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Research report

Common mental and musculoskeletal disorders as predictors of disability retirement among Finns

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ABSTRACT

Background: The contribution of common mental disorders (CMD) co-occurring with chronic musculoskeletal disorders (MSD) to disability retirement is not known.
Methods: A nationally representative sample (the Health 2000 survey) comprised 3943 occupationally active Finns aged 30–63. MSD and other chronic disorders were assessed by a physician in a standardized clinical examination, and CMD using the Composite International Diagnostic Interview. Disability pension data for 2000 – 2011 was retrieved from national pension records. Cox regression was used with censoring for death and pension other than that for disability. Covariate information was based on an interview.
Results: The baseline prevalence of CMD was 9.4% and of MSD 31.1%. CMD co-occurred with MSD in 3.3% of participants. The risks inflicted by CMD and MSD were additive. Thirty-eight per cent of the co-morbid subjects, 18% of those with CMD and 19% of those with MSD retired prematurely during the average follow-up of 8.6 years. Compared with those with neither type of disorder, the hazard ratio (HR) for disability pension was 2.4 (95% CI 1.7–2.7) for CMD only, 2.2 (1.8–2.7) for MSD only, and 4.1 (2.9–5.7) for the occurrence of both, allowing for age, gender, other chronic disorders, working conditions, and socioeconomic and lifestyle factors. No synergistic or antagonistic interactive effects were observed.
Limitations: The determinants were measured only once and we had no information on incident disorders during the follow-up.
Conclusions: It is important to identify subjects with both mental and musculoskeletal complaints in order to efficiently support their work ability.

1. Introduction

Mental and musculoskeletal disorders are among the most significant public health problems in Western countries. They are the underlying reason for a considerable amount of long-term or permanent work disability. In 2012, 7.1% of Finnish residents aged 16–64 received a disability pension; 32.5% of these were due to musculoskeletal disorders, 32.3% due to mental disorders, 7.2% due to neurological diseases and 6.8% due to cardiovascular diseases (Finnish Centre for Pensions, 2012). Depressive and anxiety disorders comprised over half of the mental diagnoses and back problems made up almost a half of the musculoskeletal diagnoses.

In addition to chronic diseases, many non-medical risk factors for disability retirement have also been reported; higher age, low education, being a woman or unmarried (Bruusgaard et al., 2010; Samuelsson et al., 2012), physical or psychosocial workload (Ahola et al., 2011; Lahelma et al., 2012), and adverse health behaviour (Neovius et al., 2010; Ropponen et al., 2011; Salonsalmi et al., 2012; Canivet et al., 2013).

Several studies have documented strong associations between mental and musculoskeletal disorders (Dersh et al., 2002; Tsang et al., 2008). Anxiety and depressive disorders in particular have been associated with musculoskeletal pain (Demyttenaere et al., 2006; Demyttenaere et al., 2008; Beesdo et al., 2010). Among musculoskeletal pain patients in primary care, high levels of

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depression or anxiety have been identified as generic factors linked with a poor prognosis (Mallen et al., 2007), and it has been suggested that chronic pain, especially in joints, may be associated with a worse than average course of depressive and anxiety disorders (Gerrits et al., 2012). Patients with pain problems and a comorbid depressive or anxiety disorder have a poorer quality of life, higher health care costs, and a greater number of disability days than those with either of the conditions alone (Arnow et al., 2006; Gameroff and Olfson, 2006). A nationwide study in the Netherlands found that co-morbidity comprising mental and physical disorders was associated with a high number of self-reported work loss days during the preceding year, the joint effect of chronic back pain and common mental disorders being particularly strong (Buist-Bouwman et al., 2005). In a large nationally representative health survey in Canada, co-morbid major depression tripled the risk of self-reported absenteeism in the preceding week due to chronic pain problems (Munce et al., 2007).

