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# Is an expert diagnosis enough for assessment of sick leave for employees with musculoskeletal and mental disorders?

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Running head: Diagnosis of employees with MSD and MD

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**Keywords:** Work ability, musculoskeletal disorders, mental disorders, sick leave, ICD-10, work ability index

## **Abstract**

*Purpose:* The aim of this study is to determine differences in self-reported work ability, work conditions, health and function between ICD-10 groups with musculoskeletal disorders (MSD), mental disorders (MD) and MSD+MD and to determine which variables are associated with sick leave.

*Method:* A cross-sectional study of 210 employees was conducted at an occupational health service unit. Physiotherapists and physicians classified the employees' health problems according to ICD-10 and the employees answered a questionnaire with questions on demographic variables, health, functioning, work ability and work conditions.

*Results:* Forty-four percent of the employees had MSD, 22% had MD and 34% had a MSD+MD. The group on sick leave had worse results for all health and work measures. Belonging to the MD group, belonging to the MSD+MD group, having poor work ability and functioning were associated with being on sick leave. The value for the model explaining being on sick leave was 0.63 (Nagelkerke *R* square).

*Conclusions:* Having a diagnosis of MD based on a professional opinion and having poor work ability and functioning based on self-reports is associated with being on sick leave. The results suggest that self-reported data could be used to complement the expert-based diagnosis.

## **Introduction**

Musculoskeletal disorders (MSD) and mental disorders (MD) are substantial health problems in many countries, and consume a large proportion of health services [1-6]. The terms MSD and MD are used for different conditions and encompass disorders of acute onset and short duration as well as long-standing, chronic disorders. The term disorders is used for a clinically recognisable set of symptoms or behaviours [7]. MSD and MD can be difficult to distinguish from one another because there is often considerable overlap between pain and psychological symptoms [8-12]. Thus, pain is a common symptom of many MDs, and depression and anxiety frequently accompany musculoskeletal pain [13-15]. MSD and MD are the main causes of occupational disability and sick leave among employees in Sweden [16]. Sick-leave periods are generally longer for individuals with MD/depression compared with individuals with MSD [17-19], and it is well known that there are many negative health and work consequences for individuals being on sick leave [16, 20-22].

To qualify for sickness benefit in Sweden, a person's disease has to impair work ability in relation to the specific demands of the person's job or to the demands of another available job on the labour market [16, 23]. A medical diagnosis and an evaluation of functioning are required in the assessment of need for sick leave. The World Health Organization's (WHO) International Statistical Classification of Diseases and Related Health Problems, 10th Revision, ICD-10 [7] is the most common basis for a medical diagnosis, but there is less agreement on how sick leave and work ability should be assessed. ICD-10 is widely used in the Swedish Occupational Health Service (OHS) and primary health care settings in Sweden and in many other countries to classify diseases and health problems, and is highly applicable within health research [14, 15, 24].

The Swedish government has introduced reforms in the national sickness insurance system that emphasize early assessments of work ability and the use of evidence-based methods for return to work. This reform has highlighted a need to determine the most appropriate method for the assessment of functional limitations and work ability [25]. The OHS in Sweden uses a variety of tools to evaluate different aspects of employees' work ability, health, and functioning. This heterogeneity is also reflected in the scientific literature on work ability as studies have described numerous approaches to determine working capacity and to assess work-related abilities. These methodologies incorporate physical, mental, functional and social abilities, and environmental factors at baseline as well as during the return to work process [26-29].

Work ability has been described as a complex, multi-faceted concept, representing the interaction of individual human resources in relation to different aspects of work, such as work demands, work community, management, and work environment. The human resources include health and functional capacities, education, competence, values, attitudes and motivation [30]. Research suggests that there is a connection between diagnosis and perceived work conditions; several studies have confirmed the links between stressful working conditions and MDs [11, 24, 31]. Earlier studies demonstrated the association between MSD and physical and psychosocial work conditions [1, 32]. The complexity of the work ability concept implies that it should be assessed from a broad, holistic perspective to accurately understand the interaction of various factors that affect an individual's ability [33, 34]. However, sickness certificates in Sweden are predominantly based on ICD-10, which is a strictly biomedical perspective used to classify diseases and other health problems [7].

