

Functional evaluation and work participation in health care workers with musculoskeletal disorders

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*To my mother and father, Hilda and Einar,
for being who you are
and for always supporting and encouraging me*

Scientific environment

This project was carried out at the Physiotherapy Research Group, Department of Global Public Health and Primary Care, University of Bergen, Norway during the period 2011 - 2015. The project was a joint project between the University of Bergen and the Department of Health- and Social Service in the municipality of Bergen. The research work and studies were supervised by Professor Alice Kvåle, PT, PhD, University of Bergen, and co-supervised by Professor Jan Sture Skouen, MD, PhD, University of Bergen and Haukeland University Hospital, and Professor Liv Heide Magnussen, PT, PhD, University of Bergen and Bergen University College.

In addition, there was a close collaboration between this research group and a steering group established for the overall project 'Function, activity and work' (FAktA). The personnel manager, the personnel adviser and the occupational physician in the municipality of Bergen, an advisor in the Norwegian Labour and Welfare Organisation (NAV) from the working life centre, Hordaland, and researchers (a physician, a physiotherapist and a psychologist) at the University of Bergen have been members of the steering group that met twice a year to discuss the project. The Norwegian Fund for Post-graduate Training in Physiotherapy has funded my position as a PhD candidate.



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For 30 years I have worked as a physiotherapist in private clinics, occupational health care, in a nursing home and at an outpatient spine clinic. For most of my working career I have been interested in and engaged with employees/patients with musculoskeletal disorders. Undertaking PhD thesis and being part of the project ‘Function, Activity and Work’ gave me the opportunity to gain a deeper understanding of aspects related to musculoskeletal disorders and work functioning. This work has been an exciting and challenging journey.

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Bergen, February 2016

Tove Ask

Abstract

Background: In Norway and other western countries, musculoskeletal disorders (MSDs) are the most frequent reasons for sick leave and disability pensions, and particularly employees in the health and social sector have a high sick leave level.

Purpose: The main purpose of the project was to gain more knowledge regarding the functional level of employees with MSDs, whether on sick leave (less than 4 months' full sick leave) or in work despite having pain, and to gain experience with a functional evaluation tool. In addition, we aimed to have close cooperation with the workplace to increase our understanding of employers' perspectives and experiences in preventing or reducing sickness absence.

Methods: Health care workers were recruited from the Department of Health- and Social Service in the municipality of Bergen from January 2012 to December 2014. Data from the functional evaluation were compared between those on full sick leave, partial sick leave and those staying in work, and factors associated with being on sick leave were examined (Study I). Participants with low back pain that met the inclusion criteria were invited to a randomised controlled trial (RCT) (not part of our study). All who were *not* included in the RCT, received advice and a report and verbal feedback from the functional evaluation tool, and four weeks later they were asked to return a short questionnaire about the usefulness of the brief functional evaluation (Study II). Focus group interviews were also conducted: three focus groups with employees (11 participants), and five with their supervisors (26 participants). Through the interviews we explored the employees' and supervisors' experiences with the brief functional evaluation (Study II), and we also explored the supervisors' strategies when following up employees with MSDs (Study III).

Results: A total of 250 employees (92.4 % women) underwent a functional evaluation. We found that participants on full sick leave had statistically significant poorer physical function compared to those working and to those on partial sick leave. Logistic regression showed that a reduced level for the physical dimension of the

Short-Form 12 Health Survey (SF-12) and a high lift test were significantly related to full sick leave (OR 0.86, $p < 0.001$) (OR 0.79, $p = 0.002$). The physical dimension of SF-12 was the only variable that was associated to partial sick leave (OR 0.91, $p = 0.005$). Of the 194 employees who received a written evaluation report, three-quarters completed the questionnaire, and about 70% found the evaluation useful. Three main themes relating to its usefulness emerged from the qualitative data analyses: 1) Clarification and raising awareness, 2) The functional evaluation report as a tool for communication, and 3) Increased knowledge - altered behavior. In Study III, the supervisors described different strategies related to three phases in sick leave management and five corresponding themes: Phase 1) Promoting well-being and a healthy working environment, Phase 2) Providing early support and adjustments, and Phase 3) Making employees more responsible, using confrontational strategies in relation to employees on long-term sick leave, and cooperation with general practitioners (GPs).

Conclusions: Reduced physical function can be measured in an early phase of sickness absence in employees with MSDs. Health care workers on full sick leave due to MSDs, who underwent a functional evaluation, had lower (worse) scores on self-reported and directly measured physical function compared to a working group with MSD and those on partial sick leave. Both employees and supervisors found the brief functional evaluation useful for clarifying the employees' functional level and for obtaining advice to improve employees' health and work functioning. At the workplace, the supervisors applied strategies to support as well as make demands on, and confront the employees. Moreover, the supervisors requested a closer cooperation with the GPs, which they believed could facilitate a faster return to work.

Norsk sammendrag

Bakgrunn: I Norge og andre vestlige land er muskel- og skjelettplager den vanligste årsak til sykefravær og uførepensjon, og arbeidstakere i helse – og sosial sektoren har et spesielt høyt sykefravær.

Hensikt: Hovedhensikten med prosjektet var å få økt kunnskap om funksjonsnivået hos arbeidstakere med muskel- og skjelettplager, enten de var sykmeldt (< 4 måneder fullt sykmeldt) eller i jobb til tross for smerter, samt å få erfaringer med et funksjonsevalueringsverktøy. I tillegg ønsket vi å ha et tett samarbeid med arbeidsplassen for å øke vår forståelse av arbeidsgivers perspektiv og erfaringer relatert til forebygging og redusering av sykefravær.

Metode: Helsearbeidere ble rekruttert fra Byrådsavdeling for helse- og omsorg i Bergen kommune fra januar 2012 til desember 2014. Data fra funksjonsevalueringen ble sammenliknet mellom arbeidstakere som var fullt sykmeldt, delvis sykmeldt og som var i jobb, og faktorer assosiert med å være sykmeldt ble undersøkt (Studie I). Deltakere med korsryggplager, som oppfylte inklusjonskriteriene, ble invitert til en randomisert kontrollert studie (RCT) (ikke en del av vår studie). Alle som ikke deltok i RCT-studien mottok en skriftlig rapport og muntlig tilbakemelding i forbindelse med funksjonsevalueringen og ble fire uker senere bedt om å fylle ut et spørreskjema om nytteverdien av evalueringen (Studie II). Fokusgruppeintervju ble også gjennomført: tre fokusgrupper med arbeidstakere (11 deltakere), og fem med deres linjeledere (26 deltakere). Gjennom intervjuene utforsket vi arbeidstakernes og linjeledernes erfaringer med funksjonsvurderingen (Studie II). Vi utforsket også linjeledernes strategier ved oppfølging av ansatte med muskel- og skjelettplager (Studie III).

Resultater: I alt gjennomgikk 250 arbeidstakere (92.4 % kvinner) funksjonsevalueringen. Arbeidstakere som var fullt sykmeldt hadde statistisk signifikant lavere fysisk funksjon sammenliknet med gruppen som var i arbeid og arbeidstakerne som var delvis sykmeldt. Logistisk regresjonsanalyse viste at redusert nivå på den fysiske dimensjonen av SF-12 og en høy løftetest var signifikant assosiert

med å være fullt sykmeldt (OR 0.86, $p < 0.001$) (OR 0.79, $p = 0.002$). Den fysiske dimensjonen av SF-12 var den eneste variabelen som var assosiert med å være delvis sykmeldt (OR 0.91, $p = 0.005$). Av 194 arbeidstakerne som mottok den skriftlige evalueringsrapporten (Studie II), besvarte tre fjerdedeler spørreskjemaet, og rundt 70 % opplevde funksjonsvurderingen som nyttig. Tre hovedtema om nytteverdien fremkom fra de kvalitative dataanalysene: 1) avklaring og bevisstgjøring, 2) funksjonsevaluering som et kommunikasjonsverktøy, og 3) økt kunnskap - endret adferd. I Studie III beskrev linjelederne forskjellige strategier i oppfølging av ansatte med muskel- og skjelettplager relatert til tre faser i sykefraværarbeidet og fem korresponderende temaer: fase 1) fremme trivsel og et sunt arbeidsmiljø, fase 2) gi tidlig støtte og tilpasninger og fase 3) ansvarliggjøring av arbeidstakerne, benytte konfronterende strategier i forbindelse med arbeidstakere som er langtidssykemeldt, og samarbeid med fastleger.

Konklusjon: Redusert fysisk funksjon kan måles i en tidlig fase av sykefraværet hos arbeidstakere med muskel- og skjelettplager. Helsearbeider som var fullt sykmeldt på grunn av muskel- og skjelettplager, og som gjennomgikk en funksjonsevaluering, hadde lavere (verre) skårer på selvrappport og direkte målt fysisk funksjon sammenliknet med arbeidstakere som var i jobb eller var delvis sykmeldt. Både arbeidstakere og linjeledere opplevde den korte funksjonsevalueringen nyttig for å avklare funksjonsnivået hos arbeidstakerne og for å få råd om å forbedre arbeidstakernes helse og arbeidsdeltakelse. På arbeidsplassen benyttet linjelederne strategier for å støtte arbeidstakerne i tillegg til å stille krav og konfrontere dem. Et tettere samarbeid med fastlegene var ønsket, noe de mente kunne stimulere raskere tilbakeføring til arbeid.

Abbreviations

BIS	Bergen Insomnia Scale
BMI	Body mass index
BPS	Back Performance Scale
DCSQ	Demand-Control-Support Questionnaire
FAkTA	Function, Activity and Work
GBE	Global Body Examination
GP	General Practitioner
ICC	Intraclass Correlation Coefficient
ICF	The World Health Organisation's International Classification of Functioning, Disability and Health
HSCL-25	Hopkins Symptoms Checklist
LBP	Low Back Pain
MSD	Musculoskeletal disorder
NAV	Norwegian Labour and Welfare Service
NDI	Neck Disability Index
NFAS	Norwegian Function Assessment Scale
NPRS	Numeric Pain Rating Scale
PT	Physiotherapist
RCT	Randomised Controlled Trial

RMDQ	Roland-Morris Disability Questionnaire
RTW	Return to work
SF-12	Short-Form 12 Health Survey
SHC	Subjective Health Complaints inventory
SPADI	Shoulder Pain and Disability Index
SPSS	Statistical Package for Social Science
STC	Systematic Text Condensation
TSK	Tampa Scale of Kinesiophobia
WHO	World Health Organisation
ÖMPQ	Örebro Musculoskeletal Pain Screening Questionnaire

List of publications

Study I

Ask T, Skouen JS, Assmus J, Kvåle A.

Self-reported and tested function in health care workers with musculoskeletal disorders on full, partial or not on sick leave.

Journal of Occupational Rehabilitation, 2015; 25:506-17 <http://www.ncbi.nlm.nih.gov/pubmed/25427674>



Study II

Ask T, Magnussen LH, Skouen JS, Skaar A, Kvåle A.

Experiences with a brief functional evaluation for employees with musculoskeletal disorders as perceived by the employees and their supervisors.

European Journal of Physiotherapy, 2015; 17:166–175 <http://dx.doi.org/10.3109/21679169.2015.1061594>

Source from the functional evaluation	Good	Moderate	Poor
1. Usability and utilization	24	7	24
2. Time to fill	24	7	24
3. It is through/obvious how to use	24	7	24
4. It is through/obvious what to do	24	7	24
5. Usability	24	7	24
6. Usability - many better points	24	7	24
7. Back Musculoskeletal Survey	24	7	24
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Study III

Ask T, Magnussen LH.

Supervisors' strategies to facilitate work functioning among employees with musculoskeletal complaints. A focus group study.

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CONTENT

SCIENTIFIC ENVIRONMENT.....	III
ACKNOWLEDGEMENTS.....	IV
ABSTRACT.....	VII
NORSK SAMMENDRAG.....	IX
ABBREVIATIONS.....	XI
LIST OF PUBLICATIONS.....	XIII
1. INTRODUCTION.....	1
1.1 THEORETICAL FRAMEWORK.....	3
1.1.1 <i>From a biomedical to a biopsychosocial model.....</i>	<i>3</i>
1.1.2 <i>International Classification of Functioning, Disability and Health.....</i>	<i>4</i>
1.2 MUSCULOSKELETAL DISORDERS.....	7
1.3 SICKNESS ABSENCE.....	9
1.3.1 <i>Risk factors for MSDs and sickness absence.....</i>	<i>11</i>
1.3.2 <i>Prevention of MSDs and sickness absence.....</i>	<i>15</i>
1.3.3 <i>Functional evaluation tools.....</i>	<i>17</i>
2. OVERALL AIM AND RESEARCH QUESTIONS.....	21
3. METHODS.....	22
3.1 SETTING - FUNCTION, ACTIVITY AND WORK (FAKTA) - PROJECT.....	22
3.2 DESIGN.....	23
3.3 THE FUNCTIONAL EVALUATION.....	25
3.4 ANALYSIS.....	31
3.4.1 <i>Statistical analysis.....</i>	<i>31</i>

3.4.2	<i>Systematic Text Condensation</i>	32
3.5	ETHICAL APPROVAL	35
4.	SUMMARY OF RESULTS	36
4.1	STUDY I.....	36
4.2	STUDY II	36
4.3	STUDY III	37
4.4	ADDITIONAL RESULTS	38
5.	DISCUSSION	39
5.1	METHODOLOGICAL AND ETHICAL CONSIDERATIONS	39
5.1.1	<i>External validity</i>	39
5.1.2	<i>Internal validity – credibility</i>	42
5.1.3	<i>Ethical considerations</i>	49
5.2	DISCUSSION OF MAIN FINDINGS	50
5.2.1	<i>Functional level of employees with MSDs</i>	50
5.2.2	<i>The usefulness of the functional evaluation</i>	53
5.2.3	<i>Strategies to facilitate work participation at workplace/community level</i>	56
5.2.4	<i>Is work participation good for health?</i>	58
5.2.5	<i>Contextual factors impact on work participation</i>	59
6.	CONCLUSION AND IMPLICATIONS	61
7.	FUTURE RESEARCH	63
	SOURCE OF DATA	64
	PAPERS I-III	
	APPENDIX	
	APPENDIX 1. PHOTOS OF PHYSICAL TESTS	
	APPENDIX 2. MAIN TOPICS OF INTERVIEW GUIDES	

1. INTRODUCTION

Musculoskeletal disorder (MSD) is a complex and multifactorial phenomenon that includes biological, psychological and social factors, and represents a great burden for the individual and society. Globally, all MSDs combined, account for more than a fifth of the total years lived with disability. Low back pain is ranked first (highest) of all health conditions studied, with neck pain as the fourth highest disability (March et al. 2014).

In Norway, MSDs are the most frequent reasons for sick leave and disability pensions (Jansson et al. 2013; NAV 2015b), and employees in the health and social sector, particularly those working in the primary care sector, have the highest sick leave (NAV 2015b). Many initiatives have been introduced to prevent sickness absence and exclusion from working life. Norwegian authorities (NOU) argue that early follow-up of employees on sick leave is important to avoid long-term sick leave and disability pension. The importance of the workplace in sick leave management has been highlighted, with the employer and employees as key persons in the return to work (RTW) process (NOU 2000). The supervisors have been given increased responsibility in the follow-up of employees with health complaints (NAV 2015a; NOU 2000), and they may therefore be able to capture a person's health problems at an early stage and take necessary initiatives to prevent or reduce sick leave. In this perspective, evaluation of a person's functional ability can be an important tool to clarify a person's work ability, and may also provide a sound basis for decisions and advice regarding treatment, sick leave and work modifications (Engbers et al. 2003; Shaw et al. 2009b; Thonnard et al. 2007).

Decision about sick leave is mainly taken in primary health care by the general practitioners (GPs). According to Norwegian social law, lack of work ability is an absolute precondition for receiving sickness benefits (Folketrygden 1997). Previous research has shown that GPs find it challenging to assess the patient's work ability

and take decisions regarding sickness certification (Arrelov et al. 2007; Nilsen et al. 2015). A functional assessment can be requested to be performed by e.g. physiotherapists and occupational therapists, but there is a lack of tools designed for giving advice about work participation and management of MSDs in an early phase of sick leave or even before sick leave.

Functional evaluation may be used to discriminate between groups of persons with MSDs, and accordingly provide knowledge about physical and psychosocial function in different stages of illness and sick leave, - information that may be used to optimize intervention and work functioning. When developing a functional evaluation tool, it is essential to anchor it in persons who will use it, and employees' and supervisors' experiences are therefore important to illuminate. These topics were addressed in the thesis. In addition, we wanted to gain insight into the supervisors' experience in the follow-up of employees with MSDs to facilitate work participation.

This PhD thesis is a part of the project "Function, Activity and Work" (FAkta), a joint project between the University of Bergen and the Municipality of Bergen. The project will be further elaborated in this thesis.

In the introduction, the biopsychosocial model and the International Classification of Function, Disability and Health (ICF) are described as theoretical perspectives. Further, the phenomenon of MSDs and the prevalence of these conditions, sick leave legislation and sick leave rates are presented. Risk factors for and prevention of MSDs and sick leave are outlined; and finally, functional evaluation tools are introduced.

1.1 Theoretical framework

1.1.1 From a biomedical to a biopsychosocial model

Health, illness and disability are multifaceted concepts and are defined in a variety of ways. The biomedical model for disease defines disease in terms of somatic and physiological processes and illness is seen as a deviation from normal biological function. Disease and illness have in this model a specific causal explanation and thereby a rationale that can be addressed with specific treatment (Engel 1977; Main et al. 2000). Even though the biomedical model is still relevant in acute health care, it is inappropriate for chronic complex conditions and illnesses (Schultz et al. 2007). As a reaction to the biomedical model, the biopsychosocial model was proposed in the late 1970s by Engel (Engel 1977). The biopsychosocial model seeks to understand human health and illness in a broader context, with interaction between physical and mental processes and social factors. While the biomedical model is cure-orientated and focuses on physical treatment modalities, the biopsychosocial model is coping-oriented and emphasises restoration of function and treatment of the whole person within the context of their disease (Main et al. 2000; Schultz et al. 2007). Since the model was first proposed, there has been an increased emphasis on the biopsychosocial model in the management of musculoskeletal complaints in both clinical and occupational settings (Schultz et al. 2007; Waddell et al. 2005). This perspective may therefore be useful when trying to understand the mechanism behind management and sick leave due to MSDs.

According to the biopsychosocial model, health professionals and employers should take into account the interplay between the biological, the psychological and the social factors to improve health and work functioning. Further, the biopsychosocial model often implies involvement from different stakeholders, for example managers, GPs and occupational health service and interaction among stakeholders (Loisel et al. 2005; Waddell et al. 2005). This is particularly relevant when dealing with multidimensional phenomena such as MSDs and sick leave.

1.1.2 International Classification of Functioning, Disability and Health

The ICF is published by the World Health Organization (WHO) and is a framework and a classification system used to describe and measure health and human functioning (ICF 2001). The ICF is based on the biopsychosocial model and represents a transition from a medical understanding of the consequences of a health condition to a relational understanding, where different dimensions of function and contextual factors may be related to and interact with each other (ICF 2001; Stucki 2005).

The health domains in the ICF are categorised into:

- Body functions and body structures
- Activities and participation

Body functions include physiological and psychological functions, and structures include anatomic parts (organs and limbs), and impairments refer to loss or deviation from normal body functions and structures. Activity is defined in the ICF as ‘execution of a task or action by an individual’; while activity limitations are the difficulties the individual may have in executing activities. Participation is ‘involvement in life situation’, and participation restrictions are the problems the individual may experience with such involvement (ICF 2001, p.10). Example of body function, activity and participation include, respectively, muscle strength, lifting and work participation. The term ‘function’ in the ICF, refers to functioning as a positive category, while ‘disability’ is categorized in negative terms. ‘Functioning’ is an umbrella term for all body functions, activities and participation, and ‘disability’ is the umbrella term for impairments, activity limitations and participation restrictions.

Contextual factors in the ICF are categorized into:

- Personal factors
- Environmental factors

The contextual factors are essential dimensions of the ICF. Personal factors cover age, gender, social status, education, lifestyle and profession, but given the large cultural and social variances associated with them, they are not classified.

Environmental factors include physical, social and attitudinal environment in which individuals live, and may be barriers or facilitators in interaction with the individual with a health condition and affect the level of functioning (ICF 2001; Sykes 2008).

