

Identifying, Describing and  
Promoting Health and Work Ability  
in a Workplace Context

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*As you venture forth to promote  
your own health and that of others,  
may the efficacy force be with you.  
A. Bandura*



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## Abstract

The overall aim of this thesis was to identify, describe and promote health and work ability in a workplace context. The thesis is based on four studies, three quantitative and one qualitative. *Study I and II* are based on the same population of employees in municipality-based home care services, responding to a self-administered questionnaire. *Study III* is based on municipal public services employees' responses to a self-administered questionnaire at baseline, at 10-weeks and at a 9 months follow-up. *Study IV* is based on qualitative interviews with ten employer representatives from different sectors. In *study I*, regression analyses were used to identify the predictors of perceived state of self-efficacy, musculoskeletal wellbeing and work ability for care aides and assistant nurses. The predictors of self-efficacy were physical job demands and safety climate, for both groups, and for assistants nurses also sex and age. The predictors of musculoskeletal wellbeing for care aides were sex and perceived personal safety. The predictors of work ability among care aides were age, seniority, and safety climate. For assistant nurses the predictors were sex, personal safety, self-efficacy and musculoskeletal wellbeing. The three potentially modifiable factors, physical job demands, safety climate and self-efficacy might promote sustainable work ability for both care aides and assistant nurses. Profession-related differences need special attention. In *study II*, home care services workers' (n=133) perceptions of the safety climate at work, working conditions, self-efficacy in relation to work and safety, safety-related behaviours, health and work ability were reported. Overall, a high frequency of musculoskeletal symptoms and physical exertion were perceived. Work-unit differences in safety climate, social support, decision-making authority, safety level at work and participative safety behaviour were noted. Restraining conditions on safe work performance were reported. Units with good practices can be role models and propose good solution in daily work for other units. Management support, structured routines and internal and external co-operation, and increased employee decision-making authority, can be prerequisites for a high quality and safe work performance. Effects of two educational interventions for women with musculoskeletal symptoms, employed in the public sector (*study III*), aiming to improve personal resources (individual-level) were studied; a self-efficacy educational intervention and an ergonomic educational intervention. Both interventions had positive effects, but in different ways. Increased perceived work ability was shown in the self-efficacy group, while increased use of pain coping strategies were shown in the ergonomic group. Employers' experiences of the work rehabilitation planning process for sick-listed employees with musculoskeletal pain and how it can be improved with a focus on quality and cost-effectiveness was described in *study IV*. The rehabilitation planning process could, according to the employers', be improved by them having a holistic perspective, supporting and evaluating goal attainment, and giving the process the time needed. Proactive workplace actions and good communication at the workplace were considered to be prerequisites for sick-listed employees successfully return-to-work.

## Svensk sammanfattning (summary in Swedish)

Det övergripande syftet med denna avhandling är att identifiera, beskriva och främja hälsa och arbetsförmåga ur ett arbetsplatsperspektiv. Tre av delarbetena är kvantitativa och en är kvalitativ. *Studie I och II* är baserade på samma population av anställda inom kommunal hemtjänst, vilka besvarade ett frågeformulär. *Studie III* är baserad på anställda vid olika enheter inom kommunal service, vilka besvarade ett frågeformulär vid tre tillfällen under en 9-månaders period. *Studie IV* baseras på kvalitativa intervjuer med arbetsgivare inom olika branscher. Den *första* studien syftade till att identifiera prediktorer för upplevd självtillit, muskuloskeletalt välbefinnande (hälsa) och arbetsförmåga hos sjukvårdsbiträden respektive undersköterskor inom kommunal hemtjänst. Resultatet från multipla regressionsanalyser visade att fysisk arbetsbelastning och säkerhetsklimat var prediktorer i båda grupperna, och för undersköterskorna var även kön och ålder prediktorer för self-efficacy. Prediktorer för muskuloskeletalt välbefinnande hos sjukvårdsbiträden var kön och upplevd personlig säkerhet. Prediktorer för arbetsförmåga hos sjukvårdsbiträden var ålder, anställningstid och säkerhetsklimat. Hos undersköterskor var prediktorerna kön, personlig säkerhet, self-efficacy och muskuloskeletalt välbefinnande. Dessa skillnader bör beaktas vid planering av framtida interventioner. Hos båda professionerna kan fysisk arbetsbelastning minskas, och arbetsplatsens säkerhetsklimat och den anställdes egen självtillit stärks stärkas. Syftet med den *andra* studien var att beskriva hemtjänstpersonalens upplevelse av säkerhetsklimat och arbetsförhållanden, aktiviteter för ökad säkerhet i arbetet, självtillit, hälsa och arbetsförmåga. Generellt rapporterade personalen höga fysiska belastningsnivåer och en hög frekvens av muskuloskeletala symtom. Signifikanta skillnader mellan hemtjänstgrupperna noterades avseende säkerhetsklimat, socialt stöd, inflytande över beslut, grad av säkerhet i arbetet, och grad av deltagande i arbetsplatsens säkerhetsarbete. Personalen angav ett stort antal faktorer som begränsade möjligheterna att utföra arbetet på ett säkert sätt. Hemtjänstgrupper med 'goda praktiska lösningar' kan utgöra roll modeller för andra grupper när det gäller att utveckla fungerande lösningar i det dagliga arbetet. Arbetsgivarstöd, tydliga rutiner, intern- och extern samverkan och påverkansmöjligheter för de anställda, kan ge bättre förutsättningar att utföra arbetet med högre kvalitet och säkerhet. I den *tredje* studien beskrivs effekterna av två interventioner för kvinnor med muskuloskeletala symtom, anställda inom kommunal service: en 'self-efficacy utbildning' respektive en 'ergonomisk utbildning'. Båda syftade till att stärka deltagarnas egna resurser i förhållande till sitt arbete. Båda interventionerna visade goda effekter, men på olika sätt i de båda grupperna. Den upplevda arbetsförmågan ökade i 'self-efficacy gruppen'. I den 'den ergonomiska gruppen' ökade användningen av smärt coping strategier. Arbetsgivarnas upplevelser av hur arbetsrehabilitering kan planeras för att bli av bättre kvalitet och mer kostnadseffektiv, beskrevs i den *fjärde* studien. Arbetsgivarna ansåg att processen kunde förbättras genom att de arbetade utifrån ett holistiskt perspektiv, gav de sjukskrivna stöd, utvärderade deras målluppfyllelse och gav rehabiliteringsprocessen tillräckligt med tid. Proaktiva arbetsplatsinsatser och god kommunikation inom arbetsplatsen var för enligt dem förutsättningar för en lyckosam arbetsåtergång.

## List of original papers

This thesis is based on the following papers.

- I. Larsson A, Karlqvist L, Westerberg M, Gard G. Identifying work ability promoting factors for home care aides and assistant nurses. *Submitted*.
- II. Larsson A, Karlqvist L, Westerberg M, Gard G. Promoting healthy work and a safe work environment in home care services in Sweden. *Submitted*.
- III. Larsson A, Karlqvist L, Gard G. Effects of work ability and health promoting interventions for women with musculoskeletal symptoms: A 9-month prospective study. *BMC Musculoskeletal Disorders* 2008, 9: 105
- IV. Larsson A, Gard G. How can the rehabilitation planning process at the workplace be improved? : A qualitative study from employers' perspective. *Journal of Occupational Rehabilitation*, 2003; 13(3): 169-181.

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## Abbreviations

Borg RPE scale	<b>R</b> ating of <b>P</b> erceived <b>E</b> xertion
CPSQ	<b>C</b> openhagen <b>P</b> sychosocial <b>Q</b> uestionnaire
CSQ	<b>C</b> oping <b>S</b> trategies <b>Q</b> uestionnaire
JCQ	<b>J</b> ob <b>C</b> ontent <b>Q</b> uestionnaire
NOSACQ-50	<b>N</b> ordic <b>O</b> ccupational <b>S</b> afety <b>C</b> limate <b>Q</b> uestionnaire
QPS Nordic-ADW	<b>N</b> ordic <b>Q</b> uestionnaire for <b>P</b> sychological and <b>S</b> ocial factors at work - for monitoring the <b>A</b> ge <b>D</b> iverse <b>W</b> orkforce
VAS	<b>V</b> isual <b>A</b> nalogue <b>S</b> cale
WAI	<b>W</b> ork <b>A</b> bility <b>I</b> ndex
WMSDs	<b>W</b> ork-related <b>M</b> usculoskeletal <b>D</b> isorders

# Introduction

## Health promotion in a workplace context

Health promotion at the workplace can be seen as a dynamic balance between personal resources and specific factors relating to the workplace [1]. The intention in promoting health is to maintain the health of workers and their ability to work, as well as to build up relevant strengths, competencies and resources. Health promotion can be defined as processes to improve health, such as initiating and ensuring empowerment, equality, partnership, collaboration, participation, and self-determination [1, 2]. Health involves a dynamic balance between individuals and their environment, including all individuals' capacity to live and achieve their potential [1, 2]. Work-related health is often defined as being well and feeling fit for work [3]. In this thesis, "health" also specifically includes *musculoskeletal wellbeing* (defined as very seldom or never experiencing pain) and the absence of injury, and having a belief in one's own ability (that is, *self-efficacy*) to cope with and exert control over work-related health and safety, as well as being able to participate in working life. In this thesis, the ability to work refers specifically to the occupation under consideration, and to the employees' ability to sustain his or her present role in the-long term. This is generally referred to as a sustainable '*work ability*'.

*Work ability* can be seen as a balance between a person's resources and the demands of the work that they perform [1, 4], where the former is linked to health and functional abilities, values, attitudes, education, work skills and health practices [4, 5], and the latter to the actual content, demands and organisation of the work, as well as the working community and the working environment [4, 6]. Being able to cope at work, having control over one's work and participating in the work community are important dimensions of work ability. These need to be viewed in relation to the potential of the organisation in which the person works to support each dimension [7].

*Health promotion* can be defined as "...a process directed towards enabling people to take action, for example to exert control over the determinants of health and thereby improve health. Thus, health promotion is not something that is done on or to people, it is done *by, with, and for* people either as individuals or as groups." [8, 9]. Today an increased attention is on the importance of *proactive interventions* focusing on the organisational, managerial, psychological, social and physical preconditions, as they all have a potential influence on employees' occupational health, safety and ability to work [1, 7, 10]. Health promoting interventions at, or affecting the workplace are needed to develop healthy work organisations and to reduce the costs of absence arising from illness. A healthy work organisation is an organisation characterised by both profitability or efficiency and a healthy workforce, which can maintain a satisfying work environment and organisational culture through periods of market turbulence and change. In healthy work organisations, work ability, job satisfaction

and well-being are all high. It is important when working with health promoting interventions to include individual, group, and organisational levels [2]. A review on the effectiveness of work-place health promotion programmes to improve workers' presence at work (i.e., reduce their sickness presenteeism at work) has been performed. They concluded that organisational leadership, screening for health risks, physical exercise, a supportive workplace culture, and engaging in individually tailored programmes were important for work place health. It also showed that certain risk factors were increasing the record of working while ill, such as high stress, poor relations with co-workers and management and lack of exercise [11]. Systematic efforts to promote health, can target and confront the specific risks for injury or disability that employees of a particular company or occupation encounter within their workplace [12].

### *The workplace contexts in this thesis*

The workplace contexts in this thesis are municipal-based public services, occupational health and occupational rehabilitation. The main context is municipal home care services. Among employees in these sectors, a trend towards increased physical and psychosocial strain can be noted, with a high frequency of work-related injuries and musculoskeletal disorders and reduced work ability according to research [13-15]. Following, the objective of interest in this thesis is on how to improve employees' ability to sustain and increase their health and work ability in the long-term. Workplace factors as well as individual factors are addressed. Programmes can be aimed at, for example, empowering and educating employees and affecting *how* they work in their workplace and/or making the changes *on* the workplace, which is, changing the environment.

### **Safety promotion – one part of a health promotion framework**

In this thesis, I have incorporated the views of health promotion and safety promotion. This is supported by proposals of that injury prevention and health and safety promotion should be integrated with, or at least performed in parallel with, a more general framework of health promotion [16-18]. This can lead to the development of good practices in Occupational health services [18]. Earlier, these two perspectives represented separate areas of expertise within public health and preventive medicine. However, adopting the best of both areas can produce positive effects. That is, while safety promotion are increasingly assuming a salutogenic view on individual resources, capacities and participation, using health psychology and models explaining behaviours, the field of health promotion are implementing more structure-oriented and environmental approaches [16, 19]. *Safety promotion* can be defined as: “the process by which individuals, communities and others develop and sustain safety”. This process includes all efforts agreed upon to modify structures, the environment (physical, technological, political, economic and organisational) as well as attitudes and behaviours related to safety”. *Safety* can be defined as “a state in which hazards and conditions leading to physical, psychological and material harm are controlled in order to preserve the health and well-being of individuals and the community. It is an essential resource for everyday life, needed by individuals and communities to realize

their aspirations” [20]. A key point made by the researchers who contributed to the document was that safety has two dimensions, one objective and one subjective. The *objective* dimension concerns the objective risk factors and environmental hazards at work, while the *subjective* dimension can be described as the person’s feelings of being safe and not worried, and considering their personal susceptibility for injury to be low [17]. In both health promotion and safety promotion the focus is on both the *process* and the *participation* and ownership of those concerned. Safety can be viewed as, one of many conditions, for health. However, while a person’s health has the potential to be improved in a positive direction the optimal levels of objective and subjective safety are still a matter of discussion [16, 17]. These can affect the person’s motivations for taking precaution concerning safe work performance, but also the ability to participate in working life and achieve his/her potential. This reasoning about safety is further elucidated in a following section in this thesis, on personal safety perceptions.

### **Health promotion in work rehabilitation**

In 2002, the Swedish government accentuated the need for clearer employer responsibility and measures to promote an early return to work after illness [21], and specified that a more active and preventive role should be undertaken by the occupational health services [22]. The Swedish National Insurance Act specifies that employers are responsible for regularly planning and controlling the working environment in their companies. Employees’ different prerequisites to perform their work need to be considered and suitable actions taken, including, e.g., adjustments *in or to* the work environment. The employers are also responsible for ensuring that any need for rehabilitation, is noted as soon as possible and that action is taken and financed. This includes making a plan for the active rehabilitation of the employee and setting up the programme in consultation with the Social Insurance Office. A satisfactory rehabilitation plan will include early, well-coordinated and varied interventions from different professionals, according to the needs of each sick-listed employee who has suffered from a work related injury or illness [22]. The process of returning to work has been studied from different perspectives for employees with musculoskeletal symptoms. It has been studied from the perspective of: the person afflicted, the employers, the Social Insurance officers and the actors involved in the rehabilitation. Taken together, these studies confirmed the importance of client centeredness, for example to take their motivation and goals into consideration. This can be fulfilled in the rehabilitation process. The employer can take early action and engage in the rehabilitation process. In addition, coordination of the professional actors involved and the ability of the workplace to ensure practical and social support have been found to be of great value [23-27]. Both employers and health care professionals have the potential to play a key role in facilitating the return to work of an injured or ill person [28]. By supporting sick-listed employees’ positive coping strategies and introducing the use of goal formulations, their social and physical function can be improved and their pain reduced [29]. From an employer perspective, it has been argued that a process of integrated actions is required to reduce the impact of disability in the workplace [12]. For example, it was shown that companies that

were advanced in terms of the safety initiatives taken also often had implemented programmes promoting and supporting a return to work [12]. Furthermore, measures taken with the purpose of encouraging injured workers to return to work, e.g., by modifying the tasks at work and introducing permanent ergonomic or organisational improvements also have shown good effects for colleagues at the same workplace by a decreasing the incidence of injury [30].

### **A salutogenic perspective**

From a *salutogenetic perspective*, workplace health and safety promotion focuses on healthy aspects at work and the potential resources that can be found there. Health and safety are perceived to involve more than just factors relating to physical health and the avoidance of injury, also psychological and social dimensions are involved [5, 17, 31], and the salutogenic perspective can be used in interventions on individual, group and organisational level. This is similar for work ability, where the work context is considered to be a resource to assist the individuals to cope at work, to exert control over their work and to increase participation at the work place [7]. Salutogenic approaches focus on resources, on factors that maintain health and promote a movement towards the healthy end of a continuous scale where the end points are ill-health and excellent health [32]. Attention have been called upon the need to analyse and understand why most people stay healthy despite health risk factors and strains, and to the importance of developing effective approaches to promote employee health at work [33]. The point of salutogenesis is to achieve low levels of known risk factors, but also to identify factors that can act as buffers against ill health. Salutogenesis also means to consider positive factors and conditions directly promoting good health [32]. This requires the introduction of actions to increase people's control over their own health, as well as action intended to promote supportive environments, i.e., to increase salutogenic features of our living conditions [16]. Research is rarely conducted at the positive end of the health continuum and on the factors that directly promote good health [34-36]. In this respect, it should be noted that research has revealed that the concept of health promotion can be viewed in different ways by health professionals, with a health promoting approach being considered to be totally proactive, integrated with primary prevention, or existing side by side with medical measures in secondary or tertiary prevention (rehabilitation). In the latter, emphasis are placed on the reinforcement of salutogenic measures intended to support the resources and healthy potential of patients [37]. This is also the view of health promotion that is adopted in this thesis, where we consider it to mean indentifying and supporting health potentials and individual- and workplace-related resources for workers in different situations along a continuum from reduced to excellent health and work ability.

### **A biopsychosocial perspective**

There are certain approaches that can be adopted to explain specific behaviour, such as the 'health belief' model, the social cognitive theory, the theory of reasoned action, and the theory of planned behaviour. At present, such theories are integrated on community level and in ecological approaches for the promotion of health. Individual



behaviours are viewed as a product of the situation, contextual or interpersonal factors and socio-cultural environmental aspects [19]. Such a model can explain how factors such as actions and decisions taken earlier in time and elsewhere, can influence people's health and safety-related behaviours at work [19, 38, 39]. An integrative model linking attitudes and behaviour was recently proposed by Fishbein, under the name of 'the integrative model of behavioural prediction' [40]. The model is centred on the theory of planned behaviour [41], describing three primary determinants of intention to engage in a particular behaviour: (1) one's attitude towards personally performing a specific behaviour (2) one's perception of the social norms or social pressure relevant to performing the behaviour, and (3) one's perception of behavioural control or self-efficacy with respect to performing the behaviour, that is, belief of having the necessary skills and abilities to perform the behaviour, even in the presence of constraints [40, 42]. The model also includes variables relating to external or background influences, such as traditional demographic and cultural differences; individual differences and external interference or exposure. These variables can be reflected in the belief structure underlying any given behaviour. Furthermore, the model reflects the understanding that the absence of necessary skills or abilities or unexpected situations or environmental constraints may motivate or hinder people from carrying out their intentions [40].

## **An organisational perspective on employee' job demands, job control, and social support**

In this thesis, I have also used the demand-control-social support model from an organisational perspective. This model assumes that job resources such as having control over one's job and receiving support from co-workers and supervisors are important health and work ability promoting factors as they can act as buffers against heavy job demands [43-45]. The model has been used frequently to analyse these psychosocial dimensions of the work environment and outcomes, in terms of feeling psychosocial strain [43, 44]. Theoretically, the demand-control model is sociological in its presumption that socially "objective" environments systematically influence the behaviour of individuals and their wellbeing. The model is also psychological in its presumption that psychosocial experiences are an important factor for health and wellbeing [46]. Over the years, the model has been used frequently and new effects relating to complex working environments have guided further development of the model and its applications [47]. In addition to the individual level, it is meaningful to identify a group or team level as well as an organisational level, as there is interplay between these three levels. More attention needs to be paid to the organisational factors and to the processes that give both the workers and the management the authority to act in ways that that are likely to promote healthy workplaces [47-49].

Job resources, such as being able to exercise control over one's work, professional knowledge and skills, and support from one's co-workers and supervisors are well-known resources for health and well-being as they can act as buffers against job

demands [43-45]. Still, research has reported conflicting results about the moderating effects of the potential resources of 'control' and 'social support' on workers' well-being. This can be explained by the fact that the impact of having a highly demanding job on well-being, is only moderated by specific aspects of job control that correspond to the specific demands of a given job [50]. Further reasons could be that factors considered as job resources in some situations (such as social support and skills) could have a negative influence, as it is known that having high requirements for skills and ingenuity, a strong sense of solidarity with peers and the organisation, and loyalty to a client can, in some situations, make it easy to exceed the limits of an acceptable workload [45, 51]. Hence, the development of the model evolves from a need to include more specific measures of demands, control and support in the models [47, 52].

### **Increased specificity of job demands in different work contexts**

The demands that jobs can impose can be defined as "psychological stressors involved in accomplishing the work load, stressors related to unexpected tasks, and stressors of job-related personal conflict" [53] have often been measured by scales of psychosocial demands at work [43, 46, 50]. It was later emphasised that the response of the individual (including specific aspects of job control) must be precise and correspond with the specific demands of a given job to obtain balance [48, 50]. This is in line with a perspective of balance between a person's resources and the demands of work, to ensure that it is possible to obtain good health and sustainable work ability [1, 4, 6]. The demand-control-support framework has recently been applied on research in an *occupational safety context* [54, 55]. It was revealed that the component relating to the demands of the job, often measured in terms of the psychosocial demands imposed, had not been able to predict safety. One explanation for this might be that the component representing the demands of the job was too general, and was, therefore, not reliable in either a general work context or a safety context [50, 54]. It was shown that "blue collar" stressors in the physical work environment were better predictors of workers' health and the safety risks they were exposed to than psychological demands [56]. Further, stressors were introduced by situational constraints, such as faulty equipment, inadequate information, and interruptions that prevent employees from performing their work, all of which have been shown to be relevant components of job demands to influence occupational safety [54].

### **Perceived control and actual opportunities to influence the work context**

The individuals' perceptions of their ability to exert control over the actions affecting their health is closely related to the concept of self-efficacy, and is essential in efforts to predict behaviour [40, 42]. Research confirms that individual workers' perceived control over the work content, as well as over the working environment, has an impact on workplace injuries [54, 57]. Nowadays, increased attention is paid to the actual opportunities available to workers to exert control over decisions and actions within their workplace context [48, 58]. Control can be interpreted as "the freedom for people to act using their repertoire of skills within the social structure in which they have

made their main investments and have gained their major life-sustaining rewards”. External organisational or environmental restrictions can hinder the execution of the strategy the individual has chosen, or can psychologically limit his or her internal control. These factors set the limits for the individuals’ alternative courses of action (degrees of freedom to operate) to meet the environmental challenges and demands [48]. External factors, and elements that may be changeable after a long period of time, are constituents primarily under the organisation’s control; e.g., the environment in which the tasks are to be conducted including the physical and geographical setting, risk, distractions, and the interpersonal environment, which incorporates elements like feedback and persuasion [59]. In studies of occupational safety, control can be specified as an employee’s perceptions of his/her influence over organisational safety practices and procedures, and engagement in safety behaviours. Control can, act as a buffer against the potentially negative effects that situational constraints can have upon the occurrence of injuries [54].

### **Social support as a job resource**

The social relations at the work place are important for the health of individuals, as they are believed to provide a buffer against heavy job demands [43, 44]. It was proposed that the different sources of support, i.e., from the employer or from co-workers, and the effects of instrumental and socio-emotional support should be considered when studying ‘support’. Instrumental social support concerns the extra resources or assistance with work tasks that is or can be given by supervisors or co-workers, while socio-emotional support is a kind of support that offers a buffer against psychological strain. Socio-emotional support concerns the degree of social and emotional trust and integration in the overall work group, e.g., the strength of the norms that influence new behaviour patterns [43]. The quality of the social support and the direction it takes can be further specified. Recently the demand-control-support framework was used in research on safe work practices (e.g., to investigate rule violations). It was shown that a good safety climate can be considered as a resource for encouraging employees to take health and safety into account as matter of course for the various situation that exist in the workplace [54].

Research has revealed that organisational leadership and a supportive workplace culture are important features in interventions to reduce absenteeism [11]. Moreover, research on *return to work-interventions* has demonstrated the significance of workplace social relations, and also of structural issues. A review of qualitative studies on occupational rehabilitation showed the importance of supervisors for good results from rehabilitation. Through their daily/continuous contact with the workers, supervisors can cope with daily physical work environmental conditions on individual and group level. They can also act as an advocate, by providing legitimacy to their workers’ illnesses and injuries and by modifying work tasks, and mediating in problematic workplace relations [28, 60, 61]. Co-workers have an important role in supporting the return to work process [61, 62]. From the perspective of social responsibility and workplace loyalty, co-workers’ actions have to a high extent concerned practical issues to make day-to-day activities work [61]. In addition to the

provision of peer support, the needs and activities of the entire work group must be focused towards improving return-to-work outcomes for injured employees [62]

### **Employees' opinions of the safety climate in their workplace**

Safety climate is one aspect of the organisational climate, that is created from the shared perceptions of employees concerning what procedures, practices, and behaviours that is rewarded and supported in the organisation [63, 64]. Hence, safety climate can be defined as the shared perceptions of the members in a social unit of safety related policies and practices influencing safety in the organisation [64]. It includes, for example, peer safety communication, perceptions of commitment, non-acceptance of risks, and the managements' ability to manage and prioritise safety [65]. A safety climate encompasses all competing demands and relative priorities between safety practices and productivity. From an employee's point of view, these signals influence perceptions of what role-related behaviour might be suitable, and rewarded at the workplace [64]. It has been proposed that the perceptions the members of a work group have of their shared climate emerge from a combination of social interaction with peers in which all concerned are trying to make sense of complex work situations, and from the quality of the leadership [64]. Previous research has confirmed that management's perceptions of safety climate influence the work teams perceptions of safety climate thereby indirectly affecting the safety of individual workers [66, 67]. Positive relationships between safety climate and the safety-related behaviour of the members of a work group and outcomes, in terms of, e.g., low injury rates, have been identified [68]. The work place safety climate has recently started to be studied in medical care sectors. There are indications that interventions focusing on potentially modifiable dimensions of the safety climate can increase the health and safety of both the medical care personnel and their patients [66, 69-72].

## **Individual factors to promote health and work ability**

### **Self-efficacy**

Self-efficacy, i.e. a belief in one's own ability to overcome obstacles and perform a desired behaviour or meet situational demands, is known to be an important health and work ability promoting factor [29, 73-75]. It refers to the perceived ability to mobilise one's own motivation, cognitive resources and to utilise the causes of action in response to situational demands [76]. Self-efficacy is a social construct, and a key concept in *Social Cognitive Theory*, making it possible to deepen the understanding of human social behaviour. Social cognitive theory emphasises cognitive and behavioural learning and the individual's abilities to exert control. There is a reciprocal interaction between personal resources (including self-efficacy), behavioural capability, and external environmental factors [42, 75]. Self-efficacy beliefs can be developed by prior successful experiences of the result of performing a certain behaviour, through the social influence of peers acting as role models for successful practice, or by verbal persuasion [75]. The stronger individuals' self-efficacy beliefs, the more persistent

they will be in their efforts to bring about behavioural changes [75]. Self-efficacy is closely related to ‘perceived behavioural control’ in other theories of behavioural changes, e.g., the theory of planned behaviour [40-42] .

### ***Self-efficacy in relation to pain, work and safety***

When a person has a sense of being in personal control or having strong ‘self-efficacy’, there are implications for the person’s ability to manage musculoskeletal pain by themselves [29, 74, 75, 77]. There is a complex interaction between psychological factors and symptoms, and each psychological factor also has different effects on health and disability. An individual’s beliefs in his or her own ability and the person’s positive expectations concerning a treatment outcome have been identified as important predictors for better recovery from illness and for work ability [29, 78-80]. Self-efficacy and other pain-related beliefs (such as fear, and the avoidance of movement) were shown to be more significant determinants for disability than the intensity and duration of the pain itself [29, 77]. Pain and other symptoms, as well as catastrophising thoughts have a negative influence on disability [74]. Programmes that focus on participants’ self-confidence and self-efficacy at work, their ability to meet the expectations of others during work, their prioritisation of health at work and their ability to manage musculoskeletal symptoms and work-related problems have proved to be effective for health and work ability [81-85]. At the workplace, a worker’s self-efficacy is not only influenced by internal factors, but also by external factors that are primarily under the control of others in the work organisation, for example the resources available, the complexity of the tasks to be performed, sudden external distractions, and the amount of danger in the work [59]. Recently developed scales on “return-to-work self-efficacy” address employees’ interaction with their workplace, by considering aspects such as being able to meet job demands by adjusting individual tasks, managing to obtain support from colleagues and supervisors and by successful coping with pain [86-88]. Attention has also been given to the need to improve self-efficacy beliefs at work, and ensuring that as many of the work tasks as possible can be accomplished in a number of different ways [48, 89]. This applies especially to jobs in which unpredicted environmental challenges and competing demands can occur, which is the case, for example, in some divisions of medical care (for example emergency teams)[90].

### **Motivation**

The motivation for behavioural change is influenced by risk perceptions, the perception of self-efficacy and the belief that the outcome is likely to be successful and valued [40, 91]. Work motivation can be promoted by increased self-efficacy in relation to a person’s performance and by feedback, balance of demands and capacity, and support with decision-making and prioritisation [92, 93]. Emphasis has also been placed on the significance of being autonomous in the performance of one’s job, and feeling this to be the case. Work environments and managers who are supporting autonomy have a positive influence on workers’ motivation, and, therefore, on positive work attitudes, job satisfaction, psychological well-being, and the quality of the employees’ work performance [94]. For the employees, motivation and knowledge

about safety in the workplace, and having a good safety climate can influence them to consider safety in work [10]. Within occupational rehabilitation, an individual's motivation in relation to his or her return to work can be influenced by individual factors, such as expectations, goals and self-efficacy [95, 96] and by work-related factors, such as the tasks involved in performing a job, and by receiving support. In addition, an individual's motivation can be influenced by factors within a rehabilitation process, for example information about possible options and interventions, the degree of participation, and communication with the people involved in the rehabilitation [25, 96].

### **Personal safety perceptions**

People's comprehensions of risk is partly 'analytical', and is formally based on a risk assessment, and calculations of probability and of the consequences of certain actions, but it is also 'intuitive' and automatic, and linked to emotion and affects [97]. Hence, demographic and individual variables will be reflected in an employee's perception of personal risks, in addition to the more objective risk factors at work [98]. If a person is feeling safe and not worried, this usually means having psychological wellbeing. On the other hand, it has been noted that if feeling *too* safe people tend to take less caution [91]. Perceiving oneself to have a vulnerability to a work-related injury or illness, this can help to motivate a behavioural change and the adoption of a safer work behaviour. That is, when it is combined with a perceived ability to take control of one's life and of risk factors at work [91, 99]. In contrast, if a threat is perceived, but the person concerned does not have any ability to manage it, that person's attitudes could be defensive [91]. Research has shown that many workers underestimate their actual risk of being inflicted with work-related musculoskeletal disorders (WMSDs) and do not take preventive actions [99]. Good intentions are not sufficient for people to routinely adopt manners that will increase their personal safety and health. Finally, it is worth mentioning that psychosocial stress [100], the existence of unexpected situations and the lack of necessary skills or can hinder people from carrying out actions in the manner that they had intended to do [40]. Such conditions increases the possibility of the work-related risks being accepted and normalised [100].