OHS professionals often use the Work Ability Index (WAI), a self-assessment tool for evaluating an individuals' work capacity [30, 35-41]. The WAI facilitates early identification

of individuals who need support, and takes the physical and mental demands of the work and the individual's health state and mental resources into consideration. The WAI is based on a more holistic approach and relies on self-reporting rather than a professional diagnosis. Considering the prevalent use of ICD-10 and the increased importance given to early assessment of work ability, it is important to analyse the relation between self-reporting health and work measures and the professional assessments used in clinical practice. However, there is a paucity of studies that have enrolled employees with a combination of MSD and MD to examine how sick leave can be understood in relation to diagnosis, health, functioning, work ability and work conditions. The aim of this study is to determine differences in self-reported work ability, work conditions, health and function between ICD-10 groups with MSD, MD and MSD+MD, and to determine which variables are associated with sick-leave status using ICD-10 and self-reported work ability, work conditions, health and function.

## **Methods**

### *Study design, setting and participants*

A cross-sectional study involving employees with MSD and/or MD was conducted between April and December 2006 at an external private OHS unit that serves a number of different companies in the eastern part of Sweden. Using a convenience sample for selecting the study subjects, 195 employees were asked to participate in the study when they consulted a physiotherapist and/or a physician in OHS. Six employees turned down the offer to participate. An additional 40 employees on sick leave were recruited from the regional social insurance office. Two employees on sick leave and 17 employees not on sick leave were excluded because they did not return the questionnaire or they did not want to continue being part of the study. Thus, a total of 210 employees were enrolled in the study, including employees on sick leave (64%) and those who were not on sick leave.

Inclusion criteria were age 18–65 years with MSD and/or MD, and good knowledge of Swedish. Exclusion criteria were psychiatric diagnosis, neurological disorders, rheumatic disease, fracture or pregnancy. These exclusion criteria were implemented before the consultation with the physician and the physiotherapist. All participants received written and verbal information about the study before giving their oral consent prior to their participation in the study. Ethical approval was granted by the local Ethics Committee (Dnr M78-05).

### *Data collection*

Two data sources were used for this study. Physiotherapists and physicians classified the employees' diseases and health problems according to ICD-10 [7]. In addition, the employees answered a questionnaire covering dimensions of health, physical and mental functioning, work ability and work conditions. The questionnaire also included questions on demographic variables (age, sex, marital status, informal care within the family, educational level, professional status, and employer).

### *Medical classification according to ICD-10*

Experienced physicians and physiotherapists at the OHS unit summarised the clinical findings and made a classification according to ICD-10 using the codes from chapters 5, 13 and 21 [7]. When depression, burnout syndrome, anxiety and panic disorders were the main cause of sick leave, the physicians' classification according to ICD-10 was used. For stress and MSD, a physician or a physiotherapist made the classification. The employees with MSD had various conditions; the most frequent diagnosis according to ICD-10 was dorsopathies, with disorders of disc and muscles, shoulder and arm lesions, arthropathies, and disorders affecting peripheral joints (M50–M54, M60, M62, M75, M77, M79, and M25 in ICD-10). The most common diagnoses among employees with MD were varying degrees of stress, burnout, anxiety, anguish, depression, and panic disorder (F32.0, F32.1, F32.9, F33.1, F41.0,

F41.1, F41.2, F41.9, F42.2, F43.8, F43.9, Z73.0, Z73.3 in ICD-10). The duration of pain was also registered. In this study the employees were classified according to ICD-10 into three subgroups: MSD, MD and MSD+MD.