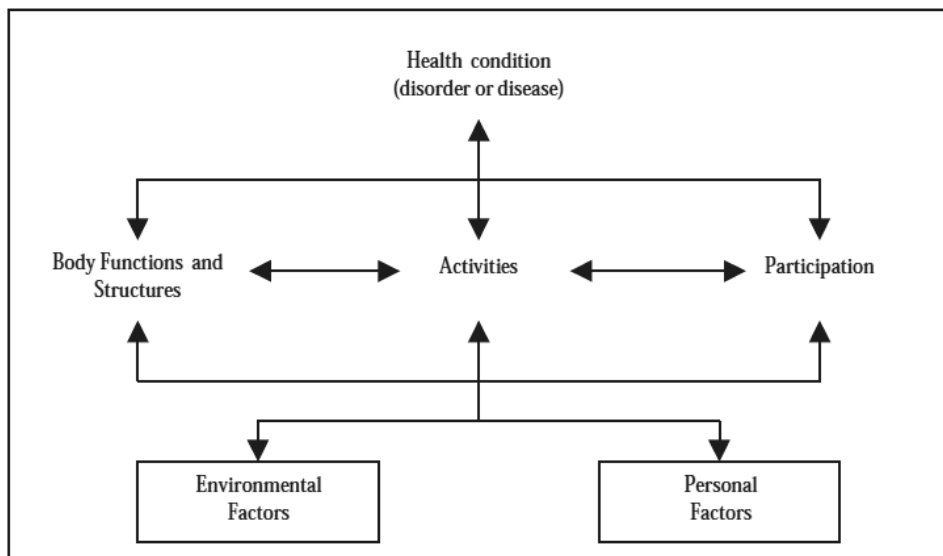


Figure 1: Interactions between the components of ICF (2001).

The ICF classification system provides a hierarchical list of more than 1,400 codes and definitions that can describe and specify the different ICF components. The list of codes becomes a classification when qualifiers are used. Qualifiers register the extent or the magnitude of functioning or disability and, together with the codes, enable a detailed classification of function. This may be a support to clinicians as well as to researchers, administration and for statistical use (ICF 2001). For activity and participation there are two qualifiers:

- Capacity
- Performance

The level of capacity is defined in the ICF as ‘what a person with a health condition can do in a standard environment’ and reflects the environmentally adjusted ability of the individual, whereas the level of performance is defined as ‘what they actually do in their usual environment’ (ICF 2001, p. 15).

The classification and coding system makes it possible to report information from a range of health conditions in a consistent way. Hence, a universal framework can make the health information comparable across various health conditions, disciplines and countries, and could facilitate and ensure communication in both clinical settings and research (Stucki 2005).

The ICF can contribute to explain the complexity of MSDs and sickness absence by taking into account personal factors and work environment in addition to physical and psychological function, and the interaction between these dimensions (Solvang et al. 2012).

The ICF will be used as a framework to describe function, disability and health, as well as contextual factors in the thesis.

Work ability

Different definitions and models of the term work ability exist depending on the context on which work ability is studied, e.g. in occupational health care, social insurance, rehabilitation or health promotion. The determination is also influenced by whether work ability is considered from the point of view of the individual, the workplace or society (Tengland 2011). Based on the ICF- framework, work ability is explained by physical, mental and social aspects of functioning, in addition to environmental work demands and personal factors that influence the capacity to meet these demands (ICF 2001) as illustrated in Figure 2. The employee’s work ability is sufficient for some kinds of work, but not for others due to the demands of the work and the occupational competence required (Tengland 2011). Health professionals evaluate the worker’s health and functional capacity, but the employer (and the

employee) must consider the employee's work ability in relation to work content and work organization, and possible modifications at the workplace.

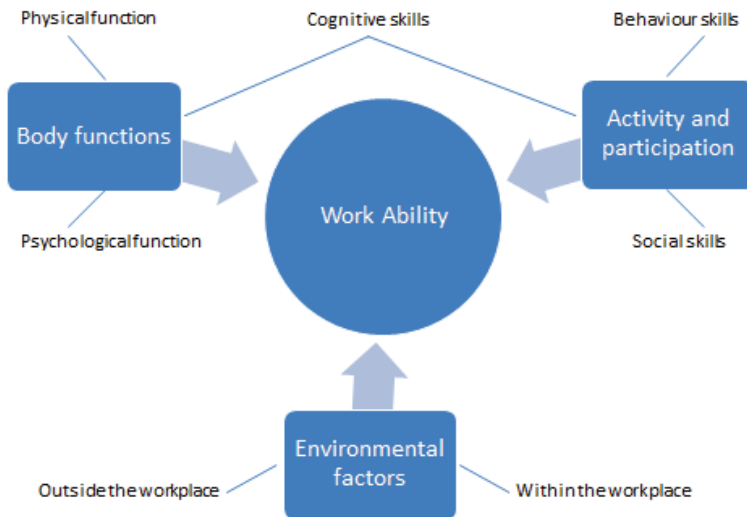


Figure 2: Factors contributing to work ability. Figure adapted from Fadyl (2009), with permission.

1.2 Musculoskeletal disorders

Musculoskeletal disorders (MSDs) is an umbrella term that covers more than 150 different conditions affecting the muscles, joints, tendons, ligaments, cartilage and spinal discs and that are usually associated with pain and reduced function (Punnett et al. 2004; WHO 2003). Musculoskeletal complaints, diseases and injuries can, according to the association of The Bone and Joint Decade, be divided into five categories (Formi 2015).

- (1) Pain and other ailments and/or altered function of the musculoskeletal system as a result of physical and mental stress
- (2) Non-infectious inflammatory (inflammation-like) diseases of the joints, spine and/or soft tissue

- (3) Degenerative diseases of the joints and/or spine
- (4) Pathological bone loss/osteoporosis with or without osteoporotic fractures
- (5) Injuries of the musculoskeletal system, including sequelae as a consequence of such damages.

The large majority of MSDs belong in the first category, with low back pain (LBP) and neck- and shoulder pain being the most frequent (Punnett et al. 2004). The focus will be on this category in the thesis, and the term “MSD” will be used for this particular group.

Prevalence

Musculoskeletal pain is common and most people will be affected by it at some time in their life (WHO 2003). About three in four of the adult population in Norway experience musculoskeletal symptoms during one month (Ihlebaek et al. 2010; Lærum et al. 2013; Natvig et al. 1994), with a 12-month prevalence of 15-48 % for LBP (Andersson 1999; Ihlebaek et al. 2006) and 30- 50 % for neck pain (Bovim et al. 1994; Hogg-Johnson et al. 2008). Most people recover fully from a given episode, but the recurrence rate for LBP is high (de Vet et al. 2002), varying from 20-40 % (Andersson 1999) and up to 75 % (van den Hoogen et al. 1997). High prevalence of MSDs has also been found in children and adolescents (Mikkelsen et al. 2008; Stahl et al. 2008). The prevalence of musculoskeletal pain increases in people up to about 65 years of age (Andersson 1999; Bergman et al. 2001), and then declines. Women are generally more affected by MSDs (Bergman et al. 2001; Cote et al. 2004; Wijnhoven et al. 2006). The large variation in prevalence reported in previous studies is a result of the different definitions used and the different populations studied.

Most of these health complaints are minor ailments that do not require treatment nor have consequences for work participation (Lærum et al. 2013; Waddell et al. 2008). Nevertheless, MSDs are among the most common causes of sickness absence and

disability pension in Norway and other Western countries (NAV 2015b; Picavet et al. 2003) and are a major burden to society, the workplace and the affected individual. In Norway, total costs of MSDs for society in 2009 were estimated to be NOK 69-73 billion, with the largest cost related to absence from work (Lærum et al. 2013).

1.3 Sickness absence

Although the sickness absence rate in Norway has stayed at almost the same level in recent decades, it is still substantial and has a major impact on society, companies and individuals. Norway has a high rate of sickness absence with a general level around 5.4 %. Sickness absence in 2014 was 7.1 % for women and 4.0 % for men (NAV 2015b). The highest rate is seen among health and social service workers at 7.9 (Figure 3) and people with MSDs (Jansson et al. 2013; NAV 2015c) (Figure 4).

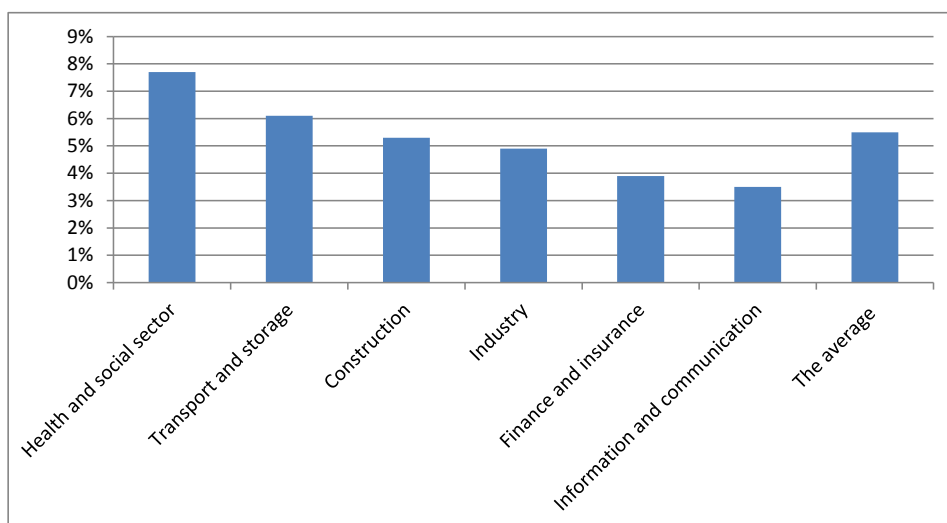


Figure 3: Medically certified sick leave in per cent in different sectors, Norway, 3rd quarter 2014. Based on statistics from the Norwegian Labour and Welfare Service.

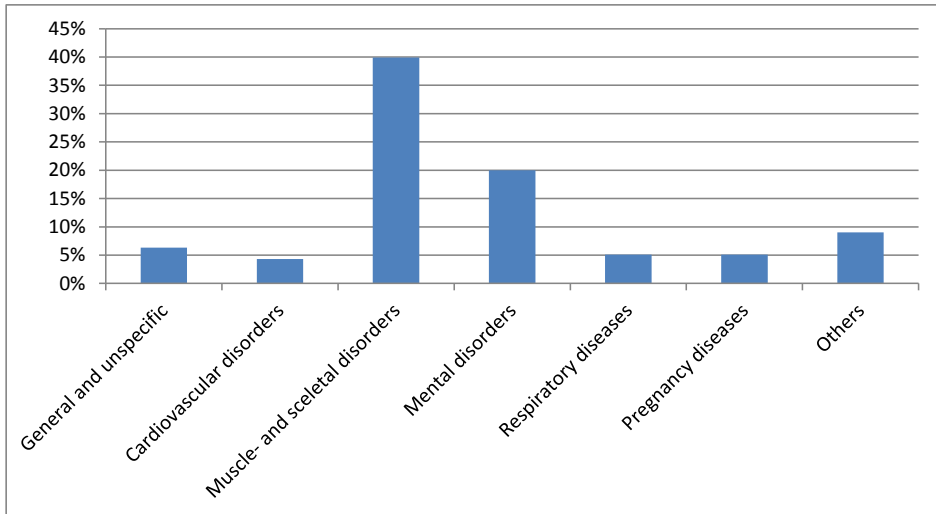


Figure 4: Medically certified sick leave days in per cent, according to diagnoses, Norway, 3rd quarter 2014. Based on statistics from the Norwegian Labour and Welfare Service.

In Norway, the sickness benefits system covers 100 % of the wage loss from the first day of reported sickness absence, up to 6 G (G is a basic amount of money, 2015: NOK 90,068). The employer covers sickness benefits for the first 16 days of sick leave, after which the employees are fully covered by The Norwegian Labour and Welfare Administration (NAV) up to a maximum of 52 weeks, regardless of whether a person is on full or partial sick leave (NAV 2015d). The person has to work for 26 weeks before new full benefits from NAV can be given due to sickness absence. If the employee is still on sick leave after one year, the employee is covered by a work assessment allowance and eventually, permanent disability pension. The benefits comprise approximately 65 % of their previous income. Self-certification in case of sickness may be used within the first three days and for up to eight days if the person is employed by a company included in the Inclusive Working Life Agreement (IA agreement), with a total of 24 days self-certification absence during 12-months.

Long-term sickness absence (>12 weeks) constitutes the largest part of sickness absence. Previous research has shown that about 10 % of the employees constitute 80

% of the sickness absence during one year (Brage et al. 2010; T Tveito et al. 2002). However, the people that make up this group vary from year to year; over a six-year period, about 35 % of the employees have been a part of the group with high sickness absence in one year (Brage et al. 2010).

Partial sick leave

Partial sick leave (less than 100 % sick leave), instead of full sick leave, has been considered to increase activity, job participation and reduce sickness absence. Partial sick leave is used in all Nordic countries, and the relationship between partial sick leave and sickness duration has been studied. Women used partial sick leave more than men, regardless of diagnoses (NAV 2013). A Finnish study (Viikari-Juntura et al. 2012) showed that early partial sick leave due to MSDs, resulted in lower rates of sickness absence compared to a group on full-time sick leave. Partial sick leave was also found to reduce the duration of sick leave in a Norwegian study (Markussen et al. 2012). However, another study did not support these findings (Lie 2014). This study showed little or no effect on the duration of sick leave when transferring people on full sick leave to partial sick leave.

1.3.1 Risk factors for MSDs and sickness absence

Individual level: health condition, body function and personal factors

Several individual factors have been shown to influence MSDs and the risk of sickness absence. Among those, perceived health complaints (Lotters et al. 2006), previous history of LBP (Waddell et al. 2001), previous sick leave (Alipour et al. 2013; Carroll et al. 2009), high pain intensity (Holtermann et al. 2010), number of pain sites (Kamaleri et al. 2009), physical capacity (Kuijer et al. 2012; Rasmussen et al. 2015), age (Lotters et al. 2006) and female gender (Holtermann et al. 2010; Lund et al. 2007), have been considered to be risk factors for long-term sick leave. Previous

studies have shown that psychological factors have an impact on sickness absence and disability for patients with MSDs. A systematic review by Pincus et al. (2002), showed an increased risk of prolonged symptoms and/or sickness absence due to psychological distress in patients with LBP. Other aspects highlighted in musculoskeletal literature as risk factors, are attitudes and beliefs related to health and work participation. There is conflicting evidence about whether fear- and avoidance beliefs are prognostic factors for the development of long-term LBP (Lakke et al. 2009; Vlaeyen et al. 2000). Own expectations of recovery and return to work have been found to be predictors for sick leave (Kuijjer et al. 2006; Lotters et al. 2006). In a recently published study, physical and mental fatigue were measured in about 2,000 Norwegian nurses working in hospital care, psychiatric care, and nursing homes/home care settings (Roelen et al. 2013). Physical fatigue predicted high sickness absence (>30 sick days in the past year), whereas mental fatigue did not.

The variety of factors described may be dynamically related; the absence could be a result of decreased work ability due to health complaints, but could also reflect the person's perspective of own health and how the person copes with his or her illness (Kristensen 1991).

Workplace and national level: Activity, participation and environmental factors

Workplace

In a Norwegian study, about 60 % of employees (30-45 years old), reported work-related MSDs in the previous month (Mehlum et al. 2006). Work-related MSDs are complaints that are caused by or aggravated by work and the workplace environment (WHO 1985). Even if the illnesses are work-related, this does not mean that work is the primary cause; it may be one of several causes. After musculoskeletal pain has developed, regardless of reasons, it may be harder to cope with high demands at work.

MSDs affect employees in all type of occupations, but some occupations involve activities with a higher risk of strain and overload (Quadrello et al. 2009). Physical demanding work, such as heavy lifting, frequent twisting and body vibration, constitute physical workplace risk factors for LBP and sickness absence (Eriksen et al. 2004; Foss et al. 2011; Hoogendoorn et al. 2002; Waddell et al. 2001). Heavy physical work was found to be the main prognostic factor for long-term sick leave in employees with neck- and shoulder pain and LBP (Holtermann et al. 2010). In addition to physical elements, psycho-social and organizational factors at work influence employees' health and work ability. Low job control (Foss et al. 2011), low social support (Eriksen et al. 2004; Foss et al. 2011; Krause et al. 1997) and/or perceived high job demands (Krause et al. 1997) have been found to have a negative impact on MSDs and work participation. In contrast, others have found no association between sick leave due to LBP and organizational factors at work or social support at work (Hartvigsen et al. 2004). Shift work is another risk factor for sickness absence. Nurses who worked shift had a higher risk of sickness absence and disability pension than those who worked during the day (Eriksen et al. 2004; Friis et al. 2008; Tuchsén et al. 2008). Shift work has also been a risk factor for sickness absence in men (Foss et al. 2011).

Socioeconomic factors also have impact on sickness absence (Christensen et al. 2008; Lund et al. 2007) and disability pension (Gjesdal et al. 2009; Mansson et al. 2001). A Danish study on participants from the general population, showed that managers and academics had a lower risk for long-term sickness absence than other white-collar and blue-collar workers (Christensen et al. 2008). However, the physical work environment and, to a lesser degree, health behaviour explained a large part of the differences between the groups.

Leadership styles may also have impact on employees' health and well-being and thereby on work ability and sickness absence (Westerlund et al. 2010; Woods 2005). A variety of leadership styles have been described: autocratic, democratic, directive, participative, task-oriented, relationship-oriented, transactional, and transformational (Bass et al. 2008). Of those, a relations-oriented leadership style has proven to

promote health and well-being in the workplace (Aas et al. 2014; Brouwer et al. 2010; Melchior et al. 1997). These leaders realize the importance of their relationship with the employees; they pay attention to the employee and offer assistance in challenging work tasks and thereby facilitate a positive working environment (Bass et al. 2008). In contrast, poor social support from the leader has been found to be associated with increased MSDs and sickness absence (Woods 2005).

Transformational leadership, which emphasizes inspirational motivation, communication of a vision, intellectual stimulation, and individual consideration, has also shown to be positive for the employees' health and well-being (Jacobs et al. 2013; Nielsen et al. 2008). In contrast, leaders committed to a task-oriented approach pay more attention to production and achievements of goals, and are less concerned with the employees' well-being (Bass et al. 2008). A task-oriented leadership style may influence the employees' health in a negative way (Duxbury et al. 1984; Seltzer et al. 1988).

National level

It is often argued in public debate that sick leave rates are too high in Norway compared to other European countries. However, differences in sickness insurance systems, sickness certification practice, levels of unemployment and organization of health care in European countries make it complicated to compare sickness absence rates (Coggon et al. 2013; Gimeno et al. 2004). Social insurance schemes and level of social security benefits have been suggested to influence the sickness absence rate (Bergendorff 2003). Norway is the only country that gives full compensation for wage loss from the first day of sickness absence, and it has been claimed that the generous welfare system in Norway results in less motivation for work. However, there is limited evidence for this statement. Halvorsen et al. (2011) found that motivation for working was high and stable over time in the Norwegian population. On the other hand, sickness absence during pregnancy has increased remarkably over the last years, but seems to be dependent on changes of norms among the pregnant women and their doctors (Mæland 2014).

Furthermore, a large variation in the sickness absence rate is seen between the different municipalities and counties in Norway and has been explained by demographic variables, types of labour market, socioeconomic levels and organization of the local community (Alexanderson 1998). Different sickness certification practice is another explanation, and previous studies have shown that the doctor plays an important role in regulating sickness absence (Markussen et al. 2011).

The level of sickness absence has been shown to be negatively correlated with the unemployment rate in Norway and other Western countries; when the unemployment rate is high, there is a lower rate of sickness absence and vice versa (Nossen 2009). The level of unemployment in Norway has been low compared to other countries, (Quadrello et al. 2009), and this will also have an impact on the sickness absence rate.

1.3.2 Prevention of MSDs and sickness absence

The effects of primary, secondary and tertiary prevention of MSDs, sickness absence and disability have been investigated in numerous studies.

Primary prevention

Primary prevention seeks to prevent or protect healthy people from developing a disease/complaint or experiencing an injury in the first place. This can be achieved by altering behaviours or exposures that can lead to disease or by promoting healthy behaviours in general (Burton et al. 2005).

Musculoskeletal complaints are very common in the general population, and it may therefore be difficult to prevent development of such ailments. Rather, it has been argued, the focus should be on reducing the consequences of MSDs, i.e. reducing the risk of long-term disability and sickness absence (Burton et al. 2005).

Secondary prevention

Secondary prevention is applicable when illness or risk factors already have developed. The goal is to halt or slow the progress of disease or illness in its earliest stages and to prevent long-term disability. Experts (occupational physicians, physiotherapists, etc.) have claimed that early screening and/or intervention can be beneficial, also before employees are put on sick leave, in order to prevent future sickness absence (Abma et al. 2013; Engbers et al. 2003; Quadrello et al. 2009; Shaw et al. 2009b). Shaw et al. described a step-wise approach; the first step is to identify employees with acute LBP who have problems doing work tasks and who have significant work concerns (Shaw et al. 2009b). Workplace and occupational health care can play an important role for employees at risk of becoming sick-listed by taking early contact and providing support, as well as providing simple adjustments at work. In line with this, a functional evaluation of employees in an early phase can make it easier to identify relevant initiatives to how employees can manage their MSDs and improve function and work participation.

