

To return or not return?

**Predictive factors for return to work
in persons with musculoskeletal disorders**

– prospective studies over a 10-year period

Marie Lydell

**Department of Public Health and Community Medicine/Primary
Health Care, Sahlgrenska Academy at
University of Gothenburg**

**Research and Development Unit, County Council of Halland
2010**



UNIVERSITY OF GOTHENBURG

Omslagsbild: iStockphoto

© Marie Lydell 2010
marie.lydell@lthalland.se

Institute of Medicine at Sahlgrenska Academy
University of Gothenburg

All rights reserved. No part of this publication may be reproduced or transmitted, in any form or by any means, without written permission.

ISBN 978-91-628-8061-3
<http://hdl.handle.net/xx>

Printed by Geson Hylte Tryck, Göteborg, Sweden 2010



*“Whether you think that you can
or you can't, you are usually right”*

Henry Ford

*“As long as you are convinced that
what you do has a meaning,
you can get through both fear and fatigue,
and take the next step”*

Arlene Blum

Abstract

To return or not return? Predictive factors for return to work in persons with musculoskeletal disorders – prospective factors over a 10-year period

Marie Lydell, Sahlgrenska School of Public Health and Community Medicine, Department of Primary Health Care, University of Gothenburg.

Background: Musculoskeletal disorders (MSD) are a major reason for sick leave and results in individual suffering as well as economical consequences for both the individual and society. It is important to study variables from a multidimensional perspective to predict sustainable return to work (RTW).

The overall aim was to identify multidimensional predictors and psychosocial characteristics for RTW in persons with musculoskeletal disorders (MSD), over a 10-year period.

Study I: *Aim:* To identify predictive factors for RTW in patients with MSD. *Design:* Prospective. *Method:* Persons aged 18-65 years (n=377), were divided into two groups due to sickness certification one year after rehabilitation. The groups were compared with each other regarding predictive factors for RTW using logistic regression analysis. *Result:* Predictive factors for RTW were gender, age, education, number of sick-listed days before rehabilitation, physical capacity, self-rated pain, self-rated functional capacity and self-rated Quality of Life (QoL). *Implication:* Identifying predictors for RTW is an essential task for designing a suitable individual rehabilitation.

Study II: *Aim:* To identify multidimensional predictive factors for sustainable RTW in a long-term follow-up study of persons with MSD. *Design:* Prospective. *Method:* Persons aged 18-65 years (n=183) were divided into "working full-time" and "sick-listed" groups five and ten years after a rehabilitation program. The groups were compared with each other regarding predictive factors for RTW using stepwise logistic regression. *Result:* Long-term predictive factors were number of sick-listed days before rehabilitation, age, self-rated pain, life events, gender, physical capacity, self-rated functional capacity, educational level, and light physical labour. *Implication:* Sustained RTW can be facilitated by early planning of the sick leave period using instruments that take these predictors into account.

Study III: *Aim:* To describe thoughts and feelings of future working life related to RTW in persons who are sick-listed due to MSD and to compare these descriptions with the person's actual working situation to create predictors for RTW. *Design:* Explorative and prospective. *Method:* Persons aged 18-65 years (n=320) answered an open-ended question about thoughts and feelings of their future working life before participating in a rehabilitation program. The answers were analysed using qualitative content analysis. The emerging categories were compared with the persons working situation one, five and ten years after the rehabilitation program using Pearson's chi-squared test. *Result:* Three categories;

“motivation and optimism”, “limitations to overcome” and “hindrance and hesitation”, and nine subcategories, were defined. Persons in the subcategories driving force, new possibilities and demand another job had changed job. Those in the reduced work-time subcategory were working part-time after a five-year period. *Implication:* Persons with a motivation for RTW and those expressing some kind of hinderence should have different types of support. **Study IV:** *Aim:* To compare psychosocial factors between healthy and sick-listed persons, both groups with MSD ten years ago. *Design:* Prospective. *Method:* Ten years after a rehabilitation program persons aged 18-65 years (n=183) were divided into a healthy group and a sick-listed group. The groups were compared with each other in regards to psychosocial factors using logistic regression analysis and Pearson’s chi-squared test. *Result:* The healthy group had a higher QoL, more control over the working situation, better sense of coherence (SOC) and more life events. *Implication:* Using the knowledge about the characteristics of the healthy group, adequate rehabilitation can be given.

General conclusion and implications: The focus of this thesis has been on healthy factors for RTW in line with the salutogenic theory. When predicting RTW for persons with MSD we must have a multidimensional perspective and physical, psychosocial and occupational factors must be considered. The instruments in this thesis can be used to predict RTW. Taking all dimensions and all predictive factors into account, sick leave can be reduced by directing the person to the correct amount of rehabilitation, not more and not less.

Keywords: Certified sick leave, functional capacity, job strain, motivation, musculoskeletal disorders, pain, physical capacity, qualitative content analysis, quality of life, return to work, sense of coherence, working life
ISBN 978-91-628-8061-3

Summary in Swedish

Att återgå eller inte återgå? Prediktiva faktorer för arbetsåtergång hos personer med muskuloskeletala besvär – prospektiva studier över en 10-årsperiod.

Bakgrund: Muskuloskeletala besvär är en vanlig orsak till sjukskrivning, vilket innebär ett lidande för den sjukskrivne och ekonomiska konsekvenser för samhället. Det är därför viktigt att identifiera vilka faktorer som förutspår en varaktig arbetsåtergång.

Det övergripande syftet var att identifiera flerdimensionella prediktorer och psykosociala faktorer, för att återgå i arbete, hos personer som är sjukskrivna p.g.a. muskuloskeletala besvär, under en 10-årsperiod.

Studie I: *Syfte:* Att identifiera prediktorer för arbetsåtergång hos personer med muskuloskeletala besvär. *Design:* Prospektiv. *Metod:* Personer i arbetsför ålder (18-65 år) (n=377) delades in i två grupper beroende på hur sjukskrivningen såg ut ett år efter att de deltagit i ett rehabiliteringsprogram. Grupperna jämfördes med varandra gällande prediktiva faktorer för arbetsåtergång med hjälp av logistisk regressionsanalys. *Resultat:* Prediktiva faktorer för arbetsåtergång var kön, ålder, utbildning, antal sjukskrivningsdagar före rehabilitering, kondition samt självskattning av smärta, funktionsförmåga och livskvalitet. *Implikation:* Att identifiera prediktorer för arbetsåtergång är viktigt för att kunna ge lämplig individuell rehabilitering.

Studie II: *Syfte:* Att identifiera flerdimensionella prediktiva faktorer för en varaktig arbetsåtergång i en långtids-uppföljning hos personer med muskuloskeletala besvär. *Design:* Prospektiv. *Metod:* Personer i arbetsför ålder (18-65 år) (n=183) delades in i två grupper; ”arbetar heltid” och ”helt sjukskriven” 5 och 10 år efter att de deltagit i ett rehabiliterings-program. Grupperna jämfördes med varandra med hjälp av stegvis logistisk regressionsanalys. *Resultat:* Prediktiva faktorer i ett långtidsperspektiv var antal sjukskrivningsdagar före rehabiliteringen, ålder, självskattad smärta, livshändelser, kön, kondition, självskattad funktionsförmåga, utbildning och lätt arbete. *Implikation:* Arbetsåtergång kan underlättas genom att använda tillgängliga instrument som tar hänsyn till identifierade prediktorer.

Studie III: *Syfte:* Att beskriva tankar och känslor inför sitt framtida arbetsliv hos personer som är sjukskrivna på grund av muskuloskeletala besvär och att jämföra beskrivningarna med personens arbetssituation, för att hitta prediktiva faktorer för arbetsåtergång. *Design:* Explorativ och prospektiv. *Metod:* Personer i arbetsför ålder (18-65 år) (n=320) besvarade en öppen fråga om planer för sitt framtida arbetsliv, inför en rehabiliteringsstart. Svaren analyserades med kvalitativ innehållsanalys. De framkomna kategorierna jämfördes med personernas arbetssituation ett, fem och tio år efter rehabiliteringen med hjälp av Pearson's chi-squared test. *Resultat:* Analysen resulterade i tre kategorier, ”motivation och

optimism”, ”begränsningar att komma över” och ”hinder och tveksamhet”, samt nio underkategorier. Personerna i underkategorierna drivkraft, nya möjligheter och efterfrågar ett annat jobb hade bytt arbete och de i underkategorin ”reducerad arbetstid” arbetade deltid fem år efter att de deltagit i rehabiliteringen. *Implikation:* Det är av prediktivt värde att ställa frågor om framtida arbetsliv. Personer med en motivation för arbetsåtergång och de som uttrycker någon form av hinder bör få olika typer av stöd.

Studie IV: *Syfte:* Att jämföra psykosociala faktorer mellan friska och sjukskrivna personer med muskuloskeletala besvär, vilket båda grupperna hade för 10 år sedan. *Design:* Prospektiv. *Metod:* Personer i arbetsför ålder (18-65 år) (n=183) delades in i två grupper 10 år efter en rehabilitering; ”frisk” och ”helt sjukskriven”. Grupperna jämfördes med varandra gällande psykosociala faktorer med hjälp av logistisk regressionsanalys och Pearson’s chi-squared test. *Resultat:* Den friska gruppen hade en högre livskvalitet, kontroll över sin arbetssituation, bättre känsla av sammanhang och fler livshändelser. *Implikation:* Med hjälp av en fördjupad kunskap om psykosociala faktorer hos den friska gruppen kan en adekvat rehabilitering lättare planeras.

Allmän slutsats och implikationer: Avhandlingen fokuserar på friskfaktorer för arbetsåtergång, i linje med den salutogena teorin. När arbetsåtergång förutspås hos personer med muskuloskeletala besvär måste ett flerdimensionellt perspektiv finnas och hänsyn tas till både fysiska, psykosociala och arbetsfaktorer. Instrumenten som har använts i avhandlingen kan användas för att förutspå en arbetsåtergång. Om hänsyn tas till alla dimensioner och prediktiva faktorer kan sjukskrivning minskas genom att skräddarsy rehabilitering för varje individ.

Original papers

- I** Lydell M, Baigi A, Marklund B, Månsson J
Predictive factors for work capacity in patients with musculoskeletal disorders
J Rehabil Med 2005;37:281-285

- II** Lydell M, Grahn B, Månsson J, Baigi A, Marklund B
Predictive factors of sustained return to work for persons with musculoskeletal disorders who participated in rehabilitation
Work 2009;33:317-328

- III** Lydell M, Hildingh C, Månsson J, Marklund B, Grahn B
Thoughts and feelings of future working life as a predictor for return to work – a combined qualitative and quantitative study in sick-listed persons with musculoskeletal disorders
Submitted

- IV** Lydell M, Marklund B, Baigi A, Mattsson B, Månsson J
Return or no return – psychosocial factors related to sick leave in persons with musculoskeletal disorders
Submitted

Contents

Abstract	4
Summary in Swedish	6
Original papers	8
Contents	9
Abbreviations	12
Introduction	13
Background	14
Sick leave due to musculoskeletal disorders and sick rules	14
Work ability	15
Pain – different aspects	16
Primary Health Care	17
General practice	17
Physiotherapeutic perspective	17
The salutogenic theory	18
Multidimensional perspective on return to work	19
Different dimensions	19
Physical factors for return to work	20
Psychosocial factors for return to work	20
Occupational factors for return to work	22
The rationale of the studies	22
Aims of the thesis	24
Methods	25
Design	25
Settings	25
Study population	26
Study I	27
Study II	28
Study III	28
Study IV	29

Instruments and data collection	29
Baseline	29
One-year follow-up	30
Five-year follow-up	30
Ten-year follow-up	30
Visual Analogue Scale (VAS)	32
Disability Rating Index (DRI)	32
Demand/control model	32
SOC questionnaire	32
Life event questionnaire	32
The Interview Schedule for Social Interaction (ISSI)	33
Data analysis	33
Ethical considerations	35
Results	36
Short- and long-term perspective of return to work	36
Background factors (I – IV)	36
Physical factors (I, II)	36
Psychosocial factors (I – IV)	39
Occupational factors (II – IV)	41
Thoughts and feelings of future working life as a predictor for RTW (III)	41
Discussion	43
Method discussion	43
The quantitative studies	43
Study population	43
Instruments	43
The qualitative study	45
Long-term follow-up	46
Result discussion	46
Changes in the society in relation to return to work	46
Multidimensional factors and return to work	46
Background factors (I – IV)	46
Physical factors (I, II)	47
Psychosocial factors (I – IV)	47
Occupational factors (II – IV)	49
Salutogenes linked to return to work	51
Sense of coherence (SOC)	51

Motivation	52
Self -efficacy	52
To refer persons to the right kind of rehabilitation	53
Conclusion	56
Implications	58
Clinical implications	58
Research implications	58
Acknowledgements	60
References	62

Abbreviations

CI	Confidence Interval
DOT	Dictionary of Occupational Titles
DRI	Disability Rating Index
€	Euro
GCT	Gate control theory
IASP	The International Association for the Study of Pain
ICD-9	The international classification of diseases, 9th edition, primary health care
ICF	International Classification of Functioning, disability and health
ISSI	Interview Schedule for Social Interaction
MSD	Musculoskeletal disorders
OCM	Occupational Competence Model
OR	Odds Ratio
QoL	Quality of life
RSIO	Regional Social Insurance Office
RTW	Return to work
SEK	Swedish crowns
SOC	Sense of coherence
VAS	Visual Analogue Scale

Introduction

In the early 1990s sick-leave quickly increased in Sweden, and employers were given increased responsibility for the return to work (RTW) of sick-listed individuals. Therefore, many rehabilitation centres, for individuals with musculoskeletal disorders (MSD), started in Sweden with the aim to reduce the "ohälsotal". "Ohälsotal" is a measure of illness and is the mean number of days with any kind of payment from the Social Insurance Office for every person over a one-year period in Sweden. My interest in this research area started at one of those centres. After participating in a five-week rehabilitation, some persons RTW rather directly, though they had difficulties with both pain and functional capacity. That raised the question of why they RTW before many others with less severe problems. What characteristics did these individuals have? What did their environment and their social life look like? Did their employer/work place have a special structure?

RTW is a phenomenon requiring recourses from both the sick-listed person and the team members at the healthcare centres, the employer and the Regional Social Insurance Office (RSIO). Taking care of this issue must be prioritised for making the best RTW and ensuring that each person receives the best rehabilitation possible. To examine the possibilities for RTW for each person instead of the obstacles may help the person by taking charge of the assets, ability and the needs of the person when planning rehabilitation and RTW. As such, I chose to identify healthy factors for RTW instead of risk factors and to describe the kinds of thoughts and feelings the individuals have of their future working life. The question posed was therefore "What is the reason this person is going back to work?" instead of "What is the reason why a person is not going back to work?". When the focus is on the person's possibilities instead of their obstacles, other solutions will arise. The possibilities must be seen from different perspectives, and the individual's whole life situation must be taken into account.