### *Work ability*

The WAI was used to evaluate the employees' self-rated work ability [42]. This instrument includes seven items answered using a Likert scale on current work ability compared with lifetime best, work ability in relation to the demands of the job, the number of current diseases diagnosed by a physician, estimated work impairments due to diseases, sick leave in the past year, psychological resources, and personal prognosis of work ability [30]. The total scores range from 7 to 49 points and are usually categorised into four groups of work ability: (1) poor,  $\leq 27$  points; (2) moderate, 28–36 points; (3) good, 37–43 points; and (4) excellent, 44–49 points [42]. In order to have contrast, the employees' scores were dichotomised into employees with poor work ability (7–36 points) and employees with good work ability (37–49 points) as used by Rotenberg et al. [43]. The WAI is shown to have good psychometric properties and is considered as an internally coherent and reliable instrument [44, 45].

### *Work conditions*

Effort–reward imbalance at work was measured using the Effort–Reward Imbalance Questionnaire (ERI) published by Siegrist et al. [46]. Effort was measured using six items on quantitative and qualitative work load, increase in total load over time and physical work load. The higher the perceived distress due to high effort at work, the higher the resulting effort score. Reward was measured using 11 items on esteem, salary/promotion, and job security. The lower the reward score, the less the perceived reward at work [46]. The effort

and reward questions were answered using a 4-point Likert scale ranging from 1 (not correct at all) to 4 (correct) [47]. The ratio of effort to reward expresses the amount of perceived effort–reward imbalance at work and is calculated using the following formula described by Siegrist et al. [46]:  $e/(r \times c)$ , where  $e$  is the sum score of the effort scale,  $r$  is the sum score of the reward scale and  $c$  defines a correction factor for different numbers of items in the nominator and denominator. The effort/reward ratio is high when the effort–reward imbalance quota is greater than 1. Over commitment (OC) was assessed by six items measuring personal patterns of coping with work demands on a 4-point Likert scale. The score varies from 6 to 24 and a high score indicates that the subject is likely to experience OC at work [46, 47]. The validity and reliability has been tested for effort, reward and OC with satisfactorily results [46-48].

### *Health*

Generic health was measured using the standardised instrument EuroQol (EQ-5D) consisting of two parts [49, 50]. The first part consists of 5 dimensions that describe health in terms of mobility, self-care, usual activity, pain or discomfort, and anxiety or depression. The instrument yields a total of 243 possible health states and the values range from –0.59 to 1.0 where 1.0 indicates full health. The information derived from the EQ-5D self-classifier with different health states was converted into a summery index (EQ-5D Index) as described by Rabin et al. [50]. The second part of EuroQol includes the EQ visual analogue scale (EQ-VAS) with end points of zero for the worst imaginable health state and 100 for the best imaginable health state. The reliability and the validity of EQ-5D has been tested in several studies with satisfactorily results [51].

### *Mental functioning*

Three instruments were used to measure different aspects of mental functioning. A modified version of Zung Self-Rating Depression Scale (ZSDS) was used to measure current severity of depressive symptoms [52]. This scale covers affective, psychological, and somatic symptoms. The 23 items have a 0-3-rating scale and a total score of 0-69, with 0 representing no signs of depression.

The Modified Somatic Perception Questionnaire (MSPQ) includes 13 items that identify somatic complaints that may be associated with psychological responses such as anxiety or depression [52, 53]. The items are recorded from 0 to 3 and the total score is from 0 to 39; higher scores indicate more problems.

The Shirom Melamed Burnout Questionnaire (SMBQ) includes 22 items graded from 1 to 7 that measure different aspects of the burnout syndrome such as physical fatigue, tension, emotional exhaustion, listlessness and cognitive difficulties [54]. High scores indicate more symptoms. The overall burnout index (SMBQ-Global) is the average of the 22 items. A high level of burnout on the SMBQ has been defined as a mean value of  $\geq 3.75$  and a low degree of burnout as a mean value of  $< 2.75$  [55].

The reliability and validity of the scales used to measure mental functioning are well established [56-58].