It is widely viewed that pain is a bio-psychosocial phenomenon, and in addition to one's physical condition, cognitive factors such as beliefs and attitudes, and the ability to control negative emotions may play an important role in the chronic pain experience annexed with musculoskeletal disorders (Dersh et al., 2002; Linton and Bergbom, 2011). A previous study suggested that anxiety and depression may interact synergistically with arthritis and neck or back disorders and increase the reporting of chronic pain (Dominick et al., 2012). Strong symptomatology might guide the use of health services and finally lead the sufferer to seek disability pension. Another possibility is that one disorder leads the process and the other has no additional effect on the probability of retirement.

There is a lack of studies on the association of co-occurring mental and musculoskeletal disorders with long-term or permanent work disability at the population level. In order to promote well-being at work it is important to determine how such co-morbidity affects work ability. The aim of this study was to examine the extent to which common mental disorders and clinically ascertained musculoskeletal disorders overlap in the population and how the co-morbidity predicts disability retirement. The analyses were made among the occupationally active people in a nationally representative sample of Finns.

2. Methods

2.1. Procedure and participants

The current study is based on the nationally representative Health 2000 Survey which was conducted in Finland between August 2000 and June 2001 (Aromaa and Koskinen, 2004). The main purpose of the Health 2000 Survey was to achieve an overall view of the population's health. The survey was carried out in several phases and included a number of questionnaires, an extensive face-to-face home interview, laboratory and functional capacity tests, and a clinical examination. The population sample of Finnish adults aged 30 or over was formed using a two-stage cluster sampling method so that Finland was stratified into 20 strata, i.e. the 15 biggest cities and five university hospital districts. The 15 cities, and 65 of the 234 municipalities or groups of municipalities with joint primary care (within the five university hospital districts) drawn by systematic sampling, formed 80 clusters (Heistaro, 2008). All the participants signed their written informed consent, and the Ethical Committee for Epidemiology and Public Health of the hospital district of Helsinki and Uusimaa in Finland approved the study.

A total of 8028 people aged between 30 and 99 were sampled from the clusters, but 51 died before the data was gathered. The final sample included 7977 participants, of whom 6986 (88%) were interviewed and 6354 (80%) participated in a health examination (Heistaro, 2008). Our study included 3943 subjects who had been full- or half-time workers at the time of baseline examination and aged 30–63. They had participated in a clinical examination, home interview and filled in self-administrated questionnaires. Specially trained physicians performed the physical examinations, and worked according to detailed written instructions with uniform diagnostic criteria.

2.2. Disability pensions

Data on disability pensions were obtained from the national registers of the Finnish Centre for Pensions, and provided complete information on all retirement events and their main diagnoses. All disability pensions granted before 1 January 2011 was linked to the Health 2000 data by each participant's personal identification number. Finnish people who have a chronic illness, disability, or injury that has been verified by a physician with a medical certificate and evaluated as causing considerably decreased work ability are entitled to a part-time or full-time disability pension (Gould, 2003).

The pensions are granted temporarily if rehabilitation or treatment can reasonably be assumed to improve work ability and return to work is conceivable. Independent pension institutions grant the disability pensions. The diagnoses of chronic illnesses in the national pension register are classified according to The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) (WHO, 2010). The register includes the primary and secondary causes of work disability. The outcome variable comprised all incident permanent, temporary, or part-time disability pensions, including “individual early retirement pension” that was available until 2005 for employees born before 1944 who had a long work career and whose work capacity was substantially decreased, but who did not yet fulfil the criteria for disability pension.

2.3. Common mental disorders

Common mental disorder (CMD) was assessed at the end of the health examination using the computerized version of the Composite International Diagnostic Interview (CIDI) (WHO, 1997; Wittchen et al., 1998). The CIDI was carried out by healthcare workers who were trained for the interview by psychiatrists and physicians who had themselves been trained by a WHO authorized trainer. The programme uses operationalized criteria for diagnoses in the Diagnostic and Statistical Manual of Mental Disorders: DSM-IV (APA, 1994) and enables the estimation of DSM-IV diagnoses for major mental disorders. The participants were identified as having a CMD if they fulfilled the criteria for depressive disorders, i.e. major depressive disorder or dysthymic disorder (6.9%) or anxiety disorder (4.1%), i.e. panic disorder with or without agoraphobia, generalized anxiety, social phobia not otherwise specified, or agoraphobia without panic disorder.

