip and lower back pain, 28% had weakness, 25% had insomnia, 24% had pain in the hips and legs, 23% had tension and nervousness, 22% had irritation, 19% had pain in the wrists and fingers and 13% had depression (Perkiö-Mäkelä et al., 2006). The link between the symptoms and sleep disorders was not studied in this study.

The use of new and different technical equipment has increased in many jobs. According to the 'Fourth European Working Condition Survey' Report (Parent-Thirion et al., 2007) around 26% of workers work with a computer all, or almost all, of the time. In 1990, the equivalent figure was around 13% (Parent-Thirion et al., 2007).

Thomée et al. (2010) studied with qualitative methods perceived connections between information and communication technology use and mental symptoms (also sleep disorders) among young adults. They interviewed 16 women and 16 men (ages 21–28 years). They discovered that central factors which appeared to explain high quantitative ICT use were: personal dependency, demands for achievement, availability originating from the domains of work (study, social life, and individual aspirations).

The aim of our work is to study self-reported sleep disorders/disturbances associated with physical symptoms and usage of computers comparing: 1) workers with quite often or more often sleep disorders/disturbances and without, and 2) employed and unemployed persons with quite often or more often sleep disorders/disturbances. The aim is to analyse groups of physical symptoms, usage of desktop computers, usage of portable computers or mini-computers, and background information such as age and gender.

Our work is part of a larger questionnaire study on the possible influence of new technical equipment on the health of the working-age population. The results of physical and psychological symptoms have been reported earlier (Korpinen et al., 2009; Korpinen and Pääkkönen, 2009).

2. Methods

2.1. Study population and questionnaire

The questionnaire was sent to 15 000 Finns in 2002. The study focused on the working age population. Therefore, the questionnaire was only sent to people between the ages of 18–65. Names and addresses were obtained as a random sample from the Finnish Population Register Centre. The study design was approved by the Ethical Committee (Pirkanmaa Health District, Finland, decision R02099). The questionnaire included six sections: 1) background information (such as age, gender, marital status, education, occupation, and home county), 2) the familiarity and use of given technical devices at leisure and at work, 3) physical loading and ergonomics, 4) psychological welfare 5) accidents and close call situations at leisure or at work and 6) an open-ended question 'other observations concerning technology and health'. The details of the questionnaire have been reported in an earlier article (Korpinen et al., 2009).

2.2. Statistical analysis

First, only the respondents, who had quite often or more often sleep disorders/disturbances were chosen. In addition, using the data, subgroups were made based on gender and work situations (employed and unemployed persons). The statistical analyses were done using the IBM SPSS Statistics version 19. The options for question '13) Have you had an ache, pain or numbness in the following body part during the last twelve months? a) in wrists and fingers, b) in elbows and forearms, c) in neck, d) in shoulders, e) in hip and lower back, f) in feet' was classified so that answers: 'cannot say',' not at all' and 'sometimes' were coded 0 (no symptoms), quite often was 1, often was 2, and very often was 3. In addition, the question '16) Have you suffered a) sleeping disorders/disturbances, b) depression, c) exhaustion at work, d) substance addiction, e) anxiety or f) fear situations during the last 12 months?' were codified in the same way.

In the first analysis background information (age, gender, marital status, education and occupation), daily usage of computers at work (questions 11b and 11e) and symptom questions 13a–f and 16a–f were analysed with independent samples Mann–Whitney *U*-test. In analyses of employed and unemployed persons we compared groups: 1) respondents, who had quite often or more often sleeping disorders/disturbances and 2) respondents, had not quite often or more often sleeping disorders/disturbances. The same analyses were also made for subgroups of women and men.

In the second analysis of independent samples Mann–Whitney *U*-test we used the same questions (background information, usage