### *Physical functioning*

The Functional Rating Index (FRI) was used to measure function and pain in the musculoskeletal system. Using a 5-point scale, the instrument consists of 10 questions pertaining to pain intensity, sleep, personal care, travelling/driving, ability to work, recreation, frequency of pain, lifting, walking and standing [59]. The total FRI score is calculated by

adding all the responses as recommended by Feise et al. [59] (total score/40)×100%) and the range of scores is 0–100%; higher scores indicate higher perceived dysfunction and pain. FRI is considered to be a valid and reliable instrument to measure subjective perception of function and pain of the musculoskeletal system [59]. However, further studies are needed to determine the validity and reliability for a broader group of patients.

### *Statistical methods*

All statistical data were analysed using the Statistical software Package for the Social Sciences (SPSS) program (version 14.0). A descriptive analysis for the total population was carried out using proportions, means and standard deviations for the assessed variables. The three groups, MSD, MD and MSD+MD, were compared for age, sex educational level, self-rated health, functioning, work ability and work conditions. The comparison was made using Pearson's chi-squared test and ANOVA. The Bonferroni post hoc test was used for pair-wise comparison between these groups. The Kolmogorov–Smirnov test was used for test of normality. Independent sample *t* test and Pearson's chi-squared test were used in the comparison of the two groups on sick leave versus not on sick leave concerning age, sex educational level, self-rated health, functioning, work ability and work conditions. In addition, Pearson's chi-squared test was used to compare the groups not on sick leave versus on sick leave within the three groups classified according to ICD-10. Analyses were also made to compare if there were any differences between the groups for gender and age. For all group comparisons the level of significance was set at  $p < 0.05$  (two-sided) and 95% confidence intervals were used when appropriate.

A forward step-wise logistic regression analysis was used to examine possible variables that explain being on sick leave. First a correlation analysis was conducted comparing the instruments to avoid a potential multicollinearity problem. High correlation was noted

between ZSDS and SMBQ (0.8), therefore SMBQ were excluded from the analyses.

Independent variables were chosen on the basis of factors that can possibly be associated with sick leave. Independent variables included were: WAI, EQ-5D, EQ-VAS, ZSDS, MSPQ, FRI, ERI, OC, and ICD-10 group. The final model was based on 205 cases and included significant variables with an accepted statistical significance level at  $p < 0.05$ . The cut-off value for the model is 0.5. Adjustments were made for age and gender by entering them as covariates in the model.

## Results

Table 1 provides details on the study participants and results from the standardised questionnaires. Two hundred and ten employees were included in the study, 182 women and 28 men. The average age was 45 years (SD 10.3). The majority were on sick leave (64%) and 81% reported long-standing symptoms (>3 months). Nearly half of the subjects (48%) had a university education, 22% lived alone, 21% had family or relatives who needed special informal care by the respondent and 12% had children who needed informal care.

The majority (81%) of the employees worked within the public sector and 19% had a private employer. The most common occupations were health care-related and administrative professions. The total study population encompassed 49 different occupations. According to the ICD-10 classification, 44% had MSD, 22% had MD, and 34% had MSD+MD.

<Insert table 1 about here>

The three groups diagnosed by ICD-10 (MSD, MD and MSD+MD) did not differ for age ( $p=0.052$ ) and sex ( $p=0.13$ ). In the group with MSD, the mean age was 46 years and 90% ( $n=84$ ) were women; in the group with MD, the mean age was 42 years and 89% ( $n=42$ ) were

women; in the group with MSD+MD, the mean age was 47 years and 80% ( $n=56$ ) were women.

Educational level was significantly lower in the group with MSD compared with the group with MD ( $p=0.014$ ). In the group with MSD, 62% ( $n=58$ ) had a lower level of education; in the group with MD, 40% ( $n=19$ ) had a lower level of education; in the group with MSD+MD, 46% ( $n=56$ ) had a lower level of education.

The comparison of these three groups with regard to health, mental functioning, physical functioning, work conditions, and work ability is presented in Table 2.