At the workplace, open and supportive communication during sickness absence can be beneficial to facilitate early RTW (Black 2008; MacEachen et al. 2006; Shaw et al. 2003). Van Ooström et al. found moderate evidence for the effect of workplace interventions (e.g. modified work, changes of work organisation, case management with employer and employees) on sick leave among workers with MSDs, while no effect was found on health outcomes (van Oostrom et al. 2009). Another systematic review of workplace interventions showed that there was limited evidence for the effect of exercise interventions on sick leave and new episodes of LBP (Tveito et al. 2004). They found that multidisciplinary interventions had an effect on pain reduction, but no effect on sick leave or new episodes of LBP. In a systematic review of active workplace interventions, Odeen and co-authors concluded that there was moderate evidence that graded activity reduced sickness absence, and limited evidence that an extensive intervention including both workplace adjustment and a

clinical component and cognitive interventions (called the Sherbrooke model), reduced sickness absence (Odeen et al. 2013).

For most employees with short sick leaves (< 3 months) a brief intervention providing information and advice about self-care and staying active is considered to be sufficient to improve work functioning (Indahl et al. 1995; Loisel et al. 1997; Waddell et al. 2008).

Tertiary prevention

Tertiary prevention focuses on helping employees/clients manage complicated, long-term health complaints, for example facilitate people to return to work after sick leave. The aims include prevention of potential future complications and disabilities from the disease or illness (Helsedirektoratet 2016). Tertiary prevention can include modifying risk factors to reduce the impact caused by the disease on the individual's function, for instance offer modified work and/or special aids and equipment to manage work.

When employees are sick-listed for a longer period (> 3-4 months), more intensive multidisciplinary rehabilitation is preferred to improve function and work participation. Common to these interventions is the emphasis on a biopsychosocial approach, including work-focused health care (Haldorsen et al. 2002; Kamper et al. 2015; Norlund et al. 2009; Waddell et al. 2008).

1.3.3 Functional evaluation tools

During the last decades, increased emphasis has been placed on function rather than on medical diagnosis with regard to sickness absence (Engbers et al. 2003). The medical diagnosis gives little or no information about how the patients function with

their health problem/disease and is therefore rarely sufficient to provide advice about rehabilitation and sick leave.

Different functional evaluation tools are available, depending on the purpose and the context. Some tools have been developed for specific health conditions, while others are generic instruments. The tools also focus on different dimensions of function (physical, psychological and social functioning), related to what they are meant to describe. A functional evaluation can be part of the process of rehabilitation by identifying the problems and needs of clients, defining therapy goals and selecting appropriate interventions (Thonnard et al. 2007). The purpose could also be to evaluate work ability in relation to sickness certification, to be a tool in relation to workplace adjustments or a basis for planning return to work (Wand et al. 2010).

An assessment tool should be reliable and valid (Thonnard et al. 2007; Wittink 2005). The tool must be of clinical relevance and reflect aspects that are important to both clients and to practitioners (Matheson et al. 1996). Functional evaluation in an ICF-perspective takes into account physical and psychological function, work demands and social support, as well as personal factors such as motivation and coping abilities.

Functional evaluation tools generally fall into two main categories: self-report measures or physical function measurements (capacity/performance measures).

Self-report measures

Many self-report measures have been developed to evaluate function and activity limitations, and there are numerous standardized questionnaires for individuals with MSDs. The most widely used and evaluated illness-specific questionnaires for those with low back pain, neck pain or shoulder pain, include the Roland-Morris disability questionnaire, the Neck disability index (NDI) and the Shoulder pain and disability index (SPADI) (Roland et al. 2000; Vernon et al. 1991; Williams et al. 1995). The Norwegian Function Assessment Scale (NFAS) is a generic instrument developed to assess the need for rehabilitation and modified work among employees on sick leave,

as well as their rights to social security benefits (Brage et al. 2004). The items in NFAS are derived from the activity/participation component in the ICF and include both physical and mental functioning at work, as well as communication and interaction. It characterises general function in daily activities and is only partly related to work tasks (Engbers et al. 2003). Another generic self-report instrument, used in some European countries, is the Work Ability Index (WAI) which aims to capture workers with reduced work capacity and at risk for disability pension (Ilmarinen 2009; Tuomi et al. 1997). It assesses individual function based mainly on somatic complaints and the relationship the individual has to work demands.

Physical tests

Tests of physical function measure the performance of standardized tasks, often reflecting work tasks or daily living activities. The number of repetitions or timing of an activity is usually recorded for the task that is performed.

Functional capacity evaluations (FCEs) are the most commonly used tools for assessing workers' capacity to perform certain work tasks and readiness to work, and are mainly used in specialist clinics, workers' compensation organisations and insurance companies (King et al. 1998; Strong et al. 2004). FCE methods primarily measure the physical dimension of work ability and often include measurements of lifting, carrying, standing and repetitive movement (Lakke et al. 2012; Tuckwell et al. 2002). It is recommended that FCEs are not relied upon in isolation, but are used as part of an overall evaluation of work ability (Strong et al. 2004). The standardized FCE protocols take from about 4 hours to two days, and the practicality of these methods can therefore be limited (Gouttebauge et al. 2010).

Other physical test batteries are less comprehensive and may not be directly work-related, but reflect daily activities, such as walking, reaching, tying shoe laces and lifting. They are often referred to as performance tests (Wittink 2005). However, the term 'performance-based tests' has also been used for test batteries intended to guide

decisions on work participation (Kuijer et al. 2012). Using ICF- language, ‘performance testing’ would be considered as capacity testing since the tasks are standardized and are performed in a laboratory setting (Wittink 2005).

A systematic review found that there was strong evidence that performance-based measures predicted work participation in patients with MSDs, particularly for non-work participation. The predictive validity of these measures on work participation was not decreased by pain intensity, work-related recovery expectations, or organisational policies (Kuijer et al. 2012). Findings from a Cochrane review showed no evidence for or against the effectiveness of FCE in preventing occupational re-injuries after return to work, as no studies have compared FCE to no intervention (Mahmud et al. 2010). The review found no significant difference between the effect of a short and a long version of FCE.

Although previous studies have measured functional level in employees with MSDs, few have compared the functional level in employees on sick leave and those staying in work despite MSDs (Soer et al. 2012). More knowledge about what characterise these groups can give us insight into what could be emphasized in interventions and in workplaces. Even though different functional evaluation tools exist, there is still a lack of appropriate, standardized and feasible tools to be used in a primary and occupational health care setting to measure the functional level and to give advice about how to manage the MSDs in daily life and work.

2. OVERALL AIM AND RESEARCH QUESTIONS

The overall aim of this thesis was to increase our knowledge about the functional level of employees with MSDs and our understanding of how function is associated with MSDs and sick leave. We also wanted to gain experiences with a newly developed brief functional evaluation tool, for assessing the functional level and for providing advice on how to handle the MSDs. Another aim was to gain insight into the supervisors' perspectives and experiences in sick leave management of their employees. The focus was on employees who were in the early phase of sick leave (<4 months full sick leave) or who were staying in work despite MSDs.

Specific aims:

Study I: The aim of this study was to describe self-reported and physically tested function in health care workers with MSDs and to examine how function was associated with work participation. By using the ICF- framework to study the complexity of work ability, a wide range of biopsychosocial and work-related factors were investigated. This study examines possible differences of functioning in health care workers with MSDs a) staying in work despite MSD, b) on partial sick leave, c) on full sick leave.

Study II: The aim of this study was to explore employees' and supervisors' experiences with a brief functional evaluation tool used to assess the functional level and as a guide for how employees could manage their MSDs in an early phase of sickness absence.

Study III: The aim was to explore what strategies the supervisors used in the follow-up of employees with musculoskeletal complaints, and what strategies they found most beneficial in the different phases of sick leave management.

3. METHODS

3.1 Setting - Function, activity and work (FAktA) - project

The studies included in this PhD thesis were part of the project ‘Function, Activity and Work’ (FAktA), a joint project between the University of Bergen and the Municipality of Bergen, conducted in the period 2012- 2016. The initial aims of the project were to expand the knowledge and understanding of factors associated with examination and treatment of musculoskeletal pain, in order to reduce sick leave and pain, and to increase function and well-being in health care workers. FAktA consists of four main parts: (i) Education of supervisors about MSDs and pain management (2 h x 3), (ii) Functional evaluation of employees with MSDs, (iii) Randomized controlled trial (RCT) for employees with back pain, and (iv) Individual and focus group interviews with employees and supervisors, and a questionnaire about the usefulness of the functional evaluation (Figure 5).

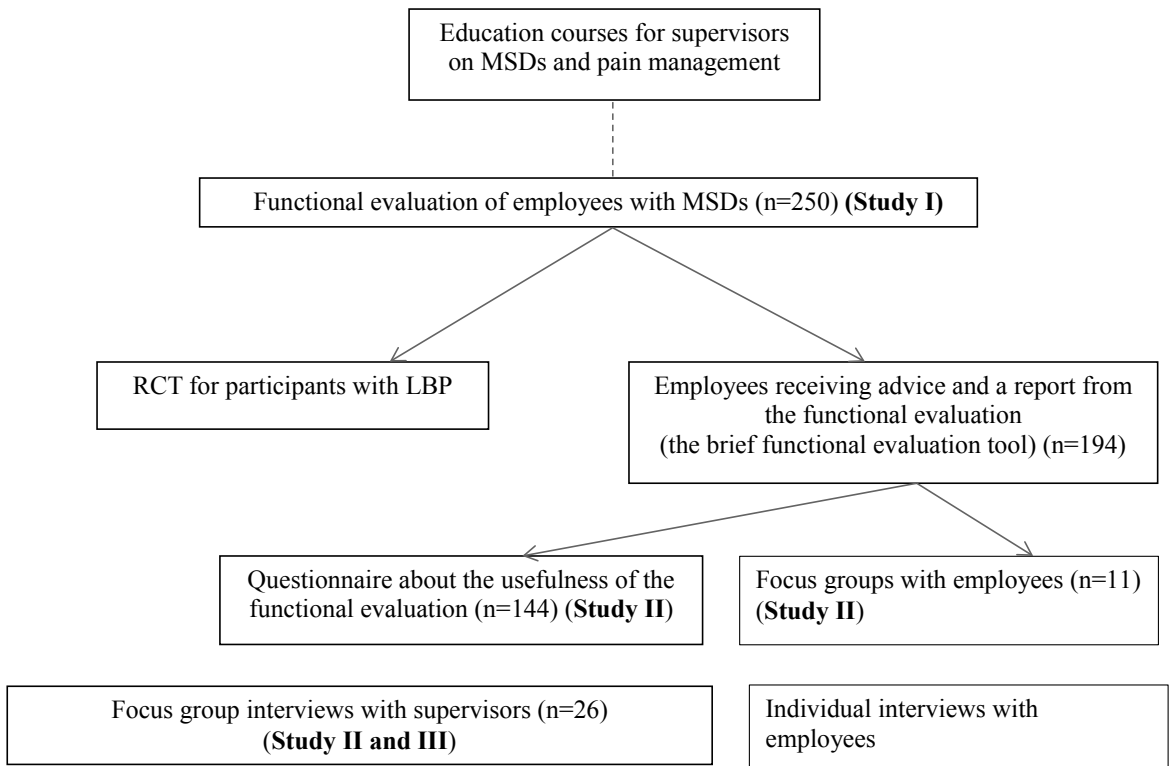


Figure 5: Overview of the FAktA- project

3.2 Design

Both quantitative (Studies I and II) and qualitative research methods (Studies II and III) were used in this PhD project. An overview over the study designs is presented in Table 1.

A cross-sectional study collects data from a population at one point in time to determine whether and how those with and without a condition differ on some chosen variables (Carter et al. 2011, p. 147) By using a cross-sectional design it was possible to compare the functional level in health care workers on full, partial or not on sick leave due to MSDs (Study I).

In Study II the employees received a functional evaluation report and answered a few weeks later a short questionnaire (structured and open-ended questions) about the usefulness of the brief functional evaluation (Figure 5).

Focus group interviews were used to gain insight into supervisors' and employees' experiences with the brief functional evaluation tool (Study II) and to explore what strategies the supervisors found beneficial in the follow-up of employees with MSDs (Study III). Focus group studies are appropriate to use in exploration of phenomena of common experiences, attitudes and perspectives (Morgan 1997, p. 20). Practice-oriented qualitative research can thus contribute to the development of knowledge that may be applied in clinical settings.

Sample and data collection

Table 1 shows an overview of samples and data collection. About 7,000 health care workers are employed in the Department of Health and Social Service in the Municipality of Bergen, Norway. The supervisors were offered an educational course about MSD (2 h x 3) to increase the knowledge about MSDs in order to improve the follow-up of employees with health complaints. Another aim with the educational course was to recruit participants to our studies. Employees on sick leave or at risk of

becoming sick-listed due to MSDs were recruited consecutively from the Department of Health and Social Service from January 2012 to December 2013 through their supervisors and/or by brochures. Those on full sick leave for more than four months were excluded as one of the study aims was to give early advice on how to handle the MSDs to prevent or reduce sick leave. Altogether 250 employees, working in nursing homes, home care service and in special homes for disabled persons, volunteered for the study and completed the functional evaluation. The employees with LBP that met the inclusion criteria for the RCT, (Örebro Musculoskeletal Pain Screening Questionnaire (OMSPQ) ≥ 31 , numeric pain rating scale (NPRS) ≥ 3 and Roland Morris Questionnaire (RMDQ) ≥ 7), did not receive a report and further advice. Those who were not included in the RCT, received individual advice in how to manage their MSDs, and a written and verbal report (n=194). These employees were also asked to return a short questionnaire about the usefulness of the brief functional evaluation tool four weeks later (Study II). Flow chart is presented in Figure 5, page 23.

The employees who received the report from the brief functional evaluation tool were also invited to participate in focus groups to discuss their experiences with the functional evaluation (Study II). Three focus groups with a total of 11 employees were conducted. All of them had worked for many years as health care workers, had recently been on sick leave due to MSDs and some were on sick leave at the time of the interview. Some of them (n=6) had also returned the questionnaire about the usefulness of the evaluation.

Five focus groups were conducted to gain insight into the supervisors' experiences with the brief functional evaluation tool (Study II) and to explore what strategies they found beneficial in the follow-up of employees with MSDs (Study III). Three focus groups were conducted in 2012 and two a year later to get an impression of the strategies used over time. Twenty-six supervisors participated. They were recruited through their managers, education courses and the project leaders.

Table 1. Description of study design, samples and analysis

Study	Design	Sample	Data collection	Analysis
Study I	Cross-sectional (Questionnaires and physical tests)	250 employees with MSDs	Jan 2012- Dec 2013	Chi-square exact test, Kruskal-Wallis test , Mann-Whitney U Test, logistic regression analysis
Study II	Questionnaire (structured and open-ended questions) Focus groups	194 employees who received a report from the brief functional evaluation tool Three focus groups with a total of 11 employees (women) Five focus groups with a total of 26 supervisors (three men and 23 women, aged 31-62)	Jan 2012 - Jan 2014	Mann-Whitney U Test, Chi-square exact test, Systematic Text Condensation
Study III	Focus groups	Five focus groups with a total of 26 supervisors	Jan 2012 - Feb 2013	Systematic Text Condensation

3.3 The functional evaluation

A functional evaluation was performed to assess the functional level of employees with MSDs and to examine how function was associated with work participation (Study I) and to give advice about how to handle MSDs (Study II). A variety of variables and instruments were chosen based on the dimensions of the ICF-framework, literature searches and discussions with researchers and experienced clinicians. Both validated physical tests and questionnaires were included, reflecting different but related aspect of function (Wand et al. 2010). All the involved researchers had long experience with functional evaluation tools in research and/or in clinical practice.

We wanted to include physical tests that could give an objective measure of the functional status in individuals with MSDs. Tests that captures function in individuals

with pain from neck, shoulder, back and widespread pain were chosen as these are the most common MSDs. To cover important aspects of musculoskeletal function we chose tests that reflected muscular endurance/strength, flexibility and relaxation, mobility-related activities and lifting capacity. We considered these tests to be of clinical importance in relation to daily activities and work, but not specific for the participants' professions. Since the test battery should be short and feasible, time consuming and tests that required extensive equipment were excluded (e.g. cardiorespiratory tests, FCEs).

We chose questionnaires that were widely used and recommended in research. The questionnaires covered aspects such as physical and psychological functioning, pain, health complaints, sleep disturbance and job characteristics, since previous research have shown that these aspects may influence functioning in daily life and work (Table 2). The collected demographic data were age, gender, educational level, work status, sick leave status and history, and the primary MSD condition. (The questionnaires and physical tests are presented in Table 2, page 28-30).

The brief functional evaluation tool

To develop a feasible test battery, a selection of instruments used in Study I was made (Table 2) and formed the basis of the functional evaluation report presented in Study II. The combination of the selected instruments, individual advice in how to handle MSDs and the written report is referred to as the brief functional evaluation (tool). Prior to the physical examination the participants filled out the validated questionnaires. An experienced physiotherapist examined the employees using standardized physical tests. The tests were easy to perform, did not require expensive equipment and took only 15- 20 minutes (Appendix 1). The employees received a report and verbal feedback from the functional evaluation, summarizing self-reported and physical findings. In the report, the employees were categorised as having: Good/favourable, moderate or low/unfavourable function for each questionnaire and test, which were based on previous research and clinical relevance. Through the

categorisation and the design of the report, we aimed to visualise not only the dimensions that should be emphasised to improve function but also employees' resources. Findings from the functional evaluation were discussed with the employee, as well as beliefs, expectations and motivation for activity and work. Based on test results and the discussions, individual advice was given on how to handle the MSDs in daily life and work. For instance, advice was provided about specific exercises, relaxation techniques and coping strategies. If necessary, the employees also received advice on further treatments and modified work. Reassuring the employee that activity and work participation were beneficial for health and wellbeing (if not contraindicated) was one part of the evaluation. The employees were encouraged to use the functional evaluation report in dialogue meetings with their supervisors and/or health professionals.

Table 2. Descriptions of questionnaires and physical tests used in Study I and II

Self-reported	Content	Score	ICF-dimensions	Study
Numeric Pain Rating Scale (NPRS) (Jensen et al. 1986)	Pain intensity over the last 2 weeks	Ranging from 0 (no pain) to 10 (worst possible pain)	Body function	Studies I and II
Pain drawing (Ohlund et al. 1996)	Marking on a pain drawing the area(s) that had been painful over the last 14 days	Number of squares marked	Body function	Studies I and II
Subjective Health Complaints inventory (SHC) (HR Eriksen et al. 1999; Grovle et al. 2011)	Consists of 29 items relating subjective somatic or psychological complaints experienced during the last month	Ranging from 0 (no complaints) to 3 (severe complaints). Each complaint was categorized into absent (0) or present (1, 2 or 3) and the scores were summarised.	Health condition	Study I
Hopkins Symptoms Checklist (HSC-25) (Derogatis et al. 1974; Sandanger et al. 1998)	Consists of 25 items with 10 items for anxiety symptoms and 15 for depression symptoms	Scores range from 1 to 4, with 4 indicating severe symptoms. Mean score is reported to 1.23 (95 % CI 1.19-1.30) in a normal population, and cut-off is 1.67 for men and 1.75 for women	Body function	Study I
The Tampa Scale of Kinesiophobia (TSK) (Kori et al. 1990)	Consists of 13-items concerning fear of movement/re-injury.	Scores range from 1-4 ('strongly disagree' to 'strongly agree'), with a total score ranging from 13 to 52. Higher scores indicate higher kinesiophobia.	Body function	Study I
Örebro Musculoskeletal Pain Screening Questionnaire (OMSPQ)–short form (Linton et al. 2011)	Predicts risk for future work disability. The short version consists of 10 items.	Ranging from 0 to 10 points on a scale anchored by extremes e.g. 'no pain' to 'pain as bad as it could be' or 'completely disagree' to 'completely agree'. Three items are reversed. The total score ranges from 1 to 100 where higher scores indicate higher estimated risk for future work disability. Cut-off point: 50.	Body function and activity/participation	Studies I and II
Norwegian Function Assessment Scale (NFAS) (Brage et al. 2004; Osteras et	Consists of 39 items, divided into seven domains: walking/standing, holding/picking up	Range from 1-4 ('no difficulty' to 'could not do it'), and an average score was calculated. A low score indicates better	Activity/participation	Studies I and II

al. 2007)	something, lifting/carrying, sitting, coping/managing, cooperation/communication, and senses.	function. Normative data showed an average for men: 1.13 (0.21) and women: 1.24 (0.34).		
Demand-Control-Support Questionnaire (DCSQ) (Landsbergis et al. 2000)	Consist of 17-items within three domains: work demands, decision latitude and social support	The scores of the single items are summated and converted into three scales of job demands, job control and social support, ranging from 0 (equivalent to “no”, “never” or “do not agree” for all items) to 1 (equivalent to “yes”, “often” or “agree” for all items). Two items are reversed. Higher scores on the three scales represent higher job demands, higher job control and higher social support.	Work environment	Study I
Short Form-12 (SF-12) (J Ware, Jr. et al. 1996; J Ware et al. 2009)	Measures physical and mental health-related quality of life.	Ranges from 0 to 100, and higher scores reflect better perceived health;- with mean (SD) scores for mental and physical dimension for a healthy population: 50 (10).	Activity/participation	Study I
Bergen Insomnia Scale (BIS) (Pallesen et al. 2008)	BIS contains 6 items that correspond to the diagnostic criteria for insomnia in DSM-IV-TR (American Psychiatric Association, 2000).	A 7-point scale; higher scores indicate more severe sleep problems. The total score has a continuous scale (max 42). Normative data: Mean (SD):10.67 (9.73)	Body function	Study I
Body Mass Index (BMI)		Weight (kg)/cm ²	Personal factor	Study I
Roland-Morris Disability Questionnaire (RMDQ) (Roland et al. 2000)	Measures physical disability due to LBP. Consists of 24 items.	Number of present symptoms are counted. Total score ranging from 0 (no disability) to 24 (maximum disability).		Study II
Neck Disability Index (NDI) (Vernon et al. 1991)	Measures disability due to neck pain. Consists of 10 items.	Each item ranges from 0 to 5 with 5 indicating more severe complaints. Total score from 0 to 50.		Study II
Shoulder Pain and Disability Index (SPADI) (Williams et al. 1995)	Measures shoulder function. Consists of a pain domain with 5 items and a function domain with 8 items.	Each item is scored on a numeric rating scale. Mean value from the combined scores is given in percent (0- 100), higher scores indicating more		Study II

		pain and disability.		
Global Body Examination (GBE)-Flexibility (Kvale et al. 2012)	Six tests: truncal flexibility and ability to relax during passive movements: Elbow-drop flexibility, lumbar-sacral flexibility, head rotation resistance and resistance to hip circumduction, hip-knee flexion and arm/shoulder flexion	Each test: 0 to 7. Total score for Flexibility: 0 to 42, higher score indicating reduced flexibility. Healthy (34 individuals): Median= 5.5, mean=7.2	Body function	Studies I and II
Back Performance Scale (BPS) (Magnussen et al. 2004; Myklebust et al. 2007)	Five tests reflecting mobility-related activities for trunk and lower extremities (sock-test, pick-up test, roll-up test, fingertip-to-floor and a lift test where a box weighing 4 kg (women) or 5 kg (men) is lifted up and down repeatedly, from floor to waist, for 1 minute).	Each test: 0 to 3. Total score: 0 to 15, with higher scores indicating worse function. Normative data for people without back pain (n=150): Median= 0, mean=0.8 (1.4)	Activity/ participation	Studies I and II
High lift test	A high lift test based on the lift test in BPS. The participants lift a box of 2 kg (for women) or 3 kg (for men) from waist to shoulder height and back again repeatedly for 1 minute.	Number of lifts performed in 1 minute is counted.	Activity/ participation	Studies I and II
Biering-Sørensen test (Biering-Sorensen 1984; Keller et al. 2001)	Static endurance of the back. Participants are positioned prone with the upper body extending beyond the edge of a plinth and the lower body is fixed to the bench with three straps.	The length of time the upper body is held straight is recorded. Max time 240 sec. Healthy (31 individuals): median=146 (111-188)	Body function	Studies I and II
Abdominal endurance/strength (Oja et al. 1995)	Three levels of dynamic sit-up test with increased demand for each level. The participants are supine with the knees flexed and with feet supported on the plinth by the tester.	The number of completed repetitions is counted (0-15).	Body function	Studies I and II
Tender points (Wolfe et al. 1990)	18 defined fibromyalgia tender points with four kilos pressure are tested.	Painful points are counted	Body function	Studies I and II