This thesis examines the predictive factors for RTW in both short- and long-term perspectives and could be helpful when planning an individual's RTW and rehabilitation.

Background

Sick leave due to musculoskeletal disorders and sick rules

MSD comprise over 200 different diagnoses, including back, neck and shoulder problems. This accounts for the majority of total morbidity in the population and is thought to cause one-third of total certified sick leave (1). In Sweden, the cost of certified sick leave and sickness- and activity-related compensation for MSD was €9.900 million (95.820 million Swedish crowns (SEK)) in 2007 (2). In addition to the high cost to society, MSD may cause patients both physical and emotional suffering, pain and financial and social problems (3, 4). Sickness absence and the way back to work are complicated, and individual connections to society, organisational factors and personal factors must be taken into account (1, 5). Not working due to sick leave can cause several problems and reduce satisfaction in leisure activities, economic situation and life as a whole (6, 7). Not feeling needed is a contributing factor for continued sick leave (8). Therefore, taking care of each sick-listed person quickly is of great importance and to take each individual's capacity into account when planning the RTW (9, 10).

A Social Insurance Report from Sweden compared some countries in Europe and found that Norway had the greatest amount of sick leave, while Germany and Great Britain had the lowest amount of sick leave (11). In Norway, an insurance system provides 100% compensation for sick leave, which may explain some of the high sickness absence. Economic research has suggested that employers change their behaviour as an effect of the insurance system. Thus, a more favourable system results in higher absenteeism and vice versa (12). However, studies showing that the system has no meaning in this context also exist (13). In Sweden, insurance tightened considerably, and today, there is less sick leave. The current "ohälsotal" in Sweden is 32,8 and is on its way down (14) (Tab. 1).

Table 1. "Ohälsotal" in Halland and in Sweden

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Halland	32.5	33.0	34.1	35.0	33.7	33.2	29.2	31.0	33.0
Sweden	38.2	38.7	39.3	39.6	38.2	38.2	33.6	35.9	37.4

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Halland	35.5	37.5	37.6	37.1	36.5	35.4	34.4	32.4	29.5
Sweden	40.7	43.0	43.2	42.5	41.3	39.9	38.3	35.8	32.8

The economy alone is not the key for RTW, which also involves the person's whole world (8). General health insurance in Sweden began in 1955. Originally, the responsibility was on the society, and sick listing had a preventive role. In the 1990s, the importance of the employer was emphasised, and now in the 2000s, the responsibility of the individual on sick leave has been highlighted (15).

Work ability

In some literature work capacity is used as a synonym for work ability, but in this thesis, work ability takes all dimensions into account when evaluating an individual's ability to RTW and work capacity indicates the physical and functional capacities for RTW.

Work ability describes a gradual movement along the health continuum, reflecting the dichotomization into health and disease (16). The requirements for work today have changed, as they were once purely physical, and have become less physical, more stress resistant, faster paced and include social skills. In the US, the Dictionary of Occupational Titles (DOT) is a record of the physical and mental demands for all professions, including the education needed, skills and demands for talent and aptitude for the current work (17). The concept of work ability comes from WHO's definition of health: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity". It is a holistic view that presumes work ability is a balance between activities of the body and the mind. In addition, the harmony between the physical and psychosocial environment is given emphasis (18). WHO's definition of functioning and health describes how people live with their health conditions, and this model is useful for understanding and measuring health outcomes, when looking beyond disease. Environmental factors have also been considered, since functioning and disability occur in a context. This can be seen in International Classification of Functioning, disability and health (ICF) (19).

There are divergent perspectives on work ability between health professionals and the Social Insurance Agency. Health professionals share a holistic view on work ability, relating it to a variety of factors, while the Social insurance officers have a reductionistic view, where they see work ability as a reflection of medical status (20). Work ability is the dynamic relationship or balance between a person's individual resources and demands at work (21).

The concept of work ability incorporates the relationship between the workers' characteristics and productive potential and the work itself, i.e., work community, organisation and work environment (21). However, there is no single accepted method for measuring an individual's work ability (22). Many definitions of work

ability exist, which could be problematic when rehabilitation teams are discussing RTW and work ability (22). A common definition of this concept is needed. Two definitions are required: specific work ability, related to the work of the individual, and general work ability, related to all types of work (23).

Specific work ability

“A person has complete work ability if they have the work specific manual and intellectual competence and the physical, mental and social health necessary to perform the tasks and reach the goals typical of the work, given that the physical, psychosocial and organisational work environments are acceptable, i.e., are such that most of the same profession is expected to manage the tasks in the environment” (23).

General work ability

“A person has general complete work ability if they have the physical, mental and social health needed to perform any type of work, work that everyone typically would be able to perform after a short period of training, given that the physical, psychosocial and organisational work environments are acceptable, i.e., are such that most individuals of working age are expected to manage the tasks in the environment” (23).

Work ability is determined by individual factors and work demands, and it is complete work ability that is being defined. It is common to describe work ability as a multidimensional concept (24) or as an interaction between the individual and their life demands (25).

Pain – different aspects

“Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (26).

Pain includes the individual experience of pain and also the fear of pain. In early theories about pain, only psychological aspects were mentioned as consequences of pain, e.g., anxiety, fear and depression (27). However, psychological aspects came to play an important part in understanding pain in the twentieth century (28). The gate control theory (GCT) suggested that pain is a perception and an experience rather than a sensation (29, 30, 31). The GCT also suggests that many factors are involved in pain perception. The pain is not only organic or psychogenic; some approaches to pain are cognitive, emotional, psychological and behavioural

conditions most people experience at some point in life (29, 30, 31). Therefore, it is important that pain is on an acceptable level for every person (32). Pain is a phenomenon every person with MSD experiences in one way or another. Natural persistent pain derives predominantly from the musculoskeletal system (33), and back pain is the most commonly reported localisation (34), followed by neck- and shoulder pain (35). Pain is a multidimensional problem. One study of individuals with MSD demonstrated that half had pain due to psychological problems, while the other half seemed to feel well despite pain problems (36). Pain is the primary symptom that motivates people to seek medical treatment and individuals with pain, often those who are on sick leave, are those generally seen in primary health care and especially in the physiotherapy units (37).

Primary Health Care

General practice

A general practitioner examines people of all ages and is usually the first physician a person with MSD meets. As it sometimes requires several meetings to build a mutual trust, the continuity between the physician and the patient is the hallmark of general practice (38). The general practitioner may have knowledge of both the disease and the whole life situation of the individual (39). A general practitioner must determine whether a person can work or needs to be on sick leave. In addition, they must also identify the additional steps necessary for the person to feel as good as possible. Currently, a decision support structure exists during sick leave with guidelines for how long a person needs to be on sick leave for different diagnoses (40).

Cooperating in teams is also of great importance with this patient category (41). Health care must not rely on only one profession, and the different professions need to contribute their specific knowledge to the assessment (42, 43). In addition, cooperation with the patient shortens decisions with different possible actions when everyone is involved in the decision (44). Having a team with a team leader is of great importance when predicting a person's RTW, and the team process starts in primary health care (43).

Physiotherapeutic perspective

Physiotherapy in primary health care is commonly offered as a treatment choice to patients with MSD, and referrals to physiotherapists have increased (45). However, persons with more well-defined diagnoses are more seldom referred than persons with more poorly defined diagnoses and with lower levels of mental health. A major reason for psychological distress being under-recognised is that 40 % to 80 % of persons with psychological distress only report physical symptoms (45).

There are several different physiotherapeutic treatment modalities that can be used for persons with MSD (36). Besides traditional biomedical methods aimed at reducing pain and restoring functioning on an impairment level, such as increasing joint motion and muscle strength, there has been a shift towards more patient-active treatment modalities such as physical training, self-exercise, group treatments with neck and back pain classes and treatments that include cognitive and behavioural approaches. Holistic physiotherapy approaches have increased during recent years due to an increase in stress-related disorders and pain problems (46). As a team member at a health care centre, the physiotherapist is an important part of the functional capacity assessment when an individual's RTW is discussed (36).

Physiotherapy science is characterized by the view of human beings as physical, psychological, social and existential totalities in the health perspective (47). Health is the fundamental perspective for physiotherapy as a science and a profession. The theory of physiotherapy science derives from different fields of science, including human, medicine, society, and behavioural science. The field combines knowledge from these other sciences with the physiotherapy-specific perspective to create an integrated totality. One part of physiotherapy includes health promotion and preventive work, against school, working life and leisure time (47).

The salutogenic theory

The salutogenic theory was introduced by Antonovsky in 1979 (48) when he switched from the well-known “why do people get sick?” focus to a “why do people stay well, despite stressful situations and hardship?” focus. In contrast to examining “pathological” factors, looking for possible predictors of health is also of importance. Health is seen as a continuum between two poles, excellent health and ill health. People constantly move up and down this continuum (49). The salutogenic approach to health (sources of health) focuses primarily on resource factors for health, which is in contrast to the pathogenic approach, where the focus is risk factors for illness (sources of disease) (50). It is also important to examine and use the resources a person has to move towards excellent health instead of identifying the missing components, and this is a distinction between the salutogenic and the pathogenic perspectives (49).

An individual's opportunities rather than obstacles are also an important focus for ensuring that the whole person is in line with salutogenesis. Antonovsky termed the resources required to move an individual towards the health pole general resistance resources (GRRs), which are available for what the person wants to achieve (51). GRRs are developed during childhood and are factors

that make it easier for people to perceive their lives as consistent, structured and understandable (48, 51). If a person is available to their GRRs, they have a better chance of dealing with the challenges of life. However, the ability to use them is the most important (51).

GRRs lead to life experiences that promote a strong sense of coherence (SOC). SOC is the capability to understand that one can manage in any situation independent of whatever is happening in life (52, 53, 54). It refers to if an individual perceives life as comprehensible (cognitive component), manageable (behavior component) and meaningful (motivational component) (49, 51).

Self-efficacy is a part of the salutogenic theory and describes a person's belief that the amount they can manage is significant for the result. Self-efficacy expectations are defined as a personal belief of how successfully one can cope with different situations (55). Individuals with high self-efficacy expectations are considered to be more persistent in difficult situations than persons with low expectations. Mastering a difficult situation results in a positive experience, this increases self-efficacy and thereby increases confidence in the ability to master future situations (55).

In sick-listed persons self-efficacy has been shown to be lower compared to the general working population, but was not associated with future sick-leave. It may be that sick leave results in a low self-efficacy, not that a low self-efficacy is the reason for sick leave (56).

Multidimensional perspective on return to work

Different dimensions

Multiple factors must be considered when predicting RTW. The RTW process must consider different dimensions and factors seen in the person and the environmental and occupation dimensions for helping the person back to work, and they must also involve the person in the planning (57, 58). The Occupational Competence Model (OCM) places these factors in context and is helpful for examining the interaction between different factors in the RTW process (57). Most research considers the person dimension, perhaps because it is rather easy to measure variables in this dimension, i.e., gender, age and sick leave. Gender and age are well-known predictors for RTW (9, 32, 59) in both the short- and long-term perspectives and the number of sick-listed days has long been known to be of great importance (9, 60).

The environmental dimension takes into account the family situation, life events and social support. Environment is often defined as either physical or social, but

must be expanded i.e., cultural, legal and political factors (61).

Environment

“The contexts and situations that arise externally to the individual and that will require some kind of response from her” (61).

Finally, the occupation dimension is also of importance. This dimension examines factors at work, including working positions, how to handle tasks, solve problems and make judgements (61).

Occupation

“Tasks and activities engaging a person’s time and can be organised into categories, for example maintenance, work or leisure” (61).

The degree of satisfaction in occupational performance is dependent on the interaction between the person dimension and the environment and activities (62). However, asking the individual has been shown to have a higher predictive value for RTW than objective methods (58). The understanding of why some people RTW and others do not demand a broad exploration of factors (57).

In this thesis we defined return to work as not being sick listed. We considered short-term follow-ups as < three years and long-term follow-ups as ≥ three years.

Physical factors for return to work

Opportunities for development and training at work are important for RTW (62). Higher physical capacity, self-rated functional capacity and lower self-rated pain have been shown to be predictors of those who are able to RTW (10).

A positive perception of one’s physical condition has been found in a normal population (especially in men) when compared to responses from people with low back pain (10, 63). The perception of an individual’s symptoms is also of importance for RTW (64).

Psychosocial factors for return to work

The use of the term “psychosocial” has increased within health research including social epidemiology, in connection with i.e. psychosocial causation, psychosocial risk factors, psychosocial environment, psychosocial context, psychosocial resources, psychosocial support, psychosocial well-being and psychosocial health (65).

The term quality of life (QoL) has been used alternatively with life satisfaction, morale, happiness and psychological or subjective well-being (66). QoL is thought to reflect an individual's living conditions, and several theories have been used to describe it (67). No universally accepted definition exists regarding QoL, but the WHOQOL Group defines quality of life as follows:

“An individual's perceptions of their position in life in the context of the culture and value system where they live and in relation to their goals, expectations, standards and concerns” (68).

In an eight-year follow-up study of persons with chronic pain, QoL was a predictor for health (69). QoL predicted RTW in a long-term follow-up and motivation for change predicted improved QoL and RTW (32, 70). To be motivated and have positive views on RTW were predictive factors taken into account when planning the RTW process (58). The chances for RTW increase if you want to RTW and have expectations for the future and a positive view of your own possibilities (58, 64, 71, 72).

SOC can be seen as an individual resource (64). This resource stability is discussed, but if SOC is high from the beginning it seems to be rather stable over time (73). High SOC and high self-rated health appear to go hand in hand. SOC also affects QoL (50).

Life events stand for life changes and can be stressors (74, 75). Both positive and negative events can lead to stress reactions. Events such as divorce, retirement, economic problems and violence are risk factors for different diseases and can influence RTW (76). To be on sick leave could be understood as being affected by a negative major life event with a great influence on everyday life (77).

Social support is related to health and even Aristotle stated that friendship is a basic human need along with food, shelter and clothing (48). During the 1970s, social support was identified as a factor that could buffer the effects of life events (48, 78).

Social support

“The interactive process in which emotional concern, instrumental aid, information, and appraisal are obtained from one's social network” (78).

For persons sick listed with MSD, social support from family and friends has been shown to be essential for RTW (79). However, depending on whether the support

reinforced a health-related behaviour or a sick behaviour, social support from the family can have a positive or a negative effect (80). A qualitative study showed that trust, communication and knowledge of the disability are key precursors for RTW (81). Nevertheless, there are studies showing no correlation between social and emotional support and RTW (82). In studies of MSD, psychosocial factors seem to be of importance in both generating and maintaining the problems of affected individuals (70), and the estimation of such factors can be achieved in various ways.