2.4. Chronic musculoskeletal disorders

Musculoskeletal disorders (MSD) were diagnosed in the clinical examination on the basis of disease history, symptoms, and clinical findings. The examining physicians diagnosed the following diseases: chronic low back syndrome (7.9%), chronic neck syndrome (4.4%), chronic shoulder syndrome (4.0%), epicondylitis (2.1%), carpal tunnel syndrome (1.8%), inflammatory polyarthritis (1.4%), knee osteoarthritis (1.3%), hip osteoarthritis (0.8%), or other MSDs (6.3%). The participants were categorized as having a MSD if they had one of the aforementioned disorders. The specific information

regarding diagnostic criteria and prevalence is presented elsewhere (Kaila-Kangas, 2007).

2.5. Covariates

Covariates were chosen on the basis of the literature and prior knowledge of factors possibly confounding the association between mental or musculoskeletal disorders and disability retirement. Detailed information of the variables has been described elsewhere (Heistaro, 2008).

2.5.1. Socio-demographic and socioeconomic factors

Information on *gender, marital status, age* (continuous), *education* (number of years) and *household income* (per family member) was collected in the home interview.

2.5.2. Other chronic diseases and disorders

Other chronic diseases and disorders were studied in the clinical examination according to standard criteria; *cardiovascular diseases:* angina pectoris, myocardial infarction, cardiac insufficiency, hypertension, arrhythmia, valvular disease, intermittent claudication, cerebrovascular disease, and having had coronary surgery (16.2%); *respiratory diseases:* asthma, chronic obstructive pulmonary disease, and allergic rhinoconjunctivitis (10.4%) and *diabetes* (2.2%). Cases of *cancer* (2.2%), *permanent injury* (10.9%), *peptic ulcer* (4.7%), and *neurological diseases such as Parkinson's disease, epilepsy, multiple sclerosis* et al. (1.3%), were elicited in the home interview. *Alcohol use disorders (dependence and abuse)* (5.4%) were diagnosed using the CIDI interview. We included the number of main categories of these *chronic diseases and disorders* (0–8) in the analyses as a continuous variable. More detailed information about the proportions of diseases among Finnish population is available elsewhere (Aromaa and Koskinen, 2004.)

2.5.3. Lifestyle-related factors

Body mass index (BMI, kg/m^2) was based on measured weight and height and classified as $\leq$24.9 (normal), 25–29.9 (overweight), and $\geq$30.0 (obese). Current daily smoking (no/yes) was evaluated in the interview. We assessed *leisure time physical exercise* based on the frequency of daily exercise per week, and classified the participants into two categories: exercising at least once a week (active)/more seldom (passive).

2.5.4. Work-related factors

Occupation and exposure to physical strain at work were elicited in the home interview. The interviewers asked the respondents about their last occupation and whether they were exposed daily to the following ten work factors in their current job (no/yes): *frequent lifting or pushing of loads of at least 5 kg*, *lifting or pushing of loads of at least 20 kg*, *working in awkward positions*, *working with one's hands above shoulder level*, *working on one's knees*, *squatting*, *using a vibrating tool*, *repetitive hand motions*, intensive *keyboard use*, or *long lasting sitting or standing periods*. We included the number (0–10) of physically loading work factors in the analyses as a continuous variable.

Psychosocial strain was measured using the Job Content Questionnaire (Karasek et al., 1998). The scales (small to high) of *job demands* comprised five items (Cronbach's alpha, α=0.79), *job control* nine items (α=0.84) and *social support* four items (α=0.81). Responses were given on a five-point scale. We used the scales as continuous variables. We substituted the missing values (10–12%) with the median of each scale.

2.6. Statistical analyses

We presented the descriptive statistics for all participants (N=3943) as percentages or mean values with standard deviations (SD). Kaplan–Meier survival curves were plotted to show the time to disability pension award for each category of the determinant variable that combined CMD and MSD. We used population weighting in the analyses to adjust for the age, sex, living district, and language distributions of the sample to correspond with those of the total Finnish population.