3.4 Analysis

3.4.1 Statistical analysis

Descriptive statistics were provided for demographic variables for all participants. To explore the differences in function between participants on full sick leave, partial sick leave or not on sick leave, the Chi-square exact test for categorical data and Kruskal-Wallis test for continuous variables were used. P-values ≤ 0.05 were considered statistically significant. A personal mean was given for missing data if less than 30% of a sub-scale was missing.

A logistic regression analysis was performed to explore which factors were associated with being sick-listed, and used the sick-listed groups as the dependent variable and several independent variables (gender, age, self-reported physical and mental function, perception of work environment, physical tests). First, we estimated an unadjusted model for each of the independent variables to detect all variables significantly associated with sick leave. Then we estimated a fully adjusted model, containing all independent variables. In the next step, correlation analyses were performed, and if the significant variables (either in the unadjusted or the fully adjusted model) were moderately to highly correlated, a selection of variables to the final model was made. However, if we considered variables to be of clinical relevance to sick leave, these variables were included in the final model. In this study, both physical and mental function were considered as clinical relevant, in addition to controlling for gender, age and smoking. Odds ratios and confidence intervals were calculated. P-value was set to ≤ 0.01 . Statistical analyses were calculated using SPSS (version 19; SPSS Inc., Chicago, IL) and Matlab (version 7.10). An overview of the analyses used can be found in Table 1.

3.4.2 Systematic Text Condensation

We used systematic text condensation (STC) (Malterud 2012b) for the qualitative analysis of Studies II and III. ‘Systematic text condensation is a descriptive and explorative method for thematic cross-case analysis of different types of qualitative data, such as interview studies, observational studies, and analysis of written texts’ (Malterud 2012b, p. 795). STC is inspired by Giorgi’s psychological phenomenological analysis. From a phenomenological perspective, social phenomena may be understood from the informant’s own perspectives and the world described as it is experienced by the individual. STC aims to present the participants’ experiences as expressed by them, rather than the underlying meaning of what has been said.

The analysis can be described in four steps: (1) reading all the material to obtain a total impression of themes; (2) identifying and sorting the meaning of units; (3) condensing the contents of each code group; and (4) synthesising the condensation to descriptions and concepts.

One example of this process follows:

Step 1 Total impression – from chaos to themes

In step 1 we listened to the recorded interviews and read the transcripts and the field notes to gain an overview of themes in the interviews. After having formed an individual impression and identified 4-8 themes we met to discuss and coordinate the preliminary themes. Preliminary themes identified in Study III were for example: ‘well-being’, ‘good relationship’ and ‘positive attitudes at work’. The themes were then reformulated to a joint preliminary theme: ‘the importance of work place culture’.

Step 2 Identifying and sorting meaning units – from themes to codes

The transcripts were reread to identify units of meaning, which are text snippets that are related to the research question, i.e. which strategies the supervisors found useful when following up employees with MSDs.

The preliminary (tentative) themes were then coded and organised in code groups, such as ‘promoting a good working environment’ and ‘early and close follow-up to support employees to stay in work’,

Step 3 Condensation – from code to meaning

We made systematic abstraction of meaning by condensing the contents of each code group. The code ‘promoting a good working environment’ was divided into the following subgroups:

- Well-being
- Relationship and trust
- Positive attitudes toward work

Example of condensation of the code ‘positive attitudes toward work’:

Forming attitudes are an important part of prevention for me. We leaders have a special responsibility and must set a good example by being role- models. I help in the morning routine on Mondays which is a particularly busy day. When I work weekends I put aside the administrative tasks and do the same tasks as the others. Another factor that is important for building positive attitudes toward work are opportunities for professional development. Which interests does the individual have and how can he or she get more expertise in this area and continue working in this field in day-to-day work? If they do not apply their resources in a good way they might be less motivated in the long term. It is easier to attend work with health complaints if they are motivated. I think it is essential that the employees get an ownership to their work. The employees should feel useful and understand that they are an important brick at the workplace. An example of trying to involve the employees more in the workplace’s policy and goals is through “the value games” in the Municipality of Bergen. All employees in our department had the opportunity to participate a whole day at a work shop to discuss the values and goals in the

municipality. Afterwards we had a meeting to create an internal action plan based on this work shop. This was the best action plan ever made by our section.

We identified a quote for each condensate which could illustrate our main findings in this subgroup. For the subgroup ‘promoting a good working environment’ we chose the following quote:

“You have to be conscious, place people where they have their competence and interest... so they get the inspiration back, - then the positive spiral will start. If they are motivated it will be easier to continue working even if they have some pain”.

Step 4 Synthesizing – from condensation to descriptions and concepts

In this step we synthesized the condensation from each subgroup to a coherent analytic text to elucidate which strategies the supervisors used and found beneficial in the follow-up of employees with MSDs. The subgroup ‘positive attitudes toward work’ was for example elaborated as follows:

Having a positive attitude to the workplace was also considered important in a well-functioning working climate. Among other things, this entailed being a role model, for instance by taking part in the day-to-day work tasks together with employees, if necessary. Sometimes the supervisors organised workshops on the organisation’s visions and goals in order to increase the feeling of belonging in the workplace. Educational courses were also regarded as a valuable way of inspiring and motivating employees to identify more with their work.

In the process of writing the results together, the subgroup ‘positive attitudes toward work’ was finally presented as a paragraph under the category ‘Promoting well-being and a healthy working environment’.

Interaction in the focus groups

All focus groups were led by a moderator. The moderator had the responsibility for the discussions and followed up with questions and elaboration to gain insight into the employees' and supervisors' experiences and perspectives. All the participants were encouraged to take part in the discussions and present examples from their daily work.

The co-moderator observed and registered the atmosphere and interaction in the groups. She also summarised the main topics that emerged and asked the participants to elaborate on and/or confirm them. The moderator and co-moderator discussed the group process immediately after each interview, and the co-moderator made a reflection note to complement what was captured on the audio recording.

3.5 Ethical approval

The studies were performed according to the Helsinki Declaration. The FAktA-project protocol was approved by the Regional Committee for Medical Research Ethics, Western Norway (REK 2011/2264) and the Norwegian Data Inspectorate. Written statements of informed consent were obtained from all the participants after presentation of oral and written information about the study.

4. SUMMARY OF RESULTS

4.1 Study I

Altogether, 250 employees with MSDs underwent a functional evaluation consisting of standardised physical tests and questionnaires about pain and health-related function. Pain and functional level were compared between those on full sick leave, partial sick leave and staying in work despite MSDs. The employees on partial sick leave also had lower (worse) functioning compared to those staying in work with MSDs, but better than those on full sick leave. No significant differences in scores on the psychological variables between those on sick leave and those working despite MSDs were found, except for OMSPQ, which reflects physical and psychosocial risk factors for future work disability. Logistic regression analysis showed that, when controlling for age, gender and smoking, the physical dimension of SF-12 and the high lift test were the variables most associated with full sick leave (OR 0.86, $p < 0.001$; OR 0.79, $p = 0.002$). Only the physical dimension of SF-12 was associated with being on partial sick leave (OR 0.91, $p = 0.005$).

4.2 Study II

Of the 194 employees that received a functional evaluation report, three quarters returned a short questionnaire about four weeks later about the usefulness of the brief functional evaluation. About 70% reported that they found the evaluation useful or very useful, 25% of limited usefulness and 5% not useful at all. Open-ended questions (a part of the questionnaire) and focus group interviews with employees and their supervisors were conducted to explore how they experienced the brief functional evaluation. Three main themes emerged from the qualitative analysis: 1) Clarification and raising awareness, 2) The functional evaluation report as a communication tool, and 3) Increased knowledge-altered behaviour. Both employees and supervisors found the functional evaluation useful to clarify the employees'

functional level. The evaluation contributed to raising awareness of the relationship between body function, pain, injuries and mind set and how to handle the MSDs. The functional evaluation report gave the employees credibility in discussions with GPs and supervisors, and resulted in referrals for further investigation or treatments, and modified work tasks, if needed. Undergoing the functional evaluation led to increased knowledge about aspects that might have an impact on their MSDs and how they could make changes to improve function. The employees described that they also had become more aware of what could be done at the workplace to improve function and health. The supervisors believed that reassuring information from an expert and advice to stay active would help the employees to increase their functional level. However, some employees described that they were already closely followed up by their GPs/therapists and nothing new had emerged from the functional evaluation. Several employees had not presented the functional evaluation report to their supervisors or healthcare provider because they were not on sick leave/had minor ailments and had no need for work adaptations or further treatments.

4.3 Study III

Five focus group interviews were conducted with a total of 26 supervisors to explore which strategies they used and found beneficial when follow-up of employees with MSDs, whether on sick leave or not. The supervisors described five strategies for sick leave management: 1) Promoting well-being and a healthy working environment, 2) Providing early support and adjustments, 3) Making employees more responsible, 4) Using confrontational strategies in relation to employees on long-term sick leave, and 5) Cooperation with general practitioners (GPs). The strategies appeared to be dependent on the phase of sick leave. In the early phases supportive strategies were utilized, while confrontational strategies and making demands were also used when employees were on recurrent or long-term sick leave. The supervisors endeavoured to find a balance between being supportive, on one hand, and making demands and

confronting the employees, on the other. They described that cooperation with the GPs was beneficial in the RTW process, but missed closer contact with them.

4.4 Additional results

An inter-tester reliability study of three testers was conducted at the University of Bergen, for all physical tests. Forty-eight employees who completed the functional evaluation participated in the reliability study from February to August 2014. Each participant was examined by two testers within an hour, each tester not being present or knowing the result from the other tester. Satisfactory measurement errors and high to very high inter-tester reliability (ICC_{2,1} ranging from 0.80 to 0.94), was found for all the tests (not yet published).

5. DISCUSSION

5.1 Methodological and ethical considerations

The following section concerns issues regarding the methodological strengths and limitations and ethical considerations for this thesis.

5.1.1 External validity

External validity is concerned with to whom and to what context the results can be transferred (Carter et al. 2011, p. 87). Samples, setting, and time of the project must be considered when discussing transferability of the findings.

Samples

Selection bias is a threat to the external validity if the participants in a study are different from the population to which the researchers want to transfer the result (Carter et al. 2011, p. 88).

The study samples in Studies I and II were health care workers with MSDs on sick leave or at risk of becoming sick-listed, and Studies II and III also included their supervisors. Two thirds of the employees were not sick-listed at the time of assessment fell into the group at risk of becoming sick-listed, and one might therefore ask whether the intended group of participants had been reached. However, among the employees not on sick leave, more than 80% had previously been on sick leave once or several times for similar complaints (Study I). This indicates that we have included the intended group. In Study II, three-quarters of the employees who received a functional report, returned a short questionnaire about the usefulness of the functional evaluation. There were no differences in demographic variables between the responders and the non-responders to the questionnaire, indicating that that the

responders were representative. The employees in Studies I and II included only people on short-term sick leave (< 4 months on full sick leave) or who were working despite MSDs. These results can be difficult to transfer into employees on long-term sick leave. However, employees on long-term sick leave were not the aim of FAKTA and can be considered a different sample.

In Study I, the employees had to contact the project group directly to get an appointment for the functional evaluation, and therefore the most motivated employees were probably easiest to recruit. Even though some of the employees were encouraged strongly by their supervisors to participate, we cannot be sure that the least motivated took contact.

In qualitative studies a purposeful sample is preferred, i.e. to gain information from key persons that can contribute to shed light over the research questions (Kreuger et al. 2009). We endeavoured to have a purposeful sample through recruiting the supervisors through their managers, and the employees consecutively recruited through the project group at the time of assessment (Studies II and III). It was difficult to recruit enough participants in this way, and therefore our sample of participants could be described partly as a convenience sample of employees and supervisors with probably more than an average interest in discussing function and work participation.

The setting

Setting may also be a threat to external validity. The participants in the studies (Study I, II and III) were all health care workers in the municipality of Bergen. The inclusion of other groups of employees with less demanding work and/or more male workers could have influenced the results and provided additional perspectives. Physical function, for example, may be less associated with work participation in less physically demanding work (Holtermann et al. 2010). Health care workers were, however, of particular interest as this group has a high sick leave rate (NOU 2010).

The sick leave certification legislation and the social security systems differ greatly from country to country. These systems in Norway are most comparable with systems in Scandinavian and partly to other North-European countries, which must be considered when discussing transferability of the results. For example, other strategies to facilitate work participation may be emphasized by supervisors in countries with different sick leave legislation and a less generous welfare system.

About half of the supervisors in the focus groups had attended at least one part of the educational courses about MSDs, and they were presented in all groups. This may have impacted their daily work in follow-up of employees with MSDs and may also have influenced the group discussions. The supervisors were asked about experiences with the course, and they expressed increased confidence in how to manage employees with MSDs, even though most of the contents in the courses were well known. We cannot clearly know if there were other attitudes and use of strategies for those who had attended the educational program compared to those who had not, but the impression was that most of the supervisors for a long period had been interested and committed to this topic.

Time

If the results of a study are applicable to limited time periods this poses a threat to external validity (Carter et al. 2011). For example, legislation related to sick leave and RTW- processes can change during or after a project and has to be taken into account when evaluating the usefulness of the results. In our project, the first focus group interviews with the supervisors were conducted six months after the introduction of new legislation on follow-up of employees on sick leave. This could have influenced the supervisors' strategies when following up their employees with MSDs. Two focus groups were therefore conducted one year later, inviting the participants in the first focus groups and new participants, in order to get an impression of strategies used over time. However, we noticed no change in the strategies used.

5.1.2 Internal validity – credibility

Credibility is concerned with whether the results are valid in relation to what we wanted to investigate (Carter et al. 2011, p. 75; Malterud 2012a, p. 132). The research methods must be appropriate for the phenomena we intend to investigate.

Design

Health research is located at the intersection of natural, social and human sciences. Natural science has its emphasis on quantitative methods while qualitative methods are more common in social and human science. Both quantitative and qualitative approaches were used to shed light on the research questions because they enlighten different aspects of the topic being studied. Quantitative methods provide width and overview of an issue and can for example measure prevalence of a phenomenon, whereas qualitative approaches may provide in-depth descriptions of lived experience and increase our understanding of a phenomenon (Malterud 2011, p. 27; Mayoh et al. 2015).

A quantitative approach with a cross- sectional design was applied in Study I in which we found that low physical function was associated with sick leave. However, this study design gives no information about causality. Therefore, we cannot draw any conclusion about the reasons why employees on sick leave had a lower functional level than those working despite MSDs. To gain insight into causality longitudinal designs must be applied.

Using quantitative design and objective measurements can be a legitimate and often an appropriate strategy to increase our knowledge about individuals'/groups' conditions. However, objective measurements of functions can represent a risk for reducing the person to sub-functions, and losing overall perspective and the person's experiences and participation. I was aware of this perspective when assessing the participants. Through testing, I got an impression of their sub- functions (e.g. muscle endurance and strength), but simultaneously also how they reacted to the tests. I

observed if they were relaxed or strained, or anxious when performing some of the test. This gave me as a physiotherapist a gateway to their experiences that might otherwise have been difficult to gain insight into. What we observed during assessment was also a part of the dialogue with the participants and, together with the results on the standardized tests, a base for the advice given in the functional evaluation (Study II). Furthermore, through the qualitative approach in the focus groups interviews we had the ability to shed light over the participants' experiences.

In Study II we combined qualitative and quantitative methods to explore employees' and supervisors' experiences with a brief functional evaluation tool. Using both methods in a single study utilize the benefits of each method and can increase the span and depth of understanding of a topic (Johnson et al. 2004). By using a short questionnaire with structured and open-ended questions in Study II we obtained data from three quarters of the employees who had been assessed. This gave a good overview of how employees had experienced the usefulness of the brief functional evaluation. To get a more profound impression of aspects that were found useful and why, focus group interviews with the supervisors and employees were conducted. Combining qualitative and quantitative methods provided a more comprehensive picture of their experiences with the functional evaluation.

A qualitative approach, using focus group interviews only, was applied in Study III as we assumed that group interaction would facilitate discussions and give wide descriptions of experiences related to the follow-up of employees with MSDs.

The instruments

Since self-reported assessment and direct measurements of functional status are only moderately related and have been considered to examine different aspects of function (Wand et al. 2010), a combination of various questionnaires and physical tests were chosen to describe function in employees with MSDs. Questionnaires and physical tests can complement each other and provide information about what should be

emphasised to increase functioning; for example a poor score on psychological questionnaires and a good score on physical tests may indicate an emphasis on coping and psychological issues, while opposite findings may indicate a focus on physical issues.

We aimed to cover the dimensions in the ICF. When comparing employees on full, partial and not on sick leave (Study I) physical, psychological and social factors, as well as personal factors (e.g. educational level, lifestyle) and environmental factors (perception of work environment) were studied. This provided extensive data related to many aspect of the employees' function. For Study I, we considered to have covered all the dimensions in the ICF. Some dimensions were less apparent in Study II, as we in this study had a selection of instruments used in Study I. A few participants expressed that there were too little attention to stress related issues during the functional evaluation. This have to be further validated and changes may be made in a revised functional evaluation tool.

The questionnaires in Studies I and II have shown good psychometric properties. Previous studies have demonstrated acceptable reliability and validity of the different physical tests, although the individual tests have formerly been mainly been used in patients on long-term sick leave due to MSDs. For further details see Table 2. A reliability study was therefore conducted for all physical tests used in FAKTA and high to very high reliability was found for all tests (not yet published).

The physical tests were chosen to cover domains we considered relevant for functioning in work and daily life in people with various MSDs, with the main focus on low back pain, neck- and shoulder pain and widespread pain. The test battery may be less relevant for people with hip- and knee pain or elbow- and wrist pain. Other tests could also have been included, for example a cardiorespiratory endurance test. However, the tool had to be short to be feasible in a primary or occupational health care setting. We therefore chose a set of tests that we considered important when evaluating function and for providing advice about further treatment and work

participation. We assumed that the report from the functional evaluation would be used as a supplement to other investigations by health professionals, if needed.

