

# **Sick Leave and Subjective Health Complaints**

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*To the memory of my parents*



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## **Abstract**

The aims of this thesis were to identify risk factors for high levels of sick leave and investigate what – if anything – can be done to reduce sick leave. What is the role of “subjective health complaints”, coping, and psychosocial work factors in relation to sick leave, and to what extent do these factors and the sick leave relate to quality of life? Are there any interventions with a documented effect on sick leave in the literature? Is it possible to influence sick leave through an intervention tailored to target the risk factors for sick leave including both psychological and physiological health factors? Finally, the aim was to identify and describe employees with a high level of sick leave.

“Subjective health complaints” are complaints without known pathology or where the pathological findings are less than expected. Such complaints are the cause of more than 50% of the sick leave in Norway. Musculoskeletal complaints are one subgroup of subjective health complaints and are responsible for nearly half of the sick leave. Low back pain is the most common diagnosis in this group. Employees in the health sector are the work group with most sick leave and highest recruitment to disability pension. In Paper 1 employees in two nursing homes for the elderly were assessed for subjective health complaints as well as for health related quality of life. In addition, personal and work factors were monitored. High levels of subjective health complaints did relate to low quality of life. High expectancies of being able to cope

and low work demands were associated to high quality of life; and low coping expectancies and high work demands were associated to low quality of life.

Since low back pain is the most common reason for sick leave and a frequent complaint among the employees in the nursing homes, the literature for work place interventions targeted at low back pain was searched. In Paper 2 the results from this systematic literature review of controlled work place interventions are presented. We identified 31 publications that satisfied our quality criteria. The inclusion criteria were: controlled intervention, work setting, and assessment of at least one of the four main outcome measures: sick leave, costs, new episodes of low back pain, and pain. All studies were scored on methodological quality. Physical exercise and comprehensive multidisciplinary interventions were the only interventions with a documented effect on low back pain. Physical exercise to prevent low back pain and comprehensive multidisciplinary interventions to treat employees with low back pain were effective in reducing sick leave, costs, and preventing recurrence of low back pain.

In Paper 3 the effects of an intervention tailored to target the risk factors for sick leave including both psychological and physiological health factors related to sick leave are presented. Employees in one of the nursing homes from Paper 1 were invited to participate in an “Integrated Health Programme” consisting of physical



exercise, health information, and stress management, in a randomised controlled study. The intervention group (n = 19) was allowed time off from work to participate in the intervention twice weekly for 9 months. The control group (n = 21) was offered the same “Integrated Health Programme” after the study was finished. The intervention had no significant effect on sick leave. Sick leave more than doubled in both groups during the intervention period. The intervention group reported less neck complaints compared to the control group, otherwise there were no effects on subjective health complaints. On the other hand, there were large positive subjective effects in the intervention group. The intervention group reported significant improvement in their experience of their own health, physical fitness, muscle pain, stress management, maintenance of health, and work situation. Still, this did not change the scores on health related quality of life. This may relate to the fact that the scores were about average for the group as a whole.

Finally, in Paper 4, the distribution of sick leave in a population of power plant employees was described. A group of 10% of the employees was responsible for 82% of the sick leave, with an average number of 44 days of sick leave in the group of employees with much sick leave and 1 day in the group with low level of sick leave. The employees with much sick leave were characterised by high levels of subjective health complaints, low education, low coping, heavy manual work, and many health risk factors such as smoking, low job satisfaction, high reports of job stress, poor quality of sleep, and low level of physical activity. With sick leave among the

employees distributed like this, demonstrating effect on sick leave of an intervention including all employees will be difficult.

The conclusion from the thesis is that a minor part of the employees had the major part of the sick leave. The employees with much sick leave were characterised by having high levels of subjective health complaints, an unhealthy life style, low coping, a reduced quality of life, and low socioeconomic status. Subjective health complaints were important for daily life functioning. High coping and low job demands were associated with high quality of life. Physical exercise interventions at the work place had a documented effect on sick leave. A work place intervention including physical exercise was not effective in reducing sick leave and subjective health complaints, but had large subjective effects. The potential for reducing sick leave is small when targeting all employees in an organisation and this may explain why so few of the interventions aiming to reduce sick leave, including the one in this thesis, are effective.