Occupational factors for return to work

It is inconvenient for the person, their work colleagues and their employers when individuals go back and forth between sick leave and RTW (83). It is important to recognise both the physical demands and the psychosocial environment at work (4). Though stress-related disorders increased more than other disorders from 1996-2003, it was the physical factors at work (i.e., heavy manual labour, strenuous working postures and short repetitive tasks) that led to work-related disorders (84). Workplace adjustment, including ergonomic advice and individual RTW coaches, was a further predictor for RTW (85). However, there is limited evidence to suggest that physical working conditions and sickness absence are related (86).

Communication between the person's physician and employer was a predictive factor for RTW (85). A good work organisation has a significant influence on employees' RTW (4) as do the actions on the part of the manager (87). Furthermore, working at a work place with no plans to close and often being in the mood for work were both predictors for RTW (88). Predictors for RTW in MSD patients also seem to be related to job satisfaction, according to the demand-control model for the characterisation of job strain (89). Acceptable demands and good control over the work situation, a positive relationship with one's manager and attitudes towards sick leave by management are also important for RTW (90, 91, 92).

The rationale of the studies

When my interest in this research area began, there were few studies on predictive factors for RTW in persons with MSD. Most studies examined risk factors for not getting back to work for all diagnoses. Such studies were also performed regarding persons with MSD, but these again focused on risk factors. My interest was in understanding why some individuals RTW, with a healthy focus on possibilities and personal qualities before others with the same problems.

Currently, most studies still focus on risk factors. Although there are a lot of studies regarding risk factors for MSD and long-term sick leave, there are less

about predictive or healthy factors for RTW. In addition, few long-term follow-ups exist in this area. Predicting an individual's RTW will be profitable, so it is important to look at this problem in a multidimensional way, i.e., personal factors, social situation, work place factors and also the persons own thoughts about RTW. Correctly rehabilitating every person is a personal issue and an economic issue, as there is limited recourses.

Aims of the thesis

The overall aim was to identify multidimensional predictors and psychosocial characteristics for return to work in persons with musculoskeletal disorders over a 10-year period.

- I** The aim of this study was to identify predictive factors for work capacity in patients with musculoskeletal disorders
- II** The aim of this study was to identify multidimensional predictive factors for sustainable return to work in a long-term follow-up of persons with musculoskeletal disorders
- III** The main aim of this study was to describe thoughts and feelings of future working life related to return to work in persons sick-listed due to musculoskeletal disorders

A further aim was to compare these descriptions with the person's actual working situation one, five and ten years after a rehabilitation period in order to create predictors for return to work

- IV** The aim of this study was to compare psychosocial factors between healthy persons and sick-listed persons with musculoskeletal disorders, both groups with musculoskeletal disorders ten years ago

Methods

An overview of the studies included in this thesis can be seen below (Tab. 2).

Table 2. Methods used in the studies in this thesis

Study	I	II	III	IV
Design	Prospective	Prospective	Explorative Prospective	Prospective
Study population	377 persons	183 persons	320 persons	183 persons
Data collection	Questionnaire at baseline	Questionnaire at baseline	Questionnaire at baseline	Questionnaire 10 years after baseline
	Physical capacity	Physical capacity	Sickness cerification data	
	Sickness cerification data	Sickness cerification data	Questionnaire 10 years after baseline	
		Questionnaire 10 years after baseline		
Data analysis	Analytical statistics	Analytical statistics	Qualitative content analysis	Analytical statistics
			Analytical statistics	

Design

A prospective design was used for all studies. An explorative design was also used in study III.

Settings

All four studies started with a study population from a rehabilitation centre located in a medium-sized city in Sweden (approximately 65,000 inhabitants). A referral from either a physician or the Regional Social Insurance Office (RSIO) was needed to participate in the programme. Inclusion criteria were sick leave due to MSD in persons aged 18-65 years. Exclusion criteria were drug abuse, psychiatric diagnoses and language problems. The rehabilitation programme, which took

place for four hours per day over a 5-week period, consisted of individual training, relaxation, ergonomic and pain theory, and an inventory of the workplace. At the end of the rehabilitation period, a rehabilitation conference was held for all members of the multidisciplinary team, personnel from the RSIO, the employer, and the sick-listed employee resulting in an individual plan based on the capacity of the individual person.

Study population

The study population consisted of 385 working-age people (18-65 years), who were sick-listed (range 0-365 days, median 161 days) as a result of MSD and who participated in a rehabilitation programme (Tab. 3 and 4).

Table 3. Background variables for the study population

		Study population (n=385)	%	Mean (years)	Range (years)
Gender	Male	156	41		
	Female	221	57		
	Missing information	8	2		
Age				43	18-65
Marital status	Married	308	80		
	Cohabiting	59	15		
	Living alone	9	2		
	Missing information	9	2		
Spouse's disability pension		16	4		
Education	Elementary school	53	14		
	Secondary school	58	15		
	Vocational training school	99	26		
	Upper secondary school	121	31		
	University	42	11		
	Missing information	12	3		
Socio-economic division	Blue-collar worker	170	44		
	White-collar worker	130	34		
	Farmer	33	9		
	Company owner	6	2		
	Remaining	46	11		

Table 4. Main diagnoses for the study population according to ICD 9-classification for primary health care centres (n=385)

Diagnosis (diagnosis number)	n	%
Arthrosis (715)	5	1
Chronic knee disease (717)	7	2
Joint pain (719E)	1	0.3
Cervical spine syndrome (723)	108	28
Back ache (724C)	88	23
Disc degeneration with radiculitis (724E)	104	27
Shoulder syndrome (726A)	42	11
Bursit and synovitis (726D)	4	1
Soft tissue rheumatism (728)	14	4
Problems relating to extremities (729F)	1	0,3
Muscle and connective tissues diseases (739R)	2	0,5
Missing information	9	2

Study I

Out of the 385 persons who participated in a rehabilitation programme, we had information regarding sickness degree one year after the rehabilitation programme in 377 persons (Fig. 1). In the one-year follow-up the study participants were divided into two groups, the “sickness absence” group (n= 146; 52 % women) and the “sickness presence” group (n=231; 63% women), depending on their ability to return to work six and twelve months after rehabilitation, and the number of sick days taken. Criteria for the “sickness absence” group were ability to work full-time at the six and twelve month follow-ups after intervention and a maximum of three weeks of continuous sick leave during this period (93). Patients who had any kind of sickness certification (more than mentioned above), temporary disability pension or disability pension were included in the “sickness presence” group.

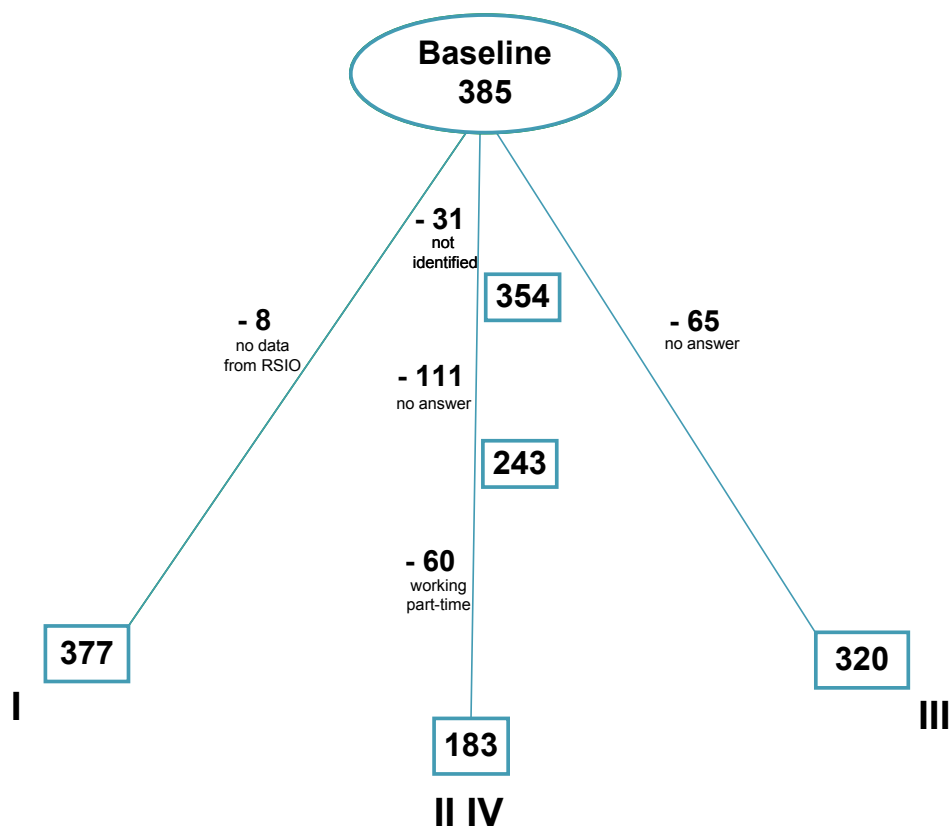


Figure 1. Flowchart of the dropouts within the study population in study I-IV.

Study II

Out of the 385 persons participating in a rehabilitation programme, 354 were identified at the ten-year follow-up later. Immigration and death were reasons for not being identified. A total of 243 of the 354 (69 %) answered a questionnaire (Fig. 1) and two groups were created: “working full-time” (n=110; 59 % women) and “sick-listed” (n=73; 66 % women). Thus, the part-time working group was not included. Most individuals in the group “working full-time” were employed for eight hours a day and had no certified sick leave at the time of investigation. The members of the sick-listed group did not work at all.

Study III

Out of the 385 persons participating in a rehabilitation programme, 320 (59 % women) answered an open question in the baseline questionnaire and took part in the study (Fig. 1).

Study IV

Out of the 385 persons participating in a rehabilitation programme, 354 were identified at the ten year follow up. Immigration and death were reasons for not being identified. A total of 243 of the 354 (69 %) answered a questionnaire (Fig. 1) and two groups were created: “healthy”(n=110; 59 % women) and “sick-listed” (n=73; 66 % women). The healthy group consisted of persons who were not on certified sick leave at the time of investigation. Members of the sick-listed group were included if they did not work at all.

Instruments and data collection

Baseline

A self-administered questionnaire designed by the authors was used in study I - III. It was composed of validated items complemented by new questions. It contained seven background questions and 19 questions regarding the persons MSD. Questions regarding pain (two items), functional capacity (15 items) (DRI), QoL (one item) and exercise habits (one item) were also included. An open question regarding future working life was included (Tab. 5). The questionnaire was sent to each person participating in the rehabilitation program (N=385). They answered the questions in private and sent it back to the rehabilitation centre.

Physical capacity was measured by heart rate during sub-maximal work on a cycle-exerciser (ml O₂ kg*min) at baseline and was used in studies I and II (Tab. 5).

Sickness certification data were obtained from The Regional Social Insurance Office (RSIO) concerning the patients' sickness certifications for the same diagnosis six and twelve months before the rehabilitation programme (Tab. 5). This data were used in study I, II.

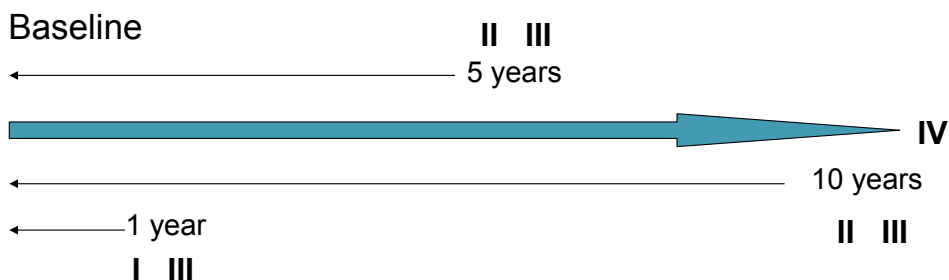


Figure 2. Time axis for the different studies

One-year follow-up

Sickness certification data were obtained from the RSIO concerning the patients' sickness certifications for the same diagnosis six and twelve months after the rehabilitation programme (Tab. 5). This data were used in study I.

Five-year follow-up

Sickness certification data, used in study II and III, were obtained from the RSIO five years after the rehabilitation programme (Tab. 5).

Ten-year follow-up

A self-administered follow-up questionnaire (five and ten years), designed by the authors was used in study II - IV. It consisted of questions regarding certified sick leave (one item), employment situation (one item), additional rehabilitation periods (one item), periods of sick leave due to disease other than MSD (one item), QoL (one item), SOC (13 items), job strain (11 items), social integration (12 items) and life events (15 items) (Tab. 5). This questionnaire was sent to 354 persons who had participated in the rehabilitation programme ten years prior who were identified at the five- and ten-year follow-up dates (two reminders).

Table 5. Instruments used in the studies

Variables	Measured used	Study	Description	Items	Reference
Profession	Socio-economic division	I	Profession according to a socio-economic division in a 1-7 graded scale regarding to Statistical central bureau.	1	94
Diagnosis	ICD-9	I - IV	The diagnoses were classified according to the primary health care classification of ICD-9	1	95
Educational level	Scored 1-5	I, II	The educational level of the participants was rated by scores from one to five (elementary school (six years) = 1, compulsory school (nine years) = 2, vocational training school = 3, upper secondary school = 4, university = 5)	1	
Habits of exercise	Scored 0-4	I	Their habits of exercise was rated by scores from zero to four (no exercise=0, sometimes=1, once a week=2, 2-3 times as week=3, >3 times a week=4)	1	
Functional capacity	Disability Rating Index (DRI)	I, II	See following text next pages	15	96
Pain intensity	Visual Analogue Scale (VAS)	I, II	See following text next pages	2	97
Quality of Life (QoL)	Visual Analogue Scale (VAS)	I, II, IV	See following text next pages	1	97
Job strain	Demand / Control model	IV	See following text next pages	11	89
Sense of coherence (SOC)	SOC questionnaire	IV	See following text next pages	13	52
Life events	Life event questionnaire	II, IV	See following text next pages	15	74
Social integration/emotional support	The Interview Schedule for Social Interaction (ISSI)	IV	See following text next pages	12	98
Thoughts and feelings of future working life	One open question	III	What thoughts and feelings do you have for future working life?	1	
Physical capacity	Cycle-exerciser (ml O ₂ /kg*min)	I, II	The heart rate during sub-maximal work on a cycle-exerciser (ml O ₂ kg*min)		99
Sickness certification	Data from the Regional Insurance Office (RSIO)	I - IV	Sickness certification data were obtained from The Regional Social Insurance Office (RSIO) concerning the patients' sickness certifications		

Visual Analogue Scale (VAS)

The 100 mm visual analogue scale (VAS) was used to measure individual pain at that moment and in the last four weeks on a scale from 0-100 (0 = no pain, 100 = worst imaginable pain). VAS is a validated instrument often used for measuring pain (97). The QoL question was on a scale from 0-100 (0 = very bad, 100 = very good), and should reflect their whole life situation.