The assessors were experienced physiotherapists who were familiar in the use of most of the tests. We considered the tests as relatively easy to learn also for therapists who are unfamiliar with the tests.

Statistical analyses

The high number of participants in Study I (n=250) provided enough power to detect differences between employees on full, partial or not on sick leave, and to identify variables related to work status. In Studies I and II non-parametric statistics were used since several variables were not normally distributed. The Kruskal-Wallis Test showed statistical differences between the sick leave groups. To identify where these differences occurred, pairwise comparisons were made using the Mann-Whitney U-test.

In the logistic regression analysis (Study I), we estimated both an unadjusted model for each independent variable and a fully adjusted model containing all independent variables. Only SHC was excluded due to the high per cent of missing data. Variables were selected based on the results of full-adjusted and unadjusted models in addition to correlation analysis and assumed clinical relevance. We chose to include all physical tests in the final model, even though they were moderately correlated. The physical tests were considered of particular clinical importance as the tests reflect different dimensions of physical functioning and have not been elucidated in this way previously. Performing multiple comparisons, this could have increased the likelihood of a false conclusion that associations existed, as occurring by chance (Type 1 error). A Bonferroni test could have been applied to protect against Type 1 errors (Carter et al. 2011) by dividing the alpha level (usually .05) by the number of comparisons that you intend to make to find a new alpha level. However, this test is considered to be highly conservative when the number of comparisons are more than

five (Altman 1991), as in our study. This can make it difficult to obtain a significant result, even when a difference between the groups exists (Type 2 error). The significant level was therefore set to ≤ 0.01 in the logistic regression analysis (Study I).

Qualitative analysis

We chose a pragmatic approach to the qualitative analysis as we were keen to present findings that could be useful for a clinician or a supervisor. Systematic Text Condensation was chosen to analyse data from the focus group interviews as we found the method applicable and feasible. This systematic approach, with detailed description of each step of the analysis process, ensures a transparent process that makes it easy for others to follow the procedures and process and understand the conclusions.

The epistemological basis for our studies was the biopsychosocial model, the ICF-framework, as well as disciplinary knowledge and previous research about MSDs and sick leave. These theoretical and practical perspectives also formed the background for analysing the data. This is in line with STC-strategy that involves a limited level of philosophical commitment, but where interpretation of the data-driven inductive patterns can be supported by theoretical perspectives in different ways (Malterud 2012b).

The choice of tests included in the functional evaluation tool (Study I and II) was based on the dimensions in ICF. Further, the ICF-framework was also the perspective in the planning and analysis phases in Study II and III.

In Study II, we wanted to explore participants' thoughts and experiences with the brief functional evaluation tool. Clinical relevance was emphasized. In addition to the ICF framework, an essential part of our pre-understanding was the health authorities' emphasis on user involvement and users'/clients' views, both regarding decision

making, quality assurance projects and in research projects (Austvoll-Dahlgren et al. 2013). We considered the participants' experiences valuable to gain more knowledge about the usefulness of the functional evaluation tool, and this knowledge was considered as one stage in the validation process of the tool.

Study III aimed to explore the supervisors' experiences in the follow-up of employees with MSDs. Results from the focus groups interviews revealed a pattern in what strategies they used, depending on the phase of the follow-up process. In addition, we found different strategies corresponding to specific leadership styles.

Although we were conscious about our pre-understanding and theoretical perspectives, this could have been further elaborated, and theory could have been used more extensively in the analysis in Study II and III. A theory can sharpen the focus and offer a perspective for the interpretation of data and may open for noticing fresh and distinguished patterns (Malterud 2015).

In the analyses of focus group interviews, descriptions of the group process can be useful as a background for interpretation of the data. This was only partially accounted for in the separate articles, and will therefore be further discussed in this part of the thesis. We conducted eight focus group interviews with employees and supervisors, with 3-7 participants in each group. In the largest groups there was a dynamic and rich conversation among the participants throughout the interview, while some participants in the smallest groups needed encouragement to take part in the discussion in the beginning of the interview. They were all enthusiastic and interested in the topics being discussed. The participants supported each other when sharing their experiences, and emotions were expressed through laughter and tears. The safe and open atmosphere in the groups reassured us that we had generated variation and different perspectives and experiences across the groups.

Reflexivity

Choices of research questions and methods as well as interpretation of results are influenced by the researcher's experiences and perspectives. Reflexivity deals with how the researcher systematically and critically evaluates his/her pre-understanding and how this impacts the different stages in the research process (Malterud 2011, p 17).

As a physiotherapist I have worked for many years with patients with MSDs in an outpatient clinic. Functional evaluation of the patients was part of the day-to-day work. My experiences with the questionnaires and physical tests used in this clinic may have influenced the choice of tests for Studies I and II. However, my experiences using standardised and validated tests had sharpened my interest for this issue. Literature research was performed and experts' perceptions consulted to find the most appropriate instruments for Studies I and II. My experience and attitude regarding the functional evaluation tool may also have influenced the interpretation of the findings in Study II. I was aware of this aspect before starting the interviews, and aimed to enlighten both what the employees and the supervisors found useful and not useful, and why, during the interviews and through the analysis.

In Study III, the authors were curious as to whether there was a difference in strategies used for employees on sick leave and employees working despite MSDs. This assumption may have influenced our analyses as we found different strategies used for sick-listed versus not sick-listed employees. However, our results indicated that the supervisors also had great concern about creating a good working environment for all employees in order to prevent future sick leave.

The supervisors expressed that they were highly committed to the follow-up of employees in different phases of sick leave, including those working despite MSDs (Study III). They also described spending much time on promoting a good working climate and well-being for all employees. This surprised me. Working in an outpatient clinic I have often heard the employees' perspectives and what they missed in the RTW- process, often related to lack of supervisor' involvement. As supervisors

have the responsibility for planning work activities and keeping up production, I had believed there was little time left to deal with sick leave matters. Through the project, I gained a deeper understanding of the importance of initiatives in the workplace to prevent and reduce sickness absence and of how essential interdisciplinary work is in the RTW- process.

5.1.3 Ethical considerations

Ethical challenges in relation to the research project have to be described and considered, such as informed consent, confidentiality, consequences and the researcher's role. I will mention some of the ethical aspects considered in our project.

The study was based on voluntary participation, but the employees could nevertheless have felt compelled by their supervisors/managers to participate. However, before entering the study, they all received verbal and written information about the project, emphasizing that it was voluntary to participate. Furthermore, the employee could choose whether they presented the evaluation to their supervisors and/or to other health personnel or not. The supervisors (Studies II and III) seemed positive to participate in the focus group study, and several expressed that this was a good opportunity to discuss sick leave issues with colleagues.

The functional evaluation included physical tests such as lifting and bending. The tests were well tolerated by the participants and few reported increased pain after the assessment. Assessment by questionnaires and physical tests could lead to increased attention to symptoms and disabilities. Reassuring information, however, was emphasized in the project, and advice was given on how to improve functioning. Even though work participation was encouraged, we were aware of possible negative effects of attending work while having severe health complaints. Findings from the functional evaluation were helpful in providing advice about whether or not to stay in/returning to work. This decision, however, is taken by other healthcare professionals.

5.2 Discussion of main findings

The main findings of the study showed that employees with MSDs who were on full sick leave had reduced self-reported and physically tested function compared to employees working despite MSDs. In the group on partial sick leave, the level of function was mainly in between the two other groups (Study I). Both employees with MSDs who had undergone the functional evaluation and their supervisors found the functional evaluation useful to clarify the employees' functional level and to receive advice on how to handle the MSDs (Study II). In Study III, we found that the supervisors utilised supportive strategies towards the employees in the early phases of MSDs and sick leave, but for employees on repeated or long-term sick leave some supervisors also emphasised a more confrontational style. A close cooperation with GPs was considered useful in the RTW process.

5.2.1 Functional level of employees with MSDs

To increase our knowledge on the functional level of employees with MSDs a functional evaluation was offered to health care workers.

In Study I we assessed 250 health care workers with MSDs, both on sick leave and not on sick leave. Certain characteristics were found; the group on full sick leave had a lower level of function, particularly for physical function, compared to the other two groups. The physical dimension of SF-12 and the high lift test were significantly associated with full sick leave. Our results are consistent with previous studies where low physical functioning was associated with reduced work participation. A Dutch study showed a significant lower physical functioning in workers on sick leave and staying in work with MSDs compared to healthy workers, with the lowest level of function measured in the sick leave group (Soer et al. 2012). In a systematic review, Kuijer et al. (2012) concluded that there was strong evidence that the results of physical capacity tests, especially lifting tests, predicted work participation in patients with MSDs. In a recently published study, health care workers with low self-reported

physical capacity had an increased risk for long-term sickness absence compared to those with high physical capacity (Rasmussen et al. 2015). Other studies have pointed to psychological (Grossi et al. 1999; Pincus et al. 2002) and psychosocial work environment factors (Hoogendoorn et al. 2002; Labriola et al. 2006; Voss et al. 2001) as risk factors for chronicity and sick leave. With the exception of OMSPQ, which reflects physical and psychosocial risk factors for future sick leave, we found no significant differences in scores on the psychological variables between those on sick leave and those working despite MSDs. The reason could be that psychological factors may have more impact on long-term sick leave. As we wanted to capture the employees before developing long-term sickness absence, the target group was employees on short-term sick leave or not on sick leave. We did not follow them up over time in this study.

Are the differences between groups of clinical importance?

Even though there were statistically significant differences in function between the groups, one may question whether these are of clinical importance to daily functioning and work participation. The group who stayed in work had better functioning than the groups on sick leave, but is the level comparative to a healthy population? To answer these questions the results should be mirrored against normative data/healthy groups and data from other patient populations to gain an impression of the functional level in all groups. However, normative data or cut-off points were not available for all the tests or were difficult to compare because different versions of the questionnaires exist. Available data is presented in Table 3.

Table 3: Normative data mirrored against group data

	Normative data/ Healthy group	Cut-off point	Gr.1 Not sick leave	Gr.2 Partly sick leave	Gr.3 Full sick leave
Variables	Mean (SD)	Mean	Median (min-max)	Median (min-max)	Median (min-max)
SF-12 physical health*	50 (10)		45.5 (12.8-59.9)	42.2 (24.3-3.2)	38.7 (24.6-48.4)
SF-12 mental health	50 (10)		50.1 (26.7-61.1)	48.6 (30.5-63.2)	48.4 (29-61.2)
ÖMSPQ		50	44.0 (14-84)	46.0 (17-70)	56.0 (32-80)
HSCL-25* mean (95 % CI)	1.23 (1.19-1.30)		1.44 (1.00-2.87)	1.42 (1.00-2.58)	1.45 (1.04-3.08)
men		1.67			
women		1.75			
BIS*	10.67 (9.73)		16.5 (0-42)	17.0 (0-36)	24.0 (2-41)
NFAS*			1.2 (1.00-2.10)	1.23 (1.00- 1.84)	1.42 (1.0- 2.38)
men	1.13 (0.21)				
women	1.24 (0.34)				
GBE-Flexibility* ¹	5.5		16.0 (2-35)	16.0 (5-30)	19.0 (5-35)
BPS	0 or 1	3.7	3.0 (0-15)	4.0 (0-11)	6.0 (0-13)
Biering-Sorensen test ¹	146 (111-188)		70 (0-240)	33 (0-220)	36 (0-240)

*SF-12: The Short Form Health Survey, ÖMSPQ: Örebro Musculoskeletal Pain Screening Questionnaire, HSCL: Hopkins Symptoms Checklist, BIS: Bergen Insomnia Scale, NFAS: Norwegian Function Assessment Scale, GBE: The Global Body Examination, ¹ Median, BPS: Back Performance Scale

The variable that was most strongly associated with sick leave was the physical dimension of SF-12. In the general US population, SF-12 physical and mental scale had a mean (SD) of 50 (10) (Ware et al. 2009). A validation study of SF-12 found a mean score on the physical dimension of 38.8 in those with severe physical complaints and 47.4 in patients with minor complaints (Ware et al. 1996). This corresponds well to the group on full sick leave and the working group, respectively, in our study (Table 3). The scores on the mental dimension of SF-12 approximated to the normative data for all groups. Emotional distress measured by HSCL-25 showed higher scores than the normal population in all three groups, but was lower than the cut-off point for mental health problems. On the short version of ÖMSPQ, a cut-off of 50 identifies disability (predicting >14 days accumulated sick leave). Only the

group on full sick leave scored above the cut-off point. Normative data from NFAS correspond to the scores of participants working or on partial sick leave, while those on full sick leave scored significantly higher (worse). For BIS, the normative score in a community sample is lower (better) than in all three groups. In a Norwegian study, patients with sleep disturbance had a mean score of 22.49 (9.86) (Pallesen et al. 2008) which is similar to the group on full sick leave in our study. Normative data for the BPS reported a considerably lower score in people without back pain (Myklebust et al. 2007), compared to the participants in our study. Strand et al. found that the best cut-off value for the BPS was 3.7, i.e. lower scores (better) indicated sufficient work ability while higher scores indicated that the patients had reduced work ability (Strand et al. 2001). Our findings support the suggested cut-off point, as both groups on sick leave achieved higher scores (worse) and those working achieved scores lower than 3.7. Scores on both the GBE- Flexibility tests and the Biering-Sørensen test for back muscle endurance were considerable better in healthy groups than the sick leave groups and the group staying in work.

In summary, the differences found between the groups relating to physical function reflect clinically important differences. All groups had a reduced functional level of the physical tests compared to normative data/healthy populations. Only the group on full sick leave scored above the cut-off point on BIS and OMPSQ, reflecting sleep disturbance and risk for future work disability, respectively. However, there was a large variation within each group in both psychological and physical functioning, reflecting the complexity of MSDs and sickness absence.

5.2.2 The usefulness of the functional evaluation

The usefulness of a functional evaluation tool will depend on the purpose of the test battery, how the tool meets the needs of the client and the referrer, the context it is meant to be used in, and the feasibility. The purpose in Study I was to map the functional level in employees on sick leave and those who stayed in work despite MSDs. The test battery captured reduced functioning in an early phase of sick leave

in employees with MSDs. Many of the questionnaires and physical tests discriminated between the group on full sick leave and the working group. Increased knowledge about the differences between these groups can provide insight into what should be emphasized in treatment and work interventions to facilitate work participation. In Study II we examined supervisors' and employees' experiences with the brief functional evaluation. Based on the results from this functional evaluation and discussion with the employee, advice was given. This is in line with previous studies recommending a functional evaluation tool to not only describe findings, but to give direction on what is needed to be emphasized with regard to demands in work and daily life (Strong et al. 2004; Thonnard et al. 2007). In contrast, inadequate evaluation of functioning and disabilities may lead to vague descriptions of health and function such as 'subjective health complaints' or 'medical unexplained pain'. Vague descriptions will make it more difficult to handle more complicated health complaints with precise strategies for treatment and RTW (Aas 2009).

Functional evaluation, including advice about self-management, treatment and work, as in our study, can be considered as a brief intervention. Early intervention of employees with musculoskeletal complaints is considered essential to prevent health complaints developing into long-lasting complaints and disability (Quadrello et al. 2009; Shaw et al. 2009b; Waddell et al. 2008). Previous research has shown that early work-related advice from healthcare professionals was associated with shorter sickness absence (Franche et al. 2007; Kosny et al. 2006). Waddell and co-authors suggested a 'stepped-care approach' where most people sick-listed for less than six weeks with common health problems can be helped with a brief intervention e.g. advice about self-management, while those with longer sickness absence need more intensive intervention in the RTW process (Waddell et al. 2008). In line with this approach, the employees in the present study (Study II) received advice on exercises, relaxation techniques, coping strategies and work adaptations, and only some of the employees were referred for further treatments to improve their health and work participation. However, some researchers argue that intervention can also be offered too early (Indahl et al. 1995; Waddell et al. 2008). Common health problems, such as

musculoskeletal complaints, often have a natural recovery and most people return to work within the first weeks of sickness absence with or without treatment. According to Waddell et al., the therapeutic window for vocational intervention is about 1- 6 months of sick leave (Waddell et al. 2008). However, many employees who stay in work with MSDs have previously been on sick leave for their complaints, and advice about how this subgroup can better manage their MSDs could help to prevent new sick leave. The supervisors in Study III believed that it was easier to find solutions in the workplace before the employees became sick-listed. They also described that employees staying in work despite MSDs seemed to have greater benefit from the functional evaluation than those on recurrent sick leaves (Study II).

Further studies are needed to examine whether the present brief functional evaluation tool is feasible and adequate in primary and occupational health care and whether the brief functional evaluation tool results in a better outcome.

Supervisors' and employees' perspectives

Knowledge about referrers', clients' and other stakeholders' perspectives are important in order to choose/develop an appropriate evaluation tool. Only a few studies have investigated the clients' perspective (Pas et al. 2013; Strong et al. 2004). In a Canadian study, clients were asked about important issues related to a functional evaluation (Strong et al. 2004). They mentioned that the report should be written in a professional way and include objective measurements, and the employees should have a copy of the report. Right timing and qualified assessors were also considered essential. In line with this study, the employees in Study II received a functional evaluation report and verbal feedback, based on standardised measures. Due to ethical consideration it was their choice whether to present the report in dialogue with others. The employees described that the report made it easier for them to be understood by their doctors and supervisors and to be referred for other treatments. They expressed that they had undergone a thorough examination and received advice that had resulted in better functioning. Both the majority of the employees and the

supervisors found the functional evaluation useful for clarifying the employees' functional level, and the report made it easier for the supervisors to take initiatives to facilitate work functioning. However, about half of the participants did not present the report in dialogue with others because they were not on sick leave or had minor ailments and had no need for work adjustments.

5.2.3 Strategies to facilitate work participation at workplace/community level

Participation is one of the health domains in the ICF- framework, and for people in working age; the workplace is an important arena for participating in society and for social and economic security. The employer/supervisor can play a key role in prevention of sickness absence in an early phase, as he/she has the responsibility for follow-up of employees with health problems (Black 2008; Waddell et al. 2008). A committee led by Sandman, appointed by the Norwegian Government (NOU 2000), considered the workplace to be the main arena for prevention of sickness absence, and the employer and employees to be the key players. From 2011, both employers and employees have increased responsibility in the RTW (NAV 2015a; NAV). The employers' responsibility to follow-up of employees with health complaints is usually delegated to the immediate leaders, the supervisors. Promoting health and supporting employees on sick leave are a part of their work duties in addition to production demands. In line with this, the supervisors (Study III) used much time and energy, and showed great enthusiasm and commitment to sick leave matters. They believed that a good relationship with the employees and a healthy working environment could help employees to stay in work despite MSDs.

Also employees have increased responsibility and have to communicate and participate in meetings with their supervisors to find solutions for an early RTW. As expressed by the employees in Study II, a functional evaluation report could sometimes make it easier to communicate the need for adjustments at work.

Leadership styles

Leadership- styles may also have an impact on work participation. Although the supervisors (Study III) emphasised supportive strategies in the follow-up of employees with MSDs, in line with relationship-oriented and transformational leadership styles, some supervisors found strategies such as making demands and confronting the employees useful to facilitate RTW for employees with recurrent or long-term sick leaves. This may indicate a concern for the company and production goals, and represent a more task-oriented leadership style (Bass et al. 2008). As supervisors they are responsible for delivering services to the community and are thus dependent on having a predictable work force. A high rate of sickness absence makes work organization challenging and could result in increased pressure on the remaining employees. Several studies have highlighted the conflict between concerns for the employees' health and production demands and how it can affect the supervisors' strategies (Baril et al. 2003; Seing et al. 2014; Stockkendahl et al. 2015). Although negative effects on employees' health have been associated with the task-oriented leadership style (Duxbury et al. 1984; Seltzer et al. 1988), it has been pointed out that this applies primarily in combination with low consideration from the leader (Seltzer et al. 1988). This was not the case in our study where the supervisors were also concerned with the employee's well-being and their job satisfaction, and endeavoured to find a balance between being supportive and making demands.

Interdisciplinary cooperation

To improve cooperation between all stakeholders engaged in supporting employees to stay in or return to work is both a challenge and an opportunity. Cooperation between employer, employees and health professionals is essential to increase work participation (Black 2008; Costa-Black et al. 2010; Waddell et al. 2008). Work-related advice from an expert has been associated with shorter sickness absence (Franche et al. 2007; Kosny et al. 2006). Information about employees' health related to work demands is, however, often lacking and this makes it more difficult for

employers to take appropriate initiatives to support employees to stay in or return to work (Black 2008).

The supervisors in our study (Study III) appreciated a close cooperation with the GPs and claimed that this had led to earlier RTW for some employees. The supervisors also valued the help of the functional evaluation report when evaluating the employees' work ability (Study II). They found the report useful to clarify the employees' functional level and a support when planning modified work tasks. In addition, the employees found the report useful in communication with their supervisors and therapists. For some employees this resulted in adjusted work and referral for further treatments.