### **Behaviour affecting work and health**

Key factors in promoting health and work ability in the workplace can involve: learning a constructive coping pattern, creating an open work climate, improving communication and learning [101]. The actions people take to manage psychological stress or to handle challenging situations in life are usually defined as *Coping* strategies. Individual and contextual factors influence the selection of coping strategies at work. A stressful work situation could be managed by learning to perform the work tasks required in a different, less stressful way, or by changing the threatening environment. It can also be changed by controlling the feelings associated with the situation. The strategies can be classified as problem-focused when the coping strategies are directed towards managing the problem and emotion-focused, when the strategies are focused on managing emotions [102]. Coping strategies can also be

active or passive in nature. For example, active self-management of pain involves taking responsibility for the pain management and attempting to control the pain and function whilst performing daily activities in spite of pain. Passive pain coping strategies, in contrast, can reflect a tendency to withdraw or to rely on an outside source [102-104]. Research has shown that decreased perceived control over pain, a belief that one is disabled by pain, catastrophising thoughts and increased use of passive strategies, have all been shown to be strong negative predictors of daily functioning [105-108]. It has been proposed that the different styles of coping are important at different stages of recovery and at different levels of pain severity [105, 106]. The use of active strategies, such as positive distraction and attempting to ignore pain, and a belief in being able to control pain, are positively associated with the general activity level of patients with relatively low pain levels [106]. In workplaces, to adopt an adequate problem-solving behaviour is the responsibility of both the employees and the organisation. Interventions need to focus on modifying environmental stressors, improving personal relationships, role issues etc. [109]. Within the context of occupational safety, different types of safety behaviours have been identified, such as compliance with recommendations for the use of personal protective equipment, following rules and standardised procedures, and engaging in participative safety behaviour that concerns taking part in proactive measures for improving workplace safety [10]. The significance of the latter is well supported by theories and research within the field of health and work ability promotion.

# Aims

The overall aim of this thesis were to identify, describe and promote health and work ability in a workplace context

The specific aims of the studies were:

- I. to identify the predictors of self-efficacy, musculoskeletal wellbeing and work ability for care aides and assistant nurses in home care services.
- II. to describe home care service workers' perceptions of their safety climate, safety-related behaviours, working conditions and self-efficacy, health and work ability.
- III. to describe the effects of a self-efficacy education intervention and an ergonomic education intervention for women with musculoskeletal symptoms, employed in the public sector.
- IV. to describe employers' experiences of the work rehabilitation planning process and how it can be improved with a focus on quality and cost-effectiveness.



# Material and methods

## Overall context and study design

This thesis is based on four studies, three quantitative and one qualitative, performed in the province of North Bothnia. Participants in the studies were to a high extent employees in municipal public services, working within municipal home care services for the elderly (study I and II). Home care workers also participated in study III which includes public service employees working with *people* in other divisions (e.g., as a child-minder or teacher), with manual handling of things (e.g., as a cook or cleaner) or with *data* (as in the case of administrative staff). These are all female-dominated workplaces. In study III all of the participants had musculoskeletal symptoms, but some were working fulltime or part time, others were on part-time sick-leave. None of the participants in studies I and II were sick-listed, but about three-quarters of them reported having some musculoskeletal symptoms. The empirical data in study IV includes employers from a variety of workplaces and geographical areas within North Bothnia, including municipal, government and private workplaces. As employers, they are responsible for the rehabilitation of employees with work-related musculoskeletal symptoms. In study IV the focus was on the employers plans for these employees to return to work.

Studies I, II and IV were cross-sectional. Study III, in contrast, was a prospective investigation conducted over a 9 -month period with the intention of describing the effects of two interventions. Studies I and II were performed within the department of home care services for the elderly in one municipality. Study III included employees in public services workplaces employed within another municipality, and study IV included employer representatives of different companies in various districts within North Bothnia. In studies I, II and III the participants completed a self-administrated questionnaire. In study III the participants responded to a questionnaire at the baseline, 10-weeks later and at a 9 month follow-up. In study IV qualitative interviews were performed with representatives of the employers from different sectors. An overview of the study designs and relevant information concerning the participants is shown in Table 1.

**Table 1.** Overview of Studies I-IV

Study	Design	Participants, n	Data source	Main objectives
I	Cross-sectional: <i>within</i> -group regression analyses	Total, n= 137 <sup>1</sup> Front-line staff within municipal home care services: Care aides, n= 58 Assistant nurses, n= 79	Self-administered questionnaire  Data collected in 2009	Identify the predictors of self-efficacy, musculoskeletal wellbeing and work ability in care aides and assistant nurses in home care services.
II	Cross-sectional descriptive study <i>Between</i> -group-analyses	Total, n= 133 <sup>1</sup> Care aides and assistant nurses within municipal home care services.	Self-administered questionnaire.  Data collected in 2009	Describe home care service workers' perceptions of their safety climate, safety-related behaviours, working conditions and self-efficacy, health and work ability
III	Prospective study: <i>within</i> -group analyses  Cross-sectional: <i>between</i> -group-analyses	Total, n=42 Women, with musculoskeletal symptoms, working full- or part time in a municipal public services division, and who were participating in either a: Self-efficacy education, n=21 or an Ergonomic education, n=21	Self-administered questionnaire.  Data collected in 2004-2005	Describe the effects of a self-efficacy educational intervention and an ergonomic educational intervention for women with musculoskeletal symptoms, employed in the public sector
IV	Cross-sectional: descriptive study	Total, n= 10 Employer representatives in different companies and rural districts	Qualitative interviews  Data collected in 2003	Describe employers' experiences of the work rehabilitation planning process and how the process can be improved with a focus on quality and cost-effectiveness.

<sup>1</sup> Subjects from the same populations of home care services workers. Only those who had completed all the questions used in either studies I or II respectively were included in the data analyses.

## Questionnaire based research

### Study I and II

#### *Participants and methods*

Studies I and II are based on the same cross-sectional data collected in early 2009 in a municipality in the north of Sweden, as a part of a larger health and safety promotion project. In this municipality, a total of 350 care aides and assistant nurses provided home care services to about 900 elderly persons (clients) living in private homes. In terms of organisation, the staff was divided into 18 work units, which are managed by 16 supervisors and one head of home care services. Of the total population of 350, 298

home care workers met the inclusion criterion of having worked in the same unit in the last six months and were, therefore, invited to participate in the study. The relevant supervisors provided the potential participants with a letter containing information about the research, a letter of consent for them to sign, a hard-copy of the questionnaire and a prepaid envelope. After one reminder, 158 (54 %) had returned their questionnaire. However, only the participants who had completed all of the questions required to measure the variables in each study were included; 137 subject in study I and 133 subjects in study II. Fewer variables were used in the regression analyses of study I than the descriptive results of study II (variables included in the studies are shown in Table 4). The final study participants had a mean age of 45 years, the majority was women and about 40 % were care aides. Although the two professions were found to differ significantly in their beliefs concerning their self-efficacy, with the assistant nurses having a higher opinion of their self-efficacy in relation to work and safety, the two professions did not differ in terms of their general health or work ability. Data on individual background factors and a selection of important health variables are provided in Table 2.

**Table 2.** Characteristics of the participants in studies I and II.

	Study I <sup>1</sup>		Study II <sup>1</sup>	p1
	Care aides n=58	Assistant nurses n=79	Care aides and assistant nurses n=133	
<b>Age</b>	44.0 ± 12.6	46.5 ± 9.3	45.3 ± 10.8	0.177
<b>Sex</b>				0.614
Female	53 (91)	74 (94)	123 (92)	
Male	5 (9)	5 (6)	10 (8)	
<b>Profession</b>				
Nursing aide	.	.	57 (43)	
Assistant nurse	.	.	76 (57)	
<b>Hours worked/week</b>	34.2 ± 5.4	34.6 ± 4.3	34.4 ± 4.8	0.654
<b>Employment contract</b>				0.915
Permanent	54 (95)	72 (92)	122 (94)	
Temporary	4 (5)	7 (8)	11 (6)	
<b>Work schedule</b>				<b>0.012</b>
Day, evening, weekend	58 (100)	71 (90)	126 (95)	
Night	0 (0)	8 (10)	7 (5)	
<b>Seniority in home care services, years</b>	13.1 ± 9.4	11.6 ± 8.1	12.4 ± 8.7	0.310
<b>Physical demands</b>	13.3 ± 2.6	13.2 ± 2.3	13.2 ± 2.4	0.706
High (scale value ≥14)	22 (38)	31 (39)	53 (39)	
<b>General health</b>	4.2 ± 0.7	4.2 ± 0.7	4.2 ± 0.7	0.998
Good (scale value ≥ 4)	50 (86)	70 (89)	117 (88)	
<b>Self-efficacy; work and safety</b>	4.4 ± 0.5	4.6 ± 0.4	4.5 ± 0.4	<b>0.004</b>
Strong (index value ≥4.5)	29 (50)	56 (71)	82 (62)	
<b>Musculoskeletal wellbeing</b>	4.4 ± 0.7	4.2 ± 1.0	4.2 ± 0.9	0.096
High (index value =5.0)	12 (21)	22 ( 28)	36 (27)	
<b>Work ability</b>	15.1 ± 2.1	15.4 ± 1.8	15.3 ± 1.9	0.331
High (index value ≥ 15)	44 (76)	66 (84)	107 (80)	

<sup>1</sup> Participants from the same populations of home care services workers. Only those who had completed all the questions used in study one and two respectively were included in the data analyses.

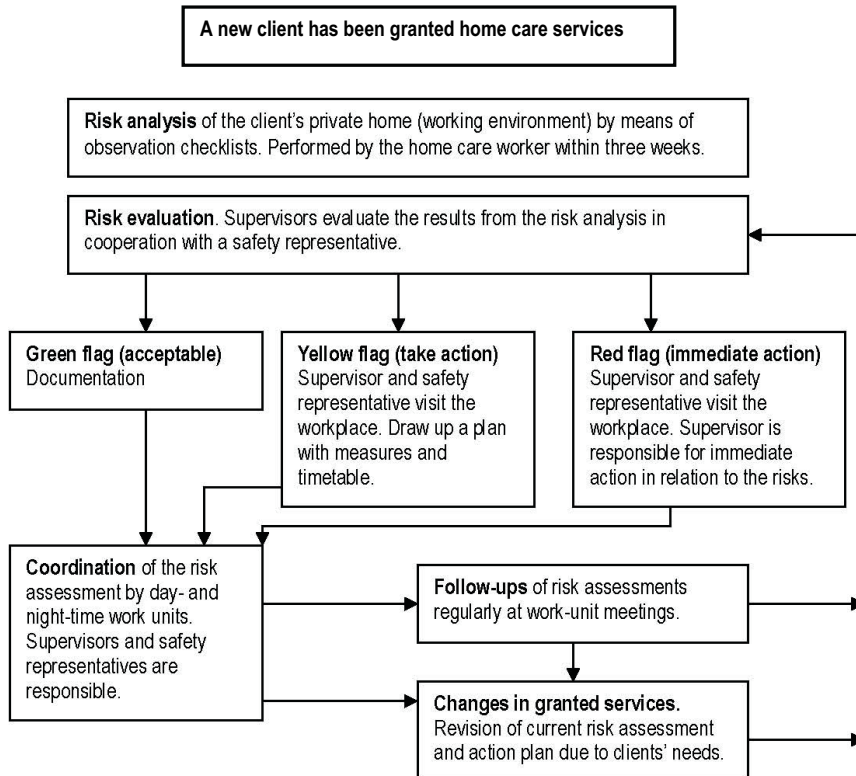
Data are given as Means ± SD and frequency, n (%).

p1 = differences between the groups at baseline (ANOVA)

Those invited to participate, but who chose to decline, were significantly younger (mean age  $41 \pm 11.9$ ) than the average for the participants, but they did not differ in terms of their age range (20-67), sex (87 % were women) or profession (51 % were care aides). The known causes for declining participation were lack of time and/or that the questionnaire was perceived to be too extensive. As a result of only inviting those having worked in the same work unit for the whole of the previous six months is an attempt to ensure that their responses were representative of the unit in which they were based at the time of the research. The proportion of assistant nurses, who responded, was somewhat higher than that in the total population. In the total population of home care services staff in this municipality, the mean age was 43 ( $\pm 11.5$ ) (range 20-67) year, the majority, 89 %, were women and 52% were care aides (Johansson, the Personnel Department of the Municipality, personal communication, September 2010).

### ***A model for participatory risk management***

All of the home care units shared the experience of using a particular model for participatory risk management in home care services. The model was developed in 2006 by an internal workgroup in the municipality. The overall vision of the risk management model is to ensure that each unit's united capacity is supported and the unit's efficacy at identifying, documenting and managing risk factors relating to workers' illnesses or accidents is enhanced. A checklist of physical and psychosocial working environment aspects was used by the staff as a preparatory risk assessment in the home of each new client. All of the workplaces, comprising about 900 private homes belonging to the clients, are checked on a regular basis by the home care staff. Risk assessments are also performed for the general working environment (e.g. for the staff room and the means of transport). This serves as a basis for the supervisor, by means of a process flow chart, to decide upon the measures that need to be taken (Figure 1).



**Figure 1.** Process flow chart for the particular participatory risk management model

### Study III

#### *Study context*

Two interventions had been embarked upon with the intention of implementing them on an ongoing basis to promote the health and work ability of staff within the municipality. The occupational health services and the personnel department of the municipality developed the programmes, which were intended to improve self-efficacy and to provide employees with the practical education required to enable them to become more aware of and improve the ergonomics of their working practices. The personnel department was covering the expenses for both interventions (including the cost of course leaders and specialists invited, the premises and the expenses associated with three months' worth of free physical training sessions at a training centre. The aims, methods and procedures of this study were developed by the researchers in cooperation with the occupational health services and the personnel department.

Invitations to participate in these programmes were sent out by the personnel department to all employees in the public services workplaces in the municipality (total population approximately 3200) via the supervisors. An invitation was also sent to employees on part time sick-leave by the personnel department. Participation was voluntary and the employees could select which intervention they wanted to participate in according to their own interest and motivation, whereupon they signed on to a list administered by the personnel department. Both interventions were conducted during paid working hours. The self-efficacy intervention lasted for ten weeks, e.g. there were ten weekly group sessions with a follow-up session conducted after an additional six months. The ergonomic education intervention contained two three-hour sessions with a one month interval between them.

### ***Participants and methods***

The participants attending four self-efficacy improving groups and ten ergonomic educational groups undergoing treatment within the primary health care sector in the north of Sweden during one year spanning 2005 to 2006 were invited to participate in the study and asked to reply to a questionnaire at baseline, and then 10-weeks and 9-months later. They were given a letter containing information, a letter of consent, a hard-copy questionnaire and a prepaid envelope by the course leader. Those who volunteered to take part in the study gave their informed consent and answered the baseline questionnaire (n=52 and n=47). The inclusion criteria for this study were being female and employed within the public sector, experiencing musculoskeletal symptoms and working at least part-time at the time of the baseline measurement. Only those who had completed all the questions, and had answered both the baseline questionnaire and the follow-up questionnaires were included in the data analyses. That is, a total of 21 for each type of intervention. Data was collected by means of self-report questionnaires similar to that provided at the baseline when the 10-weeks and 9-months follow-up information was gathered. One reminder was sent at the baseline and two reminders were sent for each follow-up to participants who had failed to answer. Data on individual background factors and a selection of important health variables are presented in Table 3.

**Table 3.** Characteristics of participants in study III

	<u>Self-efficacy group</u>	<u>Ergonomic group</u>	<u>p1</u>	<u>p2</u>
	<i>n</i> = 21	<i>n</i> = 21		
<b>Age</b>	46.4 ± 7.8	42.9 ± 11.3	0.247	0.308
<b>Sex, female</b>	<i>n</i> = 21	<i>n</i> = 21		
<b>Work field</b>				
People	<i>n</i> = 14	<i>n</i> = 10		
Object	<i>n</i> = 5	<i>n</i> = 2		
Data	<i>n</i> = 2	<i>n</i> = 9		
<b>Attendance at work, %</b>	55 ± 38.8	83 ± 25.5	<b>0.008</b>	<b>0.021</b>
<b>Seniority</b> (No. years in the position)	15 ± 9.1	11 ± 10.4	0.259	<b>0.017</b>
<b>General health</b>	3.2 ± 0.9	3.6 ± 0.75	0.136	0.224
Good (scale value ≥ 4)	10 (48)	11 (52)		
<b>Physical demands of job</b> (6-20)	13.9 ± 2.7	11.1 ± 2.8	<b>0.002</b>	<b>0.003</b>
High (scale value ≥ 14)	13 (62)	4 (19)		
<b>Self-efficacy in relation to pain</b> (0-6)	3.5 ± 1.0	3.8 ± 1.0	0.377	0.664
Strong (index value ≥ 4.5)	4 (19)	6 (29)		
<b>Severity of symptoms</b> (0-10)	6.0 ± 1.8	4.6 ± 2.1	<b>0.034</b>	0.083
Absence of symptoms for last 7 days	<i>n</i> = 3	<i>n</i> = 1		
<b>Work ability index</b> (7-49)	30.1 ± 8.6	36.2 ± 8.5	<b>0.026</b>	<b>0.023</b>
Good (index value ≥ 37)	4 (19)	11 (52)		
<i>Work ability</i> (3-17) *	11.8 ± 2.9	13.2 ± 2.8	0.107	0.131
High (index value ≥ 15)	4 (19)	7 (35)		

Data are given as Means ± SD and frequency, n (%).

p1 = differences between the groups at baseline (ANOVA)

p2 = differences between the groups at baseline (Mann Whitney U) as reported in **Paper II**.

\* Variable (three item index) for comparison with study population in studies I and II

In paper III the baseline values show that the participants in the two interventions did not differ significantly in terms of their age, body height, BMI, or in their frequency of work-related musculoskeletal symptoms. All had musculoskeletal symptoms, and nearly all (18 and 20 respectively) had experienced symptoms during the last 7 days at the time when the questionnaire was being completed. The symptoms were related to work for 12 subjects in each group. Significant between-group differences were noticed as the two interventions had attracted participants' with somewhat different starting points. The participants of the group comprised of people attempting to improve their self-efficacy, worked to a great extent in direct contact with people (e.g., as an assistant nurse, a child minder or a teacher) or worked with objects (e.g., as a cook or cleaner) as opposed to the group comprised of people learning about ergonomic practices, who tended to work more with data. Henceforth, these groups will be referred to as the self-efficacy and the ergonomic groups respectively, for the purposes of brevity. The self-efficacy group perceived themselves to have a lower life satisfaction and had a lower attendance at work than to the other group; eleven participants worked less due to sick-leave and five had part-time employments. In the ergonomic education group, nine had part-time jobs, while two had a reduced working week due to part-time sick-leave (Paper III). This was also reflected in the work ability index where 17 women (81%) in the self-efficacy group and ten (48%) in the

ergonomic group had a low work ability at baseline (at, or below 36 points) according to the Work Ability Index (WAI) [110]. About 60 % of the participants in the self-efficacy group perceived their work to involve highly physical exertion during an 'ordinary' working day, in comparison with 20 % in the other group (Table 3).

## ***Interventions***

### ***A. Self-efficacy educational intervention***

The aim of the self-efficacy education was to promote health, well-being and work ability to improve the participants' long-term ability to work by improving their self-efficacy, priority-making, self-reflection, empowerment, coping skills, physical activity patterns and helping them to gain an insight into their own life situation as individuals. Group activities were of great importance for this, as they allowed and encouraged the exchange of experiences and listening to and learning from one another. The education consisted of ten weekly group sessions as well as physical activity, followed by individual practice in the life and work situation for an additional six months, with a follow-up session at the end of this time. Each group session lasted for three hours and was conducted by a psychologist with groups of about ten participants. These sessions consisted of group discussions and self-reflections on different topics and on the participants' own life situations, where they were asked to consider the question 'what does this mean for me?' Each session started with reflections that the participants had had since the last meeting. The discussions were combined with education sessions conducted by invited specialists in the following different topics: physical activity, diet, psychological stress and strain, mental training, aspects related to the working environment, insurance issues and social insurance office liability. An integral part of the intervention involved each participant undertaking mandatory physical activity for 2–3 hours a week. These activities were tailored to each individual's physical capacity and were supported by a physiotherapist within the occupational health services and by mentors at the training centre. During the first three months free physical training sessions were offered at a training centre (pool training, group training etc.). Walks and Nordic training were encouraged. Physical fitness tests were offered; dynamic legwork on a cycle ergometer or the UKK walk test. The level of the training depended on each individual's preconditions.

### ***B. Ergonomic educational intervention***

The aim of the ergonomic education was to promote health and work ability by improving self-management skills, teaching participants about how to cope with pain at work, providing knowledge on ergonomic and preventive issues related to the work environment and explaining how to perform the necessary changes. The intervention was conducted by a physical therapist in the occupational health service, in groups of about four to five participants with similar musculoskeletal problems. The group met twice for three-hour sessions with a one month interval between them, and were educated in ergonomic and psychosocial issues related to work and health and to their own private life. The content covered their work schedule, relaxation, neck and back anatomy, biomechanics, pain mechanisms, body awareness and physical activity, and



ergonomic training in how to adjust their work stations to ensure that they adopted a good work posture. The training also included practicing stretch-and-flex breaks and relaxation exercises, as well as exercises to increase strength, movement and body awareness.

## Comparison of participants and variables in the questionnaire-based studies

Table 4 gives an overview of the content of the questionnaires and the units of analysis in the questionnaire-based studies.

**Table 4.** Participants and variables in the questionnaire-based studies I- III

	I	II	III
<b>Participants (n)</b>	137 <sup>1</sup> (58+79)	133 <sup>2</sup>	42 <sup>3</sup> (21+21)
<b>Variables</b>			
<b>Individual background factors</b>			
Age and sex	x	x	x
Seniority	x	x	x
Profession	x	x	x
<b>Healthy work organisation/ working conditions</b>			
Safety climate (shared perceptions )	x	x	
Social support			x
Decision-making authority and skill discretion		x	x
Psychosocial demands of job	x	x	x
Physical demands of job	x	x	x
<b>Personal resources and perceptions</b>			
Self-efficacy in relation to pain			x
Self-efficacy in relation to work and safety	x	x	
Personal safety perceptions at work	x	x	
Motivation to change in life and in work			x
<b>Own behaviour related to work- and health</b>			
Participative safety behaviour		x	
Behaviour related to personal safety	x	x	
Coping in relation to work			x
Coping in relation to pain			x
<b>Health-related outcomes</b>			
General health		x	x
Psychological well-being			x
Satisfaction, in life and in work			x
Musculoskeletal wellbeing	x	x	x
Work-related incident and injuries		x	
Work ability	x	x	x

<sup>1</sup> Separate analyses for care aides and assistant nurses

<sup>2</sup> Care aides and assistant nurses analysed together.

<sup>3</sup> Two different education interventions, one self-efficacy education and one ergonomic education

## ***Measurements***

Data were obtained through the completion of two different comprehensive self-administered questionnaires designed to serve the aim of studies I and II, in which the same questionnaire was used, and of study III. The items and scales for the questionnaire were derived from reliable and valid questionnaires with a few additional questions being developed by the authors. Draft versions of the questionnaire used in studies I and II were tested for face validity on representatives from the home care services. As a result 'efficiency in medical care and services' was added within brackets after one item in the safety climate scale, to elucidate 'production' in this context. It was also clarified that 'the workplace' meant both the private homes belonging to the clients and the general working environment (e.g. the staff room and the means of transport), and that 'safety training' meant training to reduce the risk of work related injuries among the staff (which was relevant to Papers I and II). The respondents were instructed to relate their answers to the job that they were performing at the time they completed the questionnaire (Studies I, II, III).

Data on Individual background factors were obtained through the use of single items on sex, age, body height, weight, period of time working in current job and seniority, hours worked/week, work schedule, profession, principal work tasks and field of work derived from QPS Nordic [111, 112] and adjusted by us to the home care services setting. This provided a basis for classification into different work categories (people/things/data) [113].

### Working conditions:

*The safety climate* was measured using the 50 items of the Nordic Safety Climate Questionnaire (NOSACQ-50) graded on four-point scales (end points 'fully disagree' and 'fully agree'). Together, these produced measures of seven dimensions of the safety climate ( $\alpha = 0.73-0.87$ ): 1) Management safety priority, commitment, and competence; 2) management safety empowerment; 3) management safety justice; 4) workers' safety commitment; 5) workers' safety priority and risk non-acceptance; 6) safety communication, learning and trust in co-workers safety competence; 7) workers' trust in the efficacy of safety systems. The questionnaire considered an individual to be the reporter of a social unit's shared perceptions of the safety climate at both the management and the unit levels [65, 114]. The scale was tested and found to be reliable and valid in the home care services context (Pousette, unpublished paper, December 2009). We used the NOSACQ database values to compare our results with other sectors [114]. In study I, we used a mean value of the seven original dimensions of the safety climate to estimate the respondent's overall impression of the safety climate.

Items derived from the Swedish version of the Job Content Questionnaire (JCQ) graded on four or five point scales [43, 115] were used to measure *supervisor and co-worker support* when facing difficulties at work (comprised of two single questions, with scale end points 'never' and 'always'). Two separate index variables measured the workers' *decision-making authority* relating to what work to perform and how to perform it (two items;  $\alpha = 0.64$ ) and *skill discretion* on the requirements for skills and ingenuity to be exercised whilst on the job (two items;  $\alpha = 0.62$ , scale end points

‘never’ and ‘often’). The proportion of those perceiving themselves to have high levels of *strain* (‘yes’), defined as having high job demands and a low decision-making authority, was calculated. The index variable *psychosocial job demands* was produced by combining five items: the requirements to work fast and work hard, needing to make a large amount of effort when working, having enough time to do the job and facing conflicting demands at work ( $\alpha = 0.66-0.75$ ). The variable *Physical job demands* (perceived physical exertion) was graded on the Borg RPE scale ranging from 6 to 20; corresponding to extremely low to extremely high [116].

#### Personal resources and perceptions.

*Self-efficacy in relation to pain* was measured using two single items from the Coping Strategies Questionnaire (CSQ) [103, 117] on the overall effectiveness of the coping strategies used, that is, the two items correspond to the extent to which one is able to control or reduce pain and they were rated on a seven-point scale (with the end points ‘no control to complete control’ and referring to pain reduction “cannot decrease” to “can eliminate completely”). The mean value of these two items was used to estimate the overall perceptions of self-efficacy in relation to pain ( $\alpha = 0.84$ ).

*Self-efficacy in relation to work and safety* was measured using five items ( $\alpha = 0.63-0.70$ ) graded on a five-point scale (with end points ‘fully disagree’ and ‘fully agree’) reflecting the respondent’s own capacity to handle most situations at work, to manage the tasks required to perform the job as well as their peers do, having a positive attitude at work, and adjusting work tasks to match one’s capacity, as determined with the QPS Nordic-ADW questionnaire (age diverse workforce) [111], and one question on being able ‘to influence safety at work’ derived from Ek [118].

*The degree of personal safety* was measured using three items graded on five-point scales: general level of safety at work, which was intended to give a general judgement about the safety in the work place (end points ‘very bad’ and ‘excellent’) derived from Olsen [69], the probability of suffering a work-related illness or injury (end points ‘low probability’ and ‘high probability’), and whether the respondent feels worried and unsafe when thinking about risks at work (end points ‘neither worried nor feeling unsafe’ and ‘very worried and feeling unsafe’) modified from Rundmo [119]. In study I, we used a mean value of the three items to estimate the overall degree of personal safety ( $\alpha = 0.69-0.76$ ). In study II we used the single item ‘general level of safety at work’.

The respondent’s *motivation* to set about making the necessary changes at work and in living conditions was measured by two single questions on eleven point visual analogue scales (VAS) (with end points ‘very bad’ and ‘very good’) modified from Gard and co-workers [120].

#### Own behaviour related to work- and health

A measure of *participative safety behaviour* was developed as an integral part of the research. The aim was to measure the frequency with which the participants took part in risk management (assessed in terms of: never, sometimes or always). There were eight questions requiring a “yes/no” response on the perceived effects of, e.g. whether

being engaged in risk assessments supports prioritisation and co-operation, and one open-ended question requesting the participants to describe the reasons why the risk management model was not used

*Personal behaviour with respect to safety* was measured using six items on a seven-point scale with the end points 'never' and 'always', reflecting the respondents' compliance with personal protection regulations ( $\alpha = 0.85-0.87$ ) [121]. The frequency of conditions for which it was not possible for the respondent to comply with safety regulations with regard to his or her own health and safety was measured with one single question on a 5-point scale (with end points 'never' and 'very often'). This was followed by one multiple-choice question (with eight reasons to choose between) and one open-ended question to describe additional reasons for the eventual existence of these conditions/constraints [118].

*Coping in relation to work*, e.g. 'what do you usually do when problems arise at work?' was measured using six items from the Copenhagen Psychosocial Questionnaire (CPSQ) [122] graded on a five-point scales (with the end points 'never' and 'always') and resulting in three dimensions of coping: *problem-focused* coping: 'Do you try to find out what you can do to solve the problem?' ( $\alpha$  of=0.75); *selective* coping: 'Do you try to think of something else to do or do something you like instead?' ( $\alpha$  of=0.62); and *resigning* coping: 'Do you accept the situation because there is nothing you can do about it anyway?' ( $\alpha = 0.63$ ).

*Coping in relation to pain* was measured using eight items selected by us specifically for study III, one from each of the eight subscales of the original CSQ [117, 123]. In line with previous item-level studies [108, 124] factor analysis of the single items revealed three subscales: 1) *Positive distraction* comprised the two items 'I think of things I enjoy doing' (corresponding to diverting one's attention) and 'I leave the house and do something active' (representing an increase in activity level) ( $\alpha = 0.55$ ). 2) *Catastrophic thinking* comprised the two items 'It's awful and I feel that it overwhelms me' (catastrophising) and 'I take my medication' (reflecting pain-behaviour) ( $\alpha = 0.67$ ). 3) *Ignoring pain* comprised the two items 'I tell myself I can't let the pain stand in the way of what I have to do' (which reflects coping self statements) and 'I ignore it' (ignoring the sensation) ( $\alpha = 0.66$ ). Each item was graded on a seven-point scale (with end points 'I never do this when in pain' and 'I very frequently do when in pain') and the items within each factor were summed and averaged to form the scales. Two single items did not contribute to a satisfactory extent in any factor in the factor analysis and were therefore excluded.

### Health-related outcomes

On five-point scales, the contemporary state of *health* of the respondents, their general health, was measured by one item (with the end points 'very poor' and 'very good') [125], mental strain (with the end points 'not at all' and 'a lot') and satisfaction with current situation concerning both work and life situation (with the end points very bad/very unpleased and very good/very pleased) [126, 127].

In study II *psychological wellbeing* during the previous/last month was measured by an index variable produced by three items on a scale ranging from 'never' to 'often' ( $\alpha = 0.85$ ) derived from the work ability index [110].