Disability Rating Index (DRI)

DRI is a questionnaire measuring self-rated functional capacity (96). Study participants rated their perceived ability to manage fifteen different activities on a 100 mm Visual Analogue Scale (VAS), from 0-100 (0 = without difficulties, 100 = not at all). Out of those fifteen activities, five questions related to physical working positions were included. An index was obtained by measuring the distance in mm. The mean value of these measurements provided the DRI index. The definition of a high degree of disability varied dependent upon the diagnosis. This instrument has been found to be reliable and valid in Swedish persons with persistent pain (96).

Demand/control model

This model was developed in the 1980s and has been used to describe and explain stress reactions (89). The questionnaire contained questions regarding work demand and control over the work situation. The instrument is designed to distinguish four groups with different work characteristic: demanding/high control, demanding/low control, low requirements/high control and low requirements/low control. Five questions regarded psychological demands and six questions regarded control. The data were analysed by summarising the answers to create indices for the demand questions and the control questions. The variables were then dichotomised.

SOC questionnaire

The instrument measured the three aspects of SOC, i.e., meaningfulness, comprehensibility and manageability (52). The original SOC questionnaire contained 29 items, but the short 13-item version was used in paper IV. The score ranged from one to seven, agree to disagree, and the total score ranged from 13 - 91. A scale score was calculated by adding the raw scores. A strong SOC was indicated by a high score. The SOC reflects a person's view of life and their capacity to respond to stressful situations (52).

Life event questionnaire

A condensed version of the life change list is called the "life event questionnaire" and contains 14 items, both positive and negative, that are related to different dimensions (five are work-related) (74). The items were answered with a yes

or a no (nominal scale) regarding whether if the event had occurred: every yes was given one score. The score was summarised and ranged from 0 - 14. Since the events could affect every person in a positive or negative way a follow-up question was included regarding the level of the effect from “affected me in a very negative way” to “affected me in a very positive way”. In our studies, the question was if the event had a strong affect on the person and included the alternative answers “yes” or “no”.

The Interview Schedule for Social Interaction (ISSI)

The instrument has a condensed version modified for use in population studies, which was used in this study (98). This scale establishes the level of social support and includes two scales. One scale regards social integration and the other emotional support. The social integration scale is a structural measure of peripheral social ties available for belongingness, tangible support and appraisal support. This integration scale consists of six items with an interval response scale where each item is coded from 1 - 6 and the total score ranges from 6 - 36. The emotional support scale consists of six dichotomous items (yes or no), and the total score ranges from 0 - 6. This scale is a functional measure of the availability and adequacy of emotional recourse (emotional support) provided by close friends and family and involves caring, empathy, love and trust.

Data analysis

Mann-Whitney U-test was used to compare the variables on an ordinal scale, including educational level, profession, habits of exercise and for the patients' self-rated pain before the intervention (study I, II).

The student's t-test was used to compare variables with a quotient scale (when the criteria for normally approximation was fulfilled) between groups including age, functional capacity, physical capacity, QoL, physical working factors and certified sick leave six and twelve months before baseline. This approximated a normal distribution (study I, II).

The Pearson's chi-squared test was used to compare the categorical variables for further rehabilitation periods and certified sick leave for other diseases than MSD (study II). This statistical method was also used to examine any correlations between the categories regarding gender, sick leave and working situation, one, five and ten years after baseline. The same procedure was performed for the subcategories (study III).

ANOVA with Bonferroni's correction was used to compare the categories with regard to age (study III).

A multivariate logistic regression analysis with odds ratio (OR) was performed between variables with consideration to eventual confounders. P-values and confidence intervals (CI) were calculated to statistically rate the results. P-values <0.05 were considered statistically significant (study I, IV).

Multiple logistic regressions by means of the stepwise selection method (with entry testing of score statistic significance and removal testing based on the probability of the Wald statistic) were used to determine the influence of different independent variables on the RTW outcomes. Missing values were replaced by mean values to avoid unnecessary reduction. CI and p-values were calculated and the significance level was set at 5 % (study II). The covariates specified in the steps were individually tested for inclusion in the model based on the significance level of the score statistics. The variable with the smallest significance level after five years was entered into the model. The odds ratio (OR) was calculated with a 95 % confidence interval. The quantity minimised in the various steps of the multiple logistical regressions was calculated by means of McFadden measures, the Cox & Snell R-Square, and the Nagelkerke R-Square (study II).

Qualitative content analysis was used to analyse the answers of the open question in the baseline questionnaire (100). This method was used to find similarities and differences in the reasoning of the persons. The method facilitates identification and categorising, without changing content in the meaning units. Qualitative content analysis is a flexible method that can identify both manifest content and/or latent message (101). A cross-professional research group (two physiotherapists, one nurse and two physicians) participated in the analysis.

The analysis consisted of several steps. It began with the first author (a physiotherapist) reading the responses to the open question carefully several times to gain a sense of the whole. Sentences relevant to the aim were extracted into meaning units.

The next step was to condense the meaning units to shorten the sentence but still retain the core message. However, some of the answers were short and were in a condensed form from the start. This part of the analysis was performed by the first author in close collaboration with the co-authors. The condensed meaning units were abstracted and labelled as a code. The various codes were then put together into groups based on similarities and differences, and the codes were sorted and abstracted into categories and subcategories. All of the authors were also involved in this phase.

The analysis constantly moved between the original texts and the various levels of abstraction to ensure that no data were excluded or included under more than

one category. It was also important to ensure that the categories were mutually exclusive. The categories confirmed in the text by quotation and the persons code, and there are further examples for following the process in table 8. During the various steps of the analysis, the first author and co-authors performed the analysis individually, but frequent discussions were had to reach consensus (study III).

Ethical considerations

Ethical approvals was granted by the Ethics Committee of Lund University, Sweden for study II-IV (Number 364/2005 and number 2009/436).

It was not as common to acquire ethical permission in the beginning of the 1990s as it was in the beginning of 2000s. However, the manager of the public sector granted permission for study I. The participants received oral and written information on volunteering to answer the questionnaire. All data were handled confidentially and was labelled with a non identifiable code. Study II had the same issue and was approved by the Ethics Committee of Lund University.

The questionnaire answered ten years after baseline (study II, IV) contained questions regarding the person's working situation and social and emotional support. In addition, that questionnaire included questions regarding life events. It could be unpleasant to be reminded about such events. To eliminate the uncertainty and protect the individuals involved in research studies there are four fundamental protection requirements regarding information, consent, confidentiality and use of information (102). By mailing of the questionnaire the informants received written information regarding the three first protection requirements. The method of protection was not discussed, but it was an obvious part of the ethical considerations. The participating individuals gave consent for participating in the study by answering the questionnaire.

Results

Short- and long-term perspective of return to work

Background factors (I–IV)

Profession was a significant variable in the one year follow-up but manifested an inverse relationship between the groups, meaning that higher rank of profession (94) was in the sickness presence group. Gender was significant in both the one- and five-year follow-ups with more men in the working full-time group. Educational level was also significant, with a higher level of education in the working full-time group. Age was a significant predictor in the one-, five- and ten-year perspectives, with younger persons in the working full-time group. The same result appeared for the number of sick leave days, meaning that the working full-time group had fewer sick-leave days at six and twelve months before baseline compared with the sick-listed group (Fig. 3).

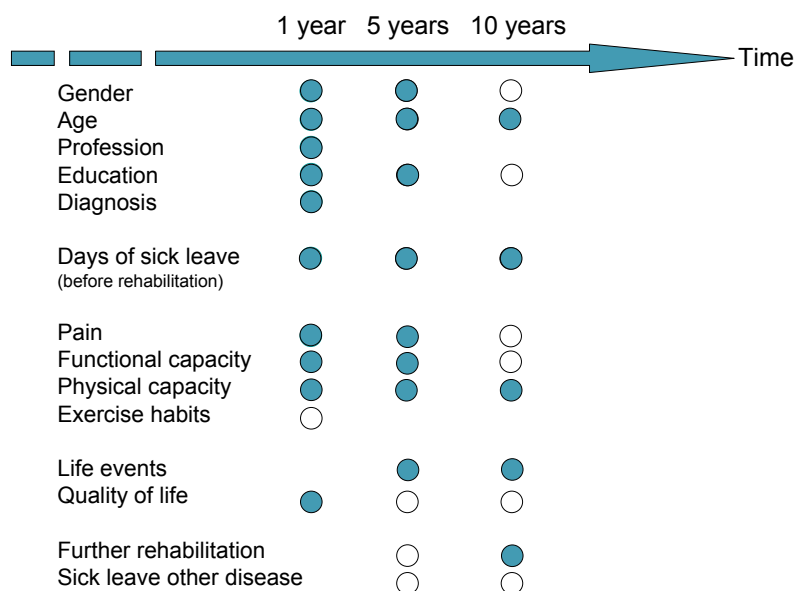


Figure 3. Predictive factors in the one-, five- and ten-year follow-ups

Physical factors (I, II)

Further predictive factors in the one- and five-year follow-ups were self-rated pain, with a lower value in the working full-time group, and self-rated functional capacity, showing that persons in this group experienced the different activities as easier to perform compared to the sick-listed group. Self-rated functional capacity was also measured in the ten-year follow-up but has not been published. This result shows that persons in the healthy group had a significant higher self-rated

functional capacity compared to the sick-listed group ($p < 0.001$).

Physical capacity was significantly better in the working full-time group in the one-, five- and ten-year follow-ups (Fig. 3, Tab. 6, 7).

Table 6. Results from logistic regression analysis. Odds ratio (95 % CI) has been estimated for influence of pain, life events and sickness certification related to different background data

	After 5 years (n=126)		After 10 years (n=131)	
	OR	95 % CI	OR	95 % CI
Sex*	0.34	0.10 - 1.12	0.54	0.20 - 1.43
Age	0.92	0.91 - 1.00	0.94	0.89 - 1.00
Pain	0.94	0.91 - 0.98	0.97	0.94 - 0.99
Life events	1.58	1.17 - 2.12	1.33	1.07 - 1.67
Sickness certification (12 months before baseline)	0.99	0.98 - 0.99	0.99	0.98 - 0.99

* Man=0, Woman=1

Table 7. Examination of predictors for RTW in the follow-up after five and ten years with a multiple logistic regression with a stepwise selection method. Odds ratio (OR) with a 95 % confidence interval (CI)

	After 5 years (n=126)			After 10 years (n=131)		
	-2 Log likelihood	OR	95 % CI	-2 Log likelihood	OR	95 % CI
Step I						
Step II						
Sickness certification	139.78	0.99	0.98 – 0.99	167.53	0.99	0.998 – 0.995
Step III						
Pain	126.98	0.96	0.94 – 0.98	162.99	0.96	0.917 – 0.997
Sickness certification		0.99	0.98 – 0.99		0.99	0.989 – 0.996
Step IV						
Age	113.64	0.91	0.86 – 0.96			
Pain		0.96	0.93 – 0.98			
Sickness certification		0.99	0.98 – 0.99			
Step V						
Age	109.55	0.93	0.88 – 0.98			
Pain		0.95	0.92 – 0.98			
Sickness certification		0.99	0.98 – 0.99			
Life events		1.24	1.01 – 1.54			
Step V						
Sex	104.72	0.31	0.10 – 0.92			
Age		0.93	0.87 – 0.98			
Pain		0.95	0.92 – 0.98			
Sickness certification		0.99	0.98 – 0.99			
Life events		1.33	1.06 – 1.67			

Psychosocial factors (I–IV)

Self-rated QoL was a significant predictor for RTW in the one-year follow-up, with a higher value in the sickness absence group (Fig. 3). It was also significantly higher in the healthy group compared to the sick-listed group ten years after baseline.

Life events as predictors for RTW were significant in the five- and ten-year follow-ups, but there were more events in the working full-time group and in terms of positive events (Fig. 3). By comparison the values of life-events among the healthy group were significant higher than the sick-listed group ten years after baseline.

The level of SOC was also significantly higher in the healthy group in a logistic regression with adjustment for gender and age.

Factors that did not show any significant differences between the two groups were social integration and emotional support.

In the qualitative analysis one of the categories was “motivation and optimism” (Tab. 8). This category contained three subcategories of powerful thoughts and feelings regarding RTW; driving force, back to normal and new opportunities. Persons in this category expressed an intention to RTW and had “a go” in their thoughts of RTW. Sick leave was not their usual state, and they had ideas and plans for the future.

Those in the driving force subcategory described a wish to RTW as soon as possible and also wanted to work as much as possible. The persons in the back to normal subcategory wanted to work as they always had done and expressed no other needs. In the new opportunities subcategory, persons showed a great ability to find new solutions for themselves.

Table 8. Examples of the analysis process regarding thoughts and feelings of return to work in sick-listed persons with musculoskeletal disorders

Condensed meaning unit	Code	Subcategory	Category
I shall be able to do full employment as soon as possible	Quickly back to full-time	Driving force	Motivation and optimism
My wish is to be able to work fully with what I trained myself to work for and with children of preschool age	Wish to work full-time in my profession	Back to normal	
To have your own business, with coaches	Start your own business	New opportunities	
Cannot continue to drive longer distances and to sit in an office	New mobile work	Demand another job	Limitations to overcome
Continue my work with new work tasks where I avoid heavy lifting	Back to easier tasks	Need for adjustment	
Being able to work part-time at something	Working part-time	Reduced work-time	
Right now, I have no hope	Poor prospects	Dejection	Hindrances and hesitation
Have not gotten so far in my thoughts	Still thinking	Irresolutionness	
Being able to return to my current job without constantly feeling pain	Want to work without pain	Bodily obstacles	

“Hindrance and hesitation” was one of the categories that emerged in the qualitative analysis (Tab. 8). This category contained three subcategories of mostly pessimistic thoughts and feelings of working life; dejection, irresolutionness and bodily obstacles. The persons in this category did not express any power or solutions. They saw their hindrance as being larger than their opportunities and had no plans for RTW (Tab. 8).

The dejection subcategory included statements expressing no willingness to RTW. These persons had given up and had no plans for RTW. Irresolutionness was a subcategory in which persons sometimes wanted other people or the health care system to take care of them, and they had no ideas about what to do in the future. The persons in the bodily obstacles subcategory were focused on their pain and bodily hindrance. For them, the outlook for RTW did not depend on the workplace or work tasks but on their bodily hindrance.

Occupational factors (II–IV)

Light physical labour was a predictor for RTW in the long-term follow-up. Regarding job strain, the healthy group had more control over the working situation, independent of demands, compared with the sick-listed group.

One of the categories which appeared in the qualitative analysis was “limitations to overcome” (Tab. 8). This category had three subcategories of thoughts and feelings about what would need to be changed to manage RTW; demand another job, need for adjustment and reduced work-time. In this category, persons expressed insight about what they must, need or want to change to RTW. They were aware of their physical limitations but expressed fewer feelings related to RTW than persons in the other categories (Tab. 8).