The need for interdisciplinary cooperation may also be dependent on the phase of sick leave. Several studies have recommended a step-wise approach in management of MSDs (Shaw et al. 2009a; Waddell et al. 2008). While most people with MSDs on short-term sick leave can be helped with minimal intervention (e.g. advice about self-management, modified work) and the involvement of few stakeholders, those with longer sickness absence need more intensive multimodal intervention. In line with this, a Dutch study (Lambeek et al. 2010) compared an integrated care program for patients with long-lasting LBP that combined a patient-directed and a workplace-directed intervention provided by a multidisciplinary team, with usual care. They found that the integrated program was significantly more effective in increasing RTW and functional status than usual care.

5.2.4 Is work participation good for health?

It has been debated whether work has a positive or negative influence on health when staying in work with health complaints. The supervisors in Study III believed that work participation was positive if the work did not exacerbate the employees' symptoms, and emphasised support and work adjustments to facilitate their employees to stay in work despite MSDs. This is in accordance with work disability

prevention literature that emphasises the positive effects of work participation on health and well-being, also for employees with ill health (Kausto et al. 2008; Quadrello et al. 2009; Waddell et al. 2006). Work participation may be good for both physical and mental health (Waddell et al. 2006) and a help to stay active and avoid isolation (Quadrello et al. 2009). Work can also be important for identity and social roles, for the socio-economic status, and for providing purpose and meaning for the employee (Quadrello et al. 2009). In these ways, work may have a therapeutic effect and reduce the risk of long-term disability. To ensure that work is healthy for employees with MSDs, a functional evaluation may be helpful in clarifying the work ability and support health professionals in sick leave decisions as well as supervisors in finding modified work.

5.2.5 Contextual factors impact on work participation

Contextual factors, i.e. personal and environmental factors, are important dimensions in the ICF- framework and may be barriers or facilitators in interaction with the individual with MSD (ICF 2001). In the following section some contextual factors related to MSDs and sickness absence will be discussed.

Gender and work characteristics

The sickness absence rate is in general higher among women than men (NAV 2015b) (Figure 6). In spite of very few male participants, this was also a trend in Study I. Several explanations have been given for the difference in sickness absence between men and women, for instance, biological differences linked to the reproduction, 'the double burden of work and family' and the overall health differences between men and women. In addition, the characteristics of the work have been suggested to explain the gender difference in sickness absence. The women often work in sectors with heavy work combined with low job control, which has been found to be risk factors for sickness absence (Mæland 2014). Findings in Study I showed a moderate

association between being female and being on full sick leave. There were no men on partial sick leave. However, as less than 10 % of the participants were males (n=19), it is difficult to draw any conclusions about gender differences in our study.

Educational level

Educational level is another component that may influence the sickness absence level. About 60 % of the employees in Study I had completed secondary school/vocational education and 40 % had higher education. We found no statistically significant differences related to the educational level between the groups on sick leave and the working group. However, other studies have shown that sickness absence is almost the double for people with low education compared to those with the highest educational level (NOU 2010). Differences in the working environment, work tasks, wage income and social inequalities in resources have been suggested as possible explanations (Mæland 2014). A Danish study showed that a physically demanding work environment explained a large part of the differences in the risk for long-term sickness absence between white-collar and blue-collar workers (Christensen et al. 2008). In our project, both employees with high and low educational levels had physically demanding work, and this can explain why we did not find a difference in sickness absence between the groups. The difference between the groups may also be less when the employees are on short-term sick leave, as the employees in our study were.

Aspect related to gender, job characteristics and educational level should be taken into account when comparing sickness absence rates between different clients/employee groups.

6. CONCLUSION AND IMPLICATIONS

Improving function and work participation among employees with MSDs are complicated due to multifactorial phenomena. Increased knowledge is needed, and initiatives at the individual and workplace level as well as at national level have to be considered in order to improve function and work participation. The focus of this present project was on the individual level as well as the work place level.

This thesis shows the following:

- Data from a functional evaluation tool consisting of physical tests and questionnaires about pain and physical and psychological function showed reduced physical function among health care workers with MSDs on full sick leave compared to employees on partial sick leave or staying in work despite MSDs.
- Employees on partial sick leave had reduced physical function compared to those staying in work, but better than those on full sick leave.
- Both employees and their supervisors found a functional evaluation useful to clarify the employees' functional level and to receive advice on how to manage their MSDs.
- The functional evaluation report was used as a tool for communication by many of the employees in meetings with their GPs and supervisors.
- The supervisors followed up employees with MSDs, whether they were on sick leave or staying in work. Strategies to support the employees as well as to make demands and confronting the employees were applied depending on the phase of sick leave management.

- Cooperation with the GPs to clarify employees' work ability was considered highly important in the RTW process.

Implications for practice

- Early clarification of function can be achieved by a brief screening battery consisting of validated questionnaires and physical tests.
- A functional evaluation report may be used as a tool for communication between different stakeholders in the follow-up of people with MSDs and may contribute to a more targeted intervention.
- A closer cooperation between workplace and health professionals may reveal opportunities for alternative solutions and facilitate “all players onside” to improve work functioning.

7. FUTURE RESEARCH

Health professionals need more knowledge about the functional level of employees with MSDs, and how functional level and the work environment affect work participation.

- The functional evaluation tool needs to be further validated. An expert panel should evaluate the test battery.
- Normative data on all physical tests should be collected.
- More research is needed to investigate whether the functional evaluation of the employees also leads to better treatment outcome, such as reduced sickness absence.
- The functional level in employees in other occupational groups should be further examined. At this time, the FAKtA project continues to evaluate function in employees working in kindergartens and schools. Future studies should include more male workers and office workers. To better understand the underlying causes and mechanisms, longitudinal studies should be conducted.
- How physiotherapists, occupational therapists and physicians working in primary care or in occupational health care experience the functional evaluation tool needs to be studied, as well as how it can be implemented in their daily work with employees who suffer from MSDs.
- How to improve communication between health professionals and the workplace is a huge and important issue for future research at workplace/community level as well as at national level.

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Paper I-III

Self-Reported and Tested Function in Health Care Workers with Musculoskeletal Disorders on Full, Partial or Not on Sick Leave

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Abstract

Purpose The aim of this study was to describe self-reported and physically tested function in health care workers with musculoskeletal disorders (MSDs) and to examine how function was associated with work participation.

Methods A cross-sectional study was conducted. 250 health care workers attended an evaluation where self-reported and physical function were measured. Differences between groups (full sick leave, partial sick leave, not on sick leave/working) were analyzed for categorical data (Chi square exact test) and continuous variables (Kruskal–Wallis and Mann–Whitney U tests). Logistic regression analysis was performed to examine which factors were associated with being on sick leave.

Results Participants on full sick leave had statistically significant poorer function compared to those working and the group on partial sick leave. Logistic regression showed that a reduced level of the physical dimension of SF-12 and a high lift test were significantly related to full sick leave (OR 0.86, $p < 0.001$) (OR 0.79, $p = 0.002$). The physical

dimension of SF-12 was the only variable that was associated to partial sick leave (OR 0.91, $p = 0.005$).

Conclusion Health care workers on full sick leave due to MSDs have reduced function on self-reported and physically tested function, compared to those working despite MSDs, as well as when compared to those on partial sick leave. More knowledge about work ability in occupational sub-groups is needed.

Keywords Musculoskeletal pain · Sick leave · Disability · Work

Introduction

Musculoskeletal disorders (MSDs) are a major problem for patients as well as for society and can lead to functional limitation and absence from work [1, 2]. Health care workers have physically and psychologically demanding work and are at high risk of developing long term MSDs and sickness absence [3–5].

Research regarding work ability and prevention of sickness absence is a great challenge because of its complexity. The International Classification of Function (ICF) provides a classification system for function and disability associated with health. The theoretical model of ICF explains functioning as all body function, activity and participation as well as personal and environmental factors that interact with these concepts [6]. Hence, work (dis)ability may be explained by physical, mental and social aspects of functioning, in addition to environmental and organizational demands of a person's work and personal factors that influence his or her capacity to meet these demands. These aspects have been investigated in a number of studies. Socio-demographic factors such as age,

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gender and educational level are important predictors for work ability [7–11]. Other factors associated with insufficient work ability are heavy physical work [9, 10, 12, 13], high pain intensity [12, 14], social and environmental workplace factors [15, 16], and psychological variables [8, 11, 17]. Besides these factors, some studies have focused on the relation between deconditioning and poor work ability [11, 18–20]. Deconditioning refers to a decrease of capacity over time expressed by weakened muscle strength, reduced aerobic fitness or altered coordination during activity. Although it is argued that deconditioning may be a result of fear avoidance and altered behavioral performance, the evidence is inconclusive [19, 21–24]. There is also conflicting evidence concerning deconditioning among patients with chronic low back pain (LBP) [19, 25, 26].

Although self-reported functioning and physical tests have been used to predict and evaluate work ability in several studies, only a few studies have compared the function of employees on sick leave and employees still working despite MSDs [17, 27–30]. It has been found that employees on sick leave have poorer health and more disability [17, 28], higher perceived workload [27], more fear-avoidance beliefs [27, 29], lower pain acceptance [17, 27, 28] and lower functional capacity [11] compared to employees still working. More knowledge about the differences between employees on sick leave due to MSDs and employees staying at work despite MSDs can give us insight into what could be emphasized in work interventions and contribute to increase work participation.

Employment policies in Scandinavian countries have focused on active approaches for employees with reduced work ability. Partial sick leave has been used to give employees the possibility to combine work and sickness benefits [31]. However, there is a lack of evidence regarding functional ability in workers on partial sick leave compared to those on full sick leave.

The aim of this study was to describe self-reported and physically tested function in health care workers with MSDs and to examine how function was associated with work participation. By using the ICF's model to understand the complexity of work ability, a wide range of bio-psychosocial and work-related factors were investigated. This study examines possible differences of functioning in (a) health care workers staying at work despite MSDs, (b) on partial sick leave, or (c) on full sick leave.

Methods

This study was part of a larger study called "Function, Activity and Work" of health care workers with MSDs in the Municipality of Bergen. A cross-sectional study was conducted.

Participants

The participants were recruited from the Department of Health and Social Service in the Municipality of Bergen, Norway, from January 2012 to December 2013. About 7,000 health care workers are employed in this department; working in nursing homes, home care service and in special homes for disabled. Through their managers and/or brochures we invited employees who were on sick leave or at risk of being sick-listed due to MSDs, to a functional evaluation. Health care workers with MSDs took direct contact with the University of Bergen and booked an appointment with a physiotherapist in the project. Exclusion criteria were insufficient knowledge of the Norwegian language and being on full sick leave for more than 4 months continuously.

Procedure

Within 2 weeks after requesting an appointment, the participants met for an evaluation completed by a physiotherapist in the project. First, the participants filled in personal background data and standardized questionnaires. This took about 30 minutes. Thereafter they were examined by standardized physical tests for 15–20 minutes. The evaluation ended with a verbal and written presentation of the self-reported and physical findings for all participants, except 56 who were recruited to a randomized controlled trial for participants with low back pain (LBP).

The testers were two experienced physiotherapists who were familiar with the tests. They practiced several times together before the start of the project and also examined the first 10 participants together. The participants performed the tests that required minimal effort first, in order to prevent fatigue and pain from having a significant impact on scores.

Measures

Self-Report

Age, gender, marital status, number of children, education, exercise, smoking, and duration of sick leave were registered. In addition, different questionnaires regarding pain, function, psychosocial health and work environment were filled in. For the logistic regression analysis we dichotomized educational level into secondary school/vocational education and university degree, episodes of sick leave into 0–1× and ≥2×, exercises into <1×/week and ≥1×/week, and smoking to yes (yes, daily and yes, sometimes) and no.

Pain intensity was assessed by Numeric Pain Rating Scale (NPRS) [32]. The NPRS has shown better reliability and responsiveness than the visual analogue scale [33, 34].

The participants marked on a pain drawing the area or areas that had been painful the last 14 days [35].

Table 1 Description of physical tests

Physical tests	Content	Score	ICF-dimensions
Global Body Examination (GBE) (51, 52)	Six tests: truncal flexibility and ability to relax during passive movements: Elbow-drop flexibility, lumbar-sacral flexibility, head rotation resistance and resistance to hip circumduction, hip-knee flexion and arm/shoulder flexion	Each test: 0–7. Total score for Flexibility: 0–42, higher score indicating reduced flexibility. Healthy (34 individuals): Median = 5.5, mean = 7.2	Body function
Back Performance Scale (BPS) (53, 54)	Five tests reflecting mobility-related activities for trunk and lower extremities (sock-test, pick-up test, roll-up test, fingertip-to-floor and a lift test where a box weighing 4 kg (women) or 5 kg (men) is lifted from floor to waist for 1 min).	Each test: 0–3. Total score: 0–15 with higher scores indicating worse function. Normative data for people without back pain (n = 150): Median = 0, mean = 0.8	Activity/participation
High lift test	A high lift test was a modified lift test included in BPS. The participants lift a box of 2 kg (for women) or 3 kg (for men) from waist to shoulder height and back again. The lifting technique was optional.	Number of lifts performed in 1 min is counted.	Activity/participation
Biering–Sørensen test (55–58)	Static endurance of the back. Participants are positioned prone with the upper body extending beyond the edge of the plinth and the lower body is fixed to the bench with three straps.	The length of time holding the upper body straight is recorded. Max time 240 s. Healthy (31 individuals): Median = 138	Body function
Abdominal endurance/strength (59, 60)	Three levels of dynamic sit-up test with increased demand for each level. The participants are supine with the knees flexed and with feet supported on the plinth by the tester.	The number of completed repetitions is counted (0–15).	Body function
Tender points (61)	18 defined fibromyalgia tender points with four kilos pressure are tested.	Painful points are counted	Body function

Subjective Health Complaints inventory (SHC) consists of 29 items regarding subjective somatic or psychological complaints experienced during the last month [36]. The SHC inventory has shown satisfactory test–retest reliability in students and patients with LBP [37].

Hopkins Symptoms Checklist (HSCL-25) has 25 items with 10 items for anxiety symptoms and 15 for depression symptoms [38]. The HSCL has been shown to have a satisfactory validity and reliability in psychiatric outpatients and in a normal population [38, 39].

The Tampa Scale of Kinesiophobia (TSK) [40] consists in short form of 13 items concerning fear of movement/re-injury. The TSK has been validated in numerous studies including patients with neck pain, acute and chronic LBP and fibromyalgia [41–43].

Örebro questionnaire predicts risk for future work disability. The short form of the Örebro Musculoskeletal Pain

Screening Questionnaire has 10 items and is appropriate for clinical and research purposes since it is nearly as accurate as the longer version [44].

Norwegian Function Assessment Scale (NFAS) is an instrument for self-report of work related functioning with basis in the ICF's classification system [45]. Test–retest reliability has been tested in a normal population and found acceptable [45].

To measure social and psycho-social characteristics of jobs the Demand-Control-Support Questionnaire (DCSQ) was developed by Theorell et al., based on a shortened and modified version of the Job-Demand- Social Support Model (JCQ) [46, 47]. The psychometric properties of DCSQ have been demonstrated to be satisfactory [46, 47].

The Short Form-12 (SF-12), a 12-item version of the SF-36, was used to measure physical and mental health-related quality of life [48]. The SF-12 has shown good internal

consistency, validity, and responsiveness in patients with LBP [49].

Sleep disturbance was measured by the Bergen Insomnia Scale (BIS) [50]. BIS can refer to high internal consistency, adequate reliability and good convergent and discriminative validity [50].

Body Mass Index was calculated by dividing weight (kg) by the square of height (m).

Physical Tests

The physical tests were chosen to get a general impression of physical function according to body functions or activities in the ICF's model. A more detailed description of the tests is given in Table 1.

The Global Body Examination (GBE) is used to assess bodily function in patients with long-lasting musculoskeletal pain and/or with psychosomatic complaints. Six tests of truncal flexibility and ability to relax during passive movements were chosen. Discriminating ability between healthy and different patients groups has shown to be very good to excellent [51]. Good inter-tester reliability has been demonstrated in a former version of the GBE [52].

Back Performance Scale (BPS) consists of five tests reflecting mobility-related daily activities for trunk and lower extremities. Satisfactory test–retest reliability and responsiveness to change have been demonstrated in patients with long-lasting LBP [53, 54].

A high lift test was also performed. This is a modified lift test from the lifting test in the BPS, but not described elsewhere.

To assess static endurance of the back extensors we used the Biering–Sørensen test [55]. Test–retest reliability has been reported as satisfactory, but variability has been high [56–58].

For testing of abdominal endurance/strength we chose a three levels dynamic sit-up test with increasing demands for each level [59, 60].

We also included testing of tender points to get an impression of widespread pain [61]. Four kilos pressure of 18 defined fibromyalgia tender points were tested, and painful points counted.

The study was accepted by the Regional Committee for Medical and Health Research Ethics, Western-Norway, and was performed according to the Helsinki Declaration. Each participant signed an informed consent form prior to the examination.

Statistical Analyses

Statistical analyses were calculated using SPSS (version 19; SPSS Inc., Chicago, IL, 2011) and Matlab (version 7.10; MathWork, 2010).

Descriptive statistics were used for demographic variables for all participants. Several variables were not normally distributed and non-parametric tests were therefore used. Differences between groups (full sick leave, partial sick leave, not sick leave/working) were analyzed by Chi square exact for categorical data and Kruskal–Wallis and Mann–Whitney U tests for continuous variables. A personal mean was given for missing data if <30 % of a sub-scale was missing.

To examine which factors were associated with being on sick leave, a logistic regression analysis was performed using sick leave groups as the dependent variable and several independent variables (gender, age, self-reported physical and mental function, perception of work environment, physical tests). We estimated both an unadjusted model for each independent variable and a fully adjusted model containing all independent variables. From those models and a correlation analysis we selected a final model based on statistical significance and clinical relevance. Some of the variables were dichotomized, as described in the method section. Work demands were reported in both back-ground data and in the DCSQ and reflect similar aspect. We chose the DCSQ in the logistic regression model because this is a standardized measurement tool. The general significance level was set to $p < 0.05$. Taking into account multiple effects, a Bonferroni adjustment was too conservative, therefore we used $p \leq 0.01$ as marginal level.

Results

A total of 250 participants (92.4 % women) were consecutively recruited to the functional evaluation study. Self-reports showed that 83 % of the participants had experienced their present complaints for more than 8 weeks. About 50 % reported previous contact with health personal for treatment of their MSDs. However, during their current episode the majority did not report any treatment. The group not on sick leave (working group) included 168 participants and the groups on partial and full sick leave each included 41 participants. In Table 2, demographic characteristics of the participants are provided. There were only women on partial sick leave. Workers on partial sick leave had statistically significant longer duration of sick leave compared to workers on full sick leave. The group on full sick leave reported more heavy physical work compared to the working group. The differences in function, health and work related variables between the three groups are presented in Table 3. Major differences in self-reported and physically tested function were observed between the group on full sick leave and the working group. Participants on full sick leave had statistically significant poorer function and higher (worse) score on Örebro questionnaire

Table 2 Demographic variables

Variables	Gr.1 working N = 168 N (%)	Gr.2 partial sick leave N = 41 N (%)	Gr.3 full sick leave N = 41 N (%)	<i>p</i> value
<i>Sosiodemographic factors</i>				
Age ^a	49 (21–64)	47 (26–62)	49 (21–67)	.414 ^b
Gender, women	155 (85.4)	41 (100)	35 (95.8)	.052 ^c
Education				.273 ^c
Secondary school	11 (6.6)	2 (4.9)	5 (12.2)	
Vocational education	82 (49.1)	23 (56.1)	24 (58.5)	
University degree	74 (44.3)	16 (39.0)	12 (29.3)	
<i>Work status</i>				
Full-time work	110 (65.5)	23 (56.1)	24 (58.5)	.436 ^b
Sick leave (weeks) ^a	0 (0)	9 (2–62)	3 (0–10)	<.001 ^b
Sick leave episodes (number)				.214 ^c
0×	27 (17.1)	8 (19.5)	10 (24.4)	
1×	32 (20.3)	13 (31.7)	10 (24.4)	
≥2×	99 (62.7)	20 (48.8)	21 (51.2)	
Type of work (mainly)				.034 ^c
Sedentary work/sitting	13 (7.8)	1 (2.5)	0 (0)	
Standing/walking	97 (58.1)	23 (57.5)	17 (42.5)	
Heavy physical work	57 (34.1)	16 (40.0)	23 (57.5)	
<i>Health related factors</i>				
Main disorder				.067 ^c
Neck- and shoulder pain	53 (32.3)	14 (34.1)	7 (17.1)	
Low back pain	61 (36.3)	19 (46.3)	19 (46.3)	
Widespread pain	3 (25.6)	3 (7.3)	10 (24.4)	
Other	10 (6.0)	5 (12.2)	5 (12.2)	
Smoking				.403 ^c
Yes, daily	31 (18.8)	9 (22.0)	13 (32.5)	
Yes, sometimes	18 (10.9)	4 (9.8)	5 (12.5)	
No	116 (70.3)	28 (68.3)	22 (55.0)	
Exercise				.752 ^c
<1×/week	30 (17.9)	7 (17.0)	9 (21.9)	
1–2×/week	73 (43.5)	17 (41.5)	13 (31.7)	
3–5×/week	65 (38.7)	17 (41.5)	19 (46.4)	
Body mass index ^a	24.9 (18.8–42.1)	25.2 (17.6–39.6)	25.4 (17.2–36.4)	.904 ^b

^a Median (min–max)^b Kruskal–Wallis test^c Chi square, exact testBold = significant at $p < 0.05$

compared to those working. When comparing those on partial and full sick leave, the group on partial sick leave had statistically significant ($p < 0.05$) better scores on NFAS, the physical dimension of SF-12, NPRS, Örebro questionnaire, BSI, GBE and high lift test, compared to the group on full sick leave.