*Musculoskeletal wellbeing* during the previous month was measured for seven different areas of the body, using seven items on a five-point scale ranging from 'every day' to 'very seldom or never' ( $\alpha = 0.67-0.86$ ) [128]. A high level of musculoskeletal wellbeing, defined as 'very seldom or never' experiencing pain, was calculated for each body areas individually, and an overall value was obtained by summing the values (i.e. the ratings for each item were summarised and divided by seven to produce a variable ranging from one to five).

The presence of *musculoskeletal symptoms* during the seven days prior to the completion of the questionnaire and the relation between the symptoms and the respondent's present work situation were assessed with two questions (with yes/no responses) [112]. Eleven-point visual analogue scales (VAS) were used for rating the intensity of the respondent's current musculoskeletal symptoms (with the end points being 'no symptoms of this kind' and 'the worst imaginable symptoms') [129]. To verify the inclusion criteria of musculoskeletal symptoms in study III, the first question posed concerned the presence of musculoskeletal symptoms, and one of the questions from the work ability index (as further described below) on contemporary diagnoses was used.

*Each respondent's accident/incident and injury rate* during the previous six months was measured by three items in which the respondents were to answer 'yes' or 'no' and, where relevant, they were to give a description of the adverse event and the outcome [130].

### Work ability

The respondent's work ability was measured by ten questions, together comprising seven dimensions of the Work Ability Index (WAI) [7, 110] ( $\alpha = 0.87$ ): 1) current work ability compared with lifetime best (0 = 'poor' to 10 = 'excellent'); 2) work ability in relation to the physical and mental demands of the work (2 = 'very bad' to 10 = 'very good'); 3) the number of contemporary diagnoses (1 = at least five' to 7 = 'none'); 4) estimated work impairment associated with diseases or illnesses (1 = 'total' to 6 = 'none'; 5) amount of sickness absence during the past 12 months (1 = more than 100 days' to 5 = 'none'); 6) belief about work ability in present occupation two years from the time of the investigation, considering the respondent's health at that time (1 = 'no', 4 = 'maybe' or 7 = 'yes'); and 7) psychological well-being (1 = 'never' to 4 = 'often'). The WAI score ranged from 7 to 49 points, with a score at, or below, 36 points indicating a low work ability. The third item included a smaller number of illnesses than the original WAI, and as a final request, the participants' were asked to 'State if you have any disease, illness or handicap' was included, as suggested previously [131]. To discriminate between physical and mental demands, the two questions comprising item two were presented separately. In study III the total WAI was used, while the work ability was measured by three items in study I and II, the first two relating respectively to the physical and mental demands of the job, and the third being his or

her belief about his/her ability to perform the same work as required in the person's occupation two years into the future considering the person's own state of health [7, 110]. The ratings of each item were summarised to produce an index variable ranging from 3 to 17 ( $\alpha = 0.67-0.73$ ).

## **Data analysis in the questionnaire-based studies**

The statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) software version 11.5 - 18.0. Principal component factor analyses and analyses of internal reliability were used to test each scale in relation to each study population, and the values are presented in papers I-III. Values for Chronbach's alpha of above 0.6 were considered to indicate a sufficient degree of internal consistency for the scales to be reliable [132]. The mean and standard deviation (in studies I and II), median (Md) and min-max values (in studies II and III) and the frequency (%) (in studies I, II and III) were used to analyse the data. The cut-off points taken to describe 'high' levels of the aspects measured are given in the tables. The significance level of  $p < 0.10$  was taken for the regression analyses in study I, and a significance level of  $p < 0.05$  was taken in study II and III to denote statistical significance.

### ***Specific analyses conducted for the different studies were:***

Study I: Between-group comparisons were analysed with ANOVA, and the relationships between variables with the Spearman rank correlation coefficient [132]. Hierarchical multiple regression analyses were used to assess the influence of several independent variables on the dependent variables; self-efficacy (model 1), musculoskeletal wellbeing (model 2) and work ability (model 3) for care and assistant nurses separately. The principle behind the selection of the variables to be used in the regressions was to combine variables reflecting the demands of their job, and the resources available through the job and their own personal resources as individuals. In the first step of the analysis, *basic background variables* (age, sex and seniority) were introduced to serve as controls. In the second step, three variables representing *job-related factors* were added; overall safety climate, psychological job demands and physical job demands. In the third step, three factors representing *individual resources* were added; perceived degree of personal safety at work, personal safety-related behavior, and self-efficacy in relation to work and safety. In the fourth step, the single variable '*musculoskeletal well-being*' was used.

Study II: Between-group differences were analysed using nonparametric tests (i.e., the Kruskal–Wallis Test and Mann-Whitney  $U$  test) [132]. The analysis of between work-unit differences in terms of their perceptions of the safety climate was performed on 11 of the 18 units. We considered it important to have a sufficient number of respondents in each work-group, to obtain a representative value of the groups shared perceptions of safety climate. Therefore, we excluded seven units in which the response rate was less than 33% or fewer than six respondents replied. In the remaining 11 work-units the response rate was  $\geq 47$ .

Study III: The Mann-Whitney  $U$  test was used for between-group comparisons at baseline and the Wilcoxon signed-rank test was used for within-group changes ten weeks and nine months after the baseline [132].

## Qualitative study

### *Study context*

The fourth study was performed as one part of the project “Can rehabilitation planning be improved in terms of its quality and effectiveness” by professor Gard and co-workers, with the results having been published between 2003 and 2006 [23-27]. In summary, the aim of the total project was to describe experiences of goals, rehabilitation content and the results of rehabilitation planning processes at a rehabilitation centre in the north of Sweden during a 2-year period from the perspective of the following different actors involved in the rehabilitation 1) the clients 2) the employers 3) the social insurance officers and 4) the rehabilitation actors. The aim was also to describe the experiences of each rehabilitation actor and summarize what can be done according to each actor to improve rehabilitation planning in terms of its quality and effectiveness.

The total project was performed within a rehabilitation centre in the north of Sweden. At this rehabilitation centre, 60 clients were treated for work-related musculoskeletal problems during the 2-year period in which the research was conducted and for all these clients, rehabilitation plans were developed. The plan included a 3-week stay at the Rehabilitation Centre. All clients had been sick-listed before the rehabilitation period. The rehabilitation included different group activities: daily physical activities, relaxation, education, discussion about ergonomics and lessons on coping with stress. There was also training in how to strengthen one’s self-confidence and body-awareness and in how to make priorities in life. Workplace analyses were performed and recommendations for alterations in the work-situation or recommendations for alternative employment were made by the physiotherapists in the rehabilitation team at the rehabilitation centre.

### *Participants in study IV*

The participants in study IV were ten employers’ representatives. They were recruited from a list comprising the names of all employers ( $n=26$ , which had sent the 60 sick-listed employees, in the total project, to the 3-week-long vocational rehabilitation at the Rehabilitation Centre during the project period from June 1999 to June 2001. The list was provided by the Rehabilitation Centre. From this list, a strategic selection of employers was made to obtain as much variety as possible in terms of the individuals’ age, sex, and experience of rehabilitation planning and the type, size and geographical location of company. The employers were contacted by telephone by the researcher, given information about the study, informed that their participation was voluntarily and that confidentiality was guaranteed and then the time and date of the interview was

scheduled. The selected participants were of different ages (mean age 51 years), sex (seven were female and three male) and seniority (mean 12 years). All had managerial posts, on different levels in their companies, which also differed in size. They were all responsible for rehabilitation planning within their workplaces. They worked in different urban or rural areas (representing six districts). Characteristics of the participants are described in Table 5.

**Table 5.** Characteristics of employers participating in study IV

Subject	Sex	Age	Seniority <sup>1</sup>	Company	Company category <sup>2</sup>	Responsibility <sup>3</sup>
2	Woman	55	22	Municipality	People	3000
5	Man	53	12	Municipality	People	56
9	Woman	53	13	Municipality	Thing/ people/ data	900
3	Man	50	16	Municipality	Thing	240
7	Woman	48	7	Municipality	People	45
1	Woman	65	27	Municipality	Thing	120
8	Man	47	10	Government	Thing	120
6	Woman	45	2	Government	People	550
10	Woman	56	10	Government	Thing	3000
4	Woman	36	2	Private enterprise	Data	5

<sup>1</sup> Years in the position of having responsibility for work rehabilitation planning within their companies.

<sup>2</sup> Company category: *People* = work in direct contact with people (e.g., as assistant nurse, child minder or teacher); *Things* = work with the handling of things= (e.g., as a cook or cleaner) or with *Data* (e.g., administrative jobs), according to Kohn and co-workers classification of work categories [113].

<sup>3</sup> Number of employees that the employer had responsibility for in work rehabilitation

### ***Method, data collection and qualitative analysis***

A qualitative interview-based study was performed. Data were collected by conducting interviews with each of the employer's representatives at their workplaces. The interviews were conducted by the first author and were guided by 15 questions covering various aspects of a rehabilitation planning process, that is, goals and content of the rehabilitation plans, cooperation with social insurance officers, clients and rehabilitation actors, and the importance, results and effectiveness of the rehabilitation planning process. The questions were open ended and intended to allow the employers to share their experiences freely. The interviews lasted for about one hour (up to one and a half hour) and were audio taped and transcribed verbatim. As the aim of study IV was specific, only the content specifying the respondent's experiences of the work rehabilitation planning process and of how it can be improved by focusing on quality and cost-effectiveness was extracted from the transcribed data to be further analysed.

The transcribed interviews were analysed with qualitative content analysis. This method of analysis can be described as a process of identifying, coding and categorising the primary patterns in the data (i.e., the meaning units). The objective of content analysis is to provide knowledge and understanding of the topic of interest (37-39). The analysis was performed in the following steps: 1) identification of meaning units (quotations), 2) categorizing of meaning units cross-case and 3) describing the categories.



## Ethics

The studies were performed in compliance with the ethical principles of the Helsinki Declaration. The participants were invited to take part in the study orally and were given a letter with information, a letter of consent for them to sign, and a hard-copy questionnaire by their respective supervisor (studies I and II) or by their course leaders (study III). The letter clarified that participation was voluntarily and that they could withdraw their consent at any time. The respondents were guaranteed confidentiality and a presentation of the results of the study on group level, so that no individual could be identified. All were informed that declining to participate would not affect their opportunities to take part in the interventions. Studies I and II (Dnr 08-217 Ö) and study IV (Dnr 2001-0286) were approved by the Committee of Research Ethics at Umeå University, Sweden. Study III was considered to be a quality and competence development work within occupational health.

# Results

In table 6 the main results of the studies can be compared in relation to their objectives.

**Table 6.** Main objectives and main result

<b>Study</b>	<b>Main objectives</b>	<b>Main result</b>
I	Identify the predictors of self-efficacy, musculoskeletal wellbeing and work ability in care aides and assistant nurses in home care services	<p>The predictors of self-efficacy were physical job demands and safety climate, for both groups, and for assistants nurses also sex and age.</p> <p>The predictors of musculoskeletal wellbeing for care aides were sex and perceived personal safety.</p> <p>The predictors of work ability among care aides were age, seniority, and safety climate. For assistant nurses, the predictors were sex, personal safety, self-efficacy and musculoskeletal wellbeing.</p>
II	Describe home care service workers' perceptions of their safety climate, safety-related behaviours, working conditions and self-efficacy, health and work ability	<p>A high frequency of musculoskeletal symptoms and physical exertion were reported.</p> <p>Work-unit differences in safety climate, social support, decision-making authority, safety level at work and participative safety behaviour were noted.</p> <p>Restraining conditions on safe work performance were noted.</p>
III	Describe the effects of a self-efficacy education intervention and an ergonomic education intervention for women with musculoskeletal symptoms, employed in the public sector	<p>Increased perceived work ability by self-efficacy education</p> <p>Increased use of pain coping strategies in ergonomic education</p>
IV	Describe employers' experiences of the work rehabilitation planning process and how it can be improved with a focus on quality and cost-effectiveness	<p>Improved by having a holistic perspective, supporting and evaluating goal attainment, and giving the process the time needed.</p> <p>Proactive workplace actions and good communication at the workplace were considered to be prerequisites for sick-listed employees successfully return-to-work.</p>

## Identifying work ability promoting factors for home care aides and assistant nurses (study I).

The results showed that the assistant nurses reported significantly higher self-efficacy ( $p=0.004$ ) than the care aides, but there was no significant difference in regard to any of the other variables studied. Strong self-efficacy (index value  $\geq 4.5$ ) was reported by 50% of the care aides and by 71% of the assistant nurses; overall musculoskeletal well-being (index value 5, i.e. symptoms very seldom or never) was reported by 21% of care aides and 28% of assistant nurses; and a good work ability (index value  $\geq 15$ ) was reported by 76% of care aides and 84% of assistant nurses. As discussed in the method, separate regression analyses were performed for the two groups to establish whether they were similar or different for each of the variables studied.

### **Model 1: Factors explaining high self-efficacy in relation to work and safety**

#### ***Care aides***

For the care aides, the regression analysis performed with self-efficacy as the dependent variable was not significant until the *second step*, indicating that the basic background variables age, sex and seniority used as controls did not affect self-efficacy. When the variables representing job-related factors were entered, it was revealed that the safety climate and physical job demands significantly contributed to the explained variance: the added variables explained 26% ( $p=0.001$ ), and the overall model had an  $R^2_{adj}$  of 0.24 ( $p=0.003$ ). The third step did not attain significance, indicating that the degree of personal safety and safety-related behaviour were not linked to self-efficacy for the care aides. Thus, for this group, a higher self-efficacy was evidenced by those who reported a stronger safety climate and by those who perceived less physical exertion in their job.

#### ***Assistant nurses***

The regression analysis for the assistant nurses attained significance during the *first step*, where age and sex significantly affected self-efficacy: the background variables explained 16% ( $p=0.004$ ) of the variance. When the job-related factors were entered in the *second step*, safety climate and the physical job demands provided a significant contribution to self-efficacy, and the variables added explained an additional 20% ( $p<0.001$ ). In the third step, the change was not significant. The overall model had an  $R^2_{adj}$  of 0.31 ( $p<0.001$ ), implying that among assistant nurses, a higher self-efficacy was affected by being older, being a man, perceiving less physical exertion in their job and being in a stronger safety climate.

## **Model 2: Factors explaining musculoskeletal wellbeing**

### ***Care aides***

For nursing aides, the regression analysis performed with musculoskeletal wellbeing as the dependent variable attained significance in the *first step*, where sex significantly contributed to the explained variance, and the background variables added jointly explained 12% ( $p=0.072$ ) of the variance. When the job-related factors were entered in the *second step*, the physical demands of performing the job significantly affected musculoskeletal well-being and the job-related variables added explained an additional 16% ( $p=0.018$ ) of the variance. In the *third step*, perceptions of the personal degree of safety significantly contributed to the explained variance. The individual resources added explained a further 11% ( $p=0.040$ ) of the variance in total, whereas physical job demands lost its explanatory value. The overall model had an  $R^2_{adj}$  of 0.28 ( $p=0.003$ ). Thus, among the care aides, a higher level of musculoskeletal well-being was affected by being a man and by reporting higher degree of personal safety at work.

### ***Assistant nurses***

In the regression analysis for the assistant nurses the overall model was not significant ( $p=0.112$ ). This indicates that the respondent's basic background variables, job-related factors and individual resources were not linked to musculoskeletal well-being for assistant nurses.

## **Model 3: Factors explaining high work ability**

### ***Care aides***

For care aides, the analysis with their work ability as the dependent variable was already significant in the *first step*, where age and seniority were found to significantly affect the work ability, and the basic background variables (age, sex and seniority) added explained 20% ( $p=0.007$ ) of the variance. When the variables representing specific job-related factors were entered in the *second step*, the overall safety climate contributed significantly to work ability, and the variables added explained a further 16% ( $p=0.008$ ). The overall model had an  $R^2_{adj}$  of 0.29 ( $p=0.001$ ). In the third and fourth step, the changes was not significant ( $p=0.143$ ). Hence, among the care aides, higher work ability was positively influenced by being of a younger age, having greater seniority and being in as stronger safety climate.

### ***Assistant nurses***

For assistant nurses, the model for explaining variations in work ability did not reach significance until the second step, indicating that the background factors were not linked to work ability. In the *second step*, the overall safety climate and physical job demands provided significant contributions to work ability, and the job-related variables added explained an additional 13% ( $p<0.017$ ) of the variance. In the *third step*, the perceived degree of personal safety and self-efficacy provided significant contributions and explained a further 19% ( $p<0.001$ ), while the job-related factors lost significance. In the *fourth step*, musculoskeletal well-being contributed significantly

and explained an additional 8% ( $p < 0.002$ ) of the variance; sex also appeared as a significant contributor. The  $R^2_{adj}$  for the overall model was 0.36, ( $p < 0.001$ ). This implies that the work ability was positively affected by being a woman and by perceiving higher degrees of personal safety, higher self-efficacy in relation to work and safety, and higher musculoskeletal well-being.

## Promoting healthy work and a safe work environment in home care services in Sweden (study II).

### **Safety climate and between work-unit differences**

The home care workers in general perceived fairly good levels of safety climate, as shown by mean values above 3.0 in all dimensions of the safety climate. However, significant differences were shown for 11 work-units for five dimensions, where the highest and lowest mean values varied between 2.6 and 3.8. The highest values at the unit level (all group means were above 3.1) and also across the whole sample were in 'group safety learning' and 'group trust in safety systems'. In addition, 'management safety justice' was high. The dimensions with the lowest median values across the whole sample (3.0-3.1) were 'management safety priority and competence', 'management safety empowerment' and 'group safety priority and non-risk acceptance'. In addition, significant intra-unit differences were also found in work-unit size ( $p < 0.000$ ), perceptions of social support from supervisors ( $p = 0.017$ ) and co-workers ( $p < 0.000$ ), decision-making authority (control) ( $p = 0.047$ ), general level of safety ( $p = 0.003$ ) and participative safety behaviour ( $p = 0.001$ ).

### **Safety behaviour and supportive and restraining factors**

Self-reported personal safety behaviour was on average fairly high. However, 18% 'rather often or often' experienced conditions resulting in not being able to follow safety regulations. The results of the causalities showed that the main reason was a lack of time (stated by 50%). The second reason was deficient equipment for household cleaning or ergonomic/lift equipment (41%). With frequencies of less than 30%, reasons such as a shortage of staff, work schedule, workload, work routines, a lack of agreement in one's work unit or experiencing pressure from clients or their families/friends were given.

In total, 23 % of the respondents claimed to always participate in risk management in their unit. Lacks of time to perform the assessments on regular basis, as well as a lack of follow-ups on necessary changes were given as examples of reasons for not using the particular model for risk management. In addition, significant differences between the individual respondents who reported 'always' participating in risk management in their units and those 'never' doing so were analysed. Workers who always participated, perceived a higher safety climate concerning the dimensions 'management safety priority and competence' ( $p = 0.010$ ), 'management safety empowerment' ( $p = 0.012$ ) and 'group trust in safety systems' ( $p = 0.008$ ) as well as they perceived higher levels of social support from supervisors ( $p = 0.008$ ), better

decision-making authority ( $p=0.001$ ), and a higher general level of safety at work ( $p=0.014$ ). They also perceived conditions that restrained them from complying with safety regulations less often than those who 'never' participated in risk management ( $p=0.024$ ).

### **Working conditions and self-efficacy**

A total of 37 % respondents considered themselves to have high physical job demands, but less reported a high psychosocial strain. Nearly all of the respondents perceived their job to require high levels of professional skill and ingenuity, while a high degree of decision-making authority was reported by 56% of them. A higher proportion, 90 %, of the respondents perceived high self-efficacy in relation to work and safety. Many of the respondents perceived themselves to receive high levels of social support from co-workers, while fewer perceived themselves to have a high level of support from supervisors. The general level of safety at work was reported to be 'acceptable', with a median of 3.2.

### **Health and work ability**

High psychological well-being was reported by 75% of respondents and more than 87% perceived themselves to be in a good general state of health, to have a good individual work capacity in relation to the physical and mental demands of the job and a positive belief in their future work ability. Good overall musculoskeletal well-being, e.g. reporting very seldom or never experiencing pain in any area of the body was reported by 27%. The neck, back, shoulders and arms were the areas reported to most commonly associate with experiences of pain. A total of 22 work-related accidents or incidents had happened during the previous six months and were reported by 14% of the respondents. Half of the events had led to injuries, of which five resulted in time of work. Two of these injuries occurred outdoors and were related with a care driving accident and with slipping and falling on ice and snow. The other three adverse events occurred indoors, and were primarily associated with slipping and overexertion when lifting.

Effects of work ability and health promoting interventions for women with musculoskeletal symptoms: A 9-month prospective study (study III).

### **Changes within the self-efficacy education group over the time period**

#### ***Work ability***

Positive changes in work ability related factors was shown: At baseline 16 of the 21 respondents were classified as having low work ability compared with 12 respondents at the 9-month follow-up, indicating a statistically significant improvement. The sub score 'work ability in relation to physical demands' was also significantly improved. Ten respondents stated that they had a *fairly good* (score 3) balance at baseline and at follow-up. The number of respondents stating a *fairly* or *very good* balance (score 4

and 5) increased from five at baseline to nine at nine months. After ten weeks the work ability in relation to physical demands had increased. At ten weeks significant improvement was also noted in terms of less work impairment due to disease or illness. No other changes were noted.

### ***Health***

In the health related factors, no significant changes were noticed at nine months. At ten weeks the intensity of musculoskeletal symptoms was significantly reduced.

## **Changes within the ergonomic education group over the time period**

### ***Work ability***

At nine months there was no change in the total WAI score. At baseline 13 of the 21 respondents had positive beliefs (score 7) in their ability to work in their present occupation two years from now, and at nine months 17 respondents had this belief, which was a statistically significant improvement. Perceived physical exertion at work was significantly increased. No changes were noted at ten weeks.

### ***Health***

In health related factors, significantly more frequent use of the pain coping strategies 'positive distraction' and 'ignoring pain' was found at nine months. The median values rose to 3.5 from 2.5 and to 4.2 from 3.5 respectively. Their use of catastrophic thinking was unchanged, remaining at a median value of 2. At ten weeks a significant increase in self-efficacy to control pain was noted.

## **How can the rehabilitation planning process at the workplace be improved? : A qualitative study from employers' perspective (study IV).**

The results concerning employers' experiences of the vocational rehabilitation planning process at the work place emerged in five categories: coping, training and assessment; interactions within the workplace; use of a proper work technique; responsibility for creating work environmental changes and functional and organisational barriers. The results on the other research questions "How can the process be improved with a focus on quality" and "How can the process be improved with a focus on cost-effectiveness" emerged in four categories each and are, in this thesis, described together. The total result of this study has been presented in a way that fit the aim of my thesis. First, all categories reflecting the rehabilitation process have been described; having a holistic perspective; supporting and evaluating goal attainment; length of vocational rehabilitation period; and reflect on deficient results. Secondly, all categories reflecting preventive actions within the workplace have been described; focus on preventive actions or a short process routines problem identification and action initiation; ability to take early actions; in-service training for

supervisors and for employees. The results are described in terms of categories and examples of quotations.

## **How do employers' experience the work rehabilitation planning process at the work place?**

### ***Rehabilitation-related factors***

Coping, training and assessment: Training in real work settings, i.e. functional capacity training for the sick-listed at the workplace without production demands, and functional capacity assessments were perceived to be good solutions. The employers emphasised that sick-listed person may need to learn to handle the work situation in a new way; therefore training in another workplace was sometimes preferred. Education or training for new jobs were perceived as good solutions for younger persons, as well as insurance medicine assessments and motivating interventions by external consultants or rehabilitation centres.

*“If you (the client) have been in a situation that has caused sickness, then I’m having doubts about you going back and train in that situation. But of course, if you went back and trained that—now I have to deal with the situation in a better way, then I think it could be good. But it has to be from the perspective of paying attention to the possible elements that having caused sickness and that you practise avoiding handling the situation in the same way.”*

### ***Work-place related factors***

Interactions at the workplace: The employers emphasised the importance of individual contact with the each sick-listed person, who must be noticed and acknowledged. The attitudes towards the sick-listed was considered to be crucial, that both co-workers and supervisors provided emotional as well as practical support, therefore all workers at the workplace should have a knowledge and understanding of what characterises a good work environment and that work tasks need to be tailored to each individual.

*“The supervisor and the fellow-workers are important for functional capacity training at the workplace. I don’t know any other that can be supportive right there. Of course, discussions of attitudes to make all understand that something could happen to any person”.*

Use of a proper work technique: The employers perceived that the employees in general were not always willing to change their work methods or try new equipment. Therefore they believed that every employee needed an introduction in ergonomics early on; it is hard to relearn after once having learned an incorrect technique.

*“There have been lots of discussions about it, about the working hours, that they must have breaks and do such things. And that is really a question of working environment, but this has been ‘painful’ to them... They will not make use of the work equipment. But it is our demand, everyone has to learn”.*

Responsibility for creating work environment adjustments: The employers reported that they took the primary responsibility for creating conditions for realistic rehabilitation in their companies. They had often made ergonomic adjustments, work modifications and changes in work schedules due to individual needs. Not all of the employers regularly cooperated with the occupational health services, but stressed the



value of medical professionals assisting with work place adjustments and in supporting the client to maintain contact with the workplace.

*“The physician plays an important role; by thinking that sick-listing might not be the cure in this care, but prescribing visits to the workplace and functional work skills training in one’s own workplace.”*

**Financial and organizational barriers:** It was considered important that financial means could be set aside for rehabilitation in the companies; still external financing were desired. The employers told that opportunities to modify work tasks or to give the sick listed new work tasks depended on the opportunities for work organizational changes and the type of occupation in question. Also, deficiencies in continuity, management or communication within the company could restrict the opportunities to create rehabilitation at the workplace.

*“If we have to pay for an intervention for someone who cannot fulfil his/her duty, then the expenses must be taken from the company. The other employees will then have to work more to cover up this economically. This increases the risk for them to end up in a similar situation. So this is not good, and above all it seems to be very uneconomical*

## **How can the process be improved?**

### ***Rehabilitation- related factors***

**Holistic perspective:** The employers believed that the sick-listed person’s whole life situation was influencing the rehabilitation process. They emphasised that it was essential that both the workplace and the sick-listed person’s family was involved, and that every person involved in the rehabilitation process were motivated, active and notices opportunities that exist or occur in the process, if not, rehabilitation risks failing.

*“.. there is lack of involvement from some participants. It is not only one that is involved. There may be neglect on the part of the employer, there may be neglect on the part of the employee, and there may be neglect on the part of the family, the Social Insurance Office or the physician. When someone gives up along the way, “the jig-saw puzzles breaks.”*

**Length of vocational rehabilitation period:** In general, the employers perceived that sick listed persons’ stay at a rehabilitation centre was cost-effective. Still, they had noticed that the result of the rehabilitation did not always last when the clients were back in their own work environment. They suggested that a rehabilitation period may be too short for client to reach a deep understanding of necessary changes in work and life situation.

*“I have sent them to the rehabilitation centre and that has been good, and they have told that—now I’m on the go. But then, they just have to try taking up work again and No; then we are back in the same position again.”*

**Support and evaluate goal attainment:** According to the employers, is it time to increase the demands on the clients’ own responsibility on all levels, in working life, in training and in general health initiatives. It was considered important that the sick listed are able to describe work-related motivations and goals. The employers

perceived it as their role to give psychological and motivational support and guidance to clients, to develop links between client and workplace, to be successful in organising the training in real work settings, and to do follow-ups of goal attainment. *“It (functional skills training) must be well organised, have a schedule and write down yourself (the sick listed) – how do you experience this, how do you feel? To document: this is how it turned out. We haven’t had that before..”*

**Reflect on deficient results:** The employers perceived that they had not noticed any major rehabilitation results, even though the employers had developed a lot of work place solutions, and were looking for new concepts in order to improve the results. One raised the question: What is in fact a “better result”?

*That is as I have told you, to focus on the healthy, on the whole picture, attitudes and motivation, earlier results of higher quality, higher quality and above all earlier results, for we can’t see if it is getting better in the way that.. what is better?*

### ***Workplace-related factors***

**Routines for early problem identification and action initiation:** The employers were of the opinion that rehabilitation needs should be identified as early as possible, followed by an early rehabilitation investigation, and early participation from rehabilitation professionals and the Social Insurance Office. Routines have to be developed for how to proceed when an employee gets sick-listed.

*“There should be a conversation within one week, and there should be weekly conversations where you may tick off: have you called, have you spoken with the co-worker during the second week of sick-leave? And if I have not, I must do it at once.”*

**Focus on preventive actions or a short process:** The most cost-effective interventions were perceived to be preventing problems from occurring, or getting an early start with quick solutions; a short process. To help the client back to his/her own work task was also considered cost-effective.

*“Cost-effective is off course to make this process as short as possible. The most cost-effective measure in rehabilitation is really to prevent (problems from occurring)”*

**Ability to take early actions:** The employers perceived that they need to be more qualified in noticing early signals of sickness at the workplace and in making work place changes early. For that, they believed that trust, and frequent and open communication with every employee was needed.

*“That the employer emphasizes that if an employee is ill, it is important that he/she tells about it and does not feel miserable in isolation.”*

**In-service training for supervisors and for employees:** Continuous in-service training of supervisors and all employees was required by the supervisors, particularly in legislation and in routines for prevention and rehabilitation. In the preventive work they wished to cooperate with the Social Insurance Office and with different rehabilitation professionals.

*“That we as employers are working with “systematic work environment control” where on at an early stage can pick up problems that ay be caused by the job; work sickness, obstacles for work and such things. That is profitable.”*

# Discussion

## Health and work ability

### **Predictors for work ability and musculoskeletal wellbeing (health)**

Knowledge of the factors that can be used to predict whether someone will be able to continue working in their present position is important for improving the design of proactive work environments and for interventions intended to improve the working life of people in these occupational groups. It is especially important to identify factors that can be altered and which can be modified to increase the health and work ability of the staff concerned. In studies I and II, the work ability reflected the staff's own prediction about their ability to work in their present job two years from the time at which the research was conducted, and it considered the person's underlying state of health, and the balance of their work ability in relation to the specific physical and mental demands of their job; in *study III*, in contrast, it was measured as the total of the WAI. The professions in study I, did not differ in reported levels of musculoskeletal wellbeing (health), work ability and other variables used in the regression models, except for the level of perceived self-efficacy, which was significantly higher for the assistant nurses. However, the overall results of the separate regression analyses revealed differences between the care aides and assistant nurses in terms of the predictors for musculoskeletal wellbeing and work ability. These findings are in line with existing research in the medical care professionals, where differences have been exhibited in the working conditions for different professions in the same medical units [133, 134]. Those with a low status and little opportunity to influence their job also have the highest overall physical exposure levels [134]. The work content for care aides and assistant nurses within the home care services is generally described as being the same, although at least one year of education (comprised of theoretical and practical training in social and medical care) is required to become an assistant nurse, and the training for a care aide is given on the job.