In the demand another job subcategory, persons did not think they could manage to return to their previous workplace and expressed a desire for a new job. Need for adjustment was a subcategory in which the persons talked about their previous jobs and expressed that other work tasks or adjustments of the work would be necessary to RTW. Persons in the reduced work-time subcategory expressed a willingness to work part-time and considered this a prerequisite to RTW, irrespective of whether they would be working with same work tasks or not and at same work place or not.

Thoughts and feelings of future working life as a predictor for RTW (III)

In the “motivation and optimism” and “limitations to overcome” categories, there were significantly more persons who had RTW one year after baseline as compared with the “hindrance and hesitation” category ($p=0.022$). Subcategories

in motivation and optimism and limitations to overcome showed the same pattern when compared with subcategories in the hindrance and hesitation at both one and five years after baseline. Persons in the reduced work-time subcategory were mostly working part-time at these point.

There were no significant differences between the categories with regard to working situation. After one year, significantly more persons in the demand another work and driving force subcategories had changed workplaces compared with those in all other subcategories ($p=0.021$). The same result was seen for persons in the demand another work subcategory after five years, at which point the persons in the new opportunities subcategory had also changed workplaces ($p=0.049$). Ten years after baseline, the results for persons in the new opportunities subcategory were the same as for the five year follow-up ($p=0.003$).

Discussion

Method discussion

The quantitative studies

Study population

The study population was the same in all four studies. They were referred to a rehabilitation program and all of the participants were included in the study, which is why no selection and power calculation was done. We have thus described the study population and are aware that we can generalize the result only to these kinds of persons (103), in this case those with a rather high socioeconomic status.

The classification of the groups The classification of the groups was different in the studies. In study I, we decided to have rather strict demands on classification, meaning that to be included in the sickness absence group you had to work full-time both at the six- and twelve-months follow-ups and not have sick leave of more than three weeks during the period between six and twelve months after baseline (93).

The classification in study II and IV was done from the same study population (Fig. 1). Because of the heterogeneity (sick-listed to different degrees, 25-75 %) in the working part time group, we decided not to include them and make two groups with distinct characteristics; a working full-time group and a sick-listed group. Another reason for not doing separate analysis in the working part-time group was the small number of persons. A major group of persons working part-time are needed for a separate analysis of the RTW phenomenon.

Study III was largely a qualitative study, but, in the quantitative part, we used the three categories as classification. Some analysis was also done between the subcategories; however, there were a small number of persons, and the results should be interpreted with caution.

Instruments

Questionnaire Collection of data by questionnaire is a good method when many people will be reached. The disadvantage is that the response rate may be lower (104). Before the rehabilitation (baseline) the first questionnaire was completed, and all participants answered the questionnaire. Before study II and IV, a new questionnaire was constructed and distributed to the identified participants. The percentage of responses was relatively good (69 %), considering this was a long-term follow-up with the same participants ten years ago (104). The percentage of answers influenced the validity of the study, but there were no differences concerning age and sex among dropouts in study II and IV.

VAS – Pain (I, II) The VAS-scale is a common instrument for the measurement of pain and is frequently used in studies, but there are relatively few instruments that measure pain in clinical operation (105). The VAS-scale has been proven to have a good validity, especially construct validity and reliability (106, 107). The VAS-scale has been proven in general to be psychometrically robust, but certain indistinctness concerning the sensitivity of the instrument remains. Calculations should be performed with nonparametric statistics (108), but the scale has also been validated as a quotient scale (109).

Pain is a multidimensional phenomenon and in this perspective the VAS-scale is not optimal. However, concerning spontaneous emotion (97) and the attitude toward pain, this method was used. No better instruments were available for measuring emotions (97).

VAS – Quality of life (I, II, IV) The QoL was measured by one global question to be answered on a VAS. The results might have been different if there had been questions capturing different dimensions of QoL. These different dimensions of QoL might have had a different impact on RTW. However, if one question is enough, why ask more? (110).

When the rehabilitation period started in 1990, there were few instruments available for measuring QoL; therefore, even here the VAS-scale was used. At the follow-up in 2000, there were better instruments for measuring QoL, but the reason for using the same instrument after ten years was that it enabled us to compare the QoL measurement taken then and now.

SOC (IV) The instrument contains 29 questions, but also exists in a shorter version with 13 questions, which was used in this study. The reliability and validity of the instrument have been found to be satisfactory when tested in different populations (52, 53). This instrument is used in up to 30 different languages and countries and in 15 versions, and it seems to be stable over time in a normal population (73).

The capacity of the SOC scale to anticipate a future outcome, i.e. “health” is expressed by the predictive validity. The SOC scale seems to be a reliable, valid and cross-culturally applicable instrument for measuring how people manage stressful situations and stay well (53).

Life events (II, IV) The life event questionnaire had previously been used in Swedish surveys and was found to be valid and reliable (74). The instrument measures stress at stressful life events, both negative and positive, which are supposed to have equal importance for stress reactions in the body. In study II, the instrument was used for describing event happenings between the follow-ups.

ISSI (IV) The ISSI questionnaire has been widely used and the validity and reliability have been tested in a Swedish population (98).

Demand/control model (IV) The demand/control questionnaire measures demands with some questions and control with other questions (89). It has been criticized for missing several dimensions. A new instrument is under construction in which workplace, work and health factors have been given due consideration. Together these factors contain 13 dimensions.

The qualitative study

The findings in the qualitative part of study III were evaluated in terms of trustworthiness (101). Our study's dependability was strengthened because the questionnaire was answered at the same time and in private before the persons started a five-week rehabilitation program. The persons were informed that answering the questions was voluntary (101). Still, there is a risk that the respondents wrote answers that they thought the staff at the rehabilitation centre expected, and it is possible that the subjects did feel some dependence on the staff. Most persons, however, answered the actual question even though it was the last question on the questionnaire. This could be interpreted as an interest in describing their thoughts and feelings of working life, and this contributed to the dependability of the study.

We used a qualitative content analysis to analyse the answers to the question because it is a suitable method when focusing on only a short text (100). Despite the fact that some answers were short, variations were reached and analysis was still possible given that most of the short answers also contained much information. The examples of the analysis process (Tab. 8) also strengthened the credibility (101).

Three of the authors had experience in the rehabilitation sector, and this pre-understanding was necessary to put brackets around. The text was interpreted with great agreement within the cross-professional research group and this increased the credibility of our results. A careful description of the study population, data collection and data analysis was made; therefore, the possibility of estimating the transferability of the study was given (101). We are inclined to believe that the results of this study can be transferred to other groups in comparable conditions.

Long-term follow-up

In these studies we had information regarding sick leave at one, five and ten years after a rehabilitation period, but we have not obtained information from the RSIO between the periods. However, in study II we asked about sick leave due to other diseases, further rehabilitation periods and life events during those periods and this is variables which could have influenced the result. Thus, neither of these was influencing the result, since there were no differences between the groups regarding sick leave due to other diseases and further rehabilitation periods. There was more life events in the working full-time group, and have presumably not influenced the result.

Result discussion

Changes in the society in relation to return to work

At the time these studies commenced, Sweden had generous sick leave rules and the sickness rate was very high (83). During the initial stages of our research the sickness rate began to increase. During the 1990s there was a decrease in the aforementioned rate and the rules for sickness certification underwent significant changes 1990s (10). During periods of high unemployment the rate of sickness decreased. Conversely, when the employment rate declined, the sickness rate decreased (10). This shows that there is a correlation between the application of sickness certification rules and RTW. This trend is significant as it enables us to better understand what motivates an individual to go back to work (83). Although there are opposite meanings, that suggest there is no relationship between these two factors, the issue is highly complex (13). Clearly, both monetary and non-monetary factors bring much to bear on the issue. Some individuals return to work primarily for financial reasons, while others have different motivations such as duty, identity, and the avoidance of shame (83).

Multidimensional factors and return to work

Background factors (I–IV)

Previous studies showed that more men return to work earlier after a certified sick leave than women, this have been shown in short-term as well as in long-term follow-up studies (59, 111). Our studies confirmed that male gender was a predictor of RTW outcomes at both one and five years after baseline and thus gender is important for predicting sustainable RTW (I, II).

Age was found to be another factor to consider, not only in the short-term, which has been shown earlier (70), but also at five- and ten-year follow-up (I, II, IV). In terms of family and leisure, men and women in different stages of life need to consider various planning strategies and RTW scenarios (9).

In our short-term and long-term studies, a higher educational level was an important predictor of RTW (I, II). These findings strengthen the validity of this well-known predictor (32, 70). A higher education level might improve a person's opportunities in getting another job in the labour market and these opportunities should be important in planning for RTW.

The number of sick-listed days before baseline confirms that this is significant both in a short- and a long-term period (I, II, IV). The number of sick-listed days is the strongest predictor for RTW (II). This is also a predictor possible to influence by outside factors. Quick reactions and collaborations between the RSIO, the employer and the multidisciplinary teams in primary health care are needed when a person is certified for sick leave (112).

Physical factors (I, II)

At the one, five and ten year follow-up, physical capacity proved to be yet another predictor for RTW (I, II). A positive perception of one's physical condition was found in a normal population, especially in men when compared to responses from people with low back pain (10). This is a predictor that strengthens the effect of physiotherapy, where the usual treatment is to go for better physical capacity. However, good physical capacity alone does not always mean good working capacity (113).

Both pain and functional capacity were identified as predictors for RTW in short-term studies (63, 114) and are now also shown to be important for RTW in the long term (II). Pain was also self-assessed and the results indicated that individuals revealed their own perception of pain, as there are several different approaches to pain (28). Self-rated pain includes the individual experience of pain as well as the fear of pain and might indicate physical as well as psychological pain (9).

Functional capacity measured at baseline is important at both the one- and five-year follow-up times (I, II). In the new analysis, complementing study IV, functional capacity measured after ten years showed that persons in the healthy group had a higher self-rated functional capacity (96). Thus, the present results reveal their perceptions of their own capacity (10). This is an important factor to consider when planning for RTW (115, 116).

Psychosocial factors (I–IV)

A high QoL score at baseline had a predictive value only in the short perspective (I), because at the five- and ten-year follow-up this factor did not have an effect on RTW (II). However another study showed a high QoL in a five-year follow-up (32). In the follow-up ten years after baseline QoL is correlated with working or not (IV) which may indicate that work provides a high QoL. Theories about QoL

indicate that it is the goal (RTW), not the way of achieving that goal that is the most important contributor to QoL (67), but it is important to have an individual plan for achieving the goal (117). Persons in the healthy group had a higher QoL, and it is possible that working is one of the goals for QoL for this group (70).

There was an overrepresentation of life events in the working full-time group, but most of these were positive events, in agreement with results from a previous study (70). Return to work is not an isolated phenomenon but it is influenced by the person's life situation as a whole (118, 119). The healthy group had a higher level of SOC, which could be the reason why that group was working despite experiencing more life events (64).

In the long-term follow-up (IV), there was a significantly higher level of SOC in the healthy group compared to the sick-listed group, similar to other studies with shorter follow-up periods (82, 120). There have been discussions regarding the stability of SOC over time, and opinions are divided. Some studies have shown that SOC is changeable over the short term after an intervention (121, 122), while others show stability over time, especially if the value is high from the beginning (73).

One study showed SOC to be stable over time and to be related to health, illness, and psychosocial factors (73). If this is the case, SOC can predict the length of the sick leave in both the short and long term, and instruments for measuring this parameter are available. However, more prospective studies are needed (123) as are qualitative and intervention studies in order to learn more about what kind of rehabilitation is needed in persons with a low level of SOC (124).

Social support in families and friends did not show any consequence for working or not working (IV). However, there are studies showing that social support is important for a good result after a multidisciplinary rehabilitation and for managing illness and difficulties (79). It is possible that the healthy group had a better social network at work and that this factor could be the determining factor for working (90, 92).

If one wants to RTW and has positive expectations for the future and one's own possibilities, the chances for RTW increase (58, 71, 120). Persons in the "motivation and optimism" category had an obvious objective and a positive view about RTW and those in the driving force subcategory had changed jobs after one year (III). Persons in the new opportunities subcategory were studying after one year and subsequently began new jobs at the five- and ten-year follow-up times, which they also described in their answers on the questionnaire (III).

Considering a person's thoughts and feelings regarding working life is helpful for planning to go back to work. When that person expresses a desire, such as motivation for something new, we must help the person in that direction, and going back to their old job would be a poor solution in these cases. Motivation for RTW has been shown to be a predictor in other studies, both in quantitative and qualitative studies (70, 125).

It seemed that persons in the "hindrance and hesitation" category (III) did not believe in themselves; they had given up, felt lost and had a weak sense of self-efficacy. A previous interview study showed that the participants had feelings of hope, doubt and fear about their possibilities for RTW and were hesitant regarding their RTW (126), like persons in the irresolutionness subcategory (III). These persons had no ideas about when or where they would RTW. They were not prepared for RTW but did not know why.

Guidance for correct rehabilitation will be very important in order to not let these persons get in to a long-term sick leave period. If they are hesitating, alternatives must be given for RTW. Those in the bodily obstacles subcategory (III) expressed their bodily hindrances; many of those sick listed with MSD have a fear of pain and physical activity (28). Those in this subcategory may have experienced more pain and had different attitudes towards pain than persons in the other subcategories.

Occupational factors (II–IV)

In terms of working organisation, on the job, it is important to recognize both the physical demands as well as the psychosocial environment (114, 127). Light physical labour was a predictor for RTW (II) and physical demands have been shown in other studies to be of importance for RTW (128, 129). This indicates the importance of close contact with the employer to create easier physical and more mobile work, suited to each person's capacity.

Our ten-year follow-up study (IV) showed that the healthy group had good control over the working situation, in spite of high demands, and this is in accordance with many other studies, although none of these were long-term (91, 130). The model by Karasek also strengthens this result (90). It may be possible to use this instrument when sick-listing in order to predict RTW. Good opportunities for development and training at work and having influence over one's job were important factors that influenced when persons on sick leave would RTW (91, 92). That is why it is important to do an inventory of the working environment when planning rehabilitation before RTW. A potential positive measure is to practise at the work place, making the employer an active participant in the process.

Persons in the “limitations to overcome” category (III) were motivated to work but expressed that they needed to change their workplace or adjust their work tasks or work time, similar to results found in a previous qualitative study (131). That study found most persons have residual work capacity, and we must adjust the work place, work tasks or work time to find the most suitable solution for each person.

In the “limitations to overcome” category, persons described what they would need to change to manage RTW. Those in the demand another job subcategory had changed workplaces at the one- and five-year follow-up (III). If persons give a clear desire about changing work place, this has to be done. No rehabilitation may be needed, it may be enough for the person to change their work place. Persons in the need for adjustment subcategory will RTW if adjustments can be made (III). This finding is in accordance with a quantitative study in which co-workers helped the returning person with the adjustment (132). It is important to note, however, that the supervisors made this possible.