Health, mental and physical functioning were significantly different between groups. The highest proportion of employees with poor work ability was found in the MSD+MD group (86%), followed by the MD group (76%), and the MSD group (56%). Poor work ability was significantly more prevalent within the MSD+MD group compared with the group who only had MSD ( $p=0.003$ ). The group with MSD was significantly less disabled according to the WAI, EQ-VAS, ZSDS, MSPQ, SMBQ, ERI, and OC. The group with MD had significantly better physical functioning according to FRI, mean score 22.1 (SD 12.5), compared with the two other groups. The MSD+MD group had the highest mean score for FRI (40.2, SD 18.4). The MD group and the MSD+MD group showed overlap for mental functioning (ZSDS, SMBQ) and work conditions.

<Insert table 2 about here>

There were no significant differences between the groups on sick leave versus those not on sick leave with regard to age ( $p=0.8$ ), sex ( $p=0.2$ ) or educational level ( $p=0.98$ ).

The mean age for the group on sick leave was 46 years, 89% ( $n=120$ ) were women and 52% had a lower level of education. The mean age of the group not on sick leave was 42, 89% ( $n=42$ ) were women and 52% ( $n=39$ ) had a lower level of education.

Table 3 presents the results for the groups on sick leave versus not on sick leave with regard to the ICD-10 classification, health, mental functioning, physical functioning, work ability and work conditions. The proportion of employees with MD on sick leave was more than twice as high (83%) as the group with MSD on sick leave (38%) ( $p=0.000$ ) and the proportion of employees with MD+MSD on sick leave was almost twice as high (77%) as the group with MSD on sick leave (38%) ( $p=0.000$ ). Compared with the group not on sick leave, the group on sick leave had significantly worse results in all health and work measures.

<Insert table 3 about here>

The self-reported measures WAI, EQ-5D, EQ-VAS, ZSDS, MSPQ, FRI, ERI, OC, and the ICD-10 group, were included as independent variables in the regression model. The results of the regression model presented in Table 4 show that belonging to the MD group ( $p=0.000$ ), belonging to the MSD+MD group ( $p=0.000$ ), WAI ( $p=0.002$ ) and FRI ( $p=0.000$ ) significantly contributed to the explanation of the dependent variable on sick leave. The value for the model explaining being on sick leave was 0.63 (Nagelkerke  $R$  square). Ninety-three percent of participants were correctly classified into on sick leave according to the model.

<Insert table 4 about here>

## **Discussion**

The present study sought to analyse how a professional opinion with ICD-10 used in practice, and self-reported data on health, functioning, work ability, and work conditions are associated with sick leave for employees with MSD and/or MD. ICD-10 is a biomedically

oriented expert-based approach to assessment, whereas the standardised instruments represent a more holistic health and work-oriented self-report approach. ICD-10 is widely used as a basis for medical diagnoses, and in Sweden it is often used as the primary basis for sickness certification. This study shows that diagnosis using ICD-10 as used in practice would gain from also including self-reported data from the WAI and FRI. The study confirms that being on sick leave is associated with having a diagnosis of mental disorder based on a professional opinion and having poor work ability and functioning based on self-reports. The results suggest that self-reported data should be used to complement expert-based diagnoses for understanding differences between employees with MSD and/or MD who are on sick leave versus not on sick leave. Our results show that there were pronounced and statistically significant differences in terms of health, functioning, work ability and work conditions between employees who were on sick leave and the group not on sick leave; the group on sick leave had worse results for all measures. A Swedish study by Undén et al. [60] showed that self-rated health measures can be valuable tools for understanding the patients' perspective. When they compared the physicians' rating of health and the patients' self-rated health, the results showed that 60% of the self-ratings corresponded to the physician's rating.

In Sweden if you are sick for more than 7 days, you must have an appointment with a physician who then decides the need for a period of sick leave; if necessary, the physician provides a medical certificate to the Social Insurance Agency who makes a decisions about entitlement to sickness benefits, full or part time. It is essential in clinical practice within OHS, that the physician has sufficient information about the employees' health condition, work ability and work tasks in order to provide enough information on the sickness certificate. The consequences of the disease should be described in the sickness certificate, i.e. how the employee is functioning in relation to the present work tasks or possible work if unemployed. Combining the objective clinical findings with self-reported measures could

provide additional information for deciding about the employee's ability to work and the need for sick leave, if a team-based judgment is not sought by the employer.