We fitted Cox proportional hazards regression models to the data using the PHREG procedure of the SAS software package (version 9.2; SAS Institute, Inc, Cary, North Carolina). The dependent variable was the first occurrence of any disability pension from 2000 to 2011. The Cox proportional hazards regression model can be written as follows:

$$h(t,X) = h_0(t)\exp(\beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_p X_p),$$

where $h(t, X)$ is the hazard at time t, $h_0(t)$ is the baseline hazard and represents the hazard when all of the covariates (or independent variables) X_1, X_2, …, X_p are equal to zero. Hazard ratios (HR) and confidence intervals (95% CI) were calculated to estimate the effect of the determinants on disability pension award, adjusted for covariates.

The follow-up of each subject started from the day they first participated in the Health 2000 Survey and ended with the award of a disability pension or of other pension, death, or end of follow-up (31.12.2011), whichever came first. A sensitivity analysis was carried out which examined disability pension awards in two follow-up periods: 2000–2005 and 2006–2011. The time dependent interaction between all determinants and covariates, and follow-up time period was statistically non-significant, confirming that the proportional hazards assumption was justified.

The analyses consisted of five models using the following covariates; (1) age and gender, (2) 1+marital status, education, household income, BMI, smoking, and leisure time exercise, (3) 1+the number of physical strain factors at work, and job demands, job control and social support at work, (4) 1+other chronic diseases and disorders, and (5) all the aforementioned.

We first analysed the effects of CMD and MSD on disability pension award in two separate sequences of models. After this, we calculated the HR estimates for the separate and joint effects using a combined variable with the following categories: (1) no CMD or MSD, (2) CMD, no MSD, (3) MSD, no CMD, (4) both. If we assume that the HR for the co-occurrence of CMD and MSD in model 1 (Table 2) is β_3, and that the estimates for CMD and MSD are β_1 and β_2 respectively, we may also calculate the interaction term as follows: interaction term=$\beta_3/(\beta_1 \times \beta_2)$=5.84/(2.57 × 2.86). In addition, we calculated the relative excess risk due to interaction (RERI) between CMD and MSD (Li and Chambless, 2007).

3. Results

The mean age of participants was 44.3 years, and 51.0% were men. The baseline prevalence of CMDs was 9.4% and that of chronic MSDs 31.1%. CMD co-occurred with MSD among 3.3% of participants (Table 1). Every tenth participant in the cohort was granted disability pension during an average follow-up time of 8.6 years. Of those who had only CMD, 17.8%, and of those who had only MSD, 18.7% received disability pension. The corresponding figure of those with both disorders was 38.2%. The Kaplan–Meier survival curves of disability pension for subjects with CMD, MSD or both are plotted in Fig. 1. Among those who had both CMD and MSD at baseline, a particularly sharp decline was seen.

Table 1
Background characteristics of all participants and those with subsequent disability pension (cases).

	Participants ($N=3943$)	Proportion of participants	Cases ($N=476$)	Proportion of cases
	N/Mean	%	*N*/Mean	%
Predictors				
CMD	372	9.4	92	19.3
MSD	1226	31.1	255	53.5
CMD and MSD combined				
Neither	2475	62.8	178	37.5
CMD, no MSDs	241	6.1	43	9.0
MSD, no CMDs	1096	27.8	205	43.2
Both	131	3.3	50	10.5
Covariates				
Gender, men	2011	51.0	225	47.3
Age, (range 30–63), mean (SD)	44.3 (8.7)		48.4 (6.8)	
Basic education in years, (range 0–33), mean (SD)	12.8 (3.7)		11.2 (3.4)	
Marital status, single vs. married/co-habiting	936	23.7	136	28.5
Household income below median	2040	51.8	241	50.6
Number of other chronic diseases >0	1637	41.5	296	62.3
Lifestyle-related factors				
Body mass index				
≤ 24.9	1593	40.4	154	32.4
25–29.9	1591	40.3	196	41.1
≥ 30	759	19.3	126	26.5
Daily smoking, yes vs. no	1039	26.4	175	36.7
Leisure time exercise, passive vs. active	975	24.7	154	32.4
Work-related factors				
Number of physical work-load factors (range 1–10), mean (SD)	2.2 (1.9)		2.8 (2.3)	
Psychosocial demands at work (range 5–25), mean (SD)	15.7 (4.0)		16.7 (4.0)	
Job control (range 10–44), mean (SD)	18.7 (4.8)		19.4 (5.1)	
Social support at work (range 4–20), mean (SD)	8.7 (3.4)		9.1 (3.8)	

