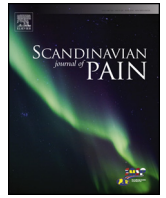




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## Relationship of musculoskeletal pain and well-being at work – Does pain matter?

Kirsi Malmberg-Ceder<sup>a,b,\*</sup>, Maija Haanpää<sup>c,d</sup>, Päivi E. Korhonen<sup>e</sup>, Hannu Kautiainen<sup>f,g,h</sup>, Seppo Soinila<sup>b,i</sup><sup>a</sup> Department of Neurology, Satakunta Central Hospital, Pori, Finland<sup>b</sup> Department of Neurology, University of Turku, Turku, Finland<sup>c</sup> Mutual Insurance Company Etera, Helsinki, Finland<sup>d</sup> Department of Neurosurgery, Helsinki University Central Hospital, Helsinki, Finland<sup>e</sup> Department of General Practice, Turku University and Turku University Hospital, Turku, Finland<sup>f</sup> Department of General Practice and Primary Health Care, University of Helsinki, Helsinki, Finland<sup>g</sup> Unit of Primary Health Care, Kuopio University Hospital, Kuopio, Finland<sup>h</sup> Folkhälsan Research Centre, Helsinki, University of Helsinki, Helsinki, Finland<sup>i</sup> Division of Clinical Neurosciences/General Neurology, Turku University Hospital, Turku, Finland

## HIGHLIGHTS

- 2/3 of Finnish female city employees suffer from chronic musculoskeletal pain.
- Work engagement had significant negative relationship with burden of pain.
- Musculoskeletal pain *per se* did not correlate with work engagement.
- Work engagement was significantly associated with psychosocial factors.

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## ABSTRACT

**Background and aims:** Musculoskeletal pain is a common symptom and many people even with chronic pain continue to work. The aim of our study is to analyze how musculoskeletal pain affects work well-being by comparing work engagement in employees with or without pain, and how pain-related risk of disability is associated with work engagement. In a separate analysis, we also studied, how psychosocial factors are related to work engagement.

**Methods:** This is a cross-sectional study of Finnish female employees of the city of Pori, Finland (PORi To Aid Against Threats (PORTAAT) study). Data was collected by trained study nurses and self-administrated questionnaires. Work well-being was measured by work engagement using Utrecht Work Engagement Scale (UWES-9) questionnaire and the burden of pain was measured by using the short version of Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ). Study population was divided into four groups: those without pain and the groups with low (I), medium (II) or high (III) ÖMPSQ score, reflecting increasing risk of long term disability due to musculoskeletal pain. The study nurse assessed psychosocial risk factors using defined core questions.

**Results:** We evaluated 702 female employees, 601 (86%) had suffered from musculoskeletal pain over the past 12 months, whereas 101 (14%) reported no pain at all. Pain was chronic (duration at least 3 months) in 465/601 (77%) subjects. Subjects with musculoskeletal pain were older, had higher BMI and were on sick leave more often than subjects without pain. Of the psychosocial risk factors, depression, type D personality, anxiety and hostility were significantly more common among subjects with musculoskeletal pain. Hypertension and the use of non-steroidal anti-inflammatory drugs were significantly more frequent in the musculoskeletal pain group. Quality of sleep and working capability were significantly better among persons without pain. Average weekly working hours were slightly higher among those with musculoskeletal pain.

\* Corresponding author at: Department of Neurology, Satakunta Central Hospital, Sairaalanatie, 28500 Pori, Satakunta, Finland.

E-mail address: [kirsi.malmberg-ceder@fimnet.fi](mailto:kirsi.malmberg-ceder@fimnet.fi) (K. Malmberg-Ceder).

In crude analysis, work engagement (UWES-9) was similar in women without pain and those with musculoskeletal pain (4.96 vs. 4.79;  $p = 0.091$ ). After adjustment for age, education years, BMI, working hours and financial satisfaction, the difference between the groups became statistically significant ( $p = 0.036$ ). Still, there was no difference between the groups of no-pain and low burden of pain ( $p = 0.21$ , after adjustment). Work engagement was significantly lower in the groups of medium ( $p = 0.024$ , after adjusted) and high ( $p < 0.001$ , after adjustment) burden of pain. Linearity across the Linton tertiles was significant ( $p < 0.001$ ). In univariate and multivariate ordered logistic regression analyses relating study variables to the work engagement musculoskeletal pain *per se* did not enter in the model to explain work engagement. Work and family stress, type D personality and duration of sick leave due to pain reduced work engagement, whereas financial satisfaction, moderate and high leisure time physical activity and higher BMI improved it.