The regression analyses (conducted in *study I*) revealed that individual and job-related factors contributed differently to work ability for care aides and assistant nurses. Among the assistant nurses, work ability was affected in a positive way by the fact that they had a high level of musculoskeletal wellbeing and perceived degree of personal safety in their working environment, as well as perceiving themselves to have a strong self-efficacy in relation to their work and safety. Work ability among care aides was positively influenced by the background factors 'being young' and having had a long period of working experience in the job but also by being in a strong safety climate. As professional skill and experience develop over time, it can be seen how accumulated seniority can provide an increased ability to perform the tasks required more efficiently [75]. However, technical developments may require different job skills [135, 136]. Accumulated seniority could also reflect the underlying health of the workers, as it is possible that some people might have changed from this job to another one earlier for health reasons [137]. Earlier research has confirmed that group solidarity, collegial support and being acknowledged for performing valuable work in

the home care job are important for the job satisfaction of home care services staff [138]. Having clear goals at work, a clear role, receiving positive feedback from superiors about work performance, and having a physically non-strenuous job have been shown to promote a high work ability [36, 138]. The predictive value of the safety climate for work ability was an important finding (in study I) as the 'safety climate' directs the attention towards supporting employees' health and of ensuring that behaviour at work is safe, in addition to providing good quality services [65, 71, 139].

Higher work ability in assistant nurses was positively influenced by being a woman and by a strong self-efficacy, by perceiving a high degree of personal safety, and a high level of musculoskeletal wellbeing. The influence of self-efficacy is the key factor here, as it focuses on being able to both influence the safety level at work and balance job demands in relation to individual capacity. Acknowledging the importance of self-efficacy can be seen as adopting a proactive attitude and therefore supporting health promotion in a workplace context [140]. High quality communication can improve participation in proactive safety activities [134], and, therefore, act as a buffer against WMSDs [141]. It could also be the case that the education and training required to be an assistant nurse may increase the awareness of assistant nurses of the importance of taking care of their health and of the need to take preventive action to ensure that they remain healthy [91, 99]. 'Work ability' includes many aspects, such as having the professional skills required for the profession that the person is engaged in. Previous research has shown that having clear values and goals to follow at work is important to reduce psychosocial stress [142]. Practical and ethical dilemmas can arise in the provision of high-quality services in combination with the home care workers' needs for a good working environment [51, 143, 144]. Motivating factors in relation to work ability, according employees, have been shown to be that the work tasks are meaningful or highly valued by others, that work can be performed in a satisfactory way according to one's own norms and also in a way that is acceptable to others in the group, having everyday responsibility, and receiving feedback and support about daily work tasks [145]. In future proactive interventions, self-efficacy and the safety climate at the work place have to be aspects that are considered carefully.

When discussing predictors for musculoskeletal wellbeing (health) among the care aides, a higher level of musculoskeletal wellbeing was related to being a man and perceiving a higher degree of personal safety at work. It had been demonstrated by earlier research that an individual's perceived degree of risk, or safety, at work reflect objective risk factors and working conditions [98]. Experiences of musculoskeletal wellbeing may have induced beliefs relating to safety amongst the staff [99], which could have implications for a person's motivation to consider safety aspects in work [91]. Men often report higher musculoskeletal well-being than women [146]. The overall model for assistant nurses was not significant, implying other variables than those used in this study could be important contributors for musculoskeletal wellbeing.

These results add to the knowledge of the importance of attaining a balance between a person's resources and the demands of the work that that person performs [4, 6, 147].

This implies that health promoting interventions and programmes need to be directed at obtaining a better balance between an individual's capacity and the physical job demands of that person's job, for all employees. Interventions need to be tailored to maximise the goal of health promotion for care aides, as the women concerned perceive themselves to have a low degree of personal safety at work and to have a relatively high level of musculoskeletal symptoms. Both the environment and the individual's capacity are potentially modifiable factors. A need for improved structures to regulate and improve the risk management within the home care services organisation has been asked for by the Swedish Work Environment Authority [148]. Reducing the job demands by, e.g., providing acceptable work schedules, adequate equipment, an acceptable physical environment, by providing such items as more ergonomic furniture in the homes of clients, are important as these were conditions that the employees said restrained their ability to comply with personal safety regulations (study II).

Furthermore, the physical capacity, the ergonomic knowledge and self-efficacy of the home care employees all need to be strengthened further. Positive effects of in-service programmes, such as performing physical exercise during working hours, receiving ergonomic education, or putting in place organisational and environmental improvements have been shown [11, 149, 150]. As emphasised by the employers interviewed (study IV), in-service training for all employees is needed, including the supervisors. This was believed to affect all workers' attitudes towards, and knowledge about, the importance of using ergonomic equipment and considering one's own health and safety while providing a service. In-service training was also believed to increase sick-listed employees' possibilities to successfully return to work after the rehabilitation period, according to the employers (study IV). This is supported by earlier research [60-62] and can be explained by the model in Figure 2 (which demonstrates the background factors that influence attitudes, norms, and self-efficacy). Unfortunately, none of the educational interventions (study III) included ergonomic assessments *at* the participants' work places. It is possible that that would have yielded a better effect, because it would have been possible to make suggestions for practical changes to the environment. However, individually tailored physical exercises, education and group reflections on how to cope with work and with pain, had positive effects on the balance between the participants' capacity and the physical demands of their jobs, and also in their total WAI score after 9-months (study III).

### **Discussion of descriptive results for the questionnaire-based studies**

The working population of home care workers (studies I and II), perceived themselves to have good general health and psychological wellbeing, but they also reported themselves as having musculoskeletal symptoms. They perceived themselves to receive high levels of social support and as having decision-making authority, and nearly all of them perceived their job as requiring high levels of skills and a great deal of ingenuity. These results were in line with earlier research, with the exception of the levels of health and wellbeing, which were higher in our study than in the literature [146, 151]. In addition, about 40% of the respondents considered themselves

to have a high degree of physical strain in their job, but fewer of them perceived their job to impose high psychosocial demands. The respondents assessed their work ability as being equal to the findings in previous research on female working populations [152].

The participants in the educational programmes (study III) reported themselves as having lower levels of work ability and general health when compared to the participants in studies I and II. All participants in study III had musculoskeletal symptoms, and nearly all had experienced symptoms during the week running up to the time at which they completed the questionnaire. The participants' opportunity to select which educational programme they wanted to participate in was important, as it implied that the participants in both programmes would be motivated. As a result, the programmes attracted participants with somewhat different working conditions and work ability. While the majority, 90 %, of the participants in the self-efficacy education worked in direct contact with *people* or worked with *things*, the participants in the ergonomic group worked more with *data*. This difference in the job characteristics may explain the higher levels of perceived physical exertion (60 % reported high levels of physical exertion) in the self-efficacy group. Self-reported work-ability, classified according to the WAI [110], was low for 81 % of the respondents in the self-efficacy group and 48% of the ergonomic group; this is high in comparison to the value of 25% obtained for the Swedish female working population as a whole [153]. It has been proposed that the WAI can identify subjects with low work ability who are in need of more extensive support, while ergonomic education is recommended for subjects with higher scores [110]. This has been found to correspond to the participants' own choice of intervention in this study where participants in the self-efficacy educational program (study III) had more characteristics in common with the population of home care workers, than the ergonomic group as a high proportion of the former were employees working with people, or with things, and as they perceived their job to be physically demanding.

The home care workers are representative of the total population of home care services staff in this municipality as far as the distribution of professions, sex and age are concerned (Johansson, the Personnel Department of the Municipality, personal communication, September, 2010). In comparison to the situation within Swedish home care services divisions in general, in this municipality there was a lower proportion of professionally educated staff and fewer staff were employed per client than the norm, but there was higher continuity in terms of the number of staff caring for each client; there were also fewer employees per supervisor [154].

## A unifying model

During my studies I have searched for a unifying model for the studies in my thesis. I found Fishbein's model [40] to be useful so I have modified this model to be used as 'a model for improved understanding of the chain of interacting factors leading to health- and work ability' (Figure 2). Health and work ability are the outcome measures. This model proposes that factors in society and at the work place, such as the perceived safety climate, job demands, social support and job control can influence the individual employees' attitudes, perceived norms and self-efficacy beliefs. All these factors can influence an employee's level of motivation in relation to a desired outcome. In this thesis, the main behaviours studied are obtaining a safer behaviour at work (studies I and II), managing musculoskeletal pain (study III) and improving health and work ability (all studies). The safety related specific behaviours in the jobs studied refers to working according to good ergonomic principles such as having good working postures and movements and appropriate scheduling of rests and pauses and ability to cope with stress at work. In the model, also interferences of sudden and unexpected events or a lack of specific skills to manage the situation are addressed. This is important, as such factors may hinder the person to perform his/her intended action (Figure 2).

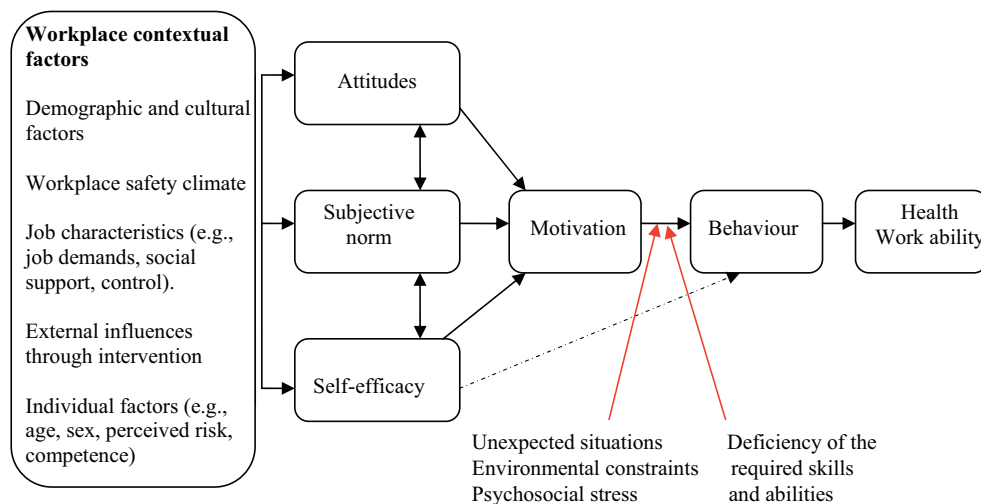


Figure 2. A model showing factors important for an adequate safety behaviour and good health and work ability adapted from Fishbein [40] and modified by Larsson and Gard.

It is important for employees to feel ‘motivated’ and to take actions in their working environment. So to focus on motivational factors as part of the process of improving behaviours leading to health and work ability is important in the model. From a healthy work perspective, one vital goal is to enhance employees’ motivation to take actions to ensure that they are in good health and have a sustainable work ability.

Differences in employee attitudes, norms, and beliefs about self-efficacy can be noted in the results of studies I, II and III. Furthermore it is important to cover all of these issues in physiotherapy interventions through the development of appropriate interventions. In studies I and II the focus was on work place characteristics and on the safety climate and therefore these factors were added to the model. Specific job characteristics can include the demands of performing the work, the social influences and the opportunities for control at the workplace. Safety climate is a measure of shared perceptions and attitudes towards health and safety in the workplace.

Workplace contextual factors, for example the workplace safety climate and job characteristics (Figure 2) may change over time, as a result of positive effects brought about by promoting safety (study II) or through the implementation of rehabilitation programmes (study III). In models that attempt to understand human behaviour, it is essential to recognize that there is a reciprocal interaction between personal resources, for example self-efficacy, a person’s behaviour and external environmental factors [155]. An individual’s behaviour is a product of situational and environmental aspects, but the behaviour also influences the surrounding environment. For example, people acting as role models for colleagues in their workplace may contribute to these colleagues development of stronger self-efficacy beliefs. Proactive participation in work place health and safety management may contribute to the development of all the people concerned, thereby leading to work environment improvements both ergonomically, psychosocially and concerning safe behaviour at work. Proactive health and safety management is not about solving problems and/or trying to change people’s behaviour from the outside. It is more a matter of identifying and promoting changes that have the potential to create a sustainable improvement for the future, a long-term improvement [156]. This model will be referred to also in the following discussion.

## Safety-related behaviours

The relative priorities that people have concerning their own work-related health and their efficiency in the provision of services were shown to have a great influence on the staffs abilities to comply with safety regulations or to participate in proactive risk management. *“We do a lot of things that we shouldn’t be doing, but we do them to get the job done, we quietly suffer and struggle with narrow bathrooms and low beds, and we do a really good job... We argue with the relatives of the client, we argue with the client, we argue with the occupational therapist and with the home care services administrator.. (in an attempt to bring about change)”* (Larsson, et. al., focus group, unpublished, October 2009). The home care staffs reported that a lack of time and



equipment restrained their work performance. Some respondents specified especially that there was a 'gap' between the time when clients returned from a stay in hospital and the time at which practical arrangements were resolved. There was a delay in receiving the necessary equipment and also a lack of appropriate instructions and information (study II). Such factors can hinder a worker or prevent him/her from performing his/her intended action, which can have harmful effects [40, 100]. Environmental constraints (Figure 2) have to be considered in future interventions to improve safety-related behaviours. The different ergonomic situations in clients' homes, many different clients and unexpected situations that need to be attended to, put high demands on the home care employees skills, abilities, and opportunities to act in a safe way. There is a need within home care to promote the staff's self-efficacy at work to develop safe work practices in unexpected situations [89, 90]. The model for risk management in the community studied in this thesis aimed to support the efficacy of each work unit in identifying and managing risk factors. Yet, only 23 % of the respondents claimed to always participate in risk management in their unit. Notable, there were significant inter-work unit differences in their members' degree of participation. Positive effects, such as improved risk awareness, concordance and routines were reported. However, a lack of time to perform the assessments on a regular basis, and irregular follow-ups on changes were given as examples of reasons for not using the risk assessment model (Figure 1). The results indicated that a high degree of proactive safety participation, was linked with perceptions of a good safety climate in the dimensions concerning the 'management' priority of safety and competence', 'the management' safety empowerment' and 'group trust in the efficacy of safety systems', as well as stronger decision-making authority, perceived level of safety at work, and with fewer occasions with constraints on the performance. These findings are supported by recent studies that showed the importance of structured routines [14]; management commitment and support for changes in the workplace [66, 157] and the importance of strengthening individual control over decisions and actions [54, 58]. It is interesting to note that the home care services, with their frequently changing conditions and the need for coordination of their services with those of other sectors to be able to provide high quality service, have many features in common with some medical care domains (for example rescue teams). Lessons learnt in the management of these sectors could be valuable for home care services, as research have confirmed that leadership, team work and the teams safety-related behaviours had positive effects on the quality and safety of patient care as well as on medical care staffs wellbeing [90].

The home care workers claimed to have very high levels of decision-making authority, but reported that on many occasions there were restraining conditions and that the physical demands of their job were high; they also said that their participation in proactive safety work was low (study II). This indicates that these workers may have high authority over decisions, but that they did not have a great deal of authority over their work environmental conditions. This needs to be improved. Earlier research has shown that it is important to consider the actual opportunities that are allowed to the individual or to a group of workers within an organisation to exert control over their work environment [48, 58]. Unfortunately, the home care services model for risk

management was not frequently used, nor was it perceived to be functioning in the everyday work. Earlier research revealed that rules and regulations need to be perceived to be functional by the employees. It was suggested that participative methods should be used for developing new rules and priorities, from the employees' view [158]. Any future revision of the existing risk management model within the home care services, needs to include the coordination and communication with other divisions of the social services and with medical care organisations earlier than is the case today. Risk assessment, too, needs to be performed at an early stage (Figure 1). It is important that individual workers, their teams and the management participate in the process of improving the workplace safety climate, and developing better health and safety management practices, as well as in identifying and implementing more effective alternative actions [159, 160]. Bringing together a range of stakeholders in a process of reflection and action and by building on the positive present, have been shown to be effective methods in the promotion of health [156]. In the home care services, units with high safety climate and good practices are in a position to propose good solutions for implementation in everyday work (study I). For example: *"This is functioning well in my unit, we have a good communication and receive work equipments fast,.. and we are fairly united within the work group."* (Larsson, et. al., focus group, unpublished, October 2009). Such a participative approach for the development of practices should also include the development of proactive process indicators [161, 162]. Within home care, such indicators could, for example, be the frequency of work place meetings discussing health and safety issues.

## Self-efficacy

### **Predictors of self-efficacy in relation to work and safety**

A significantly higher level of self-efficacy was reported by the assistant nurses than by the care aides (study I). Overall, the home care workers perceived themselves to have a high self-efficacy in our research in comparison with the previously reported value for teachers [111]. The excellent ability of home care workers to handle front-line situations relating to clients' needs has been described in previous research [51]. However, only moderate values of the perceived level of safety work were reported, (study II), with the level being low in comparison to both medical care and the petroleum industry [69]. For both care aides and assistant nurses, regression analyses demonstrated that a strong self-efficacy in relation to work and safety was positively influenced by having a strong workplace safety climate and less physically demanding jobs (study I). For assistant nurses, a strong self-efficacy in relation to work and safety was positively influenced by being older in age and being a man. The influence of these factors on self-efficacy, can be explained by the fact that the actual job content, situational constraints and role expectations at work can influence the development of self-efficacy if, for example, the person performing the work encounters respect in his/her cooperation and communication with others (e.g., clients, medical care staff, management). Self-efficacy is dependent on work place factors (Figure 2) and can be developed by prior successful experiences of an action and through influences in the social environment, for example, by other people acting as role models for successful

practice and by verbal persuasion [75]. It is plausible that accumulated seniority and the education received during the training to become an assistant nurse helps to develop skills that are reflected in a higher self-efficacy for work and safety. Research on female-dominated workplaces confirmed that the climate, power structures and group compositions together determine the power distribution among members [133].

### **Self-efficacy strengthening intervention**

Study III evaluated the effects of a self-efficacy educational programme and an ergonomic educational programme. The contents of each education was designed to improve the participants ability to manage pain and their work (in addition to their general life) situation. It has been argued that the benefits of educational programmes may depend on providing social support and encouraging employees' ability and responsibility to solve their own problems [163, 164], which, within the scope of the limited number of sessions, was also the intention of the ergonomic education given in study III. The 'self-efficacy education' was more comprehensive, spanning a period of 10 weeks, with sessions scheduled in parallel with work (study III). Earlier research revealed that the self-monitoring that takes place, enhances a persons awareness, confidence and sense of control. These personal resources can be seen as tools to handle pain and work and, as such, be important in the recovery process [165, 166]. Listening to other participants describing successful solutions to specific work or life situations can increase the participants' self-efficacy [75]. In study IV the employers reflected upon the rehabilitation process for sick-listed employees, who had participated in 3-week-long rehabilitation, where the contents of the rehabilitation were given from a multiprofessional perspective and were a result of teamwork [27]. The participants in study III, were all working, although some of them had reduced working-hours owing to part-time sick leave. The act of signing on to a list to receive an intervention can be viewed as taking one step in a health promoting direction. Awareness of a need for improvement in personal resources or in relation to the working environment, are important for a person to be able to act in the environment [99].

Over a time period of 9-months, there were small improvements within each group, however, these differed in the two groups. The major effect in the self-efficacy educational group was an increased perceived work ability. The changes could be explained by the participants having an increased physical capacity in relation to the demands of their work and/or having greater power and ability to control their life situations. Physical activities were a part of both of our programmes, but the self-efficacy group engaged in physical activities that were individually tailored to their physical capacities, to a greater extent than the others, and they were supported by physiotherapists and mentors. Previous research has shown the positive effects of physical activity interventions on musculoskeletal symptoms and sick leave [149, 167]. The ergonomic education group showed more frequent use of active pain coping strategies. Catastrophic thinking was unchanged. There were also an increased number of participants with positive beliefs in their ability to work in their present occupation considering their state of health. Surprisingly, none of the types of education showed effect on musculoskeletal symptoms or state of health. Earlier research has revealed

that improved physical function as well as reduced pain can be brought about by supporting sick-listed employees' positive coping strategies [29]. However, it has been suggested that different styles of coping may be important at different stages of recovery and at different levels of pain severity [105, 106]. The interviewed employers (study IV) reported some unsuccessful results of rehabilitation, which they assigned to, for example, a too short rehabilitation period or to that the content of the programme was unbalanced in relation to the reality at work. The unsuccessful results could also depend on supervisors and co-workers attitudes, beliefs and lack of knowledge about how to be supportive and how to promote a good working environment. In this respects it is interesting to note that other studies have reported declining effects at the follow-up owing to lack of group support [168]. This is in line with earlier findings concerning the process of integrated actions from rehabilitation to health promotion, which were found to be effective at reducing work-related disability [12]. The timing of an intervention is important, with early return-to-work programmes being more cost-effective than rehabilitation at a later stage [83]. The recently developed scales on "return-to-work self-efficacy" confirm that self-efficacy in relation to controlling pain is important for a person's return to work, especially early on in the process, within the first month of injury or illness. These scales take into account the person's interaction with his/her workplace, by considering aspects such as being able to meet the demands of the job by adjusting individual tasks, managing to obtain support from colleagues and from the supervisor and manage to cope with pain [86]. The importance of these interactive factors is supported by the results of studies I and II.

## Working conditions and safety climate

In general, the home care services staff reported a fairly good to good safety climate. This is high in comparison with a reference sample of workers from different sectors [114]. However, significant differences were found between individual work units. The low appraisals in some units indicate areas in need of improvement: these are, the members' commitment to safety, the priority they attribute to safety and their refusal to accept risks. The same applied to the priority attributed to safety by the management, and the management's ability to manage safety, including the empowering of employees and supporting their participation (study II). These two latter dimensions were found to be linked with the workers' degree of participation in proactive safety management (study II). Earlier research showed that management expectations, and the actions and support they provide concerning safety have a significant influence on the safety climate in work groups, and hence, they indirectly affect the safety behaviour of individual workers [66]. On the positive side, the respondents in study II stated that they had high beliefs in their managers' desire to treat employees fairly when reporting an accident, and they believed formal safety systems, e.g., conducting safety rounds to be effective. They also exhibited considerable confidence in the ability of their peers to communicate, learn and trust in the ability of the group to manage safety', in comparison with a reference sample [114]. Similar results concerning safety climate were recently reported by Olsen, showing that within medical care, workers' appraisals of the 'teamwork within work units' and of 'justice

in response to errors' were higher than they were in the high-risk off-shore petroleum industry, although the medical care safety climate was generally deemed to be lower [69].

Like their employees, employers considered it important to focus on health and safety in the work environment. The results in study IV showed that the employers' considered it to be important to encourage positive communication in the workplace, and they revealed that the ability of the management to take early actions to fulfil employees' work rehabilitation needs could be improved. This adds an employer perspective to this work environment and safety discussion, where employers, and also to some extent the employees have shared perceptions about what can be done to improve conditions in the working environment. The employers' overall responsibilities for the working environment include health and safety issues. I consider it important for the future that employers to an increased extent take responsibility for creating healthy and safe working environments to an increasing extent, as well as considering health promotion within their work rehabilitation planning. The employers admitted that there were financial and organisational barriers, but they were of the opinion that the work rehabilitation process could be more effective than it is today. The necessary changes could be brought about by improved health promotion and through preventive work, such as improved cooperation with rehabilitation professionals, occupational services and social insurance officers. Earlier research has demonstrated that as a group, social insurance officers wanted employers to take on increased responsibility for their employees' working environment and rehabilitation issues [23-27]. Essential components for interventions to bring about a successful return to work include coordination of each worker's return to work, individual psychological and occupational interventions, workplace-based interventions, accommodating changes in the work, contact between the various stakeholders and implementing the interventions [169].

## Methodological considerations

There are several methodological limitations associated with performing research using small groups. In our research, participation in the surveys was voluntary and the response rate of 54 % in *studies I and II* could indicate a possible selection bias. It is possible that those who perceived the safety climate to be high and the commitment to health and safety-promoting activities to be good might have been more inclined to participate in research addressing health and safety in the workplace, than other home care workers. When studying social influences and intra-unit differences, in particular, it was notable that the response rate differed in the different work units. Furthermore, those who declined to participate were significantly younger than those who participated, but they did not, however, differ in terms of the overall age range, their sex or their profession compared to the participants. A second concern was the representativeness of the home care workers in general. Not all home care workers were invited to participate: only 298 of 350 home care workers met the inclusion criterion of having worked in the same unit for the last six months and were, therefore,

invited. This criterion was decided upon because the measure of the safety climate was considered to represent the shared perceptions of the members of a social unit. The remaining 52 people (about 15 %) had been employed (or temporary employed) for less than six months. In addition, the group of participants reported having relatively high levels of general health, but their degree of self-reported work ability, decision-making authority, skill discretion and their assessment of the physical demands associated with their job were all in line with earlier research on a similar population [146, 151, 152].

In *study III*, it was an advantage that participation in both interventions was selected according to the participants' own interests, needs for change and motivation. This selection opportunity produced some differences between the groups at baseline, with the ergonomic education group being somewhat advantaged in comparison to the other group. The inclusion criteria 'having musculoskeletal symptoms' and 'working at least part time' restricted the sample sizes, but were considered to be important for this study. The sample size was also limited by subjects not responding to the nine-month follow-up questionnaire, which resulted in a response rate of about 73 %. In general, those who dropped out had a longer period of part-time sick leave and reported poorer levels of health-related factors than subjects included in the study. The reason they did not respond to the follow-up is unknown. It is possible that the choice to participate made by the participants who were on part-time sick was influenced by someone in the rehabilitation network (for example, the supervisor, a social insurance officer, the personnel manager, or the occupational health service), but we have no evidence of this. As the interventions were carried out alongside normal life and work, other factors in the participants' lives may have affected their health and work ability. We would have preferred to have been able to include a larger number of respondents, but this was not possible for organisational and economic reasons.

When recruiting the participants (*studies I, II and III*) the course leaders or supervisor, distributed a letter containing information, a letter of consent, a hard-copy questionnaire and a prepaid envelope for the reply. Based on the results (e.g. the intra-unit differences found in the safety climate, the workers' decision-making authority and in 'supervisor-level factors' influencing the degree of participation of unit members in proactive risk management, it is possible that a different number of participants or other participants would have agreed to take part in the research if the recruitment had by-passed the supervisors. It has been emphasised that, in research where people are engaged in social relations, issues of authority and dependencies may influence participants' willingness to participate [170]. The results also need to be analysed from a contextual perspective, to visualise any eventual imbalance in power related to gender, class and ethnicity and their consequences [171]. However, this research was indentifying potentially health and work ability promoting factors, as well as good practices and solutions in some work units. By using, and further building on, these results in future practice and research, positive changes can be brought about for employees within the home care services, even for those whose voices were not heard here.

The employers (Study IV) were recruited from a list of employers that had sent employees to a 3-week-long stay at a rehabilitation centre, and some of them held special positions as rehabilitation coordinators within their companies. This implies that these respondents could have a higher interest in work-related health and rehabilitation than average. The *transferability* of the results of the manifest qualitative content analysis was addressed by describing the respondents, who represented a variety of kinds of experience and different companies [172]. *Credibility* was ensured by the fact that two researchers collaborated through the analysis process, in the sorting the data (the content) into categories. The *conformability* of the results was ensured by presenting quotations in the results [173].

The data in *study I*, was derived from a cross-sectional survey, restraining us from making absolute causal conclusions about the predictors. There are always concerns about which independent variables to choose, because of needing to ensure that they are capable of reflecting the important associations. To answer our research questions in *studies I-III*, we had to rely on questions from many different standardised questionnaires. Most of the questions used had been tested for reliability and validity and, in addition, a few scales were reliability-tested for use in the research presented here. Draft versions of the questionnaire were tested for face validity on representatives from the home care services (*studies I and II*) and on the course leaders (in *study III*). For example, an explanation was added within brackets to one item incorporated in the safety climate scale, saying ‘efficiency in medical care and services work’, to elucidate ‘production’ in this context. Safety climate studies show great variation in the aspects and dimensions included in the surveys [71]. With kind permission from the research team, we were able to use the NOSACQ in our study (I and II). We used the database reference values compare our results with those of other sectors [114]. The safety climate scale was tested and found to be reliable and valid in the context of the provision of home-based care (Pousette, unpublished paper, December 2009).

Since baseline values were relatively high for some items, a ceiling effect may have caused positive changes to be underestimated. The levels reported in some variables could, to some extent, have been influenced by biases, such as recall bias, social expectations or protests. High levels might also be a ‘healthy worker effect’. The cut-off point to describe ‘high’ levels in the variables was used for the purpose of describing proportions between variables and groups of respondents. The levels should be used with caution when making comparisons with other published research, as different cut of points are often used.

The results of this research (studies I-IV) should be interpreted with some caution, as it is based on two explorative studies, one prospective intervention on small groups, and one study based on qualitative interviews. However, potentially important areas for improvement within the home care services were identified. These factors can be used in practice, and they could also be examined more closely in a larger scale investigation involving further quantitative and qualitative exploration of the determinants of good health and safety practices in municipal home care services.

## Conclusions

- Physical job demands, safety climate and self-efficacy in relation to work and safety are three potentially modifiable factors that might promote sustainable work ability for both care aides and assistant nurses in home care services. Individual and job-related variables contributed differently between the two occupations to explain self-efficacy, musculoskeletal wellbeing and work ability.
- A significant diversity was identified between work units in term of their members' perceptions about the safety climate, social support, decision-making authority, safety level at work and participative safety behaviour.
- Working conditions, such as a having a lack of time, equipments and information, restrained the performance of the home care staff. Potentially important areas for the improvement of the particular proactive health and safety management model have been identified; such as the need to increase staff's decision-making authority and participation, improvement of management support, structures and cooperation both within the home care organisation and with external divisions.
- Self-efficacy education and ergonomic education had positive effects, but in different respects. An increased perceived work ability was shown in the self-efficacy group, while increased use of pain coping strategies were shown in the ergonomic group.
- Rehabilitation planning could be improved by early identification of rehabilitation needs, early actions, and the introduction of more structured processes. In addition, proactive actions and good social interactions at the workplace were considered as prerequisites for the sick-listed employees to have a successful return to work.



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# Identifying work ability promoting factors for home care aides and assistant nurses

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## Abstract

### Background

In workplace health promotion, all potential resources needs to be taken into consideration, not only factors relating to the absence of injury and the physical health of the workers, but also psychological aspects. A dynamic balance between the resources of the individual employees and the demands of work is an important prerequisite. In the home care services, there is a noticeable trend towards increased physical and psychosocial strain on employees at work, resulting in a high frequency of work-related musculoskeletal disorders and injuries, and a low prevalence of sustainable work ability. The aim of this pilot study was to explain the predictors of self-efficacy, musculoskeletal wellbeing and work ability for front-line staff within the home care services in a municipality in northern Sweden.

### Methods

This study is based on cross-sectional data collected in a municipality in northern Sweden. Care aides (n=58) and assistant nurses (n=79) replied to a self-administered questionnaire. Hierarchical multiple regression analyses were performed to assess the influence of several independent variables on self-efficacy (model 1), musculoskeletal wellbeing (model 2) and work ability (model 3) for care aides and assistant nurses separately.

## Results

Self-efficacy in relation to work safety was explained by the safety climate and the physical demands of the job in both occupations, and also by sex and age for the assistant nurses. Musculoskeletal wellbeing was explained by sex and perceptions of personal safety for care aides. Work ability was explained by perceptions of personal safety, self-efficacy in relation to work and safety, and musculoskeletal wellbeing for assistant nurses, and by the safety climate, seniority and age for care aides.