Table 2
Common mental (CMD) and chronic musculoskeletal disorders in association with subsequent disability pension. Cox regression, hazard ratios (HR) and confidence intervals (95% CI).

Adjusted for:[a]		Model 1 Age and gender		Model 2 Socio-economic and lifestyle factors		Model 3 Physical and psychosocial strain at work		Model 4 Chronic diseases and disorders		Model 5 All aforementioned	
Reference = 1											
Separate effects		HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
CMD vs. no CMDs		2.67	2.11–3.38	2.43	1.91–3.08	2.47	1.94–3.14	2.43	1.92–3.08	2.13	1.67–2.71
MSD vs. no MSDs		2.53	2.10–3.05	2.37	1.96–2.86	2.35	1.95–2.84	2.33	1.93–2.81	2.10	1.74–2.54
Combined effects											
CMD	MSD										
No	No	1		1		1		1		1	
No	Yes	2.86	2.03–4.04	2.61	1.84–3.68	2.72	1.93–3.85	2.65	1.88–3.73	2.37	1.67–3.34
Yes	No	2.57	2.09–3.16	2.42	1.97–2.98	2.42	1.97–2.98	2.38	1.93–2.93	2.18	1.76–2.69
Yes	Yes	5.84	4.22–8.08	5.12	3.69–7.11	5.12	3.68–7.13	4.99	3.60–6.91	4.06	2.90–5.69
Interaction term		0.82	0.43–1.53	0.81	0.51–1.30	0.78	0.49–1.24	0.79	0.50–1.26	0.79	0.49–1.26
RERI		1.41	−0.52–3.33	1.09	−0.62–2.81	0.98	−0.76–2.71	0.96	−0.72–2.64	0.52	−0.90–1.95

[a] Adjustments in models: 1: age and gender, 2: 1+marital status, education, household income, BMI, smoking and leisure time exercise, 3: 1+number of physically loading work factors, job demands, job control, and social support, 4: 1+number of chronic disorders (not MSD), and 5: All aforementioned.

Of the 476 disability pensions, 23.6% were awarded due to mental disorders, 38.4% due to musculoskeletal disorders, and 38.0% due to other diagnoses. Among the subjects with both CMD and MSD at baseline, the corresponding figures were 46.3%, 30.2%, and 23.5%.

In separate models, the hazard ratio (HR) of disability pension for CMD was 2.7 (2.1–3.4) and for MSD 2.5 (2.1–3.1) allowing for age and gender (Table 2). When all covariates were adjusted for (Model 5) the figures decreased slightly. When the combined variable on separate and joint effects of CMD and MSD was used, the age and gender-adjusted HRs were 2.9 (2.0–4.0) for CMD, 2.6 (2.1–3.2) for MSD, and 5.8 (4.2–8.1) for the occurrence of both. Each category of covariates (socio-economic and lifestyle factors, physical and psychosocial strain at work and chronic disorders), modified the associations slightly and to a rather similar extent. When all covariates were included in the model, the estimates were 2.4 (1.7–2.7) for CMD, 2.2 (1.8–2.7) for MSD, and 4.1 (2.9–5.7) for the occurrence of both. In this full model socio-economic and lifestyle factors, physical and psychosocial strain at work and chronic disorders together explained 17.1% of the decrease in HRs for disability pension among those with MSD, 15.2% among those with CMD and 30.5% among those with both. The multiplicative interaction terms as well as the RERI in all models were statistically non-significant (Table 2).