**Conclusions:** Among women with musculoskeletal pain psychosocial and lifestyle factors significantly correlate with work engagement, while the pain itself does not.

**Implications:** Special attention should be paid to the psychosocial aspects in female employees with musculoskeletal pain to improve work well-being and maintain work ability.

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## 1. Introduction

Musculoskeletal pain is a common symptom, which upon prolongation into a chronic pain state often becomes a reason for disability and causes impaired work ability [1,2]. Despite the high prevalence of musculoskeletal pain in the workforce, many people with pain continue to work [3,4]. Only few studies have investigated the factors determining experienced work ability [5,6] by persons with pain. de Vries et al. assessed 119 workers, who stayed at work despite nonspecific musculoskeletal pain, and their results suggest that personal and work-related factors, rather than the pain itself, may have significant impact on experienced work ability and work performance. In a recent systematic review and meta-analysis [7] Lee et al., by using mediation analysis, found evidence to suggest that psychological stress, poor self-efficacy and fear explain the correlation between pain and disability. More thorough understanding of the complex interrelationships between musculoskeletal pain, work well-being and work ability is needed for designing individualized treatment and adjusting measures for employees with chronic pain to retain better daily functioning at and outside work.

Work engagement is a positive, fulfilling, affective-motivational state of work-related well-being [8]. Work engagement can be assessed by a validated questionnaire containing three subscales concerning vigor, dedication and absorption [8]. Work engagement reflects occupational satisfaction and is associated with experienced work ability [9]. Thus, it has been suggested that high work engagement is a predictor of maintained work ability among people with chronic pain [10]. However, to our knowledge, no studies comparing work engagement among people with or without pain have been published.

Chronic pain involves several factors in addition to the pain itself, which all contribute the cumulative burden of pain. Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ) is a self-administered instrument developed to identify those people with musculoskeletal pain who are at risk for chronicity and long term disability [11]. In its short version [12], only two of the ten questions assess the pain itself, while the rest pertain to emotional stress and functional ability.

The aim of our study is to analyze how musculoskeletal pain affects work well-being by comparing work engagement in employees with or without pain, and how pain-related risk of disability is associated with work engagement. In a separate analysis, we also studied, how psychosocial factors, characterized in this study as anxiety, depression, social isolation, work and family stress, and certain personality traits, characterized as hostility and type D personality, are related to work engagement.

## 2. Methods

### 2.1. Participants

PORTAAT (PORi To Aid Against Threats) is a study conducted among employees of the city of Pori (83 497 inhabitants in 2014) in southwestern Finland. The study population comprised workers from ten work units, which were selected by the chief of welfare unit of Pori. Invitation and study information letters were sent to the employees as an email attachment by the managers of the work units. We cannot report the exact participation rate for the study, because some employees may have ignored the invitation and information letter sent by e-mail notifications. There was also information events organized for employees concerning PORTAAT-study. There were no exclusion criteria. Librarians, museum employees, groundkeepers, computer workers, social workers, nurses, physicians, administrative officials, and general office staff were invited to an enrolment appointment with the study nurse. Altogether 836 employees (104 males, 732 females) consented to participate in the study. Because of overwhelming predominance of females, which corresponds the gender distribution of employees of Pori, males were excluded from the study cohort. For the analyses described here, we included women with musculoskeletal pain and women without any pain. In order to create a cohort with musculoskeletal pain only, we excluded subjects with pain other than musculoskeletal (17 women) and those who did not answer the pain questionnaire (13 women). Hence, 702 female were included in the analyses.

### 2.2. Measurements

The baseline examination was performed by trained study nurses. Height and weight were measured with the subjects in standing position without shoes and outer garments. Body mass index (BMI) was calculated as weight (kg) divided by the square of height ( $m^2$ ). Blood pressure was measured with an automatic validated blood pressure monitor with subjects in a sitting posture, after resting at least for 5 min.

### 2.3. Questionnaires

Data were collected using self-administrated questionnaires. Their comprehensiveness was tested in a group of volunteers. They included questions about diseases diagnosed by a physician, medication used regularly, years of education, marital status (cohabiting or not), quality of sleep (good or not good), work ability with

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