## Conclusions

A focus on potentially modifiable factors, such as reducing physical job demands, strengthening the safety climate by introducing organisational and social support for safe work practices and augmenting individual's self-efficacy beliefs, might promote a sustainable ability to work for both care aides and assistant nurses within municipal home care services. Profession-related differences ought to be considered in future proactive interventions.

## Background

In the workplace, health can be seen as a dynamic balance between personal resources and factors related to the workplace [1]. Similarly the concept of 'work ability' can be reflective of a balance between a person's resources and the demands of their work [1-3], where the former is linked to health and functional abilities, values, attitudes, education, work skills and health practices [2, 4], and the latter to the actual content, demands and organisation of work, as well as the working environment [2, 3]. In workplace health and safety promotion, all of the potential resources related to work should be taken into consideration, not only physical health and factors correlated with the absence of injury; the aspects taken into account should include psychological ones [4, 5]. The organisational, psychological, social and physical requirements for health and safety need to be given increased attention and priority in proactive interventions [1, 6].

Research has shown that many workers underestimate their actual risk developing of work-related musculoskeletal disorders (WMSDs) [7]. Perceptions of personal risk (i.e., of susceptibility) can function as a motivating force, such that, when combined with a *positive proactive approach*, such as is exhibited when taking control of one's life and of risk factors at work, health and safety practices are more likely to be adopted [7, 8]. The process through which individuals gain greater control over the actions affecting their health is related to 'self-efficacy', i.e. a belief in one's own ability to overcome obstacles and adopt the behaviour one desires. Perceived self-efficacy in performing physical tasks, fulfilling role expectations, prioritising health and safety at work and managing musculoskeletal disorders is important for a person's health, safety and ability to work [9-11]. Job control and social support are well-known determinants of good health, as clarified by Karasek and Theorell and their co-workers in the development of the demand-control-support model [12, 13]. Recently, this model was applied in research on workplace safety [14, 15]. A good safety climate can be considered as a resource for supporting employees in the performance of their work safely [14, 16]. Safety climate can be described as the shared perceptions of members in a social unit of safety-related policies and practices;

for example, communication between peers relating to safety, commitment to and the priority of safety issues, the refusal to accept risk, and the ability of management to manage and prioritise safety [17]. In addition to having the potential to support specific kinds of behaviour and to ensure certain safety-related outcomes, measured, for example, in terms of low injury rates [16], the social environment can play a role in supporting the work ability of its members[2]. The safety climate and its relation to safe behaviour has recently begun to be explored in medical care sectors [18, 19].

The combination of an aging population and financial limitations in the medical care sector are placing high demands on the municipal home care services. In association with this, a trend towards increased physical and psychosocial strain at work can be noted amongst front-line home care staff, resulting in a high frequency of WMSDs and injuries, and a low prevalence of having a sustainable ability to work [20, 21]. In the medical care sector, a disparity between the working conditions has been noted for different professions in the same medical units [22, 23], suggesting that similar profession-related differences might be present among municipal home care front-line workers. Care aides and assistant nurses within elderly care are usually considered together, as one group, in the literature. The content of their work is often described as being the same, although at least one year of education (in the form of theoretical and practical training in social and medical care) is required to become an assistant nurse, whereas the training for a care aide is given on the job. The aim of this pilot study was to identify the predictors of a perceived self-efficacy, musculoskeletal wellbeing and work ability for care aides and assistant nurses within home care services in a municipality in northern Sweden. Thus, the research questions addressed were:

1. Which factors can explain self-efficacy in relation to work and safety for care aides and assistant nurses?
2. Which factors can explain musculoskeletal wellbeing for care aides and assistant nurses?
3. Which factors can explain the work ability of care aides and assistant nurses?

## **Methods**

### **Context and population**

The research presented here was based on cross-sectional data collected in early 2009 in a northern Swedish municipality as part of a larger health and safety promotion project. In this municipality, a total of 350 care aides and assistant nurses provide home care services to about 900 elderly people (clients) living in private homes. In terms of organisation, the staff members are divided into 18 units, which are managed by 16 supervisors and one head of home care services.

### **Procedure**

Of the total population of 350, 298 home care workers met the inclusion criterion of having worked in the same unit for the last six months and were, therefore, invited to participate in the study. These potential participants were provided with a letter containing more information, a letter of consent for them to sign, a hard-copy of the questionnaire and a prepaid envelope, by means of their supervisors. After one reminder, 158 (54 %) had returned their questionnaire, however, only 137 respondents

had completed all of the questions required for this study and, thus, were included in the data analysis.

### **The participants**

The 137 participants had a mean age of 45 years, 93 % were women, and 42 % were care aides while the others were assistant nurses. Data on the individual and job-related variables are provided in Tables 1 and 2.

### **The data analyses**

Data were obtained through the completion of a comprehensive self-administered questionnaire. The scales used to measure the variables are listed below.

Individual background factors: These were obtained from items relating to age, sex, profession and seniority derived from the QPS Nordic-ADW [24] and had been adjusted by us to the home care services setting.

Job characteristics: *Safety climate* was measured using the 50 items of the Nordic Safety Climate Questionnaire (NOSACQ-50), graded on four-point scales with the end points ‘fully disagree’ and ‘fully agree’. The questionnaire presumes the respondent to be able to provide a representative voice for a social unit’s shared perceptions of the safety climate at the management and work-unit levels [17]. We used a mean value of the seven original dimensions of the safety climate to estimate the respondent’s overall impression of the safety climate.

*Psychosocial job demands* were measured using five items derived from the Swedish version of the Job Content Questionnaire [12]. These assessed the requirement to work fast, hard, and using a considerable amount of effort, as well as the impact of not having enough time to do the job and of having to face conflicting demands at work. Again, these were graded on four-point scales. *Physical job demands* (meaning the perceived physical exertion required when performing the job) were measured using the Borg RPE scale ranging from 6 to 20 equivalent to ‘very, very low’ to ‘very, very high’ [25].

Individual perceptions and practices: *Degree of personal safety* was measured using three items graded on a five-point scale: general level of safety at work (end points ‘very bad’ and ‘excellent’) derived from Olsen [19], the probability of suffering a work-related illness or injury (end points ‘low probability’ and ‘high probability’), and if the respondent feels worried and unsafe when thinking about risks at work (end points ‘not worried and unsafe’ and ‘very worried and unsafe’), modified from Rundmo [26]. *Personal safety behaviour* was measured using six items on a seven-point scale with the end points ‘never’ and ‘always’, reflecting the respondent’s compliance with personal protection regulations [27]. *Self-efficacy in relation to work and safety* was measured using five items graded on a five-point scale (end points ‘fully disagree’ and ‘fully agree’) reflecting the respondent’s capacity to handle most situations at work, to manage the work tasks as well as peers, having a positive attitude at work, and adjusting work tasks to match his/her capacity, as derived from the QPS Nordic-ADW [24], and one question on being able ‘to influence safety’ at work.

Musculoskeletal wellbeing and work ability: *Musculoskeletal wellbeing* was measured for seven different areas of the body, using seven items on a five-point scale ranging from ‘every day’ to ‘very seldom or never’ [28]. A high level of musculoskeletal wellbeing was defined as ‘very seldom or never’ experiencing pain. Musculoskeletal wellbeing was calculated for each body areas individually, and an overall value was



obtained by the ratings for each item being summarised and divided by seven to produce a variable ranging from one to five.

*Work ability* was measured with three items derived from the Work Ability Index on the present work ability in relation to the physical and mental demands of the job (five-point scale ranging from 'very bad' to 'very good'), and on the respondent's own prediction about his or her ability to perform the work that he/she are performing at that time in a further 2 years' time when his/her health is taken into consideration (response alternatives 1, 4 or 7) [29]. The ratings for each item were summarised to produce an index variable ranging from 3 to 17.

### **Data analysis**

The data are presented (in Tables 1 and 2) as means and standard deviations. Between-group comparisons were analysed with ANOVA and the relationships between variables was determined with the Spearman's rank correlation coefficient. Hierarchical multiple regression analyses were used to assess the influence of several independent variables on the dependent variables: self-efficacy in relation to work and safety (Model 1), musculoskeletal wellbeing (Model 2) and work ability (Model 3) for care aides and assistant nurses separately (Tables 3 and 4). The principle behind the selection of the variables to be used in the regressions was to combine variables reflecting individual factors, and the demands and resources of the job. In the first step of the analysis, *basic background variables* (age, sex and seniority) were introduced to serve as controls. In the second step, three variables representing *job-related factors* were added: safety climate, psychological job demands and physical job demands. In the third step, three factors representing *individual resources* were added: degree of personal safety, personal safety behaviour and self-efficacy. The fourth and final step, involved the introduction of the single variable '*musculoskeletal wellbeing*'. All statistical analyses were performed using SPSS version 18.0. A significance level of  $p < 0.10$  was taken to denote statistical significance.

### **Ethics**

The study was performed in compliance with the ethical principles of the Helsinki Declaration, and was approved by the Committee of Research Ethics at Umeå University, Sweden (Dnr 08-217 Ö).

## **Results**

Data on the 58 care aides and 79 assistant nurses are presented in Tables 1 and 2. The assistant nurses reported significantly higher self-efficacy ( $p = 0.004$ ) than the care aides, but there was no significant difference in regard to any of the other variables studied. Strong self-efficacy (index value  $\geq 4.5$ ) was reported by 50% of the care aides and by 71% of the assistant nurses; overall musculoskeletal wellbeing (index value 5, i.e. symptoms very seldom or never) was reported by 21% of care aides and 28% of assistant nurses; and a good work ability (index value  $\geq 15$ ) was reported by 76% of care aides and 84% of assistant nurses. As discussed in the introduction, separate regression analyses were performed for the two groups to establish whether they were similar or different for each of the variables studied.

*Insert Tables 1 and 2 about here*

## Regression models

The regression analyses assessing the influence of several independent variables on self-efficacy (Model 1), musculoskeletal well-being (Model 2) and work ability (Model 3) were performed separately for the care aides and assistant nurses, and the results are presented in Tables 3 and 4.

### Model 1: Factors explaining high self-efficacy for work and safety

For the care aides, the regression analysis performed with self-efficacy as the dependent variable was not significant until the *second step*, indicating that the background factors (age, sex and seniority), used as controls, did not affect self-efficacy. When the variables representing job-related factors were entered, it was revealed that the overall safety climate and physical job demands significantly contributed to the explained variance: the added variables explained 26% ( $p=0.001$ ), and the overall model had an  $R^2_{adj}$  of 0.24 ( $p=0.003$ ). The third step did not attain significance, indicating that neither perceived degree of personal safety nor personal safety behaviour were linked to self-efficacy for this group. Thus, for care aides, a higher self-efficacy was exhibited by those who reported a strong safety climate and by those who perceived less physical exertion in their job (Table 3).

The regression analysis for the assistant nurses attained significance during the *first step*, where age and sex significantly affected self-efficacy: the background variables explained 16% ( $p=0.004$ ) of the variance. When the job-related factors were entered in the second step, the safety climate and the physical job demands provided a significant contribution to self-efficacy, and the variables added explained an additional 20% ( $p<0.001$ ). In the third step, the change was not significant. Thus, the overall model had an  $R^2_{adj}$  of 0.31 ( $p<0.001$ ), implying that among assistant nurses, a higher self-efficacy was affected by being older, being a man, perceiving less physical exertion in their job and being in a stronger safety climate (Table 4).

### Model 2: Factors explaining musculoskeletal wellbeing

For care aides, the regression analysis performed with musculoskeletal wellbeing as the dependent variable attained significance in the *first step*, where sex significantly contributed to the explained variance, and the background variables added jointly explained 12% ( $p=0.072$ ) of the variance. When the job-related factors were entered in the *second step*, the physical demands of performing the job significantly affected musculoskeletal wellbeing and the job-related variables that were added explained an additional 16% ( $p=0.018$ ) of the variance. In the *third step*, the degree of personal safety significantly contributed to the explained variance. When the individual resources were added, they explained a further 11% ( $p=0.040$ ) of the overall variance, whereas physical job demands lost its explanatory value. The overall model had an  $R^2_{adj}$  of 0.28 ( $p=0.003$ ). Thus, among the care aides, a higher level of musculoskeletal wellbeing was attained by being a man and by reporting higher degree of personal safety at work (Table 3).

In the regression analysis for the assistant nurses the overall model was not significant ( $p=0.112$ ). This indicates that the respondent's background, job-related and individual resources were not linked to musculoskeletal wellbeing for assistant nurses (Table 4).

### **Model 3: Factors explaining high work ability**

For the care aides, the analysis performed with their work ability as the dependent variable was already significant in the *first step*, where age and seniority were found to significantly affect the ability to work, and the background variables that were added explained 20% ( $p=0.007$ ) of the variance. When the variables representing specific job-related factors were entered in the *second step*, the safety climate contributed significantly to the work ability and the variables that were added explained a further 16% ( $p=0.008$ ). The overall model had an  $R^2_{adj}$  of 0.29 ( $p=0.001$ ). In the third and fourth steps, the changes were not significant ( $p=0.143$ ), indicating that personal resources and musculoskeletal wellbeing were not linked with work ability in this group. Hence, among the care aides, a higher work ability was positively affected by being of a younger age, having greater seniority and being in a stronger safety climate (Table 3).

For assistant nurses, the model for explaining variations in work ability did not achieve significance until the *second step*, indicating that the background factors were not linked to work ability. In the *second step*, overall safety climate and physical job demands provided significant contributions to work ability, and the job-related variables that were added explained an additional 13% ( $p<0.017$ ) of the variance. In the *third step*, the degree of personal safety and self-efficacy provided significant contributions and explained a further 19% ( $p<0.001$ ), while the job-related factors lost significance. In the *fourth step*, musculoskeletal wellbeing contributed significantly and explained an additional 8% ( $p<0.002$ ) of the variance; sex also appeared to be a significant contributor. The  $R^2_{adj}$  for the overall model was 0.36, ( $p<0.001$ ). This implies that the work ability was positively affected by being a woman and by reporting a higher degree of personal safety, higher self-efficacy in relation to work and safety, and higher musculoskeletal wellbeing (Table 4).

*Insert Tables 3 and 4 about here*

## **Discussion**

In this study, we assessed the predictors of self-efficacy, musculoskeletal wellbeing and work ability for care aides and assistant nurses separately. Of the variables used in the models, only the level of perceived self-efficacy differed significantly between the two professions, being higher for the assistant nurses. In both professions, a high frequency of musculoskeletal symptoms was reported, with only about a quarter of the participants having no musculoskeletal complaints. However, the overall results of the hierarchical multiple regression analyses indicated that the independent variables used in the models made different contributions for the care aides and assistant nurses.

For both professions, the models for explaining self-efficacy in relation to work and safety showed that higher self-efficacy was evidenced among those who perceived a low level of physical exertion and who reported a stronger safety climate. Furthermore, for assistant nurses, being older and being a man were also linked with higher self-efficacy beliefs. This is in line with recent findings in medical care, which

showed that, within the same workplace, those with a low status and with a low degree of authority to influence the job content have the highest overall physical exposure levels [23]. Earlier research in home care services showed that group solidarity, collegial support and being acknowledged for the performance of one's home care job are important for the job satisfaction of front-line staff [30]. Therefore, the predictive value of the safety climate is important. Safety climate indicates whether the social influences of the manager and colleagues are likely to encouraging workers to perform their job safely [15, 17, 18]. According to Bandura [31], self-efficacy can be developed from the experience of having had successful experiences of an action previously and through the influence of the social environment, for example, through other people acting as role models for successful practice, and as a result of verbal persuasion. Thus, the actual job content, situational constraints and role expectations at work may influence the development of self-efficacy, for example, if the person performing the work encounters respect in his or her cooperation and in his or her communication with others (e.g., with clients, medical care staff and management). It is plausible that the education provided during training to become an assistant nurse helps to develop skills that are reflected in a higher self-efficacy where work and safety are concerned. Research on female-dominated workplaces confirmed that climate, power structures and group compositions determine the power distribution among members [22]. Furthermore, men and individuals with higher professional and life experiences are often allocated a higher status [32].

Among care aides, the regression analysis showed that the perception of musculoskeletal wellbeing was influenced in a positive direction by being a man and by perceiving a higher degree of personal safety. Before the variables representing individual resources were entered, lower physical job demands had a significantly, positive, influence on musculoskeletal wellbeing. The fact that women with physically demanding jobs run a higher risk of developing WMSDs has already been shown in previous studies [33, 34]. It is plausible that experiences of musculoskeletal wellbeing may induce feelings of safety, e.g., a lower susceptibility to WMSDs [7]. That job-related variables lost power when factors representing individual resources were entered into the model can be explained by the fact that objective risk factors are reflected in perceptions of perceived risk [35]. The model for assistant nurses was not significant, making further studies on a larger population desirable.

In this study, 'work ability' reflected the staff's own prediction about their ability to perform their present work in a further 2 years because of their state of health, and their work ability in relation to the specific demands posed by their job. Among care aides, work ability is affected in a positive way by being younger, having a relatively long experience of working within the home care services, and reporting a 'stronger' safety climate. As professional skill and experience develop over time, it can be seen how a greater seniority would provide a greater ability to perform the tasks required more efficiently [31]. Accumulated seniority could also reflect the underlying health of the workers in question, as it is possible that some former workers could have changed jobs to work in another field for health reasons. In the present study, 'safety climate' was introduced for the first time as a factor able to promote a sustainable ability to work. This supports earlier findings revealing positive feedback to be important for work ability [30, 36]. Yet, a 'safe climate' specifies that the quality of the feedback and support received from managers and peers, should, e.g., be directed

towards the need to prioritise healthy and safe behaviour at work, irrespective of the desire to provide high quality service. In the model for explaining the work ability of assistant nurses, a greater ability was exhibited by being a woman and by reports of high self-efficacy, degree of personal safety and musculoskeletal wellbeing. This can be viewed as a proactive attitude driven by the desire of workers to remain free of injury, a belief in having the skill to, and taking, preventive actions to avert potential threats [37]. The education required in training to be an assistant nurse may instil a greater awareness of one's own health and needs to take preventive actions, reflecting functional optimism [7, 8]. Holding an active belief in one's own ability to shape one's work context and having high quality communication are considered to influence participation in proactive safety activities [23], and to provide a buffer against WMSDs [33]. Unexpectedly, the degree of compliance with personal protection regulations did not contribute significantly in any of the models. It is possible, that in contexts where the environment and the tasks required vary considerably, and in which all clients are unique, it is not possible to standardise all of the processes [38]. Instead, staff self-efficacy at the identification and implementation of safe work practices in varied and even unexpected situations may be more influential than an ability to work within regulations [10]. Accordingly, there could be reasons to promote workers' knowledge, self-efficacy and ability to identify alternative courses of action when encountering environmental demands. Hence, it is important to consider the actual opportunities that are allowed to the individual or to groups of workers within an organisation to exert control [14, 39, 40]. As the 'safety climate' includes the management's ability to increase workers' empowerment, this is an interesting resource to explore further within the context of home care services.

### **Limitations**

The data for this study were derived from a cross-sectional survey, restraining us from making absolute causal conclusions about the predictors. There are always concerns associated with which independent variables are capable of reflecting the important associations, and therefore which ones to choose. The response rate of 54% could imply a selection bias, which is why the results should be interpreted with some caution. However, non-responders were significantly younger (mean age 41) but did not differ from the participants in terms of their age range, sex or profession. Thus, this research can be perceived as an explorative pilot study that has identified possible predictors for self-efficacy, musculoskeletal wellbeing and the ability to perform work, and which could be studied in greater depth in research on a larger scale.

### **Conclusions**

A strong sense of self-efficacy in relation to work and safety was influenced by having a strong safety climate in the workplace and by perceiving oneself to have a low physical exertion at work. Individual and job-related factors contributed differently to an individual's work ability in the two professions, which ought to be considered in future proactive interventions. Musculoskeletal wellbeing and perceptions of personal safety and self-efficacy were most important for the assistant nurses, while the work ability of the care aides was influenced by the safety climate, age and seniority. This implies that, for both professions, interventions to promote a sustainable work ability need to focus on potentially modifiable factors, such as the safety climate, physical job demands and self-efficacy.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

AL, LK and GG participated in the development of the study design. AL was responsible for the data collection and for drafting the manuscript. AL and MW performed the statistical analysis, and MW, LK and GG read and corrected draft versions of the manuscript. All authors read and approved the final manuscript.

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## Tables

**Table 1 – Correlations, care aides (n=58)**

	Mean	SD	Alpha	Scale	1	2	3	5	6	7	8	9	10	11
1. Age	43.95	12.59	.	.										
2. Sex (men/women, %)	9%	91%	.	.	0.22									
3. Seniority, years	13.10	9.40	.	.	<b>0.48</b>	0.23								
5. Safety climate, overall	3.20	0.49	0.96	1-4	0.19	0.07	0.13							
6. Psychological job demands	2.52	0.44	0.75	1-5	0.08	0.12	0.13	<b>-0.43</b>						
7. Physical job demands	13.31	2.58	.	6-20	-0.05	0.01	-0.11	<b>-0.29</b>	<b>0.60</b>					
8. Personal safety behaviour	5.35	0.91	0.85	1-7	0.14	0.10	-0.08	<b>0.51</b>	-0.23	<b>-0.35</b>				
9. Degree of personal safety	3.37	0.74	0.76	1-5	-0.11	-0.18	-0.02	<b>0.61</b>	<b>-0.41</b>	<b>-0.32</b>	<b>0.33</b>			
10. Self-efficacy	4.38	0.49	0.70	1-5	0.17	-0.09	0.15	<b>0.44</b>	<b>-0.34</b>	<b>-0.42</b>	<b>0.26</b>	<b>0.40</b>		
11. Musculoskeletal wellbeing	4.37	0.67	0.74	1-5	0.16	-0.25	0.12	<b>0.28</b>	-0.22	<b>-0.38</b>	0.25	<b>0.46</b>	<b>0.40</b>	
12. Work ability	15.10	2.09	0.73	3-17	<b>-0.32</b>	-0.13	0.11	<b>0.27</b>	<b>-0.33</b>	<b>-0.31</b>	0.17	<b>0.36</b>	<b>0.38</b>	<b>0.28</b>

Pearson's correlations (2-tailed) are significant at the **0.01 level** and at the **0.05 level**. Dichotomous variable: Sex: Men=1, women=2.

**Table 2 – Correlations, assistant nurses (n=79)**

	Mean	SD	Alpha	Scale	1	2	3	5	6	7	8	9	10	11
1. Age	46.48	9.27	.	.										
2. Sex (men/women, %)	6%	94%	.	.	<b>0.23</b>									
3. Seniority, years	11.57	8.07	.	.	<b>0.25</b>	<b>0.26</b>								
5. Safety climate, overall	3.26	0.43	0.96	1-4	0.10	-0.09	-0.09							
6. Psychological job demands	2.54	0.42	0.66	1-5	-0.05	-0.11	0.08	<b>-0.46</b>						
7. Physical job demands	13.15	2.30	.	6-20	0.10	0.11	0.17	-0.04	<b>0.30</b>					
8. Personal safety behaviour	5.52	0.88	0.87	1-7	0.22	0.03	-0.11	<b>0.36</b>	-0.20	-0.12				
9. Degree of personal safety	3.35	0.64	0.69	1-5	0.04	0.01	-0.06	<b>0.41</b>	<b>-0.39</b>	<b>-0.28</b>	<b>0.30</b>			
10. Self-efficacy	4.59	0.37	0.63	1-5	<b>0.30</b>	-0.18	-0.06	<b>0.35</b>	<b>-0.32</b>	<b>-0.34</b>	<b>0.33</b>	<b>0.37</b>		
11. Musculoskeletal wellbeing	4.12	0.97	0.86	1-5	-0.03	-0.18	-0.15	0.08	-0.16	<b>-0.24</b>	0.03	<b>0.33</b>	0.21	
12. Work ability	15.43	1.82	0.67	3-17	0.06	0.00	-0.16	<b>0.24</b>	-0.20	<b>-0.30</b>	<b>0.22</b>	<b>0.49</b>	<b>0.45</b>	<b>0.46</b>

Pearson's correlations (2-tailed) are significant at the **0.01 level** and at the **0.05 level**. Dichotomous variable: Sex: Men=1, women=2.

**Table 3 – Results of regression analyses for care aides (n=58)**

	Self-efficacy			Musculoskeletal wellbeing			Work ability			
Age	0.15	0.10	0.13	0.18	0.13	0.19	-0.46***	-0.50***	-0.54***	-0.57***
Sex	-0.15	-0.14	-0.11	-0.32**	-0.32**	-0.23*	-0.11	-0.10	-0.06	-0.02
Seniority, years	0.11	0.06	0.05	0.11	0.05	0.05	0.36**	0.34**	0.36**	0.35**
Safety climate, overall	.	0.33**	0.24	.	0.20	-0.12	.	0.23*	0.04	0.06
Psychological job demands	.	-0.03	-0.01	.	0.10	0.11	.	-0.13	-0.15	-0.16
Physical job demands	.	-0.29*	-0.28*	.	-0.36**	-0.25	.	-0.16	-0.02	0.01
Degree of personal safety	.	.	0.16	.	.	0.40**	.	.	0.05	-0.01
Personal safety behaviour	.	.	-0.02	.	.	0.08	.	.	0.12	0.11
Self-efficacy	.	.	.	.	.	0.15	.	.	0.28**	0.26*
Musculoskeletal wellbeing	.	.	.	.	.	.	.	.	.	0.15
F-ratio	1.06	3.92	3.01	2.47	3.25	3.42	4.49	4.85	4.03	3.75
R <sup>2</sup>	0.06	0.32	0.33	0.12	0.28	0.39	0.20	0.36	0.43	0.44
R <sup>2</sup> adj	0.00	0.24	0.22	0.07	0.19	0.28	0.16	0.29	0.32	0.32
Significance	0.374	0.003	0.008	0.072	0.009	0.003	0.007	0.001	0.001	0.001
R <sup>2</sup> Change	.	0.26	0.01	.	0.16	0.11	.	0.16	0.07	0.01
F (R <sup>2</sup> Change)	.	6.45	0.52	.	3.67	2.99	.	4.36	1.89	1.11
Sign (R <sup>2</sup> Change)	.	0.001	0.595	.	0.018	0.040	.	0.008	0.143	0.298

Significance levels: \*p<0.10, \*\*p<0.05, \*\*\*p<0.01 Regression coefficients shown are beta coefficients.

Dichotomous variable: Sex: Men= 1, women=2.

**Table 4 – Results of regression analyses for assistant nurses (n=79)**

	Self-efficacy			Musculoskeletal wellbeing			Work ability			
Age	0.38***	0.36***	0.33***	0.04	0.04	0.03	0.10	0.09	-0.04	-0.05
Sex	-0.24**	-0.22**	-0.23**	-0.15	-0.16	-0.15	0.03	0.07	0.13	0.18*
Seniority, years	-0.09	-0.01	-0.01	-0.12	-0.08	-0.09	-0.19	-0.13	-0.13	-0.10
Safety climate, overall	.	0.22*	-0.11	.	0.00	-0.08	.	0.22*	0.04	0.06
Psychological job demands	.	-0.13	-0.11	.	-0.11	-0.05	.	0.01	0.11	0.13
Physical job demands	.	-0.30***	-0.24**	.	-0.18	-0.10	.	-0.28**	-0.11	-0.08
Degree of personal safety	.	.	0.16	.	.	0.32*	.	.	0.36***	0.26**
Personal safety behaviour	.	.	0.12	.	.	-0.09	.	.	-0.01	0.02
Self-efficacy	.	.	.	.	.	0.06	.	.	0.34***	0.32***
Musculoskeletal wellbeing	.	.	.	.	.	.	.	.	.	0.32***
F-ratio	4.86	6.86	5.84	1.13	1.32	1.67	0.95	2.34	4.32	5.42
R <sup>2</sup>	0.16	0.36	0.40	0.04	0.10	0.18	0.04	0.16	0.36	0.44
R <sup>2</sup> adj	0.13	0.31	0.33	0.00	0.02	0.07	0.00	0.09	0.28	0.36
Significance	0.004	0.000	0.000	0.342	0.260	0.112	0.421	0.040	0.000	0.000
R <sup>2</sup> Change	.	0.20	0.04	.	0.06	0.08	.	0.13	0.19	0.08
F (R <sup>2</sup> Change)	.	7.58	2.13	.	1.48	2.25	.	3.63	7.01	10.1
Sign (R <sup>2</sup> Change)	.	0.000	0.127	.	0.226	0.090	.	0.017	0.000	0.002

Significance levels: \*p<0.10, \*\*p<0.05, \*\*\*p<0.01 Regression coefficients shown are beta coefficients.

Dichotomous variable: Sex: Men= 1, women=2.



## Promoting healthy work and a safe work environment in home care services in Sweden

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**Objective:** Municipal home care workers provide high-quality services to an increasing proportion of elderly people living in private homes. The work environments and working conditions of these workers vary to a great extent, which imposes demands in terms of rapid priority-making to ensure that the work can be performed in a safe way. The study aims to describe municipal home care service staffs' perceptions of their safety climate, safety-related behaviour, working conditions and self-efficacy, health and work ability. A further aim of this research was to identify between work-unit differences, as well as identifying factors supporting safety-related behaviour. **Methods:** This study was based on cross-sectional data collected from the home care services in a municipality in the north of Sweden. Nursing assistants and care aides (133 in total, with a mean age of 45 years) divided into 18 units replied to a self-administered questionnaire. Descriptive statistics and between-group differences were analysed. **Main results:** A fairly high decision-making latitude, high self-efficacy, good general health and work ability were reported, but also high physical demands and a high frequency of musculoskeletal symptoms. On average, the safety climate was fairly good, but it differed significantly between units. The perceptions of strong safety climate in aspects related to management, having the authority to make decisions, and fewer occasions with constraints on the performance, were linked with higher degree of participative safety behaviour. **Conclusion:** The focus needs to be on improving managerial and organisational preconditions for safe work practices for all staff members, e.g., by introducing structured routines and improving coordination, as well as by increasing the employees' decision-making authority. Units reporting a stronger safety climate can propose good solutions and practices for daily work.

**Keywords:** health, safety, behaviour, safety climate, working conditions, management

# Promoting healthy work and a safe work environment in home care services in Sweden

## Introduction

Research on health and safety promotion shows the importance of focusing on potential resources at work. From this point of view, health and safety are widely considered to be more than physical health and non-injury: they also have psychological aspects (Nilsen *et al.*, 2004, Lindström *et al.*, 2005). Nowadays, there is an increased awareness of the importance of proactive interventions and, in particular, of focusing on the organisational, psychological, social and physical preconditions that make people prioritise health and safety at work (Shain *et al.*, 2004, Törner, 2008). Research has revealed that many workers underestimate their actual risk of obtaining work-related musculoskeletal disorders. Perceived personal risk in a work situation can help to motivate good health and safety behaviour when those concerned have greater control over the risk factors (Whysall *et al.*, 2007, Stave *et al.*, 2006). Closely related to the process by means of which people improve their control over decisions and actions, is the concept of 'self-efficacy', i.e. a belief in one's own ability to overcome obstacles and bring about the results one requires (Bandura, 1997). As a social construct, one's self-efficacy belief are influenced by the work task and by other persons in the work environment (Gist *et al.*, 1992, Bandura, 1997). On the organisational level, a good safety climate can be considered as a positive work-related resource for actively encouraging employees to take their own health and safety into account in various situations at work (Snyder *et al.*, 2008). A safety climate can be defined as the shared perceptions among the members in a social unit of safety related policies and practices influencing safety in the organisation (Zohar, 2010). It includes, for example, inter-peer safety communication, perceptions of commitment, the prioritisation of safety, non-acceptance of risks, and the ability of management to manage and prioritise safety over productivity (Kines *et al.*, 2011). The safety climate will influence the employees' perceptions of what kind of role behaviour is expected and of how it will be rewarded at the workplace (Zohar, 2010). Positive relationships have been found to exist between safety climate and the safety-related behaviours of members of a work group in relation to outcomes, measured, for example, in terms of low injury rates (Clarke, 2006). There are indications that interventions that focus on potentially modifiable aspects of the safety climate can increase the health and safety of medical care personnel and patients (Flin *et al.*, 2006, Yassi *et al.*, 2005, Olsen *et al.*, 2010), which is of particular interest in this research on home care services.