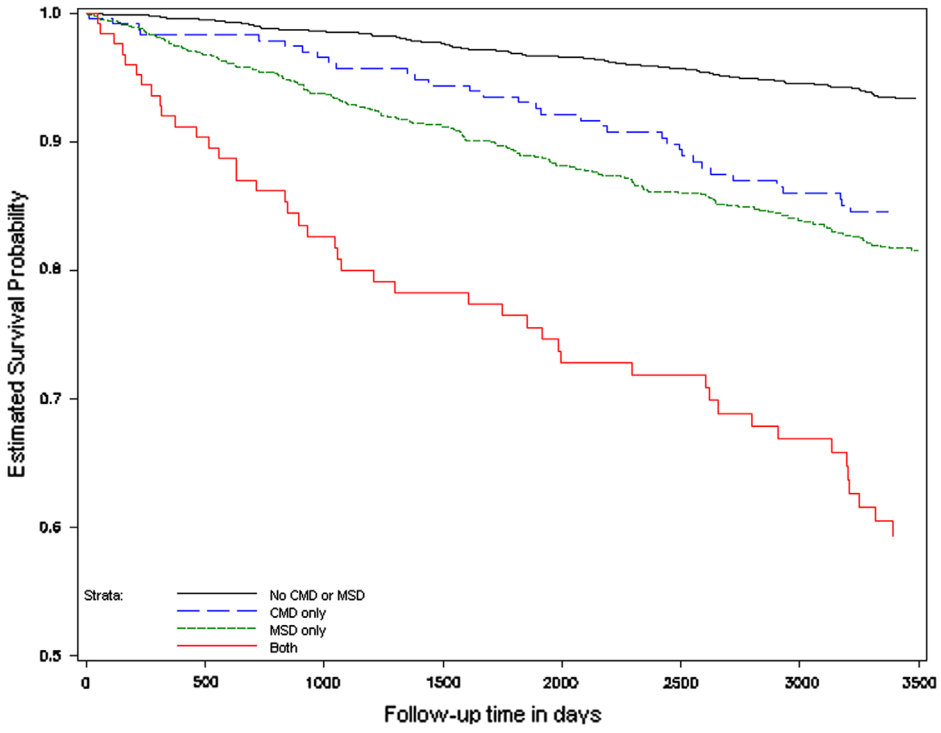

Fig. 1. Cumulative survival curves for the incidence of disability pension in an average 8.6-year follow-up due to chronic musculoskeletal disorders and common mental disorders.

4. Discussion

In this nationally representative study, mental and musculoskeletal disorders were strongly predictive of disability retirement during the average follow-up of 8.6 years. Both CMD and MSD alone doubled the risk, and those who had both CMD and MSD at baseline were at a four-fold risk compared to those with neither, when demographic and socioeconomic factors, health-related lifestyle, the number of other chronic disorders, and physical and psychosocial strain at work were allowed for. In other words, the risks annexed to CMD and MSD were additive. In absolute terms, 38% of the employees with both MSD and CMD had retired during the follow-up, while 18% of those who had only CMD and 19% of those who had only MSD were awarded a disability pension. As there was no interaction between CMD and MSD, both types of disorder had an independent effect in the process of disability retirement that was neither antagonistically nor synergistically affected by the other disorder.

In general, our study is in line with previous population-based studies which have shown that anxiety and depression (Mykletun et al., 2006; Ahola et al., 2011) as well as musculoskeletal diseases (Saastamoinen et al., 2012) are strong predictors of disability retirement. To our knowledge this is the first study, however, to observe the co-occurrence of CMD and MSD as a determinant of subsequent disability pension.