RTW even if persons have not achieved full recovery can be successful if the work had been modified, and these persons have a lower risk of recurrence for sick leave (133). If it is the person’s desire to go back to their old work, it should be easier to adjust the old work place and also cheaper for both the employer and the society than finding a new job. The size of the company may influence the ability to modify work tasks (134), but both small and large companies must have strategies for RTW.

Having a greater possibility of working part-time would simplify RTW (131), and a Swedish study showed that working part-time after sick leave often leads to full-time work (63). In this study, however, it appears that persons in the reduced work-time subcategory were working part-time at the same job one, five and ten years after baseline. To let these persons work part-time could be a solution for preventing a long-tem sick leave period.

Salutogenes linked to return to work

In this thesis the focus is directed on healthy factors for RTW instead of, more commonly, risk factors for long-term sick leave.

If considering the process of RTW as a continuum, with RTW at the pole of excellent health and not RTW at the pole of ill health, there is a demand for resources to make it possible for people to reach the pole of RTW. The sick-listed person had to be moved in that direction. We have examined some physical, psychosocial and occupational factors, which are of importance for RTW, but everyone is different in personal equipment, ability and utilisation of resources (51).

Sense of coherence (SOC)

There were many persons in this thesis with major functional problems and pain. These variables were thus self-rated and more of an attitude to their functional capacity and pain (97). The person's resources may have an important role in this RTW process. All factors of importance for RTW and for working have a role in this process, but these may be important only if we have something more. Factors that are dependent on the person's own choice are self-rated parameters such as pain and functional capacity, how a person experiences demand at work place and the control they have. "It is not how to have it, but how to take it". For some people a back ache is an insurmountable challenge, while other people manage this. Most persons on sick leave manage RTW despite their health conditions. Disability does not necessarily mean incapacity for work (135).

Persons in the "motivation and optimism" category (III) were positive and sure of their capability. They also saw their possibilities for changing without being afraid and had their own ideas of what to do in the future working life. This is interesting with regard to SOC where the motivational component, meaningfulness, intend a high SOC (50). This can be seen in study IV where a high SOC is described for persons who worked full-time. More persons in this category went back to work compared to the "hindrance and hesitation" category (III). Persons with a high SOC tend to perceive demands as challenges that are worthy of engagement, rather than as threats or stressors (136).

SOC was shown to be stronger in the working group in a long-term perspective (IV). Since many authors consider SOC stable after the age of 30, this variable could be used as a predictor for RTW, but more studies are needed (73, 123). Are there persons in the group on sick leave who would rather have a sickness certification than work? One study shows that persons on sick leave make a consideration with themselves about the advantages and disadvantages of RTW (84). If the disadvantages are greater than the advantages and the person does not

have the resources needed to go to the RTW pole, there is a risk for the person to take long-term sick leave.

Motivation

Motivation is a component in the salutogenic theory, in near relation with meaningfulness (49, 51). What motivation means is different to each person. Meaningfulness is important in order to be motivated to go back to work. Is it the motivation that makes people think they can manage? In study III, persons expressed thoughts of motivation and an optimistic view of their future working life. Their force and clear objective took them back to any kind of work. Motivation plays a major role in how persons perceive their QoL (66), and those with a good quality of life RTW.

At each point in time, a person has obvious reasons to decide to RTW or not (137). Thus, there are changes between absence from work and presence at work. External influences such as diseases or happenings in the family cause variations in the natural process of change such as absence and presence. We also have a driving force or motivation for terminating a sick leave and RTW. When it comes to motivation for RTW the motivation of the supervisors and colleagues to support the person in different ways needs to be highlighted in future research (138).

The motivation is controlled by how much the goal is worth and what you have to sacrifice. To have motivation, you have to have comprehensiveness for existence and meaningfulness. The motivation is not something you have or do not have, but how a person chooses with regard to RTW depending on what the person wants and thinks is possible (139). A person who does not want to RTW may need psychotherapy, or may need to increase their qualification, and when a RTW is not possible, a wage subsidy or an adjustment of the workplace is necessary (139).

Self-efficacy

High self-efficacy may be the reason for rating functional capacity higher in the healthy group. To think optimistically or pessimistically is self-enhancing or self-hindering, respectively (56). A persons self-efficacy plays a major role in shaping the course of their life. It is partly on the basis of efficacy beliefs that people choose which challenges to undertake, how much effort to expend in the endeavour, how long to persevere in the face of obstacles and failures, and whether failures is motivating or demoralizing (56).

To be sick-listed is a major life event no matter the cause of the sickness. To RTW after sick leave involves a complex change of behaviour (57). Positive work attitude, high social support and a high level of self-efficacy are all associated with a shorter time to RTW (140).

Persons with a positive attitude about RTW might be those with strong belief in themselves. They do not just believe that they can RTW, they know they can. A strong self-efficacy, when persons strictly believe in themselves, can facilitate a motivational process in which persons set goals for themselves and plan courses of action for the future (56), like persons described in the category “motivation and optimism”.

Studies have also shown that the belief in one’s own ability is the most important factor for RTW (73). Self-efficacy is one part of the salutogenic thinking, where the belief influences what to be achieved. Self-efficacy is in context with manageability in SOC, and this has become more obvious while writing this thesis. Concerning the self estimated variables of pain, functional capacity and QoL, an attitude is observed and directly affects how the person manages and experiences the situation (97). In study III, the subjects’ thoughts and feelings for their future working life are described and an ability to see a bright future RTW appears. Persons with a positive attitude about RTW might be those with a strong belief in themselves. Those in the ”motivation and optimism” category probably manage to get themselves back into some kind of work or studies.

Perceived self-efficacy relates to an individuals’ belief that it is possible to adapt certain behaviour to particular situations in the future and is also regarded as a predictor of rehabilitation outcome (56, 141). Self-efficacy has also been proposed as an explanatory factor for positive adaptation to chronic pain, and correlates inversely to pain intensity and pain interference with daily life (142).

Motivation is closely related to self-efficacy beliefs, as it is viewed as the internal process that affects the direction, persistence and strength of a person’s goal-directed behaviour (77).

To refer persons to the right kind of rehabilitation

Taking into account not only physical and occupational factors but also psychosocial factors are of great importance when a person becomes sick-listed. It is not helpful to adjust factors in the work place if other aspects of life are not in place. When sick-listing a person, it is important to arrange the RTW directly and take multidimensional factors into account (57). The rehabilitation alternatives available today must focus on different approaches. All dimensions must take part in the planning for rehabilitation and RTW.

Today we commonly offer persons with MSD physiotherapy, but it is time to change our treatments with regard to the person’s needs and possibilities. Persons with a weak SOC i.e. should maybe not be trained at a physiotherapeutic unit, but rather receive cognitive therapy.

More attention must be put on the consultation and the assessment of persons with MSD in primary health care, which must refer them to right kind of rehabilitation (36). Teamwork with the patient as the focus and using knowledge about the factors that influence and predict RTW increases the chance of success in directing the best possible rehabilitation for each person for RTW (Fig. 4). Multidisciplinary rehabilitation requires a holistic approach from all the team members in order to make the patient return to an active and independent everyday life (47).

It is of great importance not to rehabilitate more or less than is needed for each person; irrespective of the person's pain, functional capacity or psychosocial problems. For the rehabilitation personnel, it is significant to conduct oneself as a coach and meet the person's current needs.

The chances for RTW increase with the right intervention, which also increases QoL in a person, which is a good investment against future trouble with MSD. If sick leave in the future can be prevented, this would provide great savings for the individual, health care and society.

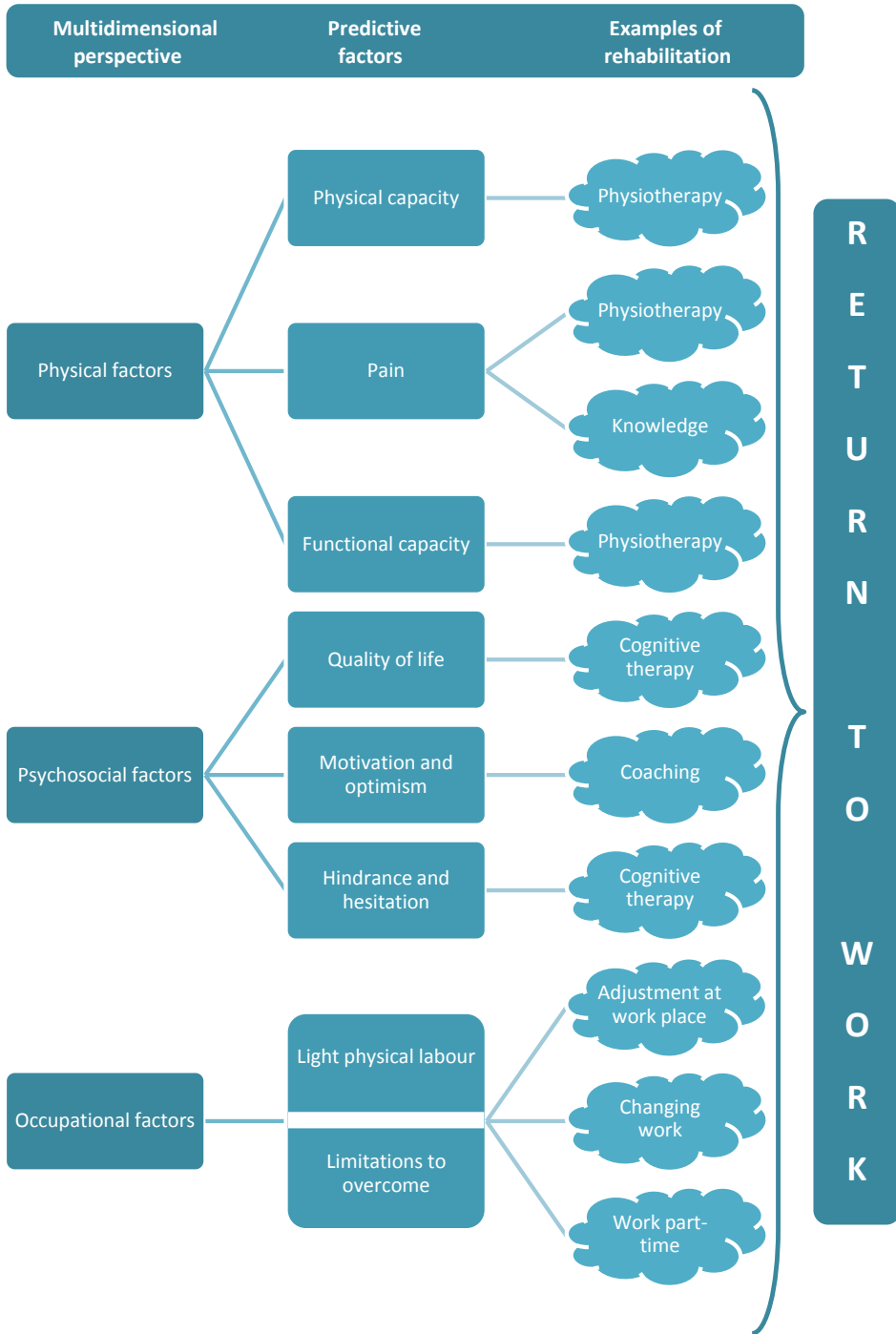


Figure 4. Predictive factors for RTW

Conclusion

Study I: Identifying predictive factors for RTW in persons with MSD, are essential tasks for directing correct individual rehabilitation. This study identified new predictive factors for RTW in a short-term perspective such as physical capacity, self-rated functional capacity and QoL. Other more well known factors such as gender, age, educational level, number of sick-listed days and self-rated pain were also identified. The identification of predictive factors could be a valuable instrument for giving priority of resources to the patients with the best chance of a successful rehabilitation.

Study II: Predictive factors for sustainable RTW were described at five- and ten-year follow-up times. The number of sick-listed days before rehabilitation and age were strong predictors of RTW, self-rated pain, life events, gender, physical capacity, self-rated functional capacity, educational level and light physical labour were also predictors of RTW in the long-term. A follow-up period of lengthy duration and a large study population make this study valuable, and it should provide a better rationale for allocating resources to facilitate RTW in sick-listed persons with MSD.

Study III: The results from the qualitative analysis revealed thoughts and feelings of future working life related to RTW in persons sick-listed with MSD and three categories emerged. One category, “motivation and optimism”, contained three subcategories of powerful thoughts and feelings regarding RTW; driving force, back to normal and new opportunities. The next category, “limitations to overcome”, also had three subcategories of thoughts and feelings about what would need to be changed to manage RTW; demand another work, need for adjustment and reduced work-time. The last category, “hindrance and hesitation”, contained three subcategories of mostly pessimistic thoughts and feelings of working life; dejection, irresolutiness and physical obstacles.

Persons in the “motivation and optimism” and “limitations to overcome” categories were back at work one year after baseline compared to those in “hindrance and hesitation” category. The demand another job subcategory mostly contained persons who had changed work after one and five years and those in the reduced work-time subcategory were working part-time at the same time. This will guide the rehabilitation team to adjust the rehabilitation to each person’s needs and facilitate RTW. To compare the qualitative categories with RTW one, five and ten year after baseline may give a deeper understanding of the RTW process.

Study IV: This study was a comparison of psychosocial factors between healthy persons and sick-listed persons with MSD, both groups with MSD ten years ago.

The healthy group had higher QoL, more control over the working situation, and a higher level of SOC, but social integration and emotional support were not significantly different between the groups. An unexpected result was that there were more life events in the healthy group, and these were mostly positive events. This overall result about psychosocial factors could be useful when planning optimal rehabilitation and RTW for each person.

General: The focus in this thesis has been on healthy factors for RTW instead of risk factors for not RTW, in line with the salutogenic theory. When predicting RTW for persons with MSD we must have a multidimensional perspective and physical, psychosocial and occupational factors must be considered. This thesis examined predictive factors in both a short- and long-term follow-up in order to predict the RTW process. We must be aware of that different rehabilitation alternatives must be available depending of the needs of the sick-listed person.

Implications

Clinical implications

We can choose to see the possibilities for the person to RTW or the obstacles. When changing focus we made the person aware of his or her abilities which can lead to motivation for RTW. When a person is supposed to be sick-listed it is important to have the predictive factors examined in this thesis in mind. It is easy to measure each of them with the instruments used and data regarding the number of sick-listed days can be gathered at an early stage from persons themselves as well as from the RSIO.

It is also important to ask the person about their previous problems and sick leave history. It is a waste of resources when referring the sick-listed person to usual treatment if it is a low QoL or low SOC that is the problem. The same is can be said for making adjustment at the work place if the person is convinced to change their work.

Asking questions of thoughts and feelings of RTW can lead us to work together with sick listed persons to come up with a better plan for RTW. The question used in the study can be a part of the history taken in the first medical examination. It is important to listen to the person's thoughts and feelings of RTW in the first dialogue and it can be of predictive value to meet their different needs during their RTW.