In home-based medical care or sectors of the social services, the safety climate and its relationship with safety-related behaviour, and health and safety-related outcomes have not yet been studied. Today, high demands are placed on home-based medical care and on the service sectors, because of the aging population and the financial limitations being imposed on the medical care sector (Lang *et al.*, 2009, Henriksen *et al.*, 2009). A high frequency of work-related musculoskeletal disorders and injuries, and a low prevalence of sustainable work ability exist among employees in the home care services (Fjell *et al.*, 2007, Dellve *et al.*, 2008b, Ono *et al.*, 1995). Home care service workers provide practical household chores, personal care and social support to an increasing proportion of elderly people living in private homes.

Each home is associated with unique physical and social working conditions. The work of the home care service workers partly consists of routine tasks, but staff must also cope with frequently changing conditions, such as having new clients, changes in staff, acute situations to attend to, travelling and performing lone work. Practical and ethical dilemmas can arise in the provision of high-quality services for elderly recipients, in conjunction with the needs for home care workers' to be ensured a good working environment (Lang *et al.*, 2009, Shain *et al.*, 2004, Henriksen *et al.*, 2009, Dellve *et al.*, 2008a). Safety climate perceptions incorporates the dilemmas arising from sometimes conflicting demands between safety practices and productivity (Zohar, 2010). In this context, productivity should be taken to mean 'efficiency in medical care and services'. As the lone work and highly varied conditions impose high demands on the staff members' individual abilities to make safe choices at work (Katz-Navon *et al.*, 2007), it is important to identify factors that can enhance safe working practices in home care services.

The study aims to describe municipal home care service staffs' perceptions of their safety climate, safety-related behaviour, working conditions and self-efficacy, health and work ability. A further aim of this research was to identify between work-unit differences, as well as identifying factors supporting safety-related behaviour.

## **Material and methods**

### ***Material***

This study was set in a municipality in the north of Sweden. A total of 350 care aides and nursing assistants, working in a total of 18 units, provide home care services to about 900 elderly people (clients). The units are situated in different geographical areas, some in the centre of the town, and others in the countryside. They are managed by one head of home care services and 16 supervisors.

### ***Methods***

#### ***A model for participatory risk management***

All of the home care units shared the experience of using a particular model for participatory risk management in municipal home care services. The model was developed in 2006 by an internal workgroup in this municipality. The overall vision of the risk management model is to support each unit's united capacity and to enhance its efficacy at identifying, documenting and managing risk factors relating to workers' illnesses or accidents. A checklist (encompassing aspects covering both the physical and psychosocial environment) enables a preparatory risk assessment to be performed by the home care staff in the home of each new client. All of the workplaces, comprised of about 900 private homes belonging to the clients, are checked on a regular basis. Risk assessments are also performed for the general working environment (e.g., the staff room and the means of transport). This serves as a basis for the supervisor, by means of a process flow chart, to decide upon the measures that need to be taken to address any environment related problems (Figure 1).

#### ***Procedure***

This research is based on cross-sectional data gathered in February and March 2009 within a study of health and safety promotion in a municipality-run home care services for the elderly. Initially, the researchers met the management of the home

care services to plan the project, in addition to which, in the development of the questionnaire for data collection, one supervisor and two home care workers participated in meetings with the researchers. Draft versions of the questionnaire were tested for face validity. The supervisors provided the researchers with lists of all the home care workers who met the criterion of having worked in the same home care unit for the last 6 months. As a result, 298 (out of a total of 350) home care workers were invited to participate in the study. The supervisors of these workers distributed a letter containing information, a letter of consent, a hard-copy questionnaire and a prepaid envelope for the reply in February, 2009. A reminder was sent out after one month. The response rate varied in the different units and, overall, 158 (54%) of the home care workers agreed to participate. Of these, only the 133 participants who had completed all of the items included in the questionnaire that were required to measure the variables in this study were included.

### *Study participants*

The 133 participants whose responses were included had a median age of 46 years, the majority were women, and 43% were nursing aides.

### *Data collection*

Data were obtained through the completion of a comprehensive self-administrated questionnaire. The scales needed to measure the variables are listed immediately below with an accompanying explanation.

Individual background factors were obtained through the use of items on age, sex, profession, hours worked/week, seniority and work schedule, derived from the QPS Nordic-ADW (Lindström *et al.*, 2008) and adjusted by us to the home care services setting.

The safety climate was measured using the 50 items of the Nordic Safety Climate Questionnaire (NOSACQ-50) (Kines *et al.*, 2011) graded on four-point scales (end points 'fully disagree' and 'fully agree'). Together, these produced measures of seven dimensions of the safety climate ( $\alpha = 0.73$  to  $0.87$ ): 1) Management safety priority, commitment, and competence; 2) management safety empowerment; 3) management safety justice; 4) workers' safety commitment; 5) workers' safety priority and risk non-acceptance; 6) safety communication, learning and trust in co-workers safety competence; 7) workers' trust in the efficacy of safety systems. The questionnaire considered an individual to be the reporter of a social unit's shared perceptions of the safety climate at both the management and the unit levels (Kines *et al.*, 2011, National Research Centre for the Working Environment, 2011).

Working conditions were measured using items derived from the Swedish version of the Job Content Questionnaire (JCQ), graded on four or five point scales (Karasek *et al.*, 1990): *Supervisor and co-worker support* 'when facing difficulties at work' was measured by two single questions (scale end points 'never' and 'always'). Two separate index variables measured the workers' *skill discretion* on the requirements for skills and ingenuity required on the job (two items  $\alpha = 0.62$ , scale end points 'never' and 'often') and *decision-making authority*, relating to what work to perform and how to perform it (two items;  $\alpha = 0.64$ ). The proportions of those exhibiting high levels of *strain* ('yes'), defined as having high job demands and a low decision-making authority, were calculated. The index variable *psychosocial job demands* was produced by combining five items: the requirements to work fast and work hard, needing to make a large amount of effort when working, having enough time to do the job and facing conflicting demands at work ( $\alpha = 0.71$ ) (Karasek *et al.*,



1990). The variable *physical job demands* (measuring the perceived physical exertion) was graded on the Borg RPE scale ranging from 6 to 20; end points ‘very, very low’ to ‘very, very high’ (Borg, 1970). The *general level of safety at work*, e.g. requiring the respondent to make a general judgement about the safety in his/her own unit, was graded on a scale with the end points ‘very bad’ and ‘excellent’ (Olsen *et al.*, 2010).

Self-efficacy in relation to work and safety was measured by an index variable produced by five items measured on a five-point scale ( $\alpha = 0.70$ ) with the end points ‘fully disagree’ and ‘fully agree’. The items reflected the respondent’s own capacity to handle most situations at work, to manage work as well as others, to have a positive view on work, to adjust work tasks to capacity (Lindström *et al.*, 2008) and to influence safety at work (Ek, 2006).

Safety-related behaviour: A measure of *participative safety behaviour* aiming to measure the frequency with which the participants took part in risk management (assessed in terms of: never, sometimes or always) was developed within this study. There were eight questions on the perceived effects (yes/no) (e.g. assists with prioritisation, co-operation) and one open-ended question to describe the pros and cons of the model. Compliance with personal protection regulations was measured using the *Personal safety behaviour* scale, comprising of six items, each measured on a seven-point scale (end points ‘never’ and ‘always’) ( $\alpha = 0.86$ ) (Pousette *et al.*, 2008). The number of *occasions when it was not possible to comply with safety regulations* with regard to one’s own health and safety were measured with one single question using a five-point scale with the end points ‘never’ and ‘very often’, and one multiple-choice question and one open-ended question to describe the reasons (Ek, 2006).

Health and work ability: On five-point scales, *general health* was estimated by one item with the end points ‘very poor’ and ‘very good’ (Idler *et al.*, 1997) and *psychological well-being* was estimated by an index variable produced by three items on a scale ranging from ‘never’ to ‘often’ ( $\alpha = 0.85$ ) (Toumi *et al.*, 1998).

*Musculoskeletal well-being* during the previous month was measured in seven body areas by seven items on a scale ranging from ‘every day’ to ‘very seldom or never’ ( $\alpha = 0.67$  to  $0.86$ ) (Tyrkkö *et al.*, 2005). High musculoskeletal well-being, defined as ‘very seldom or never’ experiencing pain, was calculated for each body area individually, and as an overall value (the ratings were summed and divided by seven to produce a variable ranging from one to five). *Accident/incident and injury rate* in the last six months was measured by three items in which the respondents answered ‘yes’ or ‘no’ and, if relevant, gave a description of the adverse event and outcome in terms of loss of time from work (Törner *et al.*, 2006). The respondent’s *work ability* was measured by three items of the Work Ability Index (WAI), the first two being his or her work ability in relation to the physical and mental demands of the job, and the third being his or her belief about work ability in the present job two years from now (Toumi *et al.*, 1998).

#### *Data analysis*

The mean, median, standard deviation, minimum and maximum and frequency measures were used to analyse the data. The cut-off points taken to describe ‘high’ levels of the aspects measured are given in the endnotes of the tables. Between-group differences were analysed using nonparametric tests (i.e., the Kruskal-Wallis test and the Mann-Whitney U test). The analysis of differences between work units in terms of their perception of the safety climate was performed on 11 of the 18 work units. We considered it important to have a sufficient number of respondents in each work-

group, to obtain a representative value of the groups shared perceptions of safety climate. Therefore, we excluded seven units in which the response rate was less than 33% or fewer than six respondents replied. In the remaining 11 units, the response rate was  $\geq 47\%$ . The software program SPSS version 17.0 was used, with a statistical significance of  $p < 0.05$ .

### *Ethics*

The research was performed in compliance with the ethical principles of the Helsinki Declaration, and was approved by the Committee of Research Ethics at Umeå University, Sweden (Dnr 08-217 Ö).

## **Results**

### ***The shared perceptions of the safety climate***

The reports of the safety climate obtained from the individual respondents were compiled to obtain values for the overall safety climate in the home care organisation and for the unit-level (Table 2). In the whole sample, mean values above 3.0 were found for all dimensions of the safety climate, however, significant differences were exhibited for the 11 units for five dimensions, where the highest and lowest mean values varied between 2.6 and 3.8. The highest values at the unit level (all group means were above 3.1) and also across the whole sample were in ‘group safety communication, learning and competence’ and ‘group trust in the efficacy of safety systems’. In addition, ‘management safety justice’ was high. The dimensions with the lowest median values across the whole sample (3.0-3.1) were ‘management safety priority, commitment and competence’, ‘management safety empowerment’ and ‘group safety priority and risk non-acceptance’.

In addition, the other variables (listed in Tables 1, 3, and 5) such as background factors, working conditions, self-efficacy, safety-related behaviour, and health and work ability were also analysed for intra-unit differences. Of these variables, significant differences were found in unit size ( $p < 0.000$ ), perceptions of social support from supervisors ( $p = 0.017$ ) and co-workers ( $p < 0.000$ ), decision-making authority ( $p = 0.047$ ), general level of safety ( $p = 0.003$ ) and participative safety behaviour ( $p = 0.001$ ).

### ***Safety-related behaviour***

In total, 23% of the respondents claimed to always participate in risk management in their unit (Table 3). The eight questions that were posed to explore the perceived effects of the model, received positive grades, from 49-66%, of the respondents. The statements that were agreed with most (66%) were: ‘the model has contributed to improved agreement in my work unit regarding risk exposure in clients homes’ and ‘I have received sufficient training to be able to work safely’. In brief, a lack of time to perform the assessments on a regular basis, and insufficient follow-through in implementing changes were given as examples of reasons for not using the model.

Self-reported safety behaviour was fairly high on average. However, 18% ‘rather often or often’ experienced conditions resulting in the respondent being unable to follow safety regulations (Table 3). The main reason for this was a lack of time (stated by 50%) and the second reason was poor/inadequate equipment for household

cleaning and a deficiency of ergonomic/lifting equipment (stated by 41%). Further reasons were given, with frequencies of less than 30%, such as: a shortage of staff, the work schedule, the workload, work routines, a lack of agreement within one's unit or experiencing pressure from clients or their families/friends. In brief notes, some respondents specified that there was a 'gap' between the time when clients returned from a stay in hospital and the time at which practical arrangements were resolved, notably involving a delay in the receipt of the required equipment and a deficiency of information.

Differences between the individual respondents reports of 'always' participating in risk management in their unit and 'never' doing so were explored further (Table 4). All variables (listed in Tables 1, 2, 3 and 5) were checked for significant differences between these two groups. The analysis showed that workers who always participated, considered the safety climate to be higher concerning the aspects of 'management safety priority and competence', 'management safety empowerment' and 'group trust in safety systems', as well as perceiving themselves to receive higher levels of social support from supervisors, to have better decision-making authority, and a higher general level of safety at work. They also perceived conditions that restrained them from complying with safety regulations less often than those who 'never' participated (Table 4).

#### ***Working conditions and self-efficacy***

Nearly all of the respondents considered their job to require high levels of professional skill and ingenuity, while 56% of them perceived themselves to have a high degree of decision-making authority. High self-efficacy in relation to work and safety was perceived by 90%. Many of the respondents perceived themselves to have high levels of social support from their co-workers, but fewer perceived themselves to receive a high level of support from supervisors. A total of 37% respondents considered themselves to have high physical job demands, but less reported a high job-related psychosocial strain. The general level of safety at work was reported to be 'acceptable', with a median of 3.2 (Table 3).

#### ***Health and work ability***

Having a high psychological well-being was reported by 75% of respondents and more than 87% perceived themselves to be in a good general state of health, to have good individual capacity in relation to the demands of the job and a positive belief in their future work ability (Table 5). Musculoskeletal wellbeing, e.g., reporting very seldom or never experiencing pain in any area of the body, was reported by 27%. The neck, back, shoulders and arms were the areas reported to be most commonly associated with experiences of pain. A total of 22 work-related accidents or incidents had happened during the previous six months, and these were reported by 14% of the respondents. Half of the events had led to injuries, of which five had resulted in time off work. Two of these injuries occurred outdoors and were associated with a car-driving accident and with slipping and falling on ice and snow. The other three adverse events occurred indoors, and were primarily related to slipping and overexertion when lifting.

#### **Discussion**

The study aimed to describe municipal home care service staffs' perceptions of their safety climate, safety-related behaviour, working conditions and self-efficacy, health

and work ability. A further aim was to identify between work-unit differences, as well as identifying factors supporting safety-related behaviour. The safety climate in all seven of the dimensions measured was revealed to have mean values of above 3.0; according to the NOSACQ guidelines (National Research Centre for the Working Environment, 2011), this indicates a fairly good to good safety climate. However, significant differences were found between individual work units. The low appraisals in some units indicate areas in need of improvement. These are, the members' commitment to safety, the priority they attribute to safety and refusal to accept risks. The same applies to the priority attributed to safety by the management and their competence to manage safety, including by means of empowering employees and supporting participation. Earlier research showed that management expectations, actions and support concerning safety have a significant influence on the safety climate aspects on group-level, and hence have indirect effects on the safety behaviour of individual workers (Olsen, 2010). Compared with the reference sample (National Research Centre for the Working Environment, 2011), the respondents in this research reported high beliefs in their managers' desire to treat employees fairly when reporting an accident, and they believed formal safety systems, e.g., safety rounds, to be efficient. Furthermore, there were high levels of confidence expressed concerning the inter-peer communication, learning and trust in the ability of the group to manage safety. Similar results were recently reported by Olsen (Olsen *et al.*, 2010, Olsen, 2010), whose studies showed that, in the field of medical care, workers' appraisals of the teamwork within units and of being treated fairly in response to errors were higher than they were in the high-risk off-shore petroleum industry, although the safety climate was generally deemed to be lower where medical care was concerned (Olsen *et al.*, 2010, Olsen, 2010). Within medical care, effective teamwork plays an important role in the prevention of adverse events and in workers' well-being (Manser, 2009). In addition, focusing on fairness and on the learning and feedback loops in the system has been successful at improving safety (Hale *et al.*, 2010). It has been suggested that these factors can be enhanced by transitions and teamwork across units (Olsen, 2010). From this perspective, it is plausible that improved communication and cooperation between home-care units might have a positive impact on safety, particularly as the units that reported a high safety climate are in a good position to propose good solutions and practices for daily work to the other units.

The model for participatory risk management aimed to support the efficacy of each work unit in identifying and managing risk factors. Positive effects within the work units were reported, such as improved risk awareness, concordance and routines. This may have been a result of the use of observation checklists as the basis for discussions with co-workers and supervisors. However, the model was not used regularly. As few as 23% of the respondents reported 'always' participating in the risk assessment that was planned in conjunction with the arrival of new clients or a change in the health status or residence of existing clients. Those who were inclined to 'always' participate, reported e.g., higher safety climate ratings at the management level, perceptions of higher decision-making authority, a higher general level of safety and a low number of occasions when it was not possible to comply with safety regulations, compared to the workers inclined to 'never' participate. These findings are supported by recent studies that showed the importance of structured routines (Dellve *et al.*, 2008b); management commitment and support for changes in the workplace (Olsen, 2010, Hale *et al.*, 2010); and strengthening individual control over

decisions and actions (Antonsen, 2009, Snyder *et al.*, 2008) for workers health and safety. The low degree of participation in risk management and conditions restricting the respondents' ability to make healthy and safe choices at work are a cause for concern. Earlier research showed that a participative safety behaviour predicts the frequency of accidents within work groups (Neal *et al.*, 2006). Hence, in a future revision of the existing model, it is important to improve the preconditions, e.g., by ensuring that sufficient time is allowed and adequate information and equipment are provided by engaging in coordination and communication with other divisions of the social services and with medical care organisations earlier than is the case at present. Risk assessment (Figure 1), too, needs to be performed at an early stage. It is interesting to note that the home care services, with their frequently changing conditions and the need for coordination with other sectors to be able to provide high quality service, have many features in common with highly dynamic medical care domains (for example rescue teams). Lessons learnt in the management of these sectors could be valuable for home care services, as research has confirmed that leadership, team work and the teams' safety-related behaviours had positive effects on the quality and safety of patient care as well as on the medical care staff's well-being (Manser, 2009).

A high proportion of respondents perceived themselves to have a high self-efficacy in relation to work and safety, with a mean value of 4.5 on a five-point scale. This is high, for example, in comparison with the mean value of 4.3 for teachers (Lindström *et al.*, 2008). The excellent ability of home care workers to respond to clients' needs has been described in previous research (Dellve *et al.*, 2008a). However, the perceived safety levels at work were only reported to be moderate in the research presented here. In general, safety was rated as 3.2 on a five-point scale. This is low when compared with the mean values of 3.4 in medical care and 3.8 in the petroleum industry, as reported previously (Olsen *et al.*, 2010). Self-efficacy is about what one can do with one's skills in a specific situation (Bandura, 1997, Katz-Navon *et al.*, 2007). The respondents reported conditions that restricted their ability to comply with safety regulations and to participate in proactive risk management. In addition, their levels of physical exposure were high. Accordingly, there could be reasons for promoting their self-efficacy in managing front-line situations with regard to their own health and safety, despite these barriers. An increase in the actual opportunities for them to exert control over the conditions existing in their working environment is also needed (Huang, 2006, Snyder *et al.*, 2008, Antonsen, 2009). Safety climate would be an important resource to explore further within the context of home care services, since it has the potential to provide support to improve safe choices at work.

The respondents perceived themselves to be in good general health and to have good psychological wellbeing. Earlier studies on home care workers have shown lower levels of health and wellbeing (Karlqvist, 2008, Fjell *et al.*, 2007). Our results can be considered to be in line with their studies since nearly all of our respondents perceived their job to be requiring high skill levels and ingenuity, and many considered themselves to receive a considerable amount of social support and to have good decision-making authority. The work ability of the respondents was equal to that found in previous studies on female working populations (Josephsson *et al.*, 2009). The respondents reported a high frequency of musculoskeletal symptoms, and the proportion of respondents claiming to have highly physical job demands was higher

than those reporting to have highly psychosocial job demands. Previous research showed that the physical workload predicts the risk of work-related musculoskeletal disorders (Joling *et al.*, 2008). A mismatch between physical demands, which are too high, and individual capacity has been shown in other studies, for example on females, classified as working with people in the public sector (Karlqvist *et al.*, 2003).

### ***Discussion of the method***

This descriptive study is part of a health and safety project on municipality-based home care services. We used items or scales derived from standardised, reliable and valid questionnaires. Draft versions of the questionnaire were tested for face validity on representatives from the home care services. For example, one item incorporated in the safety climate scale had an explanation added within brackets, saying 'efficiency in medical care and services work', to elucidate 'production' in this context. Research on safety climate show a great variation in terms of the aspects and dimensions included in the surveys (Flin *et al.*, 2006). With kind permission from the research team, we were able to use the NOSACQ. We used the database reference values to compare our results with those of other sectors (National Research Centre for the Working Environment, 2011). The safety climate scale was tested and found to be reliable and valid in the context of the provision of home-based care (Pousette, unpublished paper, December 2009).

Participation in the survey was voluntary and the response rate varied in the different work units. Those who perceived a high safety climate and commitment to health and safety-promoting behaviours might have been more inclined to participate in the research than other home care workers, which would imply a selection bias. In addition, the mean age of those who declined to participate was significantly younger (median age 42) than that of the respondents, but these groups did not differ with regard to their overall age range, profession or sex. The known reasons for refusing to participate were lack of time and/or too extensive a questionnaire. The very high (and low) levels reported in some variables could, to some extent, have been influenced by biases, such as a recall bias, social expectations or protests. High levels might also be indicative of a 'healthy worker effect'. The findings should therefore be interpreted with some caution. However, this research can be considered as an explorative study, identifying potentially important areas for improvement as well as factors that could be supportive of safe work behaviour in this context. The factors identified could be examined more closely in a larger study involving further quantitative and qualitative exploration of the determinants of good health and safety practices in municipal home care services.

### ***Conclusion***

In summary, the reported evaluation of the safety climate was, on average, fairly good, but the levels differed significantly between units. Participative safety behaviour was supported by perceptions of a strong safety climate in aspects related to management, having greater decision-making authority, and a by fewer occasions with constraints. Fairly high decision-making latitude and high self-efficacy were perceived, but the physical demands of the work were also great. A high frequency of musculoskeletal symptoms was reported, but the respondents reported themselves to be in a sound general state of health and to have good work ability. These findings imply that the focus needs to be on improving managerial and organisational preconditions for safe work practices for staff members, e.g., by introducing

structured routines and improving coordination, as well as by increasing the front-line staff's decision-making authority at work. Units reporting a high safety climate are in a good position to propose good solutions and practices for daily work; implementing and evaluating good practices in daily work may further increase the safety climate and promote musculoskeletal well-being.

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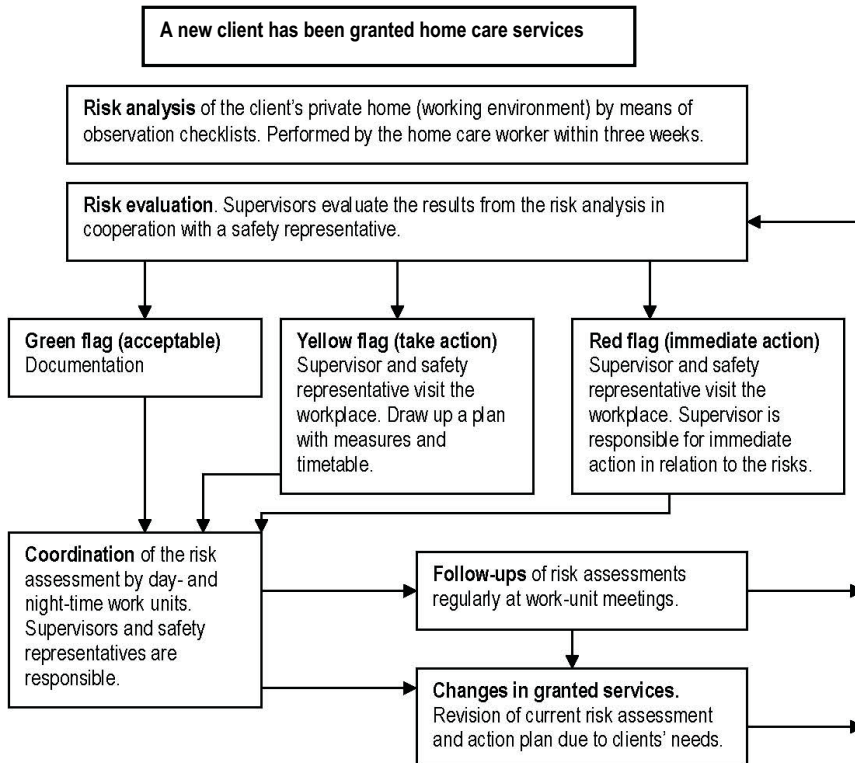


Figure 1 – Process flow chart for the participatory risk management model

Table 1. Characteristics of the participants included in the study (n=133).

	<u>%</u>	<u>Median (min-max)</u>	<u>Mean (SD)</u>
<b>Sex</b>			
Women	92		
Men	8		
<b>Age ( years)</b>		46.5 (21-67)	45.3 (10.75)
<b>Position</b>			
Care aide	43		
Assistant nurse	57		
<b>Hours worked/week</b>		37.0 (18-40)	34.4 (4.78)
Working full-time $\geq 37$ hours/week	55		
<b>Employment contract</b>			
Permanent	93		
Temporary	7		
<b>Work schedule</b>			
Day, evening, weekend	94		
Night	6		
<b>Seniority in home care service (years)</b>		10.0 (1-33)	12.4 (8.72)
Time in present work unit (years)		7.0 (1-33)	8.8 (7.54)
<b>Work unit size (number of co-workers)</b>		30.0 (7-46)	26.1 (11.14)

Table 2. Respondent's shared perceptions of the safety climate

Individual respondent's appraisals of his or her work unit's shared perceptions of seven aspects of the safety climate. The data are given in terms of the overall climate in the organisation and at the level of the work unit. The differences between 11 home-care work units are illustrated, with the highest and lowest means being provided for the work-unit-level, and with *p*-values reflecting the differences.

<b>Safety climate dimensions (scale 1-4)</b>	<b>Overall safety climate</b> (n=133)		<b>Work-unit level</b> (n=11)		<b><i>p</i><sup>1</sup></b>
	<b>Md (min-max)</b>	<b>Mean (SD)</b>	Lowest and highest work unit <b>Mean</b>		
Management safety priority and competence	3.1 (1.2-4.0)	3.1 (0.64)	2.7	3.6	<b>0.003</b>
Management safety empowerment	3.0 (1.4-4.0)	3.1 (0.59)	2.6	3.5	<b>0.005</b>
Management safety justice	3.5 (1.0-4.0)	3.4 (0.64)	2.8	3.7	<b>0.020</b>
Workers' safety commitment	3.3 (1.0-4.0)	3.2 (0.58)	2.7	3.8	<b>0.000</b>
Workers' safety priority and non-risk acceptance	3.0 (1.1-4.0)	3.0 (0.55)	2.6	3.5	<b>0.002</b>
Safety communication, learning and competence	3.5 (1.8-4)	3.4 (0.49)	3.1	3.7	0.098
Workers' trust in the efficacy of safety systems	3.6 (1.9-4)	3.4 (0.49)	3.2	3.7	0.648

<sup>1</sup> The differences between 11 home-care work units was tested by the Kruskal-Wallis test (k independent samples)

Table 3. Results on working conditions, self-efficacy and safety-related behaviour

	Participants included in the study (n=133)	
	%	Median (min-max) Mean (SD)
<b>Psychosocial and physical work conditions</b>		
Physical demands (scale 6-20)		13 (6-20) 13.2 (2.45)
'high'	38	
High levels of strain imposed by work (yes)	15	
Psychological demands (scale 1-4)		2.6 (1.6 -3.6) 2.5 (0.43)
'high'	23	
High decision-making authority (scale 1-4)		3.0 (1.0-4.0) 2.8 (0.62)
'high'	56	
Skill discretion (scale 1-4)		4.0 (2.0-4.0) 3.6 (0.47)
'high'	96	
Support from supervisor (scale 1-5)		4.0 (1.0-5.0) 3.7 (0.93)
'high'	64	
Support from co-workers (scale 1-5)		4.0 (1.0-5.0) 3.9 (0.87)
'high'	74	
General level of safety (scale 1-5)		3.0 (1.0-5.0) 3.2 (0.59)
'high'	29	
<b>Perceived self-efficacy</b> (scale 1-5)		4.6 (2.8-5.0) 4.5 (0.44)
'high'	90	
<b>Safety-related behaviour</b>		
Participative safety behaviour (scale 1-3):		
'always'	23	
'never'	10	
Personal safety behaviour (scale 1-7):		5.5 (2.5-7.0) 5.4 (0.89)
'almost always or always'	38	
'sometimes or never'	6	
Occasions not possible to comply with safety regulations (scale 1-5):		3.0 (1.0-5.0) 2.8 (0.86)
'never or rarely'	34	
'rather often or very often'	18	

**The cut-off points** taken to describe 'high' levels of the aspects measured were: 'high' physical demands  $\geq 14$ ; 'high' psychological demands, decision-making authority and skill discretion  $\geq 3$  'sometimes or often'; 'high' support  $\geq 4$  'most often or always'; 'high' level of safety  $\geq 4$  'very good or excellent'; and 'high' self-efficacy  $\geq 4$  'agree partially or fully'. Strain = high psychological demands and low decision-making authority.

Table 4. Results on differences between the workers' reports of 'always' and 'never' participating in the risk management in their own work unit.