The results of the logistic regression analysis are presented in Table 4. The group on full sick leave and the group on partial sick leave were compared with the working group. Complete data were available in 210 participants (142 working, 30 on full sick leave, 38 on partial sick leave). Reduced level of the physical dimension of SF-12 and on high lift test were significantly related to full sick leave (OR 0.86, $p < 0.001$) (OR 0.79, $p = 0.002$). There

was also a tendency ($p < 0.05$) that being on full sick leave was associated with gender, the mental dimension of SF-12, the HSCL-25, the demand dimension of the DCSQ, and the abdominal strength test. The physical dimension of SF-12 (OR 0.91, $p = 0.005$) was the only variable that was associated to partial sick leave (Table 4). The full logistic regression model is shown in Table 5.

Discussion

In this study we found that workers on full sick leave had reduced self-reported and physically tested function compared to workers still working despite MSDs, as well as

Table 3 Differences in health, work characteristics and function between three groups: those working, on partial sick leave, or on full sick leave

Variables	N	Gr. 1 working Median (min–max)	Gr. 2 on partial sick leave Median (min–max)	Gr.3 on full sick leave Median (min–max)	Kruskal–Wallis test <i>p</i> values
<i>Pain</i>					
Pain intensity	250	6 (2–10)	5 (3–10)	7 (2–10)	0.005
Pain drawing area	250	10 (1–70)	9 (2–37)	10 (1–40)	0.72
<i>Health factors and function</i>					
Ørebro questionnaire	250	44 (14–84)	46 (17–70)	56 (32–80)	0.001
SF-12 mental	232	50.1 (26.7–61.1)	48.6 (30.5–63.2)	48.4 (2.9–61.2)	0.412
SF-12 physical	232	45.5 (12.8–59.9)	42.2 (24.3–3.2)	38.7 (24.6–48.4)	<0.001
NFAS	250	1.2 (1.00–2.10)	1.23 (1 (1.00– 1.84)	1.42 (1.0– 2.38)	<0.001
HSCL	244	1.44 (1.00–2.87)	1.42 (1.00–2.58)	1.45 (1.04–3.08)	0.665
SHC (n)	179	10 (3–15)	9 (3–13.0)	10 (3–15)	0.245
TSK	247	21.7 (13.0–46.0)	21.0 (13.0–35.8)	21.0 (13.0–43.0)	0.952
BIS	244	16.5 (0–42)	17.0 (0–36)	24.0 (2–41)	0.065
<i>Work characteristics</i>					
DCSQ social	247	0.78 (0.22–1.00)	0.78 (0.33–1.00)	0.72 (0.33–1.00)	0.108
DCSQ demand	246	0.67 (0.00–1.00)	0.67 (0.27–0.93)	0.67 (0.27–1.00)	0.214
DCSQ control	240	0.67 (0.22–0.94)	0.64 (0.39–0.83)	0.67 (0.39–0.83)	0.186
<i>Physical assessment</i>					
ACR-tender points (n)	250	7 (0–18)	6 (0–18)	7 (0–18)	0.616
GBE flexibility	250	16 (2–35)	16 (5–30)	19 (5–35)	0.038
High lift test (n)	250	16 (0–29)	15 (8–24)	13 (3–25)	<0.001
Abdominal strength (n)	248	12.5 (0–15)	9 (0–15)	5 (0–15)	<0.001
Back strength (s)	248	70 (0–240)	33 (0–220)	36 (0–240)	0.002
BPS	250	3 (0–15)	4 (0–11)	6 (0–13)	<0.001

SF-12 Quality of Life, Short Form-12, *NFAS* Norwegian Function Assessment Scale, *HSCL* Hopkins Symptoms Checklist, *SHC* Subjective Health Complaints, *TSK* Tampa Scale of Kinesiophobia, *BIS* Bergen Insomnia Scale, *BMI* Body Mass Index, *DCSQ* Demand-Control-Support Questionnaire, *ACR-Tender Points* American Criteria of Rheumatology, *GBE* Global Body Examination, *BPS* Back Performance Scale. Bold = significant at *p* < 0.05

compared to those on partial sick leave. Lower physical function measured by the physical function score on SF-12 and the high lifting test were strongest associated with being on full sick leave. Being female, lower mental health score (worse) on SF-12, in addition to lower scores (better) on the HSCL-25, increased self-reported work demands (DCSQ) and lower abdominal strength showed a tendency to be associated with being on full sick leave. For the group on partial sick leave, only the physical function scale of SF-12 was associated with being on sick leave, those on sick leave having lower (worse) scores.

Our findings are supported by several studies, but there are also new and interesting findings. Low self-reported physical health and disability have been found to be associated with being on sick leave in patients with chronic LBP [62]. In a systematic review [63] of factors that promote staying at work with MSDs, an association was found between low perceived physical disability and staying at work. However, only a few studies have compared measures of physical tests/capacity between workers on sick leave and workers who continue working despite pain. Soer

et al. [11] compared functional capacity between workers staying at work despite MSDs, workers on sick leave due to MSDs and a group of healthy workers. In accordance with our findings, they found that the two groups with MSDs had significantly lower functional capacity than the healthy group, with the lowest capacity observed in the group on sick leave. Other studies have shown that physical tests can predict return to work after being on sick leave. Cardiovascular fitness was identified as one of the strongest predictors for return to work in a Norwegian study [19]. In a systematic review [18], better results on physical tests, and especially the lifting test, appeared to be predictive of work participation for patients with MSDs. As our study was cross-sectional, prediction of work participation could not be estimated. Low lifting capacity was, however, strongly associated with being on full sick leave. An explanation may be that lifting captures several components such as gripping, holding, bending and lowering. In addition, lifting can be influenced by pain and fear of movement.

Several explanations were considered in order to explain why the participants on full sick leave in the present study

Table 4 Logistic regression comparing group on full sick leave and on partial sick leave with the working group

Variables	N Unadjusted model, full sick leave N = 30			N Unadjusted model, partial sick leave N = 38						
	OR	95 % CI	p value	OR	95 % CI	p value				
Gender	41	0.49 (0.17–1.38)	0.176	0.10 (0.02–0.67)	0.018	41	0.98 (0.95–1.01)	0.241	0.97 (0.94–1.01)	0.164
Age	41	1.00 (0.97–1.04)	0.884	0.96 (0.92–1.01)	0.126	41	0.98 (0.95–1.01)	0.241	0.97 (0.94–1.01)	0.164
Smoking	40	0.67 (0.46–1.00)	0.049	0.84 (0.47–1.51)	0.567	41	0.92 (0.61–1.41)	0.711	1.16 (0.69–1.96)	0.580
SF-12 physical	37	0.86 (0.82–0.91)	<0.001	0.86 (0.79–0.94)	<0.001	40	0.91 (0.87–0.96)	0.001	0.91 (0.85–0.97)	0.005
SF-12 mental	37	0.96 (0.91–1.01)	0.110	0.89 (0.80–1.00)	0.043	40	0.98 (0.93–1.04)	0.509	0.95 (0.87–1.03)	0.210
HSCL	40	1.99 (0.84–4.72)	0.118	0.10 (0.01–0.90)	0.040	40	1.16 (0.45–2.98)	0.754	0.25 (0.04–1.43)	0.119
DCS support	41	0.12 (0.02–0.80)	0.029	0.67 (0.02–18.82)	0.816	41	1.20 (0.16–8.77)	0.861	1.96 (0.15–26.35)	0.611
DCS demand	40	3.63 (0.3–24.86)	0.189	37.07 (1.73–792.84)	0.021	41	4.75 (0.69–32.65)	0.113	6.65 (0.58–76.37)	0.128
DCS control	38	0.18 (0.01–2.88)	0.223	4.43 (0.03–578.40)	0.549	40	0.21 (0.01–3.34)	0.272	0.16 (0.01–4.88)	0.295
GBE flexibility	41	1.07 (1.02–1.12)	0.009	1.02 (0.94–1.10)	0.676	41	1.00 (0.95–1.05)	0.957	0.98 (0.92–1.04)	0.559
High lift test	41	0.82 (0.75–0.90)	<0.001	0.79 (0.68–0.91)	0.002	40	0.97 (0.89–1.06)	0.478	1.04 (0.92–1.17)	0.567
Abdominal strength	40	0.84 (0.78–0.91)	<0.001	0.84 (0.73–0.97)	0.014	41	0.94 (0.87–1.00)	0.065	0.95 (0.85–1.06)	0.335
Back strength	41	0.99 (0.98–1.00)	0.013	1.00 (0.00–1.01)	0.385	41	0.99 (0.99–1.00)	0.039	0.99 (0.99–1.00)	0.305
BPS	41	1.29 (1.15–1.45)	<0.001	0.85 (0.66–1.09)	0.206	41	1.15 (1.03–1.29)	0.016	1.06 (0.89–1.28)	0.513

SF-12 Quality of Life, Short Form-12, HSCL Hopkins Symptoms Checklist, DCSQ Demand-Control-Support Questionnaire, GBE Global Body Examination, BPS Back Performance Scale.

Bold = significant at $p \leq 0.01$

^a Only women

Table 5 Logistic regression - full model. Comparing full sick leave and partial sick leave with the working group

	N = 189			Adjusted model, full sick leave			Unadjusted model, full sick leave			Adjusted model, partial sick leave			Unadjusted model, partial sick leave		
	N	OR	(95 % CI)	p value	OR	(95 % CI)	p value	OR	(95 % CI)	p value	OR	(95 % CI)	p value	OR	(95 % CI)
Gender	41	0.49	(0.17–1.38)	0.176	0.06	(0.00–0.70)	0.025	41	0.98	(0.95–1.01)	0.241	0.98	(0.93–1.02)	0.284	
Age	41	1.00	(0.97–1.04)	0.884	0.96	(0.91–1.02)	0.160	41	0.80	(0.40–1.62)	0.541	0.49	(0.17–1.38)	0.177	
Education	41	0.52	(0.25–1.09)	0.083	0.67	(0.19–2.39)	0.541	41	1.51	(0.75–3.03)	0.245	1.16	(0.40–3.40)	0.781	
Working (full/partially)	41	1.37	(0.68–2.75)	0.381	1.93	(0.52–7.17)	0.324	41	0.57	(0.28–1.13)	0.109	0.53	(0.20–1.38)	0.190	
Sick leave episodes	41	0.63	(0.31–1.25)	0.184	0.42	(0.13–1.38)	0.153	41	0.92	(0.61–1.41)	0.711	1.25	(0.67–2.32)	0.486	
Smoking	40	0.67	(0.46–1.00)	0.049	0.72	(0.36–1.44)	0.351	41	1.06	(0.43–2.61)	0.906	1.49	(0.34–6.45)	0.594	
Exercise	41	0.77	(0.33–1.79)	0.547	0.94	(0.19–4.70)	0.937	41	0.79	(0.52–1.19)	0.266	0.89	(0.46–1.73)	0.738	
Pain categories	41	0.71	(0.47–1.08)	0.107	0.83	(0.33–2.09)	0.692	41	0.98	(0.94–1.02)	0.293	0.97	(0.92–1.02)	0.280	
Pain drawing area	41	0.99	(0.96–1.02)	0.582	0.98	(0.93–1.04)	0.572	41	0.95	(0.79–1.13)	0.546	0.77	(0.56–1.06)	0.112	
NPRS	41	1.33	(1.10–1.60)	0.003	0.95	(0.64–1.41)	0.809	41	0.95	(0.79–1.13)	0.546	0.77	(0.56–1.06)	0.112	
Örebro questionnaire	41	1.05	(1.02–1.08)	<0.001	1.04	(0.98–1.11)	0.211	41	1.01	(0.99–1.04)	0.326	1.02	(0.96–1.08)	0.470	
NFAS	41	20.89	(5.62–77.70)	<0.001	2.47	(0.13–48.00)	0.550	41	2.99	(0.72–12.47)	0.132	0.56	(0.03–9.48)	0.685	
SF-12 physical	37	0.86	(0.82–0.91)	<0.001	0.88	(0.79–0.98)	0.015	40	0.91	(0.87–0.96)	0.001	0.89	(0.81–0.97)	0.006	
SF-12 mental	37	0.96	(0.91–1.01)	0.110	0.91	(0.80–1.03)	0.131	40	0.98	(0.93–1.04)	0.509	0.94	(0.84–1.05)	0.246	
HSCL	40	1.99	(0.84–4.72)	0.118	0.08	(0.01–1.15)	0.063	40	1.16	(0.45–2.98)	0.754	0.66	(0.08–5.35)	0.699	
TSK	41	1.00	(0.95–1.06)	0.863	0.86	(0.76–0.98)	0.019	41	0.99	(0.94–1.05)	0.780	0.95	(0.86–1.05)	0.333	
DCS social	41	0.12	(0.02–0.80)	0.029	0.34	(0.01–16.50)	0.583	41	1.20	(0.16–8.77)	0.861	3.13	(0.13–73.77)	0.479	
DCS demand	40	3.63	(0.53–24.86)	0.189	153.40	(2.77–8,508.64)	0.014	41	4.75	(0.69–32.65)	0.113	5.53	(0.27–112.31)	0.266	
DCS control	38	0.18	(0.01–2.88)	0.223	1.11	(0.00–363.95)	0.973	40	0.21	(0.01–3.34)	0.272	0.14	(0.00–11.13)	0.379	
BIS	40	1.04	(1.00–1.07)	.027	1.00	(0.95–1.07)	0.873	41	0.99	(0.96–0.02)	0.533	0.95	(0.91–1.00)	0.069	
BMI	39	1.01	(0.93–1.10)	0.829	0.96	(0.82–1.12)	0.582	37	1.01	(0.92–1.10)	0.884	0.93	(0.81–1.05)	0.241	
GBE, flexibility	41	1.12	(0.02–0.80)	0.029	1.05	(0.96–1.14)	0.326	41	1.00	(0.951.05)	0.957	1.01	(0.93–1.09)	0.832	
ACR-18 tender points	41	1.04	(0.97–1.11)	.303	0.96	(0.83–1.11)	0.562	41	1.03	(0.96–1.11)	0.361	0.99	(0.88–1.11)	0.811	
High lift test	41	3.63	(0.53–24.86)	0.189	0.79	(0.66–0.93)	0.006	40	0.97	(0.89–1.06)	0.478	1.08	(0.93–1.26)	0.312	
Abdominal strength	40	0.18	(0.01–2.88)	.223	0.87	(0.74–1.03)	0.097	41	0.94	(0.87–1.00)	0.065	0.94	(0.83–1.07)	0.343	
Back strength	41	0.99	(0.98–1.00)	0.013	1.00	(0.99–1.02)	0.597	41	0.99	(0.99–1.00)	0.039	0.99	(0.98–1.01)	0.314	
BPS	41	1.29	(1.15–1.45)	<0.001	0.87	(0.631.21)	0.415	41	1.15	(1.03–1.29)	0.016	1.10	(0.87–1.38)	0.432	

NPRS Numeric Pain Rating Scale, NFAS Norwegian Function Assessment Scale, SF-12 Quality of Life, Short Form-12, HSCL Hopkins Symptoms Checklist, SHC Subjective Health Complaints, TSK Tampa Scale of Kinesiophobia, DCSQ Demand-Control-Support Questionnaire, BIS Bergen Insomnia Scale, BMI Body Mass Index, ACR-Tender Points American Criteria of Rheumatology, GBE Global Body Examination, BPS Back Performance Scale. Bold = significant at $p \leq 0.01$

had lower scores on the physical tests compared to workers not on sick leave. A possible explanation could have been different level of exercise between groups. However, the three groups in the present study reported quite similar level of regular exercising, in accordance with earlier research [12, 27]. Another aspect might be fear of pain and movement. Increased fear avoidance has been observed in workers on sick leave with MSDs [19, 27, 29]. Our findings did not support this association, as scores on the TSK were similar for those on sick leave versus those working.

Reduced physical function does not necessarily lead to limitation of work participation. Even if a state of deconditioning is present, the functional capacity could still be sufficient to meet actual work demands, especially if they are not too excessive [11]. However, health care workers usually have physically demanding work, including lifting, transferring patients and working in uncomfortable positions. In accordance with several studies showing that perceived workloads are associated with being on sick leave [12, 19, 27], the workers on full sick leave in this present study reported higher perceived work demands than the other two groups. The reason might be more demanding work tasks for this group, but decreased physical capacity might also influence an individual's perception of work demands. This highlights the need for research that takes into account work demands and work environment for specific occupational groups.

High pain intensity has also been associated with being on sick leave [8, 11, 17]. Our study showed a statistically significant difference of pain intensity between the groups, with the highest level in the group on full sick leave and the lowest in the group on partial sick leave. However, there was only one point in difference on the NPRS between those on full sick and the working group. Only a few of the participants reported increased pain after the physical tests. It is therefore not likely that the pain level was of great importance for the result regarding physical functioning in the present study.

In previous years, much attention has been given to the role of psycho-social factors related to work ability [17, 64]. There were only small differences in measures of the psychological variables between the groups in our study. Reduced physical function was more strongly associated with being sick-listed than psycho-social factors, also reported in previous research [12, 27]. There was only a tendency that being on full sick leave was associated with mental health, and the results were conflicting. The group on full sick leave showed worse function at the mental health component of SF-12, but surprisingly, better score on HSCL-25. The HSCL-25 has a higher number of items related to mental health and may therefore provide a more precise picture than the less detailed generic questionnaire SF-12. Being on short time sick leave, as in our study, may to a lesser degree influence psycho-social factors.

The authorities in Norway, Sweden and Denmark have strongly promoted the use of partial sick leave as the primary choice, if sick leave is needed. It is assumed that partial sick leave has positive effects on health and well-being, compared to full-time absence, and it is believed to facilitate return to full-time work [31]. To our knowledge, the present study is the first study comparing self-reported and physical tested function in workers with those on full or partial sick leave, due to MSDs. The group on partial sick leave had statistically significant better function on some of the functional questionnaires and physical tests compared to those on full sick leave. Interestingly, there were only women in the partial sick leave group. More women than men have been on partial sick leave according to register data from Norway [2]. Further research is needed to get insight into factors affecting workers on partial and full sick leave, and the decisions around sick leave.

Strengths and Limitations

The high number of participants in our study ($n = 250$) gave us enough power to detect differences between workers on full, partial or not on sick leave, and to identify variables related to work status. In accordance with the ICF- model [6] a variety of demographic variables, questionnaires and physical tests were used to cover the different dimensions in the model when evaluating the participants' functioning and working ability. We used well-known standardized questionnaires measuring pain, physical- and mental functioning and conditions at work. In addition, we used standardized physical tests. This is in line with Wand et al. [65] who argued that both self-reported and physically tested functioning need to be assessed to get a better understanding of MSDs and how they could be managed. The physical tests we used were likely to reflect function in different MSDs. The testing was well tolerated by the participants. The tests demonstrate good levels of reliability and validity, but two of the tests (abdominal and high lift tests) are still under evaluation. The physical tests were able to discriminate functioning between workers on sick leave and not, although most of the workers were not on long-term sick leave. This indicates that the test battery could be a useful assessment of function at an early stage of sick leave and a tool when giving advice about rehabilitation and work adaption. Different batteries of physical tests are designed to evaluate work ability and daily functioning [18, 66, 67]. Most of them are costly and time-consuming and are mainly used as assessment tools in the return to work process. In contrast to this, our test battery is cheap, quick to apply and require little equipment and therefore could also be a useful clinical tool in private practice for physiotherapists.

Workers were provided with information about the project by their leaders and through pamphlets and took direct contact to participate. A threat to the external validity is a possible selection bias. Although several workers were “pushed” by their employer to participate, we cannot be sure that the least motivated and the workers with more complex health problems actually contacted us. Our target population was workers on sick leave or at risk of becoming sick-listed due to MSDs. Only 20 % of all that were examined had never been on sick leave due to MSDs before; indicating that we have included the target group. Interviews with managers in the midst of the total project supported that we had managed to get a representative sample of participants (not yet published).

The present study only included self-reported data on sick leave. Although self-reported sick leave data has been evaluated as being less reliable than register recorded data [68], other studies [69, 70] have demonstrated good agreement between self-reports and register data in cross-sectional design. The workers’ sick leave history is only partial known. The length of the last sick leave and number of sick leave episodes the last years are reported, but not the length of all absences. There could also have been changes in job status in the period before assessment. Workers on sick leave could recently have returned to work, and workers on partial sick leave could have changed to full sick leave. Our study did not record this, and it is quite surprising that the differences between the groups still were so significant.