Return to work planning should take place at an early stage of the certified sick leave period using the available instruments for predicting RTW. When having a multidimensional perspective, taking all dimensions and all predictive factors into account, sick leave can be reduced by directing the person to the correct amount rehabilitation, not more and not less. The resources are limited and have to be allocated in the best possible way.

Research implications

This thesis revealed some factors that predict RTW after a sick leave because of MSD. However, more comparative research would be desirable, ideally carried out by multidisciplinary groups. Those working part-time (50 %) due to MSD needs to be further investigated in a larger study population. Are these people fighting for manage to work 50 % although they nearly can't, or are they satisfied with working 50 % even if they could work more? If so, why?

Multidisciplinary collaboration may also promote better integration between theory and empirical results. Knowledge about the predictors of RTW should be given greater priority in the education of those working in primary health care as well as at the RSIO.

Sustained RTW after sick leave is a challenge and therefore justifies further research in this area. More studies combining qualitative and quantitative analysis could be a possibility for deeper understanding of RTW of sick-listed persons.

The measurements used in these studies can act like a screening instrument, for predicting RTW in persons with MSD, though, further research in this issue is needed. An intervention study using these instruments for directing tailor-made rehabilitation for each person would be of great interest.

Acknowledgements

I am very grateful for everyone that has helped and supported me, making this thesis possible. Special thanks go to:

All persons included in these studies for kindly answering the questionnaires.

Jörgen Månsson, my supervisor and teacher, you are the reason why I started research. Thank you for your bright advice and encouragement. You have guided me the whole way to goal and have always believed in me.

Bertil Marklund, my co-supervisor, and the greatest coach. Thank you for your ability to share your knowledge in a way that makes me grow. Thank you for letting me try to be a researcher, I managed!

Birgitta Grahn, my co-supervisor. From you I have learnt everything worth knowing in this research field. Snow has been a common problem when travelling between Falkenberg and Växjö, but we solved this one too.

Bengt Mattsson, my co-supervisor. Your helpful and wise comments made it easier for me. I am grateful for having taken part of your knowledge.

Amir Baigi, my first connection with research. You obtained a computer for us and helped us with coding our collected data, which was of great importance. During my work with this thesis you have been an enormous coach and helped me in the statistical world.

Cathrine Hildingh, my co-author in the qualitative study. I am very glad that I had you by my side in the world of categories, always positive and encouraging.

Eva, Katarina, Mayvor, Susanne, Annika, Eva-Carin, Helena and Håkan , my dear work mates and friends, you mean so much to me. So many laughs' we have shared together. I can't imagine a work place without you. *Eva* for your support, coaching and understanding, *Katarina* for your hospitality and kindness, *Mayvor* for caring about me, *Susanne* for all jokes, *Annika* for helping me with excellent layout and advice regarding my thesis, *Eva-Carin* for good and fun discussions, *Helena* for always helping whenever needed, *Håkan* for your humor and wisdom. You are all my idols!

Bengt Fridlund for valuable comments when I needed them. Your great knowledge impresses me.

Gunnel Caesar, for our start and trip with Kungsbacka Rehab. If you hadn't been so wise we would not have had so much data to use in these studies. Most of all, thank for your friendship, it always strengthens me.

Lolo, for taking care of everything, I really mean everything. How will the Department of Primary Health Care manage without you?

All supportive *friends and relatives*, for your patience with me when I didn't have time for you. Now I have time for everything.

Mats and Britt, my dear brother and sister-in-law, for being there for me with a lot of support, food and good wine whenever I wanted to visit you and write in a calm atmosphere and for always being interested in what I was doing. Mats, I "forced" you to read my papers and you did, that made me feel important for you.

My dear brother *Lars and Nina*, for caring and supporting me whenever I needed. For good food and "semlor". For your phone calls which filled me with energy and for your patience and understanding for me when I did not have the time to call you back. I'll be a better sister now.

My three wonderful kids, *Kristian* with girlfriend *Josefn*, *Martin and Hanna*, for always believing in me. Thank you for your love, patience and understanding. Now it's your turn to have my attention. I'm so happy and proud for having you and I love you so much.

Last but not least my dear husband, *Dan*, for always loving and supporting me and for taking care of everything in our family's life. Especially thanks for all the fresh juice you made me both day and night to give me energy during this time. Without that I would not have managed to write this thesis. Now its payback time...
Love you!

Marie

Thank you also to the County Council of Halland for financial support with this thesis.

References

1. Alexanderson K, Norlund A. Sickness absence - causes, consequences, and physicians' certified sick leave. A systematic literature review by the Swedish Council on Technology Assessment in Health Care. *Scand J Public Health* (supplement). 2004;63:1-263.
2. Årsredovisning 2007 (Account of year 2007) (In Swedish). www.forsakringskassan.se. 2008-04-13.
3. Engels C, Von Korff M, Katon W. Back pain in primary care: predictors of high healthcare costs. *Pain*. 1996;65:197-204.
4. Johansson G, Lundberg O, Lundberg I. Return to work and adjustment latitude among employees on long-term sickness absence. *J Occup Rehabil*. 2006;16:185-95.
5. Pransky G, Gatchel R, Linton SJ, Loisel P. Improving return to work research. *J Occup Rehabil*. 2005;15:453-7.
6. Floderus B, Göransson S, Alexanderson K, Aronsson G. Self-estimated life situation in patients on long-term sick leave. *J Rehabil Med*. 2005;37:291-9.
7. Bränholm IB, Eklund M, Fugl-Meyer AR. On work and life satisfaction. *J Rehabil Sci*. 1991;4:29-34.
8. Ekbladh E, Thorell LH, Haglund L. Perceptions on the work environment among people with experience of long term sick leave. *Work*. 2010;35:125-36.
9. Borg K, Hensing G, Alexanderson K. Prediction of future low levels of sickness absence among young persons sick listed with back, neck, or shoulder diagnoses. *Work*. 2004;23:159-67.
10. Smeets RJ, Wittink H, Hidding A, Knottnerus JA. Do patients with chronic low back pain have a lower level of aerobic fitness than healthy controls? Are pain, disability, fear of injury, working status, or level of leisure time activity associated with the difference in aerobic fitness level? *Spine*. 2006;31:90-7.

11. Social Insurance Report 2009:10 Stockholm.
12. SBU – Statens beredning för medicinsk utvärdering (The Swedish Council on Technology Assessment in Health Care) (In Swedish). Stockholm. 2003.
13. Waddell G. A new clinical model for the treatment of low back pain. *Spine*. 1987;12:632-44.
14. Ohälsotalet. (The number of ill health). 2010-04-08. www.forsakringskassan.se
15. Järvholm B, Karlsson B, Mannelqvist R. Arbetsförmåga i sjukförsäkringen - så beskrivs begreppet i lagstiftningen (Work ability in the sickness insurance - the way the concept is described in the law). Report 2009;106:1178-81.
16. Johansson G, Lundberg I. Adjustment latitude and attendance requirements as determinants of sickness absence or attendance. Empirical tests of the illness flexibility model. *Soc Sci Med*. 2004;58:1857-68.
17. DOT 2006. Dictionary of Occupational Titles. www.wave.net/upg/immigration/dot_index.html
18. Dimenäs E, Dahlöf C, Jern S, Wiklund I. Defining quality of life in medicine. *Scand J Prim Health Care (Supplement)*. 1990;1:7-10.
19. International Classification of Functioning. Disability and Health (ICF). Geneva; World Health Organization, 2001.
20. Ståhl C, Svensson T, Petersson G, Ekberg K. The work ability divide: holistic and reductionistic approaches in Swedish interdisciplinary rehabilitation teams. *J Occup Rehabil*. 2009;19:264-73.
21. Tuomi K, Illmarinen J, Seitsamo J, Huuhtanen P, Martikainen R, Nygård C-H et al. Summary of the Finnish research project (1981-1992) to promote the health and work ability of ageing workers. *Scand J Work Environ Health*. 1997;23 suppl 1;66-71.
22. Ekbladh E, Thorell LH, Haglund L. Return to work: The predictive value of the Worker Role Interview (WRI) over two years. *Work*. 2010;35:163-72.

23. Tengland P-A. Begreppet arbetsförmåga (The concept of work ability) (In Swedish). HIS Report 2006:1. Linköping.
24. Ludvigsson M, Svensson T, Alexanderson K. Begreppet arbetsförmåga – en litteraturgenomgång (The concept of work ability – a literature review) (In Swedish). The Institute of Working Life. Nr 2006:8. Stockholm.
25. Sjögren-Rönkä T, Ojanen MT, Leskinen EK, Tmustalampi S, Malkia EA. Physical and psychosocial prerequisites of functioning in relation to work ability and general subjective well-being among office workers. *Scand J Work Environ Health*. 2002;28:184-90.
26. IASP. Subcommittee on taxonomy: pain terms. A list with definitions and notes on usage. *Pain*. 1979;6:249-52.
27. Von Frey M. Untersuchungen Über die Sinnesfunctionen der Menschlichen Haut Erste Abhandlung: Druckempfindung und Schmerz. Leipzig: Hirzel. 1895.
28. Lundberg M, Larsson M, Östlund H, Styf J. Kinesiophobia among patients with musculoskeletal pain in primary health care. *J Rehabil Med*. 2006;1:37-43.
29. Melzack R. *The Puzzle of Pain*. Basic Books. New York, USA. 1979.
30. Melzack R, Wall PD. Pain mechanisms: a new theory. *Science*. 1965;150:971-9.
31. Melzack R, Wall PD. *The Challenge of Pain*. Basic Books. New York, USA. 1982.
32. Westman A, Linton SJ, Theorell T, Ohrvik J, Wahlen P, Leppert J. Quality of life and maintenance of improvements after early multimodal rehabilitation: a 5-year follow-up. *Disabil Rehabil*. 2006;28:437-46.
33. Andersson HI, Ejlertsson G, Leden E, Rosenberg C. Chronic pain in a geographically defined general population: studies of differences in age, gender, social class, and pain localization. *Clin J Pain*. 1993;9:174-82.

34. Mcbeth J, Macfarlane GJ: The prevalence of regional and widespread musculoskeletal pain symptoms. IN Linton SJ (Ed). *New avenues for the prevention of chronic musculoskeletal pain and disability*. 1st.ed. Amsterdam; New York, Elsevier. 2002.
35. Croft P, Pope D, Zonca M, O'neill T, Silman A. Measurement of shoulder related disability: results of a validation study. *Ann Rheum Dis*.1994;53:525-8.
36. Malmgren-Olsson E-B. Health problems and treatment effects in patients with non-specific musculoskeletal disorders. A comparison between Body Awareness Therapy, Feldenkrais and Individual Physiotherapy. Doctoral thesis. Umeå university, Umeå 2002.
37. Gerdle B, Björk J, Henriksson C, Bengtsson A. Prevalence of current and chronic pain and their influences upon work and health-care seeking: a population study. *J Rheumatol*. 2004;31:1399-406.
38. Hansson A. Nya utmaningar, gamla strategier – om distriktsläkares yrkesroll och attityder till samarbete. (New challenges, old strategies – about the physician's profession and attitudes to cooperation). (In Swedish.) Doctoral thesis. University of Gothenburg, Gothenburg 2008.
39. Olesen F. A framework for clinical general practice and for research and teaching in the discipline. *Fam Pract*. 2003;20:318-23.
40. <http://www.socialstyrelsen.se/riktlinjer/forsakringsmedicinsktbeslutsstod>. 2010-04-09.
41. Grumbach K, Bodenheimer T. Can health care teams improve primary care practice? *J Am Med Assoc*. 2004;291:1246-51.
42. Ridd M, Shaw A, Salisbury C. Two sides of the coin – the value of personal continuity to GPs: a qualitative interview study. *Fam Pract*. 2006;23:461-8.
43. Werkö L. Läkarna inte längre herrar på sjukvårdstappan. Att laget och lagledaren drar jämnt är av allt större betydelse. (The physicians are not masters on the health care hill any more. That the team and the coach must agree is of increasing importance). (In Swedish.) *Läkartidningen* 2003;100:2373-7.

44. Lundin A, Hultberg EL. Teamarbete har lett till minskad sjukskrivning. (Teamwork has led to decreased sick leave). (In Swedish.) *Dagens Medicin*. 2006;7, suppl. 3.
45. Jørgensen C, Fink P, Olesen F. Patients in general practice in Denmark referred to physiotherapists: a description of patient characteristics based on general health status, diagnoses, and sociodemographic characteristics. *Phys Ther*. 2001;81:915-23.
46. Nichols D, Larmer P. Possible futures for physiotherapy: an exploration of the New Zealand context. *N Z J Physiother*. 2005;33:22-7.
47. Broberg C, Tyni-Lenne´R. Sjukgymnastik som vetenskap och profession. (Physiotherapy as a science and profession). (In Swedish). <http://www.sjukgymnastforbundet.se/profession/Sidor/Profession.aspx>. 2010-04-09.
48. Antonovsky A. (Ed.). *Health, stress and coping*. Jossey-Bass, San Fransisco. 1979.
49. Antonovsky A. (Ed.) *Unravelling the mystery of health*. Jossey-Bass, San Fransisco. 1987.
50. Eriksson M. *Unravelling the mystery of salutogenesis. The evidence base of salutogenic research as measured by Antonovsky’s Sence of Coherence Scale*. Doctoral thesis. Åbo Academy, Wasa, Finland. 2007.
51. Lindström B, Eriksson M. Salutogenesis. *J Epidem Commun Health*. 2005;59:440-2.
52. Antonovsky A. The structure and properties of the sense of coherence scale. *Soc Sci Med*. 1993;36:725-33.
53. Flannery RB, Perry JC, Penk WE, Validating Antonovsky’s Sense of coherence scale. *J Clin Psychol*. 1994;50:575-7.
54. Kivimäki M. Sense of coherence as a modifier of occupational stress exposure, stress perception, and experienced strain: a study of industrial managers. *Psychol Rep*. 1998;83:971-81.
55. Bandura A. Self-efficacy: toward an unifying theory of behaviour change. *Psychol Rev*. 1977;84:191-215.