Only variables with statistically significant differences are presented in the table, with the relevant *p*-values

	Yes always (n=30)			No, never (n=13)			<i>p</i> <sup>1</sup>
	%	Md (min-max)	Mean (SD)	%	Md (min-max)	Mean (SD)	
<u>Safety climate dimensions</u> (scale 1-4)							
Management safety priority and competence 'high'	57	3.3 (1.4-4)	3.2 (0.62)	23	2.8 (1.4-3.6)	2.6 (0.71)	<b>0.010</b>
Management safety empowerment 'high'	33	3.1 (1.6-4)	3.2 (0.59)	15	2.8 (1.4-4)	2.7 (0.68)	<b>0.012</b>
Workers' trust in the efficacy of safety systems 'high'	73	3.7 (2.7-4)	3.6 (0.42)	31	3.0 (1.9-4)	3.0 (0.69)	<b>0.008</b>
<u>Psychosocial and physical work conditions</u>							
Authority over decision-making (scale 1-4) 'high'	73	3.0 (2-3.5)	3.0 (0.42)	15	2.5 (1.5-4)	2.3 (0.66)	<b>0.001</b>
Support from supervisor (scale 1-5) 'high'	70	4.0 (2-5)	3.9 (0.86)	38	2.0 (1-5)	2.7 (1.38)	<b>0.008</b>
<u>Perceptions of safety</u>							
General level of safety (scale 1-5) 'high'	37	3.0 (3-5)	3.4 (0.63)	15	3.0 (1-4)	2.8 (0.83)	<b>0.014</b>
<u>Safety behaviour</u>							
Conditions restraining the ability to comply with safety regulations (scale 1-5): 'high'	10	2.5 (1-4)	2.5 (0.82)	23	3.0 (1-5)	3.3 (1.32)	<b>0.024</b>

<sup>1</sup> The differences between the groups were tested by the independent-sample Mann-Whitney U test

**The cut-off points** taken to describe 'high' levels of the aspects measured were: 'high' safety climate  $\geq 3.3$ ; 'high' decision-making authority  $\geq 3$  'sometimes or often'; 'high' support  $\geq 4$  'most often or always'; 'high level of safety'  $\geq 4$  'very good or excellent'; 'high' restraints  $\geq 4$  'rather often or very often'.

Table 5. Results on health and work ability

	Participants included in the study (n=133)		
	%	Md (min-max)	Mean (SD)
<b>Health</b>			
Level of general health (scale 1-5)		4 (2-5)	4.2 (0.66)
'high'	87		
Psychological well-being (Index; scale 1-5)		4 (1-5)	4.2 (0.63)
'high'	76		
Level of musculoskeletal well-being (index; scale 1-5)		4.6 (1-5)	4.2 (0.87)
overall	27		
in upper part of neck or back	48		
in lower back	49		
in shoulders or arms	52		
in hands or wrists	70		
in hips	74		
in knees	73		
in feet or ankles	77		
Accident/incident during last 6 months (yes)	14		
Work-related injury during last 6 months (yes)	7		
<b>Work ability</b>			
Correspondence between ability and physical demands (scale 1-5)		4 (3-5)	4.3 (0.68)
'high'	88		
Correspondence between ability and mental demands (scale 1-5)		4 (3-5)	4.4 (0.66)
'high'	90		
Positive belief about future ability to work (scale 1, 4, 7)		7 (4-7)	6.6 (1.03)
'high'	87		

**The cut-off points** taken to describe 'high' levels of the aspects measured were: 'high' general health  $\geq 4$  'rather good' or 'very good'; 'high' psychological well-being  $\geq 4$  'quite often' or 'often'; 'high' musculoskeletal well-being = 5 'very seldom or never experiencing pain'; 'high' work ability in relation to demands  $\geq 4$  'rather good' or 'very good'; and 'high' positive beliefs = 7 'yes, most likely'.

Research article

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## Effects of work ability and health promoting interventions for women with musculoskeletal symptoms: A 9-month prospective study

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### Abstract

**Background:** Women working in the public human service sector in 'overstrained' situations run the risk of musculoskeletal symptoms and long-term sick leave. In order to maintain the level of health and work ability and strengthen the potential resources for health, it is important that employees gain greater control over decisions and actions affecting their health – a process associated with the concept of self-efficacy. The aim of this study was to describe the effects of a self-efficacy intervention and an ergonomic education intervention for women with musculoskeletal symptoms, employed in the public sector.

**Methods:** The design of the study was a 9-month prospective study describing the effects of two interventions, a comprehensive self-efficacy intervention ( $n = 21$ ) and an ergonomic education intervention ( $n = 21$ ). Data were obtained by a self-report questionnaire on health- and work ability-related factors at baseline, and at ten weeks and nine months follow-up. Within-group differences over time were analysed.

**Results:** Over the time period studied there were small magnitudes of improvements within each group. Within the self-efficacy intervention group positive effects in perceived work ability were shown. The ergonomic education group showed increased positive beliefs about future work ability and a more frequent use of pain coping strategies.

**Conclusion:** Both interventions showed positive effects on women with musculoskeletal symptoms, but in different ways. Future research in this area should tailor interventions to participants' motivation and readiness to change.

### Background

Health promotion is an important issue, with the aim of maintaining the level of health and work ability and strengthening the potential resources for health. Health involves a dynamic balance between individuals and their environment, including all individuals' capacity to live

and achieve their potential physically, mentally and socially [1-3]. Health promotion in the workplace is a multidimensional concept, where health can be seen as a dynamic balance between employee resources, such as individual capacities, health practices, attitudes and values in relation to psychosocial and organisational work-

place factors [1]. Health promoting interventions need to target managers who make qualified decisions regarding structural factors, as well as employees' individual skills, cautiousness and power to influence and act here and now [1,4]. In this article focus is placed on the employees' perspective and on the processes through which individual resources can be strengthened.

According to Antonovsky's salutogenic model, health is seen as a movement along a continuum between ill health and excellent health [5]. Research on health promotion shows the importance of focusing on healthy aspects, for example defining oneself as in good health, having the ability to ignore pain and believing that physical activity does not exacerbate the symptoms [6]. Experiencing trust, team spirit, work pride and confidence [7] are also health- and work ability-promoting factors. For successful return to work, perceived self-efficacy to perform physical tasks, meet role expectations, obtain support and maintain job security is of central importance [8]. Thus, personal resources such as one's ability to assess and understand the situation, to find a meaning in moving in a health promoting direction and having the capacity to do so, seem to function as 'brokers' that moderate how health is affected by stressful situations [5,7]. The demand-control-social support model also indicates that these relations are very important for good health [9,10]. The process through which people gain greater control over decisions and actions affecting their health is frequently associated with Bandura's concept of self-efficacy, i.e. one's confidence in performing a particular behaviour and in overcoming barriers to that behaviour [11,12]. Several studies have been published on the effectiveness of self-efficacy-enhancing interventions on self-management effectiveness and work ability among patients with various chronic diseases [13-15] and it has been identified as important for employees with musculoskeletal pain [1,8,16]. Behavioural interventions focusing on graded activity exposure and skills training [17], on motivating factors such as feedback and rewards, and cognitive processes such as goal formulation, problem solving and information processing [3,18,19] have also been shown to be important for health and work ability. What a person wants is clearly connected with views on one's own possibilities and own competence, what one 'can manage' [20]. Despite the increasing evidence of the importance of employees' self-efficacy for managing musculoskeletal pain and work demands, it has rarely been targeted in workplace-based interventions for employees with musculoskeletal pain [1,8,16]. A 9-month prospective study was designed with the aim of describing the effects of a self-efficacy intervention and an ergonomic education intervention for women with musculoskeletal symptoms, employed in the public sector. The research questions addressed were: 1) what changes in

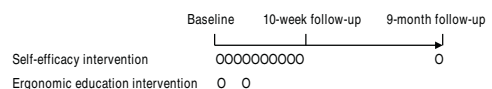
work ability-related factors could be shown within each intervention over the time period, and 2) what changes in health-related factors could be shown within each intervention over the time period?

## Methods

### Study design and subjects

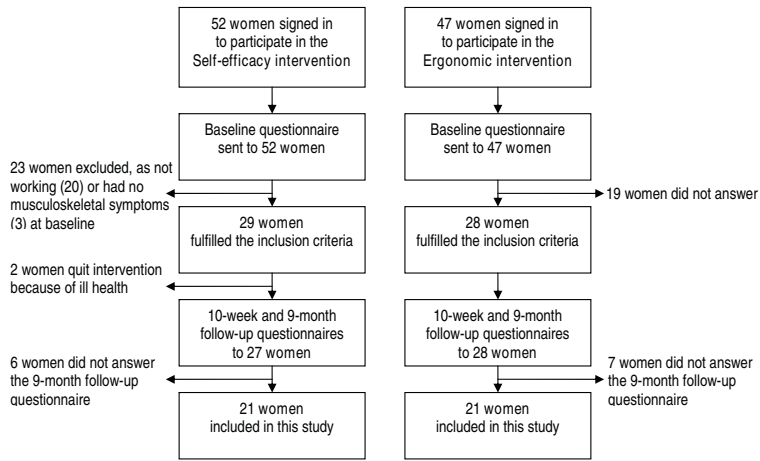
The study was a prospective 9-month follow-up study on the effects of a self-efficacy intervention and an ergonomic education intervention (Figure 1). Approximately 3200 women were employed in public service workplaces within a municipality in the north of Sweden. Invitations to participate in both interventions were sent out to these employees through the first line management in the workplaces. Invitations were also given directly to employees on part-time sick leave by the personnel department. Participation in both interventions was voluntary. The employees selected which intervention they wanted to participate in according to their own interests and motivation and signed on to a list administrated by the personnel department. Both interventions were conducted during paid working hours and the personnel department covered any expenses that arose in terms of cover. The self-efficacy intervention lasted for ten weeks and the ergonomic education intervention for two weeks. Four self-efficacy groups and ten ergonomic education groups were treated during a period of one year. Information of the study was given to all participants in these groups. Thereafter, those who volunteered to take part in the study gave informed consent and answered the baseline questionnaire administered by the University. Inclusion criteria for this study were being female, employed within the public sector, experiencing musculoskeletal symptoms and working at least part-time at the time of baseline measurement. Only those who answered both the baseline questionnaire and the follow-up questionnaires were included (Figure 2). The baseline data are summarised in Table 1 and supplementary baseline values in Tables 2 and 3.

At baseline, no significant differences were found between participants in the two interventions in terms of age, body height, BMI, presence of musculoskeletal symptoms and their relation to work, satisfaction with present work, motivation for change in work or private life. However, some differences were connected with the participants' opportunity to select which intervention they wanted to



**Figure 1**  
Study design.





**Figure 2**  
Flow chart of the total number of included and excluded cases, and dropouts during the period studied.

participate in. Participants in the self-efficacy intervention were less satisfied with their present life situation, had higher seniority and lower attendance at work; eleven worked reduced hours because of sick leave and five had part-time jobs. The majority worked with people, for example as a teacher, child minder or assistant nurse while about a quarter worked with things, for example as

a cleaner or cook. In the ergonomic education intervention two women worked less due to sick leave and nine had part-time jobs. Half of the participants worked with people and the other half with data, for example clerical and customer service jobs (Table 1).

**Table 1: Baseline data. Individual characteristics, field of work, work attendance, motivation and satisfaction with work and life at baseline for the two groups.**

	Self-efficacy group	Ergonomic group	p
Female	n = 21	n = 21	
Age (years)	46 (33–58)	44 (23–61)	0.308
Height (cm)	167 (154–173)	169 (155–184)	0.632
Body mass index (in kg/m <sup>2</sup> )	24.3 (19.7–40.4)	23.8 (18.3–40.8)	0.675
Musculoskeletal symptoms last 7 days (yes)	n = 18	n = 20	0.299
Musculoskeletal symptoms related to work (yes)	n = 12	n = 12	0.675
Seniority (years)	17.5 (2.5–35)	8.5 (1.5–38)	<b>0.017</b>
Work field – people	n = 14	n = 10	
- things	n = 5	n = 2	
- data	n = 2	n = 9	
Attendance at work (%)	50 (1–100)	95 (1–100)	<b>0.021</b>
- working full time	n = 5	n = 10	
- working 60 – 95%	n = 5	n = 9	
- working ≤ 50% <sup>a</sup>	n = 11	n = 2	
- no work activity	n = 0	n = 0	
Sick leave duration (number of months) <sup>b</sup>	4.2 (0–26)	16 (0–33)	1.000
Satisfaction, in life (1–5)	4 (1–5)	4 (3–5)	<b>0.011</b>
Satisfaction, in work (1–5)	3 (3–5)	4 (1–5)	0.502
Motivation, in life (0–10)	7 (2–10)	8.5 (2–10)	0.173
Motivation, in work (0–10)	6 (2–10)	7.5 (2–10)	0.192

Data are given as medians (min-max) or n = frequency.  
<sup>a</sup> The frequency of subjects included in <sup>b</sup> duration of sick leave

**Table 2: Changes in work ability-related factors. Within-group changes after ten weeks and nine months compared with baseline.**

	Baseline	p 1	10-week follow-up	9-month follow-up	p 2	p 3
<b>Work ability index (WAI) (7-49)</b>						
Self-efficacy group	28 (17-47)	<b>0.023</b>	31 (20-49)	34 (20-48)	0.574	<b>0.028</b>
Ergonomic group	38 (16-49)		39.5 (16-49)	40.5 (17-49)	0.896	0.983
<b>1. WA relative to lifetime best (0-10)</b>						
Self-efficacy group	5 (0-10)	0.063	6 (1-10)	7 (0-10)	0.290	0.129
Ergonomic group	7 (0-10)		8 (0-10)	8 (0-10)	1.000	0.833
<b>2a. WA/physical demands (1-5)</b>						
Self-efficacy group	3 (1-5)	<b>0.008</b>	3 (2-5)	3 (2-5)	<b>0.021</b>	<b>0.012</b>
Ergonomic group	4 (2-5)		4 (1-5)	4 (1-5)	0.405	0.265
<b>2b. WA/mental demands (1-5)</b>						
Self-efficacy group	3 (2-5)	<b>0.016</b>	3 (2-5)	3 (2-5)	0.206	0.052
Ergonomic group	4 (1-5)		4 (1-5)	4 (2-5)	1.000	0.808
<b>3. Diagnosed diseases (1-7)</b>						
Self-efficacy group	5 (2-7)	0.501	5 (2-7)	5 (3-7)	0.458	0.408
Ergonomic group	5 (4-7)		5 (3-7)	6 (3-7)	0.366	0.458
<b>4. Work impairment (1-6)</b>						
Self-efficacy group	2 (1-6)	<b>0.042</b>	4 (1-6)	4 (1-6)	<b>0.047</b>	0.119
Ergonomic group	4.5 (1-6)		5 (1-6)	4.5 (1-6)	0.120	0.809
<b>5. Sickness absence (1-5)</b>						
Self-efficacy group	2 (1-5)	<b>0.000</b>	2 (1-5)	3 (1-5)	0.705	0.058
Ergonomic group	4.5 (1-5)		4 (1-5)	4 (1-5)	0.248	0.250
<b>6. Belief of work ability (1,4,7)</b>						
Self-efficacy group	7 (1-7)	0.858	4 (1-7)	7 (1-7)	0.102	0.655
Ergonomic group	7 (1-7)		4 (1-7)	7 (1-7)	0.564	<b>0.046</b>
<b>7. Psychological well-being (1-4)</b>						
Self-efficacy group	3 (2-4)	0.573	3 (1-4)	3 (2-4)	0.782	0.052
Ergonomic group	3 (1-4)		3 (1-4)	3 (1-4)	0.739	0.100
<b>Physical strain in work (6-20) *</b>						
Self-efficacy group	14 (9-18)	<b>0.003</b>	14 (9-17)	15 (7-17)	0.130	0.279
Ergonomic group	12 (6-15)		12 (6-16)	12 (6-16)	0.459	<b>0.044</b>
<b>Coping in relation to work</b>						
<b>1. Problem-focused coping (0-100)</b>						
Self-efficacy group	75 (50-100)	0.596	75 (50-100)	88 (50-100)	0.672	0.351
Ergonomic group	75 (50-100)		75 (50-100)	75 (38-100)	0.236	0.714
<b>2. Selective coping (0-100)</b>						
Self-efficacy group	38 (0-100)	0.556	38 (0-88)	38 (0-75)	0.420	0.174
Ergonomic group	38 (0-75)		44 (0-62)	50 (12-75)	0.484	0.109
<b>3. Resigning coping (0-100) *</b>						
Self-efficacy group	25 (0-88)	0.828	25 (0-88)	25 (0-50)	0.138	0.060
Ergonomic group	38 (0-62)		38 (0-75)	38 (0-62)	0.541	0.542

\* High values represent a bad level for the items 'physical strain in work' and 'resigning coping'.

A high value is good for all other items.

Data are given as medians (min-max) and as differences within groups.

p 1 = differences between the groups at baseline (Mann Whitney U)

p 2 = baseline compared with 10-week follow-up within the groups (Wilcoxon Signed Ranks Test)

p 3 = baseline compared with 9 month follow-up within the groups (Wilcoxon Signed Ranks Test)

Baseline values in work ability-related factors (Table 2) showed no significant differences between the two groups in terms of use of coping strategies at work, psychological well-being or in positive belief about future work ability. The self-efficacy group showed a significantly lower self-reported work ability (total WAI score) than the ergonomic group. The self-efficacy group also perceived a significantly lower work ability in relation to physical and mental demands, higher work impairment and sickness absence and higher physical strain at work. Baseline val-

ues in health-related factors (Table 3) showed no significant differences between the two groups in terms of perceived state of health, in mental strain or in any other factor.

**Interventions**

**A. Self-efficacy intervention**

The aim of the self-efficacy intervention was to promote health and work ability by improving individual self-efficacy, priority-making, self-reflection, empowerment, cop-

**Table 3: Changes in health-related factors. Within-group changes after ten weeks and nine months compared with baseline.**

	Baseline	p 1	10-week follow-up	9-month follow-up	p 2	p 3
<b>General health</b>						
<b>1: Severity of symptoms (0–10) *</b>						
Self-efficacy group	6 (3–9)	0.083	5 (3–7)	5 (1–10)	<b>0.023</b>	0.113
Ergonomic group	5 (0–8)		4 (1–10)	5 (2–10)	0.819	0.924
<b>2: State of health (1–5)</b>						
Self-efficacy group	3 (2–4)	0.224	3 (2–5)	4 (2–5)	0.265	0.097
Ergonomic group	4 (2–5)		4 (1–5)	4 (2–5)	0.793	0.782
<b>3: Mental strain (1–5) *</b>						
Self-efficacy group	3 (1–5)	0.455	3 (1–4)	2 (1–4)	0.776	0.070
Ergonomic group	3 (1–5)		3 (1–5)	2 (1–4)	0.297	0.169
<b>Coping in relation to pain</b>						
<b>1: Positive distraction (0–6)</b>						
Self-efficacy group	3.5 (1.5–5.5)	0.082	3 (0–5)	3 (0–6)	0.681	0.134
Ergonomic group	2.5 (0–4.5)		3 (1.5–5)	3.5 (2.5–4.5)	0.059	<b>0.002</b>
<b>2: Catastrophic thinking (0–6) *</b>						
Self-efficacy group	3 (1–6)	0.051	2.5 (1–6)	3 (0.5–4.5)	0.482	0.237
Ergonomic group	2 (0–4.5)		2.5 (0–4.5)	2 (0–4.5)	0.352	0.784
<b>3: Ignoring pain (0–6)</b>						
Self-efficacy group	3 (0–5)	0.087	3.5 (1.5–6)	3.5 (1–4.5)	0.052	1.000
Ergonomic group	3.5 (1–5)		3.5 (1.5–5.5)	4.2 (1.5–5.5)	0.310	<b>0.048</b>
<b>Self-efficacy in relation to pain</b>						
<b>1: Control pain (0–6)</b>						
Self-efficacy group	4 (0–5)	0.947	4 (2–5)	3.5 (0–5)	0.577	0.366
Ergonomic group	3 (2–6)		4 (3–6)	4 (2–6)	<b>0.040</b>	0.071
<b>2: Reduce pain (0–6)</b>						
Self-efficacy group	3 (1–5)	0.422	4 (2–6)	3 (1–6)	0.054	0.913
Ergonomic group	3 (2–6)		4 (3–5)	4 (2–6)	0.130	0.580

\* **High values** represent a **bad level** for the items 'severity of symptoms', 'mental strain' and 'catastrophic thinking'.

**A high value is good** for all other items.

Abbreviations as in Table 2.

ing skills, physical activity patterns and insight into one's own life situation. The intervention consisted of ten weekly group sessions as well as physical activity, followed by individual practice in the life and work situation for an additional six months, with a follow-up session at the end of this time. Each group session lasting three hours was conducted by a psychologist with groups of about ten participants. These sessions consisted of group discussions and self-reflections in relation to different topics and to the participants' own life situations, i.e. 'what does this mean for me?' The discussions were combined with education by invited specialists in different topics: physical activity, diet, psychological stress and strain, mental training, working environment factors, insurance factors and social insurance office liability. As a parallel part of the intervention each participant practised physical activity 2–3 hours a week. These activities were individually tailored to physical capacity and were supported by physiotherapists and mentors, and during the first three months free training sessions at a training centre were offered.

#### B. Ergonomic education intervention

The aim of the ergonomic education was to promote health and work ability by improving self-management skills, coping with pain at work, ergonomic and preventive knowledge about work environment factors and how to perform necessary changes. The intervention was conducted by a physical therapist in the occupational health service, in groups of about four participants with similar musculoskeletal problems. The group met at two monthly three-hour sessions and received education about ergonomic and psychosocial work issues in relation to work and health and the practice of stretch-and-flex breaks, physical activity and relaxation.

#### Questionnaire

Data were obtained through a self-report questionnaire with 43 questions from reliable and valid questionnaires and one question concerning attendance at work, developed by the authors. Baseline data were assessed with questions about gender, age, body height, weight, period of time working in current job and seniority, profession, principal work tasks and field of work [21–23]. This provided a basis for classification into different work categories.

ries (people/things/data) [24,25]. Five-point Likert scales were used to estimate current state of health (1 = 'very bad', 5 = 'very good') [23], mental strain and satisfaction with current work and life situation (1 = 'not at all/very bad/very displeased', 5 = 'a lot/very good/very pleased') [22,26]. The presence of musculoskeletal symptoms during the previous seven days and their relation to the present work situation were assessed with two questions (response options yes/no) [21]. Eleven-point visual analogue scales (VAS) were used for rating the intensity of current musculoskeletal symptoms (0 = 'no symptoms' to 10 = 'worse imaginable symptoms') [27] and current motivation to set about necessary changes in their working and living conditions (0 = 'very bad' to 10 = 'very good') [28].

Work ability was assessed by ten questions forming seven items of the Work Ability Index (WAI) [29,30] ( $\alpha = 0.87$ ): 1) current work ability compared with lifetime best (0 = 'poor' to 10 = 'excellent'); 2) work ability in relation to the physical and mental demands of the work (2 = 'very bad' to 10 = 'very good'); 3) number of current diagnosed diseases (1 = '≥ five' to 7 = 'none'); 4) estimated work impairment due to diseases or illnesses (1 = 'total' to 6 = 'none'); 5) sickness absence during the past 12 months (1 = '>100 days' to 5 = 'none'); 6) belief about work ability in present occupation two years from now (1 = 'no', 4 = 'maybe' or 7 = 'yes'); and 7) psychological well-being (1 = 'never' to 4 = 'often'). The WAI score ranged from 7 to 49 points, with a score at, or below, 36 points indicating low work ability. In the present study item 3 included a smaller number of illnesses than the original WAI, and at the end the question 'state if you have any disease, illness or handicap' was included, as suggested previously [31]. To discriminate physical and mental demands the two questions forming item 2 are presented separately. The participants' ordinary physical strain at work was graded on a Borg RPE-scale (range 6–20) [23].

Coping strategies in working life, e.g. 'what do you usually do when problems arise at work?' were assessed on three scales taken from the Copenhagen Psychosocial Questionnaire [32]: *problem-focused* coping: 'do you try to find out what you can do to solve the problem?' ( $\alpha = 0.75$ ); *selective* coping: 'do you try to think of something else or do something you like?' ( $\alpha = 0.62$ ); and *resigning* coping: 'do you accept the situation because there is nothing you can do about it anyway?' ( $\alpha = 0.63$ ). Each item comprised five responses (0 = 'never', 100 = 'always').

Coping abilities for pain were assessed by a single item from each of the eight subscales in the Coping Strategies Questionnaire (CSQ) [33,34]. As in previous item-level studies [35,36] factor analysis of the single items revealed three subscales that were factorially distinct and internally

consistent: 1) *Positive distraction* comprised the two items 'I think of things I enjoy doing' (diverting attention) and 'I leave the house and do something active' (increased behavioural activities) ( $\alpha = 0.55$ ). 2) *Catastrophic thinking* comprised the two items 'It's awful and I feel that it overwhelms me' (catastrophising) and 'I take my medication' (pain behaviours) ( $\alpha = 0.67$ ). 3) *Ignoring pain* comprised the two items 'I tell myself I can't let the pain stand in the way of what I have to do' (coping self statements) and 'I ignore it' (ignoring sensations) ( $\alpha = 0.66$ ). Each item was graded on a seven-point Likert scale (0 = 'never do when in pain', 6 = 'very frequently do when in pain') and the items within each factor were summed and averaged to form the scales. Two single items did not load consistently on any factor and were excluded. Self-efficacy was consistent with the original CSQ, rated by two items on seven-point Likert scales: 1) 'control over pain' and 2) 'ability to decrease pain'.

#### Statistical analysis

Median (Md), min-max values and prevalence (%) were used for descriptive statistics. The Mann-Whitney *U* test was used for between-group comparisons at baseline and the Wilcoxon signed-rank test was used for within-group changes after ten weeks and nine months compared with baseline. Due to small sample sizes  $p$ -values  $\leq 0.05$  were considered statistically significant. Principal component factor analyses and analyses of internal reliability were used to test each scale in relation to our study population, and the values are presented in the Methods section. Chronbach's alpha values above 0.6 were considered to indicate a sufficient degree of internal consistency for the scales [37]. The statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) software version 11.5.

#### Ethics

The study was regarded as quality development work within the area of occupational health. The aims, methods, and procedures of the study were developed in cooperation with and agreed by the occupational health service and the personnel department of the municipality. The study was performed in compliance with the ethical principles of the Helsinki Declaration. Decline participation in the study or to withdraw consent to participate did not affect the employees opportunity to take part in the interventions.

#### Results

##### Changes in work ability-related factors within each intervention over the time period

###### Results within the self-efficacy intervention group

At baseline 16 of the 21 subjects were classified as having low work ability compared with 12 subjects at the 9-month follow-up, indicating a statistically significant

improvement. The sub score 'work ability in relation to physical demands' was also significantly improved. Ten subjects stated that they had a *fairly good* (score 3) balance at baseline and at follow-up. The number of subjects stating a *pretty* or *very good* balance (score 4 and 5) increased from five at baseline to nine at nine months. After ten weeks the work ability in relation to physical demands had increased. At ten weeks significant improvement was also noted in terms of less work impairment due to disease or illness. No other changes were noted (Table 2).

#### *Results within the ergonomic education intervention group*

At nine months there was no change in the total WAI score. At baseline 13 of the 21 subjects had positive beliefs (score 7) in their ability to work in their present occupation two years from now, and at nine months 17 subjects had this belief, which was a statistically significant improvement. Physical strain at work was also significantly increased. No changes were noted at ten weeks (Table 2).

#### **Changes in health-related factors within each intervention over the time period**

##### *Results within the self-efficacy intervention group*

No significant changes were noticed at nine months. At ten weeks the intensity of musculoskeletal symptoms was significantly reduced (Table 3).

##### *Results within the ergonomic education intervention group*

Significantly more frequent use of the pain coping strategies 'positive distraction' and 'ignoring pain' was found at nine months. The median values rose to 3.5 from 2.5 and to 4.2 from 3.5 respectively. The use of catastrophic thinking was unchanged, remaining at a median value of 2. At ten weeks a significant increase in self-efficacy to control pain was noted (Table 3).

## **Discussion**

Over the time period studied there were small magnitudes of improvements within each group. The small improvements that appeared differed between the two groups. The major effect in the self-efficacy intervention group was increased perceived work ability, reflected in the total WAI score and its sub score 'work ability in relation to physical demands'. The ergonomic education intervention showed more frequent use of pain coping strategies, and an increased number of subjects with positive beliefs in their ability to work in their present occupation.

These differences in outcomes may to some extent reflect the fact that the interventions attracted participants' with somewhat different starting points, as shown in the baseline values. The participants' opportunity to select which group they wanted to participate in implied motivated participants in both interventions. This condition was

considered a prerequisite for fulfilling the aim of the interventions. In the present study 16 women (76%) in the self-efficacy group and nine women (43%) in the ergonomic group had low work ability at baseline (at, or below, 36 points) according to the WAI. This is high compared with the frequency (25%) of low work ability in the female working population [23]. It has been proposed that the WAI can identify subjects with low work ability who are in need of more extensive support, while ergonomic education is recommended for subjects with higher scores [29]. This is only partly in accordance with the participants' own choice of intervention in this study. A major focus, especially in the self-efficacy intervention, was the motivation to work with oneself and one's life situation. Besides lower work ability, those who wanted to participate in the self-efficacy intervention were, to a higher extent than the ergonomic group, employed within physically strenuous *people* or *thing* occupations and were experiencing less life satisfaction. It may be that these participants chose to attend the comprehensive self-efficacy intervention, as they needed more social support, coaching and help to make work and life-style changes. They may have needed to participate in a process of reflection and awareness to make priorities in their own life situation. This reasoning is supported by studies showing that persons on sick-leave may experience reduced self-esteem, sense of control, self-determination and feel shame [38,39]. The self-monitoring that takes place in rehabilitation groups, such as in the present study, have positive effects on these issues [38,39]. The encountering process in itself has been shown to be very important. Being met with recognition enhances strength, confidence and awareness which can provide tools with which to handle pain and illness and, as such, is important in the recovery process [38,40]. To listen to other participants describing successful solutions to specific work or life situations may, according to the theories of self-efficacy [11], increase the participants' self-efficacy. An increased perception of own ability to manage work or perform a specific behavioural change can increase work motivation [3,20]. For participants in the present study, the acts of signing on to a list for intervention was one step in a health promoting direction. It has previously been shown among employees that factors such as feeling susceptible to work-related musculoskeletal disorders and experiencing pain influences their will to take actions to improve their health and work situation. Working on one's readiness to change may influence the receptiveness of health information and education and promote positive behaviour changes [41], as in this study.

#### **Changes in work ability-related factors**

The self-efficacy group showed positive effects on work ability that were reflected in the WAI, with the sub score 'work ability in relation to physical demands' improving

the most. These changes could be explained by increased physical capacity in relation to work demands and/or an increased power and ability to control participants' own life situations. Physical activities were a part of both our programmes, but the self-efficacy group had, to a greater extent, physical activities individually tailored to their physical capacities and were supported by physiotherapists and mentors. Previous research has shown the positive effects of physical activity interventions on musculoskeletal symptoms and sick leave [42,43]. Pain-related beliefs such as high self-efficacy and low fear-avoidance have been shown to be important determinants of work ability among patients with musculoskeletal pain. The intensity of pain has produced conflicting results, but has been found to have a more negative impact on work ability in women and among those listed as sick [16,44]. Interventions that focus on participants' self-confidence and self-efficacy in dealing with symptoms and work-related problems have proved to be effective [13-15]. Finally, the higher the level of control and ability to influence one's situation, the greater the opportunity for health and work ability [9,10].