In the present study, employees with MSD+MD had the lowest overall score for work ability and constituted the largest group of individuals with poor work ability. Furthermore, employees with diagnosed MD or with MSD+MD were on sick leave significantly more than those diagnosed with MSD. Other study results show that MD/depressed patients have more days on sick leave [17-19] and the association between sick leave and disability pension has been found to be very strong for individuals with diagnosed mental disorders [61]. Several studies [10, 13-15, 62] have documented that physical-mental co-morbidity is common, underscoring the importance of evaluating work ability from a holistic perspective that includes mental and physical dimensions. A review by Baire et al. [13] estimated that the prevalence of pain in patients with depression varies from 15% to 100%, whereas the prevalence of depression in primary health care patients with pain varies from 6% to 46%. It has also been shown that adults with low back and/or neck pain report more co-morbid conditions, exhibit more psychological distress, and are more frequently engaged in health-compromising behaviours than adults without either condition [5]. Furthermore, musculoskeletal and psychological symptoms often occur in patients with the burnout syndrome, a stress-related disorder that has become increasingly common in various occupations.

There was an overlap in the severity of mental functioning and work conditions between the MD group and MD+MSD group. However, employees with MSD+MD had consistently poorer results than those with MSD only, which indicates the importance of recognising mental aspects related to work ability and sick leave. This is consistent with previous research findings. For instance, Busit-Bouwman et al. [63] found that both physical and mental

disorders are significantly related to work loss, but mental disorders are more strongly related than physical disorders. Similarly, Martimo et al. [64] observed that musculoskeletal and mental disorders along with work-related factors were the strongest determinants of reduced work ability, although the highest risk of full disability was observed for mental disorders.

Employees in our study with MD or MSD+MD perceived higher levels of effort in combination with low rewards as well as higher levels of over commitment compared with employees with MSD only. We also found that employees on sick leave perceived higher levels of efforts in combination with low rewards as well as higher levels of over commitment compared with employees not on sick leave. These findings are largely consistent with previous research. There is a known association between depression and chronic psychosocial stress at work [65]. In a study on employees, Preckel et al. [48] found that all components of the effort–reward imbalance model were associated with health-related quality of life, vital exhaustion, depression, and quality of sleep. Work ability is affected by many different aspects of work [30]. Previous research has linked poor or reduced work ability to poor general health, poor mental and physical health, increasing age as well as poor work postures, muscular work, dissatisfaction with tools and rooms, long working hours, unskilled work, and psychosocial factors at work [35-37, 39, 41, 43, 66]. Studies have also shown an association between poor work ability and sick leave. Kujala et al. [38] showed that poor work ability, defined as a low score on the WAI, was associated with sickness absence for men and women. The WAI is also predictive of future sick leave, particularly long-term sick leave and receiving a disability pension [67, 68]

This study has some limitations that must be considered when interpreting the results and does not guarantee generalisability for all employees with MSD and/or MD. We used a convenience sample, which mainly consisted of female employees working in the public

sector and with long-standing symptoms. The gender differences in the present study might reflect that women are known to use health care services more often than men [69].

Furthermore, the prevalence rate for MSD and depression is known to be higher for women [1, 2, 6]. Other studies including MSD and/or MD also have a predominance of women [17, 70]. Future studies should include more men in order to make supplementary analyses of gender differences. In addition, future studies need to include both acute and subacute disorders for assessment of sick leave, work ability, health, and functioning among broader groups of employees. The cross-sectional design restricts the possibility of analysing the development of work ability, health and functioning over time.