56. Labriola M, Lund T, Christensen KB, Albertsen K, Bultmann U, Jensen JN et al. Does self-efficacy predict return-to-work after sickness absence? A prospective study among 930 employees with sickness absence for three weeks or more. *Work*. 2007;29:233-8.
57. Shaw L, Polatajko H. An application of the Occupational Competence Model to organizing factors associated with return to work. *Can J Occup Ther*. 2002;69:158-67.
58. Heymans M, de Vet H, Knol D, Bongers P, Koes B, Van Mechelen W. Workers' beliefs and expectations affect return to work over 12 months. *J Occup Rehabil*. 2006;16:685-95.
59. Enthoven P, Skargren J, Carstensen J, Öberg B. Predictive factors for 1-year and 5-year outcome for disability in a working population of patients with low back pain treated in primary health care. *Pain*. 2006;122:137-44.
60. Grahn B, Borgquist L, Ekdahl C. Rehabilitation benefits highly motivated patients: a six-year prospective cost effectiveness study. *Int J Technol Assess Health Care*. 2004;20:214-21.
61. Law M, Cooper BA, Strong S, Stewart D, Rigby P, Letts L. The Person-Environment-Occupational Model: a transactive approach to occupational performance. *Can J Occup Ther*. 1996;63:9-23.
62. Josephson M, Heijbel B, Voss M, Alfredsson L, Vingård E. Influence of self-reported work conditions and health on full, partial and no return to work after long-term sickness absence. *Scand J Environ Health*. 2008;34:430-7.
63. Chung-Keung Cheng J, Wai-Ling Li-Tsang C. A comparison of self-perceived physical and psycho-social worker profiles of people with direct work injury, chronic low back pain, and cumulative trauma. *Work*. 2005;25:315-23.
64. Hansen A, Edlund C, Bränholm I-B. Significant resources needed for return to work after sick leave. *Work* 2005;25:231-40.
65. Martikainen P, Bartley M, Lahelma E. Psychosocial determinants of health in social epidemiology. *Int J Epidemi*. 2002;31:1091-3.

66. Lau A. A quality of life study on non-institutionalised elderly stroke survivors in Hong Kong. Doctoral thesis. Department of Occupational Therapy, Queensland. 2000.
67. Brülde B. Teorier om livskvalitet. (Theories of Quality of life) (In Swedish). Studentlitteratur. 2003.
68. WHOQOL. www.who.int . 100413.
69. Arvidsson S, Arvidsson B, Fridlund B, Bergman S. Health predicting factors in a general population over an eight-year period in subjects with and without chronic musculoskeletal pain. *Health Qual Life Outcomes*. 2008 11;6(1):98. Epub ahead of print.
70. Grahn B, Ekdahl C, Borgquist L. Motivation as a predictor of changes in quality of life and working ability in multidisciplinary rehabilitation. A two-year follow-up of a prospective controlled study in patients with prolonged musculoskeletal disorders. *Disabil Rehabil* 2000;22:639-54.
71. Heijbel B, Josephson M, Jensen I, Vingård E. Employer, insurance, and health system response to long-term sick leave in the public sector: policy implications. *J Occup Rehabil*. 2005;15:167-76.
72. Ekbladh E, Haglund L, Thorell LH. The worker role interview - preliminary data on the predictive validity of return to work of clients after an insurance medicine investigation. *J Occup Rehabil*. 2004;14:131-41.
73. Nilsson B, Holmgren L, Stegmayr B, Westman G. Sense of coherence – stability over time and relation to health, disease and psychosocial changes in a general population: A longitudinal study. *Scand J Public Health*. 2003;31:297-304.
74. Holmes T, Rahe R. The social readjustment rating scale. *J Psychosom Res*. 1967;11:213-8.
75. Rosengren A, Orth-Gomer K, Wedel H, Wilhelmsen L. Stressful life events, social support, and mortality in men born in 1933. *BMJ*. 1993;307:1102-5.

76. Van den Akker M, Buntinx F, Mutsemakers JF, Van der Aa M, Knottnerus JA. Psychosocial patient characteristics and GP-registered chronic morbidity: a prospective study. *J Psychosom Res.* 2001;50:95-102.
77. Smith R. *Psychology.* Minneapolis/St. Paul: West Publishing Company. pp366-493. 1993.
78. Cassel J. The contribution of the social environment to host resistance. The Fourth Wade Hampton Frost Lecture. 1976. *Am J Epidemiol.* 1995;141:798-814.
79. Kaiser PO, Mattsson B, Marklund S, Wimo A. The impact of psychosocial 'markers' on the outcome of rehabilitation. *Disabil Rehabil.* 2001;23:430-5.
80. Schanberg L, Keefe F, Lefebvre M, Kredich D, Gil K. Social context of pain in children with juvenile primary fibromyalgia syndrome: parental pain history and family environment. *Clin J Pain.* 1998;14:107-15.
81. Lysaght RM, Larmour-Trode S. An exploration of social support as a factor in the return-to-work process. *Work.* 2008;30:255-66.
82. Bergh H, Baigi A, Fridlund B, Marklund B. Life events, social support and sense of coherence among frequent attenders in Primary Health Care. *Public Health* 2006;120:229-36.
83. Thulesius HO, Grahn B. Reincentivizing – a new theory of work and work absence. *BMC Health Service Research.* 2007;7:100.
84. Sveriges officiella statistik (Official Statistic of Sweden.) Arbetsorsakade besvär. (Work related disorders). Stockholm: Arbetsmiljöverket (Swedish Work Environment Authority) and Statistiska centralbyrån (Statistics Sweden) (In Swedish). 2005.
85. Franche RL, Cullen K, Clarke J, Irvin E, Sinclair S, Frank J. Workplace based return to work interventions: a systematic review of the quantitative literature. *J Occup Rehabil.* 2005;15:607-31.
86. Allebeck P, Mastekaasa A. Swedish Council on Technology Assessment in Health Care (SBU). Chapter 5. Risk factors for sick leave - general studies. *Scand J Public Health.* 2004;32:49-108.

87. Holmgren K, Ivanoff SD. Supervisors' views on employer responsibility in the return to work process. A focus group study. *J Occup Rehabil.* 2007;17:93-106.
88. Lindberg P, Vingård E, Josephson M, Alfredsson L. Retaining the ability to work – associated factors at work. *Eur J Public Health.* 2005;16:470-5.
89. Karasek RA, Job demands, job decision latitude, and mental strain: Implications for job redesign. *Adm Science Quarterly.* 1979;24:285-307.
90. Bildt C, Backstig L, Hjelm IL. Work and health in Gnosjö: A longitudinal study. *Work.* 2006;27:29-43.
91. Lidwall U, Marklund S. What is healthy work for women and men? - A case-control study of gender- and sector-specific effects of psychosocial working conditions on long-term sickness absence. *Work.* 2006;27:153-63.
92. Siegrist J, Wahrendorf M, von dem Knesebeck O, Jürges H, Börsch-Supan A. Quality of work, well-being, and intended early retirement of older employees - baseline results from the SHARE study. *Eur J Public Health.* 2007;17:62-8.
93. Lindh M, Lurie M, Sanne H. A randomized prospective study of vocational outcome in rehabilitation of patients with non-specific musculoskeletal pain: A multidisciplinary approach to patients identified after 90 days of sick-leave. *Scand J Rehabil Med.* 1997;29:103-112.
94. Statistics Sweden (SCB). Swedish socio-economic classification. Stockholm. 1982.
95. Socialstyrelsen. Klassifikation av sjukdomar. Primärvård. (Classification of diseases, Primary Health Care). (In Swedish.) Liber. Nordstedts tryckeri. Stockholm. 1987.
96. Salen BA, Spangfort AL, Nygren AL, Nordemar R. The Disability Rating Index: an instrument for the assessment of disability in clinical settings. *J Clin Epidem.* 1994;47:1423-35.
97. Carlsson A-M. Assessment of chronic pain. Aspects of the reliability and validity of the Visual Analogue Scale. *Pain.* 1983;16:87-101.

98. Uden AL, Orth-Gomer K. Development of a social support instrument for use in population surveys. *Soc Sci Med.* 1989;29:1387-92.
99. Åstrand PO, Ryhming I. A nomogram for calculation of aerobic capacity (physical fitness) from pulse rate during sub-maximal work. *J Appl Physiol.* 1954;7:218-21.
100. Hsieh H-F, Shannon S. Three approaches to qualitative content analysis. *Qual Health Res.* 2005;15:1277-88.
101. Graneheim U, Lundman B. Qualitative content analysis in nursing research: concept, procedures and measures to achieve trustworthiness. *Nurse Educ Today.* 2004;24:195-212.
102. Forsman B. Forskningsetik. En introduction (Ethics in research. An introduction) (In Swedish.) Lund; Studentlitteratur. 1997.
103. Polit DF, Beck T. *Nursing research. Principles and Method* (7th ed.). Philadelphia; Lippincott Williams & Wilkins. 2004.
104. Edwards P. Increasing response rates to postal questionnaires: systematic review. *BMJ.* 2002;324:1183-5.
105. Huskisson EC. Measurement of pain. *Lancet.* 1974;9:1127-31.
106. Jensen MP, Karoly P. Self-reported scales and procedures for assessing pain in adults. *Handbook of pain assessment.* New York: The Guildford press. 1992
107. Frank-Stromborg, M, Olsen SJ. *Instrument for clinical health-care research* (2nd ed.) London: Jones & Bartlett pub. 1997.
108. Altman DG. *Practical statistics for medical research.* London: Chapman & Hall. 1991.
109. Price DD, McGrath DA, Rafii A, Buckingham B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. *Pain.* 1983;17:45-56.
110. Bowling A, Just one question: If one question works, why ask several? *J Epidemi Community Health.* 2005;59:342-5.

111. De Smet P, Sans S, Dramaix M, Bouleguez DA, Backer G, Ferrario M et al. Gender and regional differences in perceived job stress across Europe. *Eur J Public Health*. 2005;15:536-45.
112. Goine H, Knutsson A, Marklund S, Karlsson B. Sickness absence and early retirement at two workplaces – effects of organisational intervention in Sweden. *Soc Sci Med*. 2004;58:99-108.
113. Söderback I, Jacobs K. A study of well-being among a population of Swedish workers using a job related criterion-referenced multidimensional vocational assessment. *Work*. 2000;14:83-107.
114. Lotters F, Burdorf A. Prognostic factors for duration of sickness absence due to musculoskeletal disorders. *Clin J Pain*. 2006;22:212-21.
115. Behtge M, Herbold D, Trowitzsch L, Jacobi C. Return to work following work-related orthopaedic rehabilitation: a cluster randomized trial. *Rehabilitation (Stuttg.)*. 2010;49:2-12.
116. Soer R, van der Schaus CP, Geertzen JH, Groothoff JW, Brouwer S, Dijkstra PU et al. Normative values for a functional capacity evaluation. *Arch Phys Med Rehabil*. 2009;90:1785-94.
117. Werner EL, Storheim K, Løchting I, Grotle M. The COPE LBP trial: cognitive patient education for low back pain – a cluster randomized controlled trial in primary care. *BMC Musculoskelet Disord*. 2010. 16;11:33.
118. Bergman S. Public health perspective – how to improve the musculoskeletal health of the population. *Best Pract Res Clin Rheumatol*. 2007;21:191-204.
119. Coutu MF, Baril R, Durand MJ, Cote D, Rouleau A. Representations: an important key to understanding workers' coping behaviours during rehabilitation and the return-to-work process. *J Occup Rehabil*. 2007;17:522-44.
120. Hansen A, Edlund C, Henningsson M. Factors relevant to work: a multivariate approach. *Work*. 2006;26:179-90.

121. Haraldsson K, Fridlund B, Baigi A, Marklund B. The self-reported health condition of women after their participation in a stress management program: a pilot study. *Health Soc Care Community*. 2005;13:224-30.
122. Malmgren-Olsson EB, Bränholm IB. A comparison between three physiotherapy approaches with regard to health-related factors in patients with non-specific musculoskeletal disorders. *Disabil Rehabil*. 2002;15:308-17.
123. Leino-Loison K, Gien LT, Katajisto J, Välimäki M. Sense of coherence among unemployed nurses. *J Adv Nurs*. 2004;48:413-22.
124. Suominen S, Helenius H, Blomberg H, Uutela A, Koskenvuo M. Sense of coherence as a predictor of subjective state of health: results of 4-years of follow-up of adults. *J Psychosom Res*. 2001;50:77-86.
125. Edén L, Andersson HI, Ejlertsson G, Ekström BI, Johansson Y, Leden I. Characteristics of disability pensioners returning to work: an interview study among individuals with musculoskeletal disorders. *Disabil Rehabil*. 2007;29:1720-6.
126. Svajger A, Winding K. Perceptions of possibilities of returning to work with chronic musculoskeletal disorders. *Work*. 2009;32:443-54.
127. Szubert Z, Merez-Kot D, Sobala W. Occupational stress and the risk of sickness absence in customer service workers. *Med Pr*. 2009;60:259-71.
128. Sato Tde O, Coury HJ. Evaluation of musculoskeletal health outcomes in the context of job rotation and multifunctional jobs. *Appl Ergon*. 2009;40:707-12.
129. Genaidy AM, Rinder MM, A-Rehim AD. The work compatibility improvement framework: an assessment of the worker-work environment interaction in the manufacturing sector. *Ergonomics*. 2008;51:1195-218.
130. Eriksen HR, Ihlebaek C, Jansen JP, Burdorf A. The relations between psychosocial factors at work and health status among workers in home care organizations. *Int J Behav Med*. 2006;13:183-92.

131. Sjöström R. Multidisciplinary rehabilitation in musculoskeletal disorders. Quantitative and qualitative follow-up studies. Doctoral thesis. Mid Sweden University, Östersund. 2009.
132. Tjulin A, MacEachen E, Ekberg K. Exploring workplace actors experiences of the Social Organization of Return-to-Work. *J Occup Rehabil.* 2009; Oct 21 [Epub ahead of print].
133. van Duijn M, Burdorf A. Influence of modified work on recurrence of sick leave due to musculoskeletal complaints. *J Rehabil Med.* 2008;40:576-81.
134. van Duijn M, Miedema L, Elders L, Burdorf A. Barriers for early return-to-work of workers with musculoskeletal disorders according to occupational health physicians and human resources managers. *J Occup Rehabil.* 2004;14:31-41.
135. Wadell G. Preventing incapacity in people with musculoskeletal disorders. *Br Med Bull.* 2006;77-78:55-69.
136. Antonovsky A. A social critique of the “well-being” movement. *ADVANCES: J Mind-Body Health.* 1994;10:6-12.
137. Fichman MA. Theoretical approach to understanding employee absence. San Francisco: Jossey-Bass. 1984;1-46.
138. Gard G, Sandberg AC. Motivating factors for return to work. *Physiother Res Int.* 1998;3:100-8.
139. Berglind H, Gerner U. Motivation and return to work among the long-term sicklisted: an action theory perspective. *Disabil Rehabil.* 2002;24:719-26.
140. Brouwer S, Reneman M, Bültmann U, Van der Klink J, Groothoff J. A prospective study of return to work across health conditions: Perceived work attitude, self-efficacy and perceived social support. *J Occup Rehabil.* 2010;20:104-12.
141. Thomee P, Währborg P, Börjesson M, Thomee R, Eriksson BI, Karlsson J. Att tro på sig själv – grund för lyckad rehabilitering. (To believe in oneself – base for successful rehabilitation) (In Swedish). *Läkartidningen.* 2009;206:1975-7.

142. Lin CC. Comparison of the effect of perceived self-efficacy on coping with chronic cancer pain and coping with chronic low back pain. *Clin J Pain.* 1998;14:303-10.