## List of publications

- Paper 1      Tveito, T.H., Passchier, J., Duivenvoorden, H.J., and Eriksen, H.R. (2004). Subjective health complaints and health related quality of life in a population of health workers. *Psychology & Health* 19(2): 247-59.
- Paper 2      Tveito, T.H., Hysing, M., and Eriksen, H.R. (2004). Controlled low back pain interventions at the workplace. A systematic review. *Occupational Medicine* 54(1): 3-13.
- Paper 3      Tveito, T.H. and Eriksen, H.R. (Submitted). Improving health in health workers: A randomised controlled trial of physical exercise, health information, and stress management.
- Paper 4:      Tveito, T.H., Halvorsen, A., Lauvålien, J.V., and Eriksen, H.R. (2002). Room for everyone in working life? 10% of the employees – 82% of the sickness leave. *Norwegian Journal of Epidemiology* 12(1): 63-8.

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## 1. Introduction and theoretical framework

What we refer to as “Subjective Health Complaints” are the cause of the major part of the sick leave in Norway (see Fig. 1) (National Insurance Administration, 2005b).

These are complaints where pathological findings are absent or substantially less than expected compared to the reported intensity of the complaints (Eriksen, Ihlebæk, & Ursin, 1999). The concept includes musculoskeletal complaints, pseudoneurological complaints (i.e. tiredness, light mood changes, dizziness), gastrointestinal complaints, allergy, and “flu”. Subjective health complaints are very prevalent in the general population, statistically it is more common to report complaints than to report no complaints (Ihlebaek, Eriksen, & Ursin, 2002).

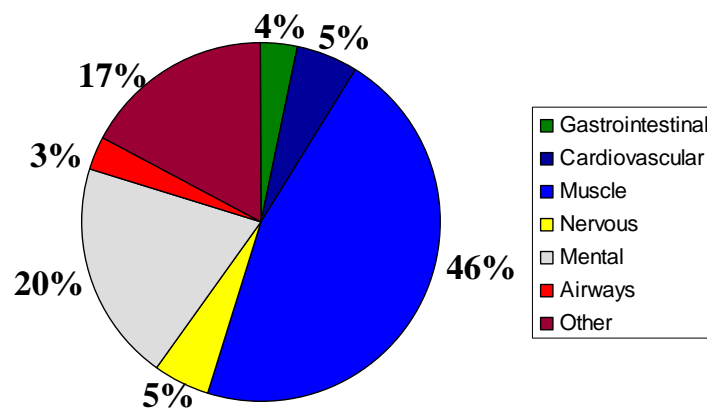


Figure 1. Days of sick leave by diagnosis. (National Insurance Administration, Statistical Yearbook 2005, table 6.15).

All of us experience some of these complaints from time to time, but our perception of the complaints and their consequences for our daily functioning may be influenced by work characteristics, socioeconomic status, psychological demands, perceived job stress, coping and other psychological factors (Ihlebak & Eriksen, 2003).

Health and sick leave are related to the social hierarchy in working life. Employees with low socioeconomic status and poor coping abilities have more long term sick leave compared to other General Practitioner (GP) patients with musculoskeletal complaints (Grossi, Soares, Angeseva, & Perski, 1999). This is but one of many social inequalities in health. Cardiovascular morbidity has also been shown to be associated to socioeconomic status of the employees (Marmot, Bosma, Hemingway, Brunner, & Stansfeld, 1997). European democratic governments have invested a lot of political work into eliminating such differences, but social inequalities in health still persist, and represent an ethical challenge to most European societies (Bosma et al., 1997; Burstrom, Holland, Diderichsen, & Whitehead, 2003; Kristenson, Eriksen, Sluiter, Starke, & Ursin, 2004; Osler et al., 2000; Siegrist, 2002; Singh-Manoux, Adler, & Marmot, 2003; Whitehead, 1999; Zollner, 2002).

Sick leave is an economic problem to society and organisations (Karas & Conrad, 1996; McDaid, Curran, & Knapp, 2005). This has created a market with an abundance of offers of more or less (mostly less) documented interventions,



promising to reduce sick leave and increase productivity. These interventions are often not evaluated and if an evaluation is performed, it is usually without comparison to a control group. The natural course of chronic conditions (Deyo, 1998) may help many interventions to show an apparent short time effect. For instance, chronic pain is not painful at the same level always, it varies in intensity over time (Deyo, 1998). An intervention is often started when there is a peak in the complaints and a few months afterwards when the complaints and maybe sick leaves are reduced, the intervention gets the credit for the improvement, whereas the effect really comes from the natural course of the condition. Only designs with a randomised control group will separate the effect of the intervention from the natural course of the complaints. Admittedly, evaluating work place interventions is difficult and the gold standard of double blind randomised controlled interventions is impossible to apply. However, organisations with much sick leave among their employees should invest more in obtaining evidence-based knowledge about which work place interventions are effective.