Over 90 % of the participants in the present study were women working in the health- and social sector. This limits the generalizability of the study. Being male and/or having a less demanding work may not affect work ability in the same way.

The present study was cross-sectional and therefore causality cannot be inferred, and only associations are reported. It was conducted in a single country with a highly established social insurance system, thereby reducing generalizability of the study to countries that have similar social and security system.

More specific knowledge about occupational sub-groups is needed to catch groups at risk for prolonged sick leave, and further research in this field should emphasize longitudinal studies.

Conclusion

Health care workers on full sick leave due to MSDs have reduced function on self-reported and physically tested function, compared to those working despite MSDs, as well as compared to those on partial sick leave. Lower physical function measured by the physical dimension on SF-12 and

the high lift test were strongest associated with being on full sick leave, and only the physical dimension on SF-12 was associated with being on partial sick leave. More knowledge about work ability in occupational sub-groups is needed.

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Conflict of interest The authors, Tove Ask, Jan Sture Skouen, Jörg Assmus, and Alice Kvåle have no conflict of interest.

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Research Article

Supervisors' Strategies to Facilitate Work Functioning among Employees with Musculoskeletal Complaints: A Focus Group Study

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Aim. To explore what strategies the supervisors found beneficial to prevent or reduce sickness absence among employees with musculoskeletal complaints. *Methods.* Five focus groups were conducted and 26 supervisors from health and social sector participated. Commonly used strategies to prevent sickness absence and interdisciplinary cooperation in this work were discussed in the focus groups. Systematic text condensation was used to analyse the data. *Results.* The supervisors described five strategies for sick leave management: (1) promoting well-being and a healthy working environment, (2) providing early support and adjustments, (3) making employees more responsible, (4) using confrontational strategies in relation to employees on long-term sick leave, and (5) cooperation with general practitioners (GPs). *Conclusions.* Strategies of promoting a healthy working environment and facilitating early return to work were utilised in the follow-up of employees with musculoskeletal complaints. Supportive strategies were found most useful especially in the early phases, while finding a balance between being supportive, on one side, and confronting the employee, on the other, was endeavoured in cases of recurrent or long-term sick leave. Further, the supervisors requested a closer cooperation with the GPs, which they believed would facilitate return to work.

1. Introduction

Environmental and organizational factors in the workplace have been highlighted as important in the prevention of long-term sickness absence [1–5], where musculoskeletal complaints are the most frequent reasons for sick leave [6, 7]. Supervisors' responsibility and role have been emphasised in this work [8–13]. They are often the first to notice employees' health problems in the workplace and have an opportunity to make adjustments at an early stage in order to limit work disabilities [3, 13].

Promotion of employees' health and well-being has been linked to increased work ability and work participation [14, 15]. The impact of social support from supervisors has been emphasised in particular [15, 16]. Social support includes

general social support at work, good communication and social contact with supervisors, a good work atmosphere, understanding of pain, help when things are difficult, and social support away from work [15].

Supervisor support may also influence the return to work (RTW) process. Poor supervisor support combined with high psychosocial demands has been found to be strongly associated with increased sickness absence due to overstrain or fatigue [16] and with increased risk of musculoskeletal complaints [15]. Labriola et al. [17] showed that low supervisor support, measured at the workplace level, was associated with increased risk of long-term sickness absence. However, other authors have reached opposite conclusions, demonstrating that low supervisor support was associated with a higher RTW rate [18], or have found no association

between the level of supervisor support and risk of back pain and/or sick leave [19, 20].

Several aspects may influence the supervisors' choice of strategies in the follow-up of employees with health complaints. Tjulín and coauthors [21] found that workplace strategies shifted during three RTW phases: the prereturn, the initial return, and the postreturn phases. Supervisors seemed to follow the advice from the organisational policy in the RTW process, but when the employee was back in work they took less responsibility. Although assisting people with health complaints to stay at work has been recommended in the literature [2, 22], few have described this phase.

The choice of strategies may also be dependent on national legislation and policy. In Norway, both employer and employees have since 2011 been given increased responsibility in the RTW process. For instance, an early and close follow-up of employees on sick leave is considered important. After four weeks of sickness absence, the employer is responsible for facilitating work modifications and provides a detailed RTW plan in cooperation with the employee on sick leave. At seven weeks of sick leave, all stakeholders are required to participate in a dialog meeting in order to solve the problem [23].

Despite increased focus on the workplace and the supervisor's role in the prevention of sickness absence, knowledge is still lacking about key strategies utilised in the different phases of sick leave management, including the phase where the employee remains in work despite complaints. Insight into these strategies may increase our understanding of aspects that facilitate work participation. The aim was therefore to explore what strategies the supervisors used in the follow-up of employees with musculoskeletal complaints and what strategies they found most beneficial in the different phases of sick leave management.

2. Methods

The present study was part of the project "Function, Activity, and Work," a joint project between the University of Bergen and the municipality of Bergen's Department of Health and Social Services. Focus group interviews were used since we wished to gain insight into the supervisors' experiences of following up employees with musculoskeletal complaints. Group discussions can stimulate the interaction among participants in the target group and yield a wide range of views across several groups [24].

The study was approved by the Regional Committee for Medical Ethics.

2.1. Participants. The participants were recruited from the Department of Health and Social Services in the municipality of Bergen, Norway. The department has around 7,000 employees, with a mean sickness absence rate of approximately 10% in recent years [25], which is considerably higher than the mean rate in Norway, which is 5.2% [7]. A total of 26 supervisors (23 women, three men), aged 31 to 62, who had worked as supervisors for from nine months to 18 years, agreed to participate. They were the immediate supervisors

and, in addition to overall professional responsibility in their department, had responsibility for following up employees on sick leave. Most of them were nurses and a few were social educators. They worked in the home nursing service, nursing homes, or group homes for intellectually disabled people. Each supervisor had responsibility for about 40 employees.

2.2. Procedure. Eligible supervisors were given verbal and written information about the project and were invited to participate through their manager and the project managers. The supervisors contacted the project managers if they agreed to participate. Written informed consent was obtained from all participants before the start of the study.

Five focus groups were conducted between January 2012 and February 2013, with six to seven participants in each group. Three focus groups were carried out at the beginning of 2012, with two additional groups a year later. To get an impression of the strategies used over time, the supervisors in the first focus groups were invited to participate one year later, and six of them agreed. An additional seven supervisors were therefore recruited and mixed with the previous participants in two groups.

The focus groups took place in a conference room at the university and lasted for 90 to 110 minutes. All focus group discussions were led by a moderator (TA), and a comoderator (LHM) took field notes, describing the atmosphere and the interaction in the group discussions.

A semistructured interview guide with open-ended questions was used. The interview guide covered questions about strategies used in the follow-up of employees with musculoskeletal complaints and experiences of interdisciplinary cooperation in this work. The moderator guided the focus group discussions and encouraged all group members to participate. The comoderator summarised the main topics that emerged, and the participants were asked to elaborate on and/or confirm them.

2.3. Data Analysis. The data was analysed using systematic text condensation as described by Malterud [26] in four steps: (i) listening to the interviews and reading all the materials to get an overall impression and describe themes; (ii) identifying units of meaning relating to experiences and strategies when following up employees with musculoskeletal pain and coding them; (iii) systematic abstraction of meaning units by condensing the contents of each code group; and (iv) synthesising from condensation to generalised descriptions and concepts describing supervisors' experiences.

Both authors discussed the themes and their interpretations of the interview data. They met several times to discuss the transcripts and the open codes that were identified by the individual researchers until consensus was reached about the different codes. To validate data and to ensure that important aspects were not lost, all the transcripts were reread.

3. Results

The supervisors described different strategies related to three phases in the sick leave management and five corresponding

themes: phase (1), preventive strategies for all employees: promoting well-being and a healthy environment; phase (2), supporting employees with musculoskeletal complaints to remain in work: providing early support and adjustments; and phase (3), RTW phase: making employees more responsible, using confrontational versus supportive strategies in relation to employees on long-term sick leave, and cooperation with the general practitioners (GPs).

Phase 1

Promoting Well-Being and a Healthy Working Environment. The most basic strategy to prevent sick leave was to ensure a well-functioning social climate in the workplace, which was considered to promote health and well-being. One strategy mentioned was to pay attention to each individual in their day-to-day work, while another was to strive for a good relationship with the employees. A safe and open atmosphere based on mutual trust and respect made it easier for employees to support each other, for example, if a colleague experienced musculoskeletal pain. One of the supervisors said:

We have a positive working climate and know each other well. The working relationship is good and we try to help each other in our day-to-day work.

Having a positive attitude to the workplace was also considered important in a well-functioning working climate. Among other things, this entailed being a role model, for instance, by taking part in the day-to-day work tasks together with employees, if necessary. Sometimes the supervisors organised workshops on the organisation's visions and goals in order to increase the feeling of belonging in the workplace. Educational courses were also regarded as a valuable way of inspiring and motivating employees to identify more with their work. A 35-year-old supervisor explained:

You have to be aware, place people where they have their competence and interests... so that they get their inspiration back, - then a positive spiral will start. If they are motivated, it will be easier to continue working even if they have some pain.

Phase 2

Providing Early Support and Adjustments. The supervisors agreed that sickness absence could be avoided if they recognised early signals of health complaints and offered support and modified work. The supervisors observed the employees in the performance of work tasks and gave advice on better working techniques. The sooner the supervisors became aware of employees' complaints the better, they explained. One of the supervisors put it as follows:

I pay a lot of attention to their (employees') body language... and I try to follow them closely and, for instance, ask about complaints if somebody holds their hands to their back. I consider myself observant and pick up on many things. For me, this is one important way of prevention.

Much time was spent on finding solutions and adjusting tasks to individual needs in order to prevent sickness absence. Easier work tasks, extra aids, working in pairs with the heaviest patients, changing shifts for a period, or, as a last resort, finding an alternative workplace in the municipality was among the solutions offered. Cooperation with the occupational health service was seen as helpful in many of these cases.

She (the employee) told me that she had to be on 50% sick leave because she needed to be treated by a physiotherapist. I asked her if there was anything we (the workplace) could do to prevent the absence. Looking at the job plan together, we changed her shifts for a period. She was also helped by the occupational health service and avoided sickness absence.

Although the supervisors showed great commitment, they expressed frustration about spending so much time and effort dealing with sick leave matters. The supervisors questioned the extent of their responsibility to adjust working conditions, especially in cases where the employees' main problem did not appear to be work-related.

Phase 3

Making Employees More Responsible. Several supervisors argued that employees need to take more responsibility for themselves, both in the workplace and in life situations in general. A healthy lifestyle was encouraged. Being aware of the balance between work and private life and keeping in good physical shape were seen as a prerequisite for this challenging work. A 50-year-old supervisor had told one of her subordinates:

If we intend to work as nurses until retirement, we'll have to do a lot of things like exercising and organising our private lives in a better way.

Employees on sick leave were encouraged to be more responsible in their own RTW process, for instance, by phoning when they received a sick note, participating in meetings, and cooperating with the supervisor to find solutions that could facilitate an early RTW. Statutory requirements, such as preparing a detailed RTW plan and holding a dialogue meeting after a certain time, were seen as useful in this process. When clarifying the responsibility each part had and the consequences of not following the procedures, the supervisors found support in the written rules at meetings with their subordinates. One of the younger supervisors stated:

I think it is okay to make demands of employees even if they are on sick leave. We can be better at that... It can easily happen that we do not dare to ask critical questions. We have to emphasize not only the rights, but also the duties of employees on sick leave in connection with sickness absence.

Confrontational versus Supportive Strategies in relation to Employees on Long-Term Sick Leave. The supervisors agreed that a supportive attitude would facilitate a healthy working environment and thereby prevent sickness absence. However, they disagreed on the most appropriate strategy for following up employees on recurrent or long-term sick leave, and these differences were eagerly discussed in the groups. While some were convinced that being understanding and supportive was the best approach to helping the employees to return to work, others believed that they as supervisors could be too supportive and claimed that, in some cases, a confrontational style was more useful.

Confrontational discussions were especially useful in communication with some of the younger employees and employees with recurrent periods of sick leave who they believed exploited the sickness certification system. In such cases, they were more direct towards the employees and asked critical questions about their sickness absence. They sometimes increased the pressure on the employees by informing them about and discussing financial consequences of being on long-term sick leave and difficulties finding jobs in future. They expressed a lack of trust in those who returned to work after one year's absence when further sick leave would have resulted in reduced disability payments. The supervisors suspected that these employees could manage to work well and wondered why they had not returned to work earlier. One supervisor claimed that, for temporary employees with a sick leave history, sickness absence decreased after these meetings:

I had to explain to each of them that their high level of sickness absence was not in line with national guidelines for that illness and that frequent sickness absence would have consequences for future work.

Some of the supervisors felt guilty, however, about questioning the employees' work ethic. The usefulness of confronting the employees nevertheless appeared to overshadow this feeling. Although the strategy of making demands and applying pressure was emphasised in some situations, supportive strategies were also valued, but the supervisors found it challenging to strike the optimal balance between the two.

Cooperation with GPs. Cooperation with GPs in dealing with challenging cases of sickness absence was seen as very important. The GPs' assessment of what the employees could safely do helped to reassure all parties in the dialogue. This led to a better evaluation of the employee's work ability and provided support when planning modified work tasks. Some supervisors said that these meetings had often resulted in an earlier return to work or at least from full-time to part-time sick leave. The supervisors found, however, that GPs knew little about current opportunities for adjusting work tasks and wanted closer dialogue with GPs in difficult cases. One of the younger supervisors said:

In our jobs, we are working with multi-handicapped people and we have a lot of heavy lifting, but it is not black or white. It is often possible to

find easier tasks for a while, but the doctors know too little about our workplace, and people listen to what the doctors recommend.

As a consequence, employees risked being put on sick leave without having tried other alternatives first.

4. Discussion

In the present study, we explored what strategies the supervisors found beneficial to prevent sick leave among employees with musculoskeletal complaints. All supervisors found supportive strategies useful to promote health and well-being and early RTW. For employees on recurrent or long-term sick leave, some supervisors found these strategies useful as well, while others emphasised a more confrontational style. Striking a balance between being supportive, on the one hand, and making demands and confronting the employees, on the other hand, seemed to be challenging.

The supervisors expressed great enthusiasm and involvement in the follow-up of employees with musculoskeletal complaints. Although most attention was directed towards employees who had already developed musculoskeletal complaints, strategies for creating a good working environment for all employees were also eagerly discussed.

The strategies the supervisors claimed to apply seemed to follow a specific pattern that was related to the different phases in the sick leave management. Mainly supportive strategies were used to promote a healthy working environment and to help employees remain in work despite musculoskeletal complaints. These strategies included facilitating a good social climate at work, taking notice of each individual, assisting in work situations, making modifications, and offering educational courses. They also motivated the employees to engage with the organisation's visions and strategy plans, which was considered to increase well-being and positive attitudes towards the workplace. Our findings are in line with other studies that point to the importance of social support from supervisors to enable employees to remain in work. An in-depth review of 52 studies showed that social support from coworkers and/or supervisors could help employees to cope with their musculoskeletal complaints and thus have impact on the prevention of musculoskeletal complaints and sickness absence [15]. According to a Dutch study [9], workers and occupational physicians as well as supervisors considered the supervisor's role to be important in relation to optimising functioning at work and helping workers with health problems to stay at work. In two systematic reviews, it was found that supervisor support did not seem to prevent the development of back pain [19, 20]. In our study, however, the focus was on management of musculoskeletal complaints and prevention of sick leave due to complaints, not on primary prevention.

There is conflicting evidence as regards which strategies are most appropriate in the RTW phase. Supportive strategies have been considered to be beneficial in the RTW process [2, 3, 10, 13, 27]. Employees on sick leave who reported that leadership qualities were good returned to work sooner than those not reporting such qualities among their leaders [27].

The feeling of being protected by their supervisor was the strongest predictor of early RTW. However, other studies have shown no association between supervisor support at work and sickness absence due to back pain [19, 20]. Post et al. [18] also found that low supervisor support was associated with a higher RTW rate. One explanation may be that having a supportive and empathetic supervisor could make it easier for employees to extend their sick leave and also lead to a feeling of dependency on the supervisor [18].

In the present study, utilising supportive strategies alone was not regarded to be sufficient to reduce sick leave. Confronting employees and demanding more responsibility of them in the RTW process were considered to be essential by some supervisors. Making demands on employees on sick leave was also emphasised by the supervisors in a Swedish study [10]. However, encouragement and pressure to remain in or return to work may have negative consequences for health and well-being if the employees are too ill to work [28]. The supervisors in our study seemed to be aware of this, and close cooperation with the GPs was seen as desirable in order to get a better judgment of the employees' work ability.

In line with our findings, previous research has concluded that close collaboration between health professionals, employees, and supervisors is essential in the RTW process [1–3, 22]. From supervisors' point of view, cooperation with health professionals was considered to be helpful in selecting modified work tasks, establishing a mutual understanding, and clarifying the supervisor's role in the RTW process [1, 10, 11]. However, the supervisors in the present study claimed that GPs knew too little about the workplace and they wanted a closer dialogue with the GPs in order to increase the effectiveness of the RTW efforts. According to a systematic review, employers described that the physicians were difficult to reach when they needed to discuss the employee's capability in relation to work tasks [3]. It is argued that GPs could make better judgments about work ability if they collaborated with the employer to obtain information about the individual's work situation [29].

Supervisors may find it challenging to strike a balance between production demands and employees' health concerns [1, 10, 12], and this could possibly influence their strategies in the RTW process. Swedish workers and supervisors were interviewed about the employers' role in relation to RTW, and both groups reported that the economic consideration for their company often dominated at the expense of the legal and ethical aspects [12]. This may also be the reason why some supervisors in the present study preferred to use confronting strategies in difficult RTW cases.

The supervisors in our study expressed great enthusiasm about following up employees with musculoskeletal complaints. Their preoccupation with sick leave and disability prevention is in accordance with the Norwegian government's policy and with legislation on the follow-up of employees on sick leave [23]. The high level of sickness absence in this department might therefore seem surprising. However, Health and Social Services is the sector with the highest sickness absence rate in Norway [7]. Nursing homes and home nursing services are characterised by female employees, physically demanding work, low control, and night shifts, all

described as risk factors for prolonged sickness absence [30–32]. It is therefore likely that the high sick leave level, in this particular department, reflects the level in such workplaces in Norway in general.

4.1. Methodological Considerations. Five group interviews were conducted with six to seven participants in each group in accordance with common recommendation for optimal group interaction [33]. The data yielded rich and broad descriptions that shed light on the topic, and we considered the material to have reached saturation since no new insights emerged from the last interviews.

We chose a systematic text condensation of the qualitative interview material and carried out an analysis of meaning across the interviews [26]. Two focus groups interviews were conducted one year after the first ones. This gave us more nuanced and broad descriptions, but no new strategies appeared. Because we noticed no time effect in this context, we considered transversal analysis to be the best method.

Half of the participants were invited to participate by their managers and half were self-selected. This may have resulted in selection sample of participants who were more enthusiastic and motivated than others in relation to finding solutions for the employees with musculoskeletal complaints.

The study was limited to the Bergen area and the supervisors were healthcare workers, mainly female nurses. Including male employees and employees from other professions might have provided additional perspectives. Substantial differences in culture, social insurance system, and sickness certification legislations between different countries may also influence the choice of strategies. However, how supervisors follow up employees with health complaints is a general topic, and knowledge from this study may be useful to others involved in prevention of sickness absence.

5. Conclusion

The present study provides insight into strategies used by supervisors to facilitate work functioning among employees with musculoskeletal complaints. Different strategies were applied depending on the phase of sick leave management. Supportive strategies were found most useful especially in the early phases, while finding a balance between being supportive, on one side, and making demands and confronting the employees, on the other side, was endeavoured in cases of recurrent or long-term sick leave. Furthermore, the supervisors requested a closer cooperation with the GPs, which they believed would facilitate RTW.

Conflict of Interests

The authors report no conflict of interests.

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Appendix 1: Illustration of the physical tests

Back Performance Scale (BPS)



Global Body Examination (GBE)



Static endurance of back muscles (Biering-Sørensen test)



Endurance/strength abdominal muscles



High lift test



Tender points



Appendix 2: Main Topics in interview guides

Study II

Can you describe your overall experiences with the functional evaluation?

How did you experience to undergo the functional evaluation?

Can you describe the relevance of the functional evaluation? A) regarding your illness?
B) regarding function at work and leisure time?

Did the result of the functional evaluation correspond to your own judgement of the functional ability?

Was there any significant aspect regarding your illness that was not covered in the evaluation?

Have you used the functional evaluation report in conjunction with supervisors or health personnel? Can you describe your experiences?

Study III

Can you describe your experiences with the follow-up of employees with MSDs?

What do you think is important in the follow-up process? Describe examples from daily work.

What are the challenges in the follow-up process?

How do you follow up employees with MSDs who are not on sick leave?

What are your experiences with interdisciplinary cooperation?

What is your opinion about the new legislation regarding follow-up of employees on sick leave?

What experiences do you have with the content of the MSD-educational course?

Are there other experiences related to the follow-up of employees with MSDs you think are important to discuss?