The ergonomic education group showed increases in positive beliefs about their ability to work in their present occupation two years from now. Other studies have shown that one's view of one's own competence and expectations of recovery and work ability are important predictors for better health outcomes and work ability [20,45-47]. The ergonomic education group that had a high work ability at baseline may have increased their knowledge and practical ability to solve ergonomic problems at work and increased their self-management of pain in work situations. This is in line with the recommendation for ergonomic education of subjects with higher WAI scores [29]. It has been argued that the benefits of educational programmes may depend on providing social support and encouraging employees' ability and responsibility to solve their own problems [15,17], which, within the scope of the limited number of sessions, was also the intention of the ergonomic education in the present study.

#### **Changes in health-related factors**

No significant improvements were found within the self-efficacy intervention group, except for reduced musculoskeletal symptoms at ten weeks. At this point, descriptive statistics also indicated an increased use of the 'ignoring pain' strategy as well as increased self-efficacy to reduce pain. These effects were not seen at nine months. Other studies have reported declining effects at follow-up due to lack of group support [40]. This points to the importance of different sources of support in life and in work and of a positive working environment in order to attain health and sustained or improved work ability.

Supervisors and co-workers attitudes, beliefs and basic knowledge about how to be supportive and how to promote a good working environment is important [48,49]. However, it has been shown that a high proportion of employees, even though they may experience musculoskeletal pain, may not yet realise their need for preventive efforts to reduce work environmental risks and improve their health [41]. Key factors in promoting health and work ability in the work place can involve learning a constructive coping pattern, creating an open work climate, communication and learning [50].

A significantly increased use of active coping strategies was shown at nine months within the ergonomic education group. However, catastrophic thinking was unchanged. At ten weeks the increase in self-efficacy to control pain was significant. The fact that this had no effect on musculoskeletal symptoms or state of health is however puzzling. It has been suggested that treatment programmes that are designed to encourage active coping strategies may encourage passive coping as well [51]. It may also be that different styles of coping are important at different stages of recovery and at different levels of pain severity [51,52]. It has previously been shown that a patient's use of active strategies such as positive distraction and ignoring pain, and their belief in control of pain, are positively associated with general activity level in patients with lower pain levels [52]. Decreased perceived control over pain, belief in oneself as disabled by pain, catastrophising cognitions and increased use of passive strategies, i.e. a tendency to withdrawal or to rely on an outside source, have been shown to be strong negative predictors of daily functioning and should be controlled by cognitive behavioural methods [35,51-53].

Previous research has shown that a cognitive behavioural intervention in itself or in combination with preventive physiotherapy is effective in increasing self-efficacy to control and reduce pain and promote work ability in the long term [54,55]. The timing of an intervention is important, with early return-to-work programmes being more cost-effective than rehabilitation at a later stage [55]. In the present study, even though all participants were working, some of them had been listed as sick part-time for up to 2.5 years, and may have needed this intervention earlier for greater health and work ability effects. This study showed that these two interventions had positive effects on women with musculoskeletal symptoms but in different ways. In spite of the small magnitudes of improvements, these can indicate the beginning of positive development in use of effective coping strategies and in more positive beliefs about recovery and ability to work.



### Limitations of the study

It was not possible to use randomisation or pair-wise matching in the present study. An advantage was that both interventions were selected according to the participants' own interests, need for change and motivation. This selection opportunity produced some differences between the groups at baseline, where the ergonomic education group were somewhat advantaged. An increased number of subjects was desired but this was not possible for organisational and economic reasons. The inclusion criteria 'having musculoskeletal symptoms' and 'working' restricted the sample sizes, but were considered important for this study. The sample size was also limited by subjects not responding to the nine-month follow-up questionnaire. Those that dropped out in general had a longer period of part-time sick leave and reported poorer levels of health-related factors than subjects included in the study. The reason they did not respond to follow-up is unknown. It is possible that the part-time sick leave participants' choice of intervention was influenced by someone in the rehabilitation network (the first line management, social insurance officer, personnel manager, occupational health service), but we have no evidence of this. As the interventions were carried out alongside normal life and work, other factors in the participants' lives may have affected their health and work ability. Since baseline values for some items were relatively high, a ceiling effect may have caused positive changes to be underestimated. To answer our research questions we had to rely on questions from many different standardised questionnaires. Most of the questions used had been tested for reliability and validity and, in addition, a few scales were reliability-tested for use in the present study group. Generalisation of the results is limited to women experiencing musculoskeletal symptoms, and working in mostly female-dominated work settings in the public human service sector.

### Conclusion

Both interventions showed positive effects on women with musculoskeletal symptoms, but in different ways. In general there were small magnitudes of improvements within each group. Positive effects in perceived work ability were found in the self-efficacy intervention group. The ergonomic education group showed effects on increased positive beliefs about future work ability and a more frequent use of pain coping strategies. Future research in this area should tailor interventions to participants' motivation and readiness to change.

### Competing interests

The authors declare that they have no competing interests.

### Authors' contributions

All authors have been involved in the development of the study design. AL was responsible for the data collection and for writing the manuscript. GG and LK participated in the general coordination of the study and read and corrected draft versions of the manuscript.

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## How Can the Rehabilitation Planning Process at the Workplace Be Improved? A Qualitative Study From Employers' Perspective

Agneta Larsson<sup>1,2</sup> and Gunvor Gard<sup>1</sup>

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*Employers in Sweden are by law responsible for planning and controlling the working environment situation in their companies and for ensuring that any need for rehabilitation is noted as soon as possible and that action is taken. This includes developing a plan for rehabilitation. The aim of this study is to describe employers' experiences of the work rehabilitation planning process at the workplace, and how it can be improved with a focus on quality and cost-effectiveness. Qualitative interviews were performed with 10 employers of employee/s that had participated in vocational rehabilitation at a rehabilitation center in the North of Sweden. The results showed that employers were interested in detecting work rehabilitation needs and in taking action early. Rehabilitation at the workplace could be improved by development of routines, improved work relations and work technique, and environment-in-service training at the workplace. Prevention was perceived as a prerequisite for a good result of rehabilitation. Attention to social and geographic conditions is needed. Organizational and financial limitations exist.*

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**KEY WORDS:** rehabilitation planning; quality; cost-effectiveness; qualitative interview; workplace.

### INTRODUCTION

Work-related musculoskeletal disorders cause chronic pain and functional impairment, impose heavy costs on society, and reduce productivity. The best method of prevention is considered to be the application of ergonomic principles in the workplace. Surveillance systems should be developed nationally and in workplaces, and more effort should be directed to information distribution, education, and training (1). Employment status, to be employed, is shown to be an important factor for a sick-listed client to succeed in returning to the labor market after vocational rehabilitation (2). Sick-listed clients' decisional balance of profits and consequences of returning to work may be affected by interactions within the worksite, employers' and coworkers' responses, legitimacy issues, workplace culture (3).

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The workplace strategies for management of disabled employees are a determining factor for returning to work (4).

Since the Work Environment Act of 1991, employers in Sweden have the responsibility for planning and controlling the working environment situations in their companies and for organizing work rehabilitation (5,6). The law is supplemented by detailed rules issued by the Swedish Work Environment Authority in form of provisions, general recommendations, and information. The employer must take employees' different prerequisites for work into consideration by adjusting the work environment or take other suitable actions. According to the National Insurance Act, employers must ensure that any need for rehabilitation is noted as soon as possible and that the required action is taken and financed. When an employee has been continuously ill for 4 weeks the employer is to make a rehabilitation investigation as a basis for a plan for active rehabilitation of the employee that is to be set up in consultation with the Social Insurance Office (6,7). To change the tendency towards rising costs of sickness benefits, the Government in its Budget bill for 2002 (8) presented a comprehensive action program that includes clearer employer responsibility and measures to promote an early return to work after illness. The preventive role of occupational health services of being more actively involved in investigating rehabilitation needs and in the development of individual rehabilitation programs was recently emphasized in a government commission report (9).

The rehabilitation always begins with an early somatic, psychological, cultural, social, and economic investigation, resulting in a medical diagnosis or a symptom diagnosis. Out of the symptom diagnosis a rehabilitation plan is developed (10). The rehabilitation plan is a plan for all interventions that have to be taken in order for a sick-listed client to return to work. Early, well-coordinated and varied interventions from different professionals, a combination of medical social, psychological, and technical competences according to each client's needs and interests is to be focused on (11), as well as all the client's resources and functional capacities (12,13). The goal of the rehabilitation process may be described in different ways, as a way of finding new realistic goals, of regaining functional capacity, and of improving the quality of life (12,13). The rehabilitation process aims at regaining the balance between work demands and individual capacities. During the rehabilitation process work demands and/or individual capacities have to be changed and balanced in relation to each other (14).

The aim of this study is to describe employers' experiences of the work rehabilitation planning process at the workplace and how it can be improved with a focus on quality and cost-effectiveness.

### **Research Questions**

How do employers experience the work rehabilitation planning process at the workplace?

How can the process be improved with a focus on quality?

How can the process be improved with a focus on cost-effectiveness?

## **MATERIALS AND METHODS**

### **Informants**

The informants in this study are 10 employers, out of a group of 26 who have sent a total of 60 employees (clients) to participate in a 3-week period of vocational rehabilitation

at a rehabilitation center in North Bothnia in the north of Sweden from June 1999 to June 2001. The clients had work-related musculoskeletal problems, and for all these clients rehabilitation plans had been developed in cooperation with the Social Insurance Office. The 10 employers differed in age and gender, and also in their experience of rehabilitation planning at their workplaces. All employers had managerial posts but on different levels in their organizations or in companies of different sizes. They were thus responsible for the working environment issues and rehabilitation planning in different-sized units. They worked in different rural districts and companies of various characters; in municipal authorities: school administration, technological administration, and social administration; in government authorities: in the technological area and in social service; in private enterprises in the financial area.

### **Method and Analysis**

This study was one part of a larger study "How can the quality and cost-effectiveness of rehabilitation planning be improved." The interview guide covered questions about goals, content, importance, results, and effectiveness of a rehabilitation planning process. In this study we focus on the results dealing with employers' experiences of the work rehabilitation planning process at the workplace and how it can be improved with a focus on quality and cost-effectiveness. Tape-recorded narrative interviews were made. The interviews lasted for about 1 h and were audiotaped and transcribed. The analysis was made by content analysis (15–17). The method of analysis may be described as a process of identifying, coding, and categorizing the primary pattern in the data (i.e., the content) (15). The objective of content analysis is to provide knowledge and understanding of the phenomena under study, both at a manifest and a latent level which include interpretation (17).

## **RESULTS**

### **The Rehabilitation Planning Process at the Workplace**

The results concerning experiences of rehabilitation planning processes could be described in five categories: Interactions within the workplace; Use of a proper work technique; Responsibility for creating work environment changes; Coping, training and assessment; Financial and organizational barriers.

#### *Interactions Within the Workplace*

The employers emphasized the importance of individual contact with the sick-listed employee. Each individual must be noticed and acknowledged. It is important that the client receives understanding and support from his/her coworkers and from the employer. The workplace attitudes in relation to the sick-listed are crucial, and it is therefore helpful if all coworkers have some knowledge and understanding of what characterizes a good work environment and that individual solutions are needed.

*It is this contact between the sick-listed and the supervisor that is so extremely important, to have frequent contacts. They have to participate and get the same information as the healthy ones at work.*

*The supervisor and the fellow-workers are important for functional capacity training at the workplace. I don't know any other that can be supportive right there. Of course, discussions of attitudes to make all understand that something could happen to any person.*

### *Use of a Proper Work Technique*

The employers were of the opinion that every employee needs an introduction to what characterizes a proper work technique; it is hard to relearn after once having learned an incorrect technique. The employees were not always willing to change their work methods or try new equipment. However, the younger employees seem to take more care of their health.

*There have been lots of discussions about it, about the working hours, that they must have breaks and do such things. And that is really a question of working environment. But this has been painful to them. And then they are forced to learn how to run machines. They will not make use of the work equipment. But it's our demand, everyone has to learn.*

### *Responsibility for Creating Work Environment Changes*

The employers were aware of the fact that they have the responsibility for creating conditions conducive to a realistic rehabilitation in their companies. The employers stated that they take on that responsibility, but that they still can improve their workplace rehabilitation, for example by changes in the work organization, psychosocial interventions, and installation of ergonomic equipment. These adjustments had often been made, above all ergonomic adjustments and changes in work schedules due to individual needs.

*Occasionally you have to take extra measures for the sick-listed. And then we try... buying more machines, changing the schedule for cleaning so that the work gets more varied, changing the working hours. It may be all kinds of changes.*

*That they maybe can exclude some work tasks, do easier tasks or limit their tasks.../.../ And to reduce the working hours, so that they maybe don't work full time.*

The employers cooperated with occupational medicine clinics to a varying extent. The professionals at the occupational health clinic can assist with workplace adjustments. The employers emphasized that the physician can stimulate the client to maintain contact with the workplace.

*The physician plays an important role, by thinking that sick-listing might not be the cure in this case, but prescribing visits to the workplace and functional work skills training in one's own workplace.*

### *Coping, Training, and Assessment*

Training in real work settings, i.e. functional capacity training at the client's own workplace or at another workplace without production demands, and functional capacity assessment in different tasks were perceived to be good solutions. The employers believed that this could be a good opportunity for the clients to return to their social contacts at work,

but preferably at another workplace than the client's own. In situations of work training or capacity assessment, it was considered necessary that clients learn to handle the work situation in a new way and avoid old habits. The employers also helped other companies by arranging training opportunities in their companies.

*If possible, I try to have them at other workplaces during a functional capacity testing. For if they go back to their old workplace, there is a huge risk for them to fall back to certain bad habits, and get some pressure on having to do certain things.*

*If you (the client) have been in a situation that has caused sickness, then I'm having doubts about you going back and train in that situation. But of course, if you went back and trained that—now I have to deal with the situation in a better way, then I think it could be good. But it has to be from the perspective of paying attention to the possible elements that have caused sickness and that you practise avoiding to handle the situation in the same way.*

The employers perceived that education or training was an effective rehabilitation solution, especially for younger clients. Insurance medicine assessments and motivating interventions were other effective solutions that were bought from consultants or rehabilitation centers.

*/. . . / and make such things for the person to be able to stay at work. That we do. But from that, if it doesn't help, then we suggest other things. Education. But it's just obvious that the reason why they are often scared is that they have such a poor educational background.*

*And these overall assessments are of great use, bringing up everything, giving a background for the Social Insurance Office to be able to decide about pension. Or, they (the rehabilitation center) can begin with assessment and conversation, and then functional capacities assessment/. . . / And they have the opportunity to start with motivating conversations when they notice that the person is hesitant and does not know, and when you are of the right age for education.*

### *Financial and Organizational Barriers*

The employers consider it important that there are some financial means set aside for rehabilitation in the companies. Still, this amount has been reduced in the last few years. Rehabilitation interventions are costly and problematic when the expenses have to be covered by the company. This may influence other employees' situation at work. The possibility of modifying a client's work task or for a client receiving new tasks depends on the opportunities for work organizational changes. It is difficult to modify some occupations to fit persons with reduced work capacity. At best, there is already in the company a suitable vacant task that is already financed.

*The physician writes on the certificate: the client should not do this and that, but we can't have people returning to work released from certain things. Then quite soon we will have the next person falling off, she has to take on the task that is heavy and that doesn't go well.*

*In many cases is it like the "Black-Peter phenomenon" (a card game, where you lose if at the end you are stuck with a specific card): OK, we can do it if only someone else is paying the expenses, with the system of today it is working like that in many places. If we have to pay for an intervention for someone who cannot fulfil his/her duty, then the expenses must be taken from the company. The other employees will then have to work more to cover up this economically. This increases the risk for them to end up in a similar situation. So this is not good, and above all it seems to be very uneconomical.*

The employers also mentioned that they do not always have an organization that facilitates rehabilitation at the workplace. The staff responsible for rehabilitation may for

example change often and cause lack of continuity, or there may be deficient communication between different organizational levels.

*When, as we have done, you once again change the person responsible for the staff, this is a disadvantage for the sick-listed. Now they will have to start all over again*

### Quality of the Work Rehabilitation Process

The results concerning factors that can influence the quality could be described in four categories: Routines for early problem identification and action initiation; Holistic perspective; Support and evaluate goal attainment; Reflect on deficient results.

#### *Routines for Early Problem Identification and Action Initiation*

The employers described factors that may influence the quality and result of rehabilitation. To ensure good quality the rehabilitation process should be started as soon as possible; rehabilitation needs should be identified as early as possible at the workplace, followed by an early rehabilitation investigation, and early participation from rehabilitation professionals and the Social Insurance Office. The employers think that routines have to be developed in companies for how to proceed when an employee gets sick-listed.

*There should be a conversation within a week, and there should be weekly conversations where you may tick off: have you called, have you spoken with the co-worker during the second week of sick leave? And if I have not, I must do it at once.*

#### *Holistic Perspective*

The client's whole life situation influences the process, and therefore family and workplace should be involved. It is essential that every person involved is motivated, active and notices opportunities that exist or occur in the process. Rehabilitation risks to fail if one of the participants gives up.

*One thing that is really important is to notice the relation between the physical injury and the social conditions. For many times, in the most difficult rehabilitation cases, there is a connection.*

*The physicians often writes—not possible to rehabilitate. But you should never listen to the physicians in that case. Otherwise it is beginning to be comfortable just staying at home.*

*... there is lack of involvement from some participants. It is not only one that is involved. There may be neglect on the part of the employer, there may be neglect on the part of the employee, and there may be neglect on the part of the family, the Social Insurance Office or the physician. When someone gives up along the way, "the jig-saw puzzles breaks."*

#### *Support and Evaluate Goal Attainment*

To document the content with a focus on the time scheduling, and to do follow-ups of goal attainment were considered important. For a good result it is necessary that the client is able to describe work-related motivations and wishes. The employers perceived it as their aim to give psychological and motivational support and guidance to clients and in order for

them to succeed they get help from other professional actors. Their aim is also to develop links to the client's workplace, for example by invitations to workplace meetings, and to be successful in organizing the training in real work settings. For a more effective result they think it is time to increase the demands on the clients' own responsibility on all levels, in work life, training, and in general health initiatives.

*About finding functional work capacities training, if the client is to go back and undergo work training, then it must be well organized. Have a schedule and write down yourself (the client)—how do you experience this, how do you feel? To document: this is how it turned out. We haven't had that before, but that is also a necessity.*

*We have invested so much in measures for prevention and other things. What would it have been like if we hadn't done that? I think it is due to the fact that we haven't put any demands on the clients. /.../ We haven't had any demands, and they have done whatever they wanted, and I think that is a pity. Now we are starting to increase our demands, but it is a little late.*

### *Reflect on Deficient Results*

Even though there were financial means for rehabilitation, and the employers had developed a lot of workplace solutions, they had not noticed any major results. At the time there was money to apply for to finance rehabilitation, and the employers were looking for new concepts to improve rehabilitation results. They also raised the question: What is in fact a "better result"?

*We do have a lot of things going, because there has been money to apply for to improve rehabilitation. At present we are thinking about this: how could we apply for money for... something else that we haven't already done, to find out what that thing is. And it is in this reasoning that this question arises—why have we not noticed any better results with the things we have done?*

*This, as I have told you, to focus on the healthy, the whole picture, attitudes and motivation, earlier results and of higher quality. Higher quality and above all earlier results, for we can't see if it's getting better in the way that... what is better?*

### **Cost-Effectiveness of the Work Rehabilitation Process**

The results concerning cost-effectiveness could be described in four categories: Length of vocational rehabilitation period; Focus on preventive actions or a short process; In-service training for supervisors and for employees; Ability to take early actions.

#### *Length of Vocational Rehabilitation Period*

A clients' stay at a rehabilitation center was mostly considered to be cost-effective. However, sometimes the result of the work rehabilitation did not always last when the clients were back in their own work environment. A rehabilitation period may be too short for client to reach a deep understanding of necessary changes.

*Rehabilitation centers are cost-effective, and we have done something new... we have sent one full time working employee to a rehabilitation center due to his need for preventive action.*

*I have sent them to the rehabilitation center and that has been good, and they have told that—now I'm on the go. But then, they just have to try taking up work again and No; then we are back in the same position again.*

### *Focus on Preventive Actions or a Short Process*

The most cost-effective interventions were perceived to be preventing problems from occurring, or getting an early start with quick solutions. A short process. To help the client back to his/her own work was considered cost-effective.

*I think that the most cost-effective thing is if you can rehabilitate the employee back to his own work task.*

*Well, the most cost-effective intervention is when there exists that kind of situation where people feel that it is fun to come to work. And if you like the work, you are thinking when you walk home that—Yes it was a nice day today, it will surely be fun tomorrow. That is cost-effective.*

*Cost-effective is of course to make this process (the work rehabilitation process) as short as possible. The most cost-effective measure in rehabilitation is really to prevent (work-related problems from occurring).*

### *In-Service Training for Supervisors and for Employees*

Continuous training of supervisors was required, particularly in the work environment legislation, “systematic work environment control,” and the significance of early rehabilitation. The employers asked for a set of different measures to choose among. In the preventive work they wished to cooperate with the Social Insurance Office and with different rehabilitation professionals, and the employers perceived it as their responsibility to take these contacts. They considered that training of all employees at the workplace was needed, in preventive measures as well as in the handling of rehabilitation cases.

*At first, I believe that you need to have continuous training of employers, so that they acquire knowledge of and become aware of what the working environment legislation says about rehabilitation. Above all one needs to inform employers about the whole process and about the importance of starting the rehabilitation process early—the quicker the person returns to work.*

*That we as employers are working with “systematic work environment control” where one at an early stage can pick up problems that may be caused by the job; work sickness, obstacles for work and such things. That is profitable.*

### *Ability to Take Early Actions*

The employers perceived that they need to be more qualified in noticing signals of sickness at the workplace and in talking with employees about the importance of it and in making workplace changes early. Response from the employees is essential.

*I think that we are deficient in picking up the signals. I think that we are lacking insight and tools for identifying early signals of sickness.*

*At the workplace you should talk and cooperate and communicate, and react at an early stage if you notice that there is something that is not quite all right. I think that what is crucial here are the workplace meetings, individual development talks, that the supervisor is given the opportunity to communicate with his staff and meet them and control the situation.*

*That the employer emphasizes that if an employee is ill, it is important that he/she tells about it and does not feel miserable in isolation.*



## DISCUSSION

The focus and aim of this qualitative study was to describe employers' experiences of the questions studied with the focus on their unique experiences for a deeper understanding of this topic. The results of quantitative studies cannot be generalized to all employers, but show the respondents' varying perspectives and experiences of the topic in question.

The result showed that the employers were interested in improving rehabilitation planning. The employers had good intentions; they were willing to take on the responsibility for workplace adjustments, were involved and interested in developing relations, and they wanted to take part in work rehabilitation early and in a more distinct way. However, they perceived financial and organizational limitations to successful work rehabilitation.

The employers perceived that they took the primary responsibility for their employees and created conditions for realistic rehabilitation in their companies, but they could still see many things to be improved. They considered that each client should be acknowledged as a human being worthy of attention. The workplace attitude towards the sick-listed was not always positive, but could be changed to a more positive attitude. The employers put emphasis on the support from employers and colleagues in functional capacity training, and the value for each client of returning to social contacts at work. They recommended that, if possible, each client should also undergo functional capacity training in a different workplace and with other colleagues to reduce the risk of falling back on old habits. For a client to succeed with the functional capacity training or assessment takes a lot of effort and self-awareness. Not only the client but also the employer and colleagues need to be motivated to change the view of themselves and each other, and learn what characterizes a good work environment and work technique. And put that into practice. It is known that return to work is not limited to a client's actual symptoms or functional disabilities (18). When a client is trying to return to work, this can arouse negative attitudes and expectations from colleagues and supervisors, and those forces can cause setbacks for the client. In cases when the rehabilitation process is based on changes in the individual or in the workplace, and the changes take place independently of each other, there is a risk that they will not cooperate or support each other. The work situation can cause sickness and maintain the individual's role as sick by defective routines for vocational rehabilitation, deficient social support, and defective information and communication. On the other hand, if the process is carried out in parallel and interactively, a gradual development of strategies and goals for change in the individual and at the workplace is made possible (18).

The results showed that a lot of accommodations could be made at the workplace. The workplace rehabilitation included changes in work organization, psychosocial interventions, or purchase of ergonomic equipment. Above all, by modifying ergonomic risk factors like adjusting work tasks or by changes in work schedules such as reducing the working hours because of individual needs. The employers in this study did not have built-in rehabilitation facilities at their companies; instead they turned to their occupational health clinic when they needed to buy their services. They cooperated with the occupational medicine clinics to a varying extent. They considered the physician to have a crucial function in motivating clients to maintain contact with their workplace, and avoid long periods of sick leave. They also cooperated with other employers in arranging training opportunities. We suggest that employers' associations to an increased extent can be used to find new jobs or training opportunities for clients and to help with work organizational changes at the workplace.

An increased focus on training as an intervention conducive to finding a new job can also be a creative solution for some clients. A review of the literature on modified work (29 studies) (4) showed considerable differences in the design of modified work programs. Most of these programs were "light duty" assignments with temporary changes in work tasks or work hours and ergonomic equipment modification in the worker's preinjury job or in a different job. Other designs were "graded work exposure," "work trial," "supported employment" or "sheltered employment." Often several of these elements were used within one company and in most cases modified work was also a part of a broader return to work programs. The review also showed that modified work programs did facilitate return to work. Workers taking part in modified work programs returned to work about twice as often as those who were not, and the number of lost workdays was cut in half (4). Further, research shows that partial instead of full sickness benefits were connected with a positive outcome of rehabilitation of 732 long-term sick-listed people. Other identified positive factors were younger, male, employed, an early start of rehabilitation and in a program that included education (2). In another study, almost 40% of the women reduced their working hours on return to work, because of persistent disorders and partly so that they could deal with their domestic work (19).

The employers thought that the use of modified work in their companies was limited by the opportunity of making work organizational changes and by the nature of the work task. There were difficulties in modifying the work content in some occupations to fit persons with reduced work capacity. Research indicates that early return to modified work by the use of active sick leave may require interventions targeted at barriers that limit its use (20). Identified barriers for implementing active sick leave were shown to be proactive rather than intrinsic: insufficient information, lack of time, and workflow constraints such as poor communication and coordination activities between the physician, employers, and social insurance officers (20). A trial with interventions tailored to address identified barriers showed that the main impact of a proactive intervention was through direct contact and motivating telephone calls to the client by resource people. If the professional practice was changed, it was either client mediated or by clients bypassing their physician (21).

The employers emphasized that for long-term good rehabilitation results, attention needs to be given to the client's environment and social and geographic conditions. Socially, any connections between the client's symptoms and the social circumstances have to be analyzed for the solution to last. Geographical obstacles may also interfere with good solutions, for example a long travel distance to work. Other factors to consider for a good quality, content, and result of rehabilitation planning are that rehabilitation investigations should be started as early as possible and that all rehabilitation professionals participate in them. The employers thought that every person involved has to be involved at an early stage, be motivated, and take an active part in the process. To document the results, to focus on the time scheduling, and make follow-ups of goal attainment were also considered important by the employers. They think it is time to increase the demands on the clients' own responsibility and motive action. The employers considered that developing links between client and work and being supportive of the client were important aims for them in work rehabilitation. Developments of routines for the management of sick-listed employees were needed, which is in line with a study of laypersons' opinions (22). Support from a person with a case management function is recommended for long-term sick-listed clients (23). Research shows that trained case managers make the implementation of accommodations

at workplaces easier (24). Further, research shows that multidisciplinary rehabilitation that takes the clients' motivation for change into consideration has a good effect on occupational rehabilitation (25). There are many different rehabilitation arrangements that have yielded good results, for example to focus on practice in functional activities and psychosocial factors (26), and physical activity in a group combined with training (27). Significant for a good result of rehabilitation is to take workplace-related factors such as work structure, work content, and work relations into consideration (28).

The employers told us that they had not noticed any major long-lasting results of rehabilitation interventions. Perhaps the clients' training at a rehabilitation center is too separated from their reality at work. The employers are looking for new concepts to improve the results. They also reflect on the difficulties of estimating what a good result really is. They consider that the most cost-effective solution is to prevent problems from occurring at all, or that a rehabilitation process is short and should start early. The employers considered that primary prevention was as important as work rehabilitation, and a prerequisite for successful work rehabilitation. They were of the opinion that employees were not always willing to change their work, take breaks, or use new equipment. It is known that tertiary prevention through modified work programs including permanent ergonomic or organizational improvements can also have a primary prevention effect in reducing the risk of reinjury for the client and colleagues at the same workplace by a decrease in injury incidence (4). A study of employer strategies for preventing and managing work disability shows that companies that are most advanced in their safety initiatives have implemented some form of return to work programs. Thus, a process of integrated actions ranging from prevention to injury management to return to work to health promotion is required for reducing the impact of workplace disability (29). This is in line with the employers' view. In our opinion, the gap between external rehabilitation actions and actions performed at the workplace must be eliminated for a more effective work rehabilitation process. Integrated planning of actions between employers and different rehabilitation actors are needed to identify and use clients' resources to a higher extent. To eliminate this gap, organizational and economic problems must be solved. For example, positive attitudes towards work rehabilitation at the workplace, a person responsible for work rehabilitation at the workplace, and knowledge and economic resources are needed to solve this problem in practice. It is essential to increase the ability to solve work rehabilitation problems within the workplace and bring the rehabilitation professionals' competence closer by integrated cooperation.

The employers recognized their need to become more qualified in noticing early signals of sickness at the workplace and in making workplace changes early. 'Systematic work environment control' and frequent talks with the employees were perceived to be ways for the employers to have control of the situation. However, they wished that they had more time to communicate and cooperate with their employees, which is important in psychosocial work environment changes. This is also shown in another study (22). Research shows that employers generally seem passive regarding rehabilitation. Documented rehabilitation activities were too few and initiated unnecessarily late; an impulse indicating that some sort of rehabilitation could be of interest was documented in a majority of the cases, but the employer or the Social Insurance Office often did not follow up the impulses. The rehabilitation investigations were conducted late and in less than half of the cases, and rehabilitation plans were established late and in only about a quarter of long-term sick cases (30).

To increase the quality of rehabilitation planning the employers in the present study considered that training of supervisors is required, as well as training of every employee. In the preventive work they wish to cooperate with the Social Insurance Office and with rehabilitation professionals, and are interested in finding out what solutions different actors can offer. This is in accordance with another study that suggests that preventive actions are needed from different rehabilitation actors (31). Social insurance officers could work for the purpose of influencing attitudes at the workplace to reach a greater understanding of and impact on rehabilitation at the workplace. Strategies for influencing attitudes need to be developed in different trades (31). It is also suggested that systematic health promotion efforts should be targeted at the particular injury or disability risk that a company confronts (29). The incidence of net benefits from programs or medical interventions that reduce absenteeism due to illness is likely to fall largely on employees in the long run but on employer profits in the short run (32).

## CONCLUSIONS

The employers were interested in detecting needs for rehabilitation and taking actions early. Rehabilitation at the workplace could be improved by development of routines, improved work relations and work techniques, and environment in-service training at the workplace. Prevention was perceived as a prerequisite for a good result of rehabilitation. Attention to social and geographic conditions is needed. Organizational and financial limitations exist.

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