The psychosocial work environment is important for health and sick leave (Hoogendoorn et al., 2002; van der Giezen, Bouter, & Nijhuis, 2000). Job satisfaction has been found to be a predictor of return-to-work of low back pain patients with long term sick leave (van der Giezen, Bouter, & Nijhuis, 2000) and other populations (Andrea et al., 2003; Petterson, Hertting, Hagberg, & Theorell, 2005). In a large meta-analysis job satisfaction was found to be associated with mental health and

subjective physical health (Faragher, Cass, & Cooper, 2005). Other aspects of psychosocial work environment with an effect on health and sick leave are psychological work demands, control, social support (Andrea et al., 2003; Bosma et al., 1997; Gheldof, Vinck, Vlaeyen, Hidding, & Crombez, 2005; Karasek & Theorell, 1990; Petterson, Hertting, Hagberg, & Theorell, 2005), and effort reward imbalance (Bosma, Peter, Siegrist, & Marmot, 1998; Siegrist, 1996). Individual factors are also important (Eriksen & Ursin, 1999; Gard & Sandberg, 1998; Hansen, Edlund, & Henningsson, 2006) but the amount of research in this area is restricted.

## 1.1 Sick leave

In Norway employees have the right to economic benefits from the employer (for the first 16 days) or later from the National Insurance if they because of illness or disease are unable to go to work ("Lov om folketrygd (folketrygdloven)", 1997). To get the benefits the employees in principle had to be sick listed by a physician, but for short lasting absences the employees had the right to sick list themselves for up to three days not more than four times per year. These are the rules as they were at the time of the data collection, later there have been some changes.

The cost of sick leave compensation from the National Insurance in Norway has increased by 74% from 1998 to 2004 (National Insurance Administration, 2001,

2005a). In the same period the consumer price index has increased by 14% (Statistics Norway, 2006b). Employees working in health care have the highest level of sick leave (Statistics Norway, 2006a) and also have the highest recruitment to disability compensation (Norges offentlige utredninger, 2004).

More than half of the sick leave in Norway is caused by what may be classified as “subjective health complaints” (National Insurance Administration, 2005b).

Musculoskeletal complaints is the largest diagnose group, in 2004 alone responsible for 46% of the sick leave (National Insurance Administration, 2005b). Low back pain is the largest diagnosis in the group of musculoskeletal complaints (National Insurance Administration, 2006). There seem to be a slow decrease in musculoskeletal complaints from 49% in 1994 to 46% in 2004, whereas mental diagnoses have increased from 10% in 1994 to 20% in 2004 (National Insurance Administration, 2005b; Oppdalshei, 2000).

Sick leave is a difficult concept to compare across different countries and cultures because it is influenced by so many factors other than the health of the employees (Brage et al., 2002). The sickness benefit systems are different in different countries, the rate of unemployment differs, the legal protection of employees differs, and the economic consequences of losing income because of sick leave differ (Brage et al., 2002; Engstrom & Eriksen, 2002).

## 1.2 Subjective health complaints

In their 1948 constitution the World Health Organisation defined health as: “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity” (World Health Organisation, 1948). By this definition, the positive health concept, health is something else, and something more than the opposite of disease. Disease may be defined as “a biological event, characterised by anatomic, physiologic, or biochemical changes, or by some mixture of these” (Barondess, 1979, p. 375). The focus in this thesis is on complaints or illness, not on disease. Barondess (1979, p. 375) defines illness as “an array of discomforts and psychosocial dislocations resulting from interaction of a person with the environment. The environmental stimulus may be a disease, but frequently is not.” Illness thus is the individual perception of not being well. Illness or complaints play a more prominent role than disease for causes of sick listing (National Insurance Administration, 2005b).

It is crucial for the understanding of the WHO definition that health as well as illness is a subjective experience. Accordingly, to get information on health, asking the individual is necessary, and self-rated or subjective health is a valid measure. It also follows that “unhealth”, or lack of health, is a subjective state, the individual perception of not being well – illness. Illness may or may not have objective or clinical signs and symptoms.

