



A population-based survey of sleep disturbances in middle-aged women – Associations with health, health related quality of life and health behavior



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ABSTRACT

Objective: To evaluate the prevalence of sleep disturbances and the contributing factors in middle-aged women.

Methods: In a cross-sectional design of the long-term, prospective follow-up study project of 1278 families from a random population sample, the mothers of 15 year-olds were asked to fill in a questionnaire about sleep, health, health related quality of life, and health behavior.

Results: Quality of sleep was reported by 32% of women as good, 43% quite good, 12% average, 10% quite poor and 3% as poor. The most frequent sleep disturbance was awakenings in the night, which 60% of the women experienced at least once a week. Difficulty falling asleep and waking too early in the morning were reported as a weekly occurrence by 16% and 20%, respectively. Morning sleepiness was experienced by 42% and daytime sleepiness by 32%. Chronic diseases and use of medications was associated with various sleep disturbances. Both somatic and mental symptoms increased the risk for sleep disturbances. **Conclusions:** Almost one-quarter of middle-aged women is dissatisfied with their quality of sleep. Women who have chronic disease or use of medications for basic diseases often suffer from sleep disturbance, which is also associated with the health related quality of life. Further analysis of the risk factors is needed to improve the sleep health of middle-aged women.

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1. Introduction

Although sleep disturbances are common both in women and men across all age ranges, the literature supports female dominance [1–3]. Women are 1.3–1.6 times more likely than men to report sleep disturbances [4–7]. Biologic vulnerability precipitating or aggravating sleep disturbances may be associated with female reproductive phases, such as menstruation cycle [8,9] puerperium [8] or menopause [8,10] and comorbid conditions, sociological and psychological factors, and higher rates of depression and

anxiety. Disturbed sleep, in both genders, is often linked with increased work absenteeism, disability and health care costs [11–13] and has been shown to predict morbidity and mortality [14–17].

In both genders, sleep disturbances may be associated with diseases or disorders, or are self-induced by life-style [1,16,18,19]. Due to the complexity of the causal relationships, recently, the comorbid nature of sleep disturbances has gained increasing support [17,18,20,21]. Sleep disorders are found to be comorbid with psychiatric disorders, especially with depression and anxiety [16,17], somatic diseases such as cardiovascular, neurological, respiratory, gastrointestinal, endocrinological and skin diseases as well as malignancies [22,23]. The coexistence of both psychiatric and somatic disorders causing sleep disturbances may further complicate the disorders [17]. Patients with sleep disorders are more likely to have multiple comorbid conditions than those without sleep

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disorders [24]. Sleep disorders appear to be more severe in people with chronic somatic or psychiatric disorders compared to those without the same disorders [17,18]. In addition, several medications cause, or aggravate, sleep disorders [17,21]. However, there are also results showing that insomnia in postmenopausal women is not associated with incidence of chronic disease [25].

Stress [26], pain [13,26,27], poor quality of life [11,28,29] and obesity [30] have been shown to impair sleep quality. Also life-style factors such as smoking [14,31] and consumption of alcohol [14,32], have an impact on sleep. With aging there is also deterioration in sleep quality that manifests later in healthy subjects [33,34].

Recognizing various related contributors to sleep disorders enables healthcare professionals to better identify and treat sleep problems in middle-aged women. Thus the first objective of our study was to evaluate the prevalence of various subtypes of sleep disturbances and the daytime consequences. The second objective was to estimate the associations of possible contributing factors, like health, health related quality of life, sociodemographic factors, as well as health behavior, such as body mass index (BMI), physical exercise, smoking and alcohol intake, with sleep disturbances.

2. Material and methods

2.1. Subjects

The present study is a part of the Finnish Family Competence Study (FFC) in the Province of Turku and Pori in South-Western Finland [35]. The source population was an unselected sample from two of the 21 Central Hospital regions of Finland and the subject collection was based on randomized cluster sampling as described in more detail previously [35]. All 67 maternity health care clinics and 72 well-baby clinics in the 11 health authority areas participated in the baseline study. Families expecting their first child and having their first visit to a maternity health care clinic were selected in the study population. In Finland more than 99% of women use the public maternity health care clinic services at least once during pregnancy [36]. There were 1713 families in the study area. Maternity health care nurses offered 1582 women the possibility to participate, 1443 of them gave informed consent for participation, while the remaining 139 (8.8%) women refused to participate in the study. The number of original potential study families was 1278. After delivery, the study group was followed eight times (time points of three, nine, 18 months and three, five, seven, 12, and 15 years) and in every check-point, there were different questionnaires about the life of the children and the mothers. The data for the present study ($n=850$) was collected as a cross-sectional study at the time point of 15 years, since it was the only inquiry about the sleep quality issues. The study had approval from the Ethics Committee of Turku University Central Hospital.