The poor results for employees on sick leave with MD+MSD found in this study indicate that this group constitutes an important target population because of their poor overall health-related quality of life, mental functioning, physical functioning, work ability and work conditions. This is supported by the regression model analysis. This group deserves special attention in return-to-work efforts. This finding has relevance for OHS, which has come to play an increasingly important role in assessing and contributing to maintaining employees' work ability in Sweden. It is important that OHS professionals understand the holistic nature of work ability in order to be able to support the employee and the employer in the rehabilitation process to facilitate the return to work after sick leave. A current challenge is to understand how self-reported measures and ICD-10 can be used together for the classification of employees on sick leave with MSD and/or MD and to develop routine protocols within OHS for the application of different tools. The WAI is a broad tool that captures several dimensions of relevance for work ability and sick leave. The WAI is considered a feasible screening tool [68] and can be used as a first step in assessing work ability to obtain a general picture of how well an employee with MSD and/or MD is able to perform their work. The WAI takes into account individual characteristics and factors related to demands at work as

well as physical and mental conditions [41]. However, full understanding of an employee's health condition, work ability and a prognosis for returning to work requires additional assessments to account for further dimensions of health, psychological and physical functioning and motivation, as well as workplace assessments and functional capacity evaluations [26-29, 33]. Non-occupational aspects must also be considered [34].

## **Conclusions**

ICD-10 is widely used as a basis for medical diagnoses, and in Sweden it is often used as the primary basis for sickness certification. This study demonstrates that ICD-10 diagnosis as used in practice does not seem to sufficiently capture all relevant aspects of the holistic work ability concept when on sick leave. The study confirms that having a professional diagnosis of MD and poor work ability and functioning based on self-reports is associated with being on sick leave. The results suggest that self-reported data could be used to complement the expert diagnosis to understand the differences between employees with MSD and/or MD on sick leave versus those not on sick leave. The study also implies that having MD or MSD+MD represents a target population that needs special attention for return to work efforts.

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Table 1. Characteristics of the study population (N=210).

Variables	% (n)	Variables	Mean (SD)
Sex		Work ability	
Female	87 (182)	WAI	31.4 (8.6)
Marital status		Work conditions	
Married/living together	78 (164)	ERI	1.0 (0.3)
Single	17 (35)	OC	2.3 (0.8)
Other	5 (11)	Health	
Educational level		EuroQol (EQ-5D)	0.6 (0.3)
Lower education	52 (109)	EuroQol (EQ-VAS)	59.5 (19.3)
Higher education (university)	48 (101)	Mental functioning	
Sick-leave		ZSDS	24.3 (11.2)
On sick leave	64 (134)	MSPQ	7.2 (5.6)
Classification according to ICD-10		SMBQ	3.9 (1.3)
MSD	44 (93)	Physical functioning	
MD	22 (47)	FRI	35.9 (19.3)
Combination of MSD and MD	34 (70)		
Duration of symptoms			
Acute, < 1 month	7 (14)		
Subacute, 1–3 months	12 (25)		
Longstanding symptoms, >3 months	81 (171)		

ERI, Effort–Reward Imbalance Questionnaire; FRI, Functional Rating Index; MD, mental disorders; MSD, musculoskeletal disorders; MSPQ, Modified Somatic Perception Questionnaire; OC, Over Commitment; SMBQ, Shirom Melamed Burnout Questionnaire; ZSDS, WAI, Work Ability Index; ZSDS, Zung Self-Rating Depression Scale.

Table 2. Results of multiple comparisons between the MSD, MD and MSD+MD groups concerning work ability, work conditions health and functioning.