Subjective health complaints (SHC) is a concept used in this thesis, referring to complaints without pathological signs and symptoms or where the pathological findings are disproportionate to the illness experience (Eriksen, Ihlebæk, & Ursin, 1999; Ursin, 1997). Subjective health complaints have a high prevalence, 96% of the general Norwegian population reported that they had suffered one or more complaint(s) during the last month (Ihlebaek, Eriksen, & Ursin, 2002). This is not a finding exclusive to Norway, subjective health complaints are prevalent in the other Nordic countries (Eriksen, Svendsrød, Ursin, & Ursin, 1998), in Europe (Agreus, 1998; Bassols, Bosch, Campillo, Canellas, & Banos, 1999; Kind, Dolan, Gudex, & Williams, 1998; Makela et al., 1999; Picavet & Hazes, 2003) and in the rest of the world (Eriksen, Hellesnes, Staff, & Ursin, 2004). Only 3% report substantial complaints (Ihlebaek, Eriksen, & Ursin, 2002). Thus subjective health complaints are the everyday complaints we all are bothered by, but in most instances not so much bothered that we seek health care or are absent from work. The plurality of our population have subjective health complaints, at the same time the plurality reports that their health is good or very good (Statistics Norway, 2003). Subjective health complaints may develop because of a disease, or they may be symptoms of a disease. Most such complaints are not signalling any disease, still these complaints are the main reason for seeing a physician or get sick listed (National Insurance Administration, 2005b; Rokstad, Straand, & Sandvik, 1997). Even in the absence of any disease these complaints may become too much to participate in ordinary social and working life.

The subjective health complaints inventory used in this thesis (Eriksen, Ihlebæk, & Ursin, 1999) does not ask for attributions or medical diagnoses, the participants simply were asked if they had been affected by any of the 29 complaints listed during the last month, and also to register intensity and duration of the complaints. The 29 complaints are grouped into five subscales, musculoskeletal complaints, pseudoneurological complaints, gastrointestinal complaints, allergy, and flu. They are “subjective” because they are based solely on self report. The term is not meant to imply that the complaints are not real, or indicating a mental dysfunction. Pain is painful, and based only on subjective or self report. Pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” by the International Association for the Study of Pain and in their pain terminology it is emphasised that pain always is subjective (International Association for the Study of Pain, 1994).

### 1.3 Sensitisation

To explain why some individuals are suffering more from subjective health complaints than most of us, sensitisation is suggested as one possible psychobiological mechanism (Eriksen & Ursin, 2004; Ursin, 1997). Low back pain patients with long term sick leave have been found to have significantly more subjective health complaints than the general population (Hagen, Svensen, Eriksen, Ihlebaek, & Ursin, 2006). The same pattern has been seen in patients with functional gastrointestinal illness (Lind et al., 2005; Orchard, 2003; Vandvik, Wilhelmsen, Ihlebaek, & Farup, 2004). Sensitisation is suggested as being a multilevel

phenomenon rather than only a neuronal phenomenon (Brosschot, 2002). The neurobiological sensitisation is the sensitisation that happens in the neuronal synapses, an increased reaction to stimuli (Ursin, 1997). Repeated firing of synapses may result in changed synaptic efficiency, either sensitisation or habituation. The last concept is a decreased reaction due to repeated firing in the synapses. There is no habituation to pain stimuli (Ursin, 1997). Increased pain sensitivity have been demonstrated in patients with low back pain (Clauw et al., 1999), fibromyalgia (Vaeroy, Helle, Forre, Kass, & Terenius, 1988), and functional gastrointestinal complaints (Mearin et al., 1995).

Cognitive or attentional bias is suggested as a higher form of sensitisation (Brosschot, 2002). Conditions likely to lead to sensitisation are when the stimulus is irregular, strong or extreme, the stimulus is relatively unpredictable, or if the background level of arousal is high (Overmier, 2002). High level of background arousal, or sustained arousal, may lead to vigilance; and this vigilance may be directed towards body sensations, i.e. low back pain or other subjective health complaints the individual experiences (Eriksen & Ursin, 2002).

The feed-forward mechanism of cognitive sensitisation may cause sustained activation and repeated activation, and thus strengthening, of cognitive networks related to pain and complaints (Brosschot, 2002). This mechanism will help the

individual to manage in situations that potentially may be harmful (Brosschot, 2002). The sensitised persons are in a state of vigilance, constantly scanning the environment for information related to the pain or illness. The rumination and worrying of the patient after a stressful event and in anticipation of another, is of far more long-standing character than the temporal effect of the actual stressor and may be more important for the development of pain or illness than the stressful event itself (Brosschot, Gerin, & Thayer, 2006).

## 1.4 Stress and coping

Subjective health complaints are often attributed to stress and psychosocial work factors (Bongers, de Winter, Kompier, & Hildebrandt, 1993; Bongers, Kremer, & ter Laak, 2002). The stress theory in this thesis is based on the Cognitive Activation Theory of Stress (CATS) (Ursin & Eriksen, 2004). This theory puts forward that stress is related to both health and illness, depending on the expectancy of the individual regarding the outcome of the response of the individual. No response outcome expectancies or negative response outcome expectancies may lead to tonic activation and maybe sustained activation, which in turn may be related to development of illness.