It appeared that those who had both types of disorders at baseline received disability pension due to mental disorders more often than for other reasons. This suggests that mental disorders were preferred as the primary diagnosis for the disability pension or that CMD played a greater role in the retirement process. According to findings in previous studies, mental disorders are sometimes under-recognized and untreated, particularly in primary care settings (Olsson et al., 2006; Honkonen et al., 2007). People with both depressive symptoms and pain were less likely to seek mental health care than depressive patients without pain (Bao et al., 2003). Medical consultation is sought for physical symptoms more willingly than for mood complaints (Ohayon and Schatzberg, 2010). Unrecognized psychopathology can significantly interfere with the successful rehabilitation of somatic disorders (Dersh et al., 2002; Bair et al., 2003), and on the other hand, the presence of a painful disorder negatively affects the recognition and treatment of depression (Bair et al., 2003). A previous nationally representative study indicated that, despite of improved practice guidelines for treating depression and a substantial increase in the use of antidepressants, a high proportion of subjects who received long-term compensation for depression seemed to be sub-optimally treated in Finland (Honkonen et al., 2007).

We found that roughly a third of the effect of co-morbid CMD and MSD on the risk of disability retirement was due to the influence of health-related lifestyle, physical workload, psychosocial strain at work, other co-occurring chronic disorders, and socio-economic factors, but that proportion was smaller when CMD or MSD occurred alone. It is conceivable that some of the factors treated as confounders in the analyses may partly act as mediators of the effect. For instance, co-morbidity may more negatively affect motivation to participate in leisure-time physical activities than when either of the disorders occurs alone, thereby increasing the risk of poor physical functioning and overweight, which further decrease work ability.

The prevalence of co-morbid CMD and MSD was 3.3%. This is lower than anticipated on the basis on previous reports, but comparison is rendered difficult due to the large variation in methodological approaches and the definition of mental disorders and chronic pain (Aguera et al., 2010). Several small studies based on clinical data (Bair et al., 2003; Ho et al., 2011) as well as some population studies (McWilliams and Cox, 2003; Gureje et al., 2008; Levinson et al., 2008; Goral et al., 2010), suggested that depression and anxiety are often co-morbid with chronic pain, Among Canadians aged 15 years or over, the co-occurrence of chronic back pain with major depression was 6.2%, with arthritis or rheumatism 5.0% and with fibromyalgia 13.4% (Patten et al., 2006).

The low prevalence of the co-occurrence in our study was likely due to the nature of the data, which included employed people of the general population, and the use of specified clinical criteria for CMD and MSD.

In Finland, the statutory pension security consists of a defined benefit earnings-related pension that accrues from work, and a residence-based national pension and guaranteed pension that ensure minimum security. Statutory pensions provide security for old age and in the event of disability. The special features of the pension benefits of the earnings-related pension scheme are the same for all, regardless of type of work. People can retire flexibly on old-age pension at age 63–68. Employees under 63 years of age are eligible for disability pension after one year of continuous work disability; they are also eligible for a daily allowance from sickness insurance for 300 working days. If the disability is anticipated to continue longer than this maximum, the person must apply for either a temporary or a permanent disability pension. Medical impairment is evaluated by weighing health status against the demands of the person's job (Finnish Centre for Pensions, 2012).

Our study has several strengths. The sample represented the Finnish population and the participation rate was high. The standardized CIDI interview was used to assess the participants' mental health status according to DSM-IV diagnostic criteria. Chronic musculoskeletal and other chronic disorders were diagnosed by specially trained physicians who followed a predetermined clinical protocol. The data of disability pensions were received from national pension registers and may be considered reliable. Hence, each of the main determinants and the outcome variable were measured independently. Most items in the questionnaires, interviews, and in the health examination were selected on the basis of standard recommendations or nationally established practice (Heistaro, 2008). We also had information on other pensions and dates of death, and were able to take these into account in the analyses.

A limitation in our study was that the determinants were measured only once and we had no information on incident disorders during the follow-up. However, the survival curves among those with CMD or MSD declined in a constant manner from the beginning of the follow-up, and particularly sharply among those with both disorders.

To conclude, common mental and chronic musculoskeletal disorders are strong predictors of premature retirement, particularly when they occur jointly. This underlines the importance of identifying people with both mental and musculoskeletal and musculoskeletal complaints, for providing care, rehabilitation, and optimization of work tasks in order to efficiently support their work ability.

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Conflict of interest

All authors declare that they have no conflicts of interest.

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