Variable	MSD (n=93)	MD (n=46)	Combination of MSD and MD (n=70)	Group comparisons	p-value
<b>Work ability</b>					
WAI	33.2 (9.5)	31.8 (7.5)	28.7 (7.5)	MSD+MD<MSD	0.003
Good work ability (%)	44	24	14		
Poor work ability (%)	56	76	86		
<b>Work conditions</b>					
ERI	0.9 (0.3)	1.0 (0.3)	1.0 (0.3)	MSD+MD>MSD MD>MSD	0.02 0.02
OC	1.9 (0.7)	2.5 (0.8)	2.7 (0.8)	MSD+MD>MSD MD>MSD	0.000 0.000
<b>Health</b>					
EuroQol EQ5D	0.6 (0.3)	0.7 (0.2)	0.6 (0.3)	MSD+MD<MD	0.04
EuroQol VAS	63.5 (19.3)	61.2 (19.3)	52.9 (17.9)	MSD+MD<MSD	0.003
<b>Mental functioning</b>					
ZSDS	18.8 (10.0)	28.4 (11.5)	29.1 (9.1)	MSD<MD MSD+MD>MSD	0.000 0.000
MSPQ	5.5 (5.0)	6.6 (4.8)	10.0 (5.9)	MSD+MD>MD MSD+MD>MSD	0.003 0.000
SMBQ	3.1 (1.1)	4.4 (1.1)	4.7 (1.1)	MSD<MD MSD+MD>MSD	0.000 0.000
<b>Physical functioning</b>					
FRI	33.2 (9.5)	22.1 (12.5)	40.2 (18.4)	MSD+MD>MD MSD>MD	0.000 0.000

Average scores and (SD), except where noted. ANOVA with Bonferroni post hoc test was used for all comparisons. The mean difference was considered significant at the 0.05 level. ERI, Effort–Reward Imbalance Questionnaire; FRI, Functional Rating Index; MD, mental disorders; MSD, musculoskeletal disorders; MSPQ, Modified Somatic Perception Questionnaire; OC, Over Commitment; SMBQ, Shirom Melamed Burnout Questionnaire; WAI, Work Ability Index; ZSDS, Zung Self-Rating Depression Scale.

Table 3. Comparison between those on sick leave and those not on sick leave for diagnosis, health, functioning and work conditions.

Variable	On sick leave ( <i>n</i> =127)	Not on sick leave ( <i>n</i> =80)	Significance P value
<b>ICD-10 Classification</b>			
MSD (%)	38	62	
MD (%)	83	17	
MSD+MD (%)	77	23	
<b>Work ability</b>			
WAI	27.3 (6.4)	38.1 (6.4)	0.000
<b>Work conditions</b>			
ERI	1.0 (0.3)	0.9 (0.3)	0.000
OC	2.5 (0.8)	1.9 (0.7)	0.000
<b>Health</b>			
EuroQol (EQ-5D)	0.5 (0.3)	0.7 (0.2)	0.000
EuroQol (EQ-VAS)	53.6 (18.1)	68.7 (17.7)	0.000
<b>Mental functioning</b>			
ZSDS	28.9 (10.0)	17.6 (9.3)	0.000
MSPQ	9.1 (5.7)	4.6 (4.3)	0.000
SMBQ	4.5 (1.2)	3.1 (1.1)	0.000
<b>Physical functioning</b>			
FRI	41.1 (20.1)	27.5 (15.0)	0.000

Average scores (SD), unless otherwise noted. ERI, Effort–Reward Imbalance Questionnaire; FRI, Functional Rating Index; MD, mental disorders; MSD, musculoskeletal disorders; MSPQ, Modified Somatic Perception Questionnaire; OC, Over Commitment; SMBQ, Shirom Melamed Burnout Questionnaire; WAI, Work Ability Index; ZSDS, Zung Self-Rating Depression Scale.

Table 4. Independent variables predicting sick leave using a forward step-wise logistic regression analysis, adjusted for age and gender.

Independent variables	Beta value	Wald	df	Odds ratio	95% CI	<i>p</i> -value
Belonging to the MD group	3.9	27.8	1	47.4	11.3–199	0.000
Belonging to the MD+MSD group	2.5	17.9	1	11.8	3.8–37.2	0.000
WAI	1.7	11.8	1	5.5	2.1–14.6	0.001
FRI	0.07	15.7	1	1.07	1.04–1.1	0.000

CI, confidence interval; df, degrees of freedom; FRI, Functional Rating Index; MD, mental disorders; MSD, musculoskeletal disorders; WAI, Work ability Index.