2.2. Questionnaires

Sleep quality was assessed using the Basic Nordic Sleep Questionnaire [37]. The questionnaire consisted of 21 questions about sleep quality and sleep disturbances over the past three months. Since various sleep disturbance subtypes and daytime consequences were the focus of the present study only 11 questions were applied (Appendix). The symptoms were assessed on a scale from 1 to 5 (1 = never or less than once a month, 2 = more often than once a month but less than once per week, 3 = in 1–2 days a week, 4 = in 3–5 days a week, 5 = in 6–7 days a week).

Health state, health-related quality of life, sociodemographic factors and health behavior factors were used as explanatory variables. Questions about health state included the existence of long-term disease (yes/no) and use of a regular medication

for some basic diseases (yes/no). Health related quality of life questions were with regard to somatic health (healthy–sick), vitality (vital–stressed/tired), mental stability (balanced–unbalanced) and mood (satisfied–melancholic) on a scale from 1 to 5, where 1 was the best and 5 the worst option. Sociodemographic factors included age, employment status (work corresponding to education, work not corresponding to education, house-wife, unemployed, student) and working status (fulltime, part-time, shift work). Health behavior factors considered were body mass index (BMI, kg/m²), frequency of physical exercise (greater or equal than once a week; yes/no), smoking (yes/no) and alcohol intake (no, rarely, 1–2 times/month, 1–2 times/week, more often).

2.3. Statistical analysis

The data are presented as means and standard deviations (SD) or percentages. Univariate associations between explanatory factors and various sleep disturbances were analyzed using a cumulative logistic regression. The associations were quantified with cumulative odds ratios (COR) and 95% confidence intervals. Stepwise cumulative logistic regression analysis (inclusion criteria $p < 0.05$, exclusion criteria $p \geq 0.05$) was used for further multivariable analysis to identify explanatory factors independently associated with various sleep disturbances. Because of few cases in poor health related quality of life-scores (somatic health, vitality, mental stability, mood), classes 4 and 5 were combined. Quality of life was analyzed both as categorical (1–4) and continuous variables. Since the results were essentially the same, only the data from the categorical analysis is presented here. Age was calculated as continuous variable and BMI in 5 kg/m² incremental steps (<20 kg/m², 20–25 kg/m², 25–30 kg/m², 30–35 kg/m², >35 kg/m²). Alcohol intake was calculated in three categories (no, combined rarely or once or two times per month and combined once or more often per week). P -values less than 0.05 were considered statistically significant. Statistical computations were performed using SAS system for Windows, release 9.1.3 (SAS Institute, Cary, NC, USA).

3. Results

3.1. Background variables

At the 15 years check-point used in the present study the mean age of the women was 41.9 years (SD 4.0, range 32.0–58.0 years) and the mean BMI 24.9 kg/m² (SD 4.1 kg/m², range 17.0–45.0 kg/m²). Thirty-two percent had some chronic illness and 28% took a regular medication. Seventy percent were in work corresponding to their education, 16% in work not related to their education, further 7% were house-wives, 5% unemployed and the remaining 2% were students. Seventy-four percent worked full-time, 8% part-time and 18% were shift workers. Seventy-four per cent took physical exercise at least once a week, and 18% were smokers. The use of alcohol was as follows: 10% never, 66% rarely or once or twice per month and 24% once or more often per week. The percentages of various health related quality of life categories are described in Table 1.

3.2. Sleep quality

Subjective sleep quality was rated by 32% of women as good, 43% quite good, 12% average, 10% quite poor and 3% poor subjective quality of sleep. The frequencies of various sleep disturbances are presented in Table 2. Awakening in the night was the most frequent sleep disturbance reported at least once a week by 60% of the women. The frequencies of the awakenings per night were as follows: once 50%, twice 18%, three to four times 7%, and at least five times 1%. Sixteen per cent had difficulties in falling asleep at

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