Stress is a complicated concept, and its definition has been a source of discussion and disagreement among researchers for years (Levine & Ursin, 1991; Ursin & Eriksen, 2004). However, there are some consensus statements in this area, the most important



one is that there is no linear association between the stress stimulus and the stress response (Levine & Ursin, 1991). Stress is used about the stress stimulus or stressor, it is used about the stress experience, it is used about the stress response, and finally it is used about the feedback from the stress response (Levine & Ursin, 1991; Ursin & Eriksen, 2004).

According to CATS (Ursin & Eriksen, 2004) the stress stimulus is filtered through the brain to answer the crucial questions: what does the stimulus mean and what can I do about it? This is explained as “two different filters” in the brain, stimulus expectancy and response outcome expectancy. Stimulus expectancy covers classical conditioning, where one stimulus signals another event. When a true relationship exists, and a potential harmful event is signalled, the expectancy may be distorted. This is the CATS definition of psychological defence. Response outcome expectancy covers instrumental conditioning, a given response results in an event, for instance a reward. The expectancy is directed towards the resources of the individual, whether the response will be adequate to get a good result. There are three different response outcome expectancies, positive, negative, and no expectancy.

A stress stimulus leads to activation and the brain filters are intended to reduce this arousal and re-establish the level of activation before the stress stimulus came. The CATS definition of coping is the acquired expectancy that all or most responses lead

to a positive result, positive response outcome expectancy. A positive expectancy will effectively reduce the general activation and the stress response will be a phasic short lasting effect with an anabolic effect which may have a positive training effect on health. If the individual has the acquired expectancy that there are no relationships between responses and result, no response outcome expectancy, that is helplessness. Then the activation will not be reduced but sustained. This has a tonic and catabolic effect, a negative straining effect on health. The worst case is hopelessness, the acquired expectancy that most or all responses lead to a negative result, negative response outcome expectancy (Overmier & Seligman, 1967). This also leads to sustained activation, with the tonic and catabolic straining effect on health. The two latter types of expectancies are related to clinical depression and anxiety in humans.

The phasic stress response is associated with positive health effects and sustained activation is associated with negative health effects in CATS. From animal research we know that animals exposed to situations beyond their control – sustained activation – may develop gastric ulcerations, hypertension, cardiac failure, immunological deficits, or changes in the brain similar to those occurring in depression and psychoses (Olf et al., 1995; Overmier & Murison, 2000; Ursin & Murison, 1983). Sustained activation implies that recovery after the stress response is not sufficient and from exercise physiology it is known that the body needs a period of recovery to be rebalanced after an effort (Kristenson, Eriksen, Sluiter, Starke, & Ursin, 2004). Need for recovery has been introduced as an important factor in

employee health, several studies have found that employees with a perceived need for recovery have high levels of subjective health complaints and stress hormones (Sluiter, Frings-Dresen, van der Beek, Meijman, & Heisterkamp, 2000; Sluiter, van der Beek, & Frings-Dresen, 1998, 1999). Reports of high need for recovery are also associated to high job demands and low control (Sluiter, Frings-Dresen, van der Beek, Meijman, & Heisterkamp, 2000; Sluiter, van der Beek, & Frings-Dresen, 1999).

A concept related to sustained activation is allostatic load, used about the result of physiologic responses to accumulated exposure to environmental stressful challenges – the hassle of daily life (McEwen & Stellar, 1993). Allostatic systems are adaptive systems working to maintain homeostasis by responding to a threat to homeostasis by appropriate changes (McEwen, 1998). When the body is exposed to a challenge it responds by turning on an allostatic response which is shut off after the challenge is over (McEwen, 1998). Four situations associated with allostatic load are listed by McEwen (1998), frequent stress, exposure to repeated stressors without adaptation, allostatic responses that are not shut off after a stress is terminated, compensatory increases in some allostatic systems as a consequence of inadequate responses from others. However, the cognitive aspects are not included in the allostatic load model as they are in CATS (Eriksen, Murison, Pensgaard, & Ursin, 2005).

CATS differs from many other stress theories in having a more differentiated approach to the relationship between stress and health. The consequences of stress in the normal healthy individual are positive, it is only sustained high activation that is a health hazard (Ursin & Eriksen, 2004).

## 1.5 Quality of life

To what extent do high levels of subjective health complaints influence the daily functioning of the individual? Individuals with high levels of subjective health complaints are at risk for sick leave, but why are they bothered more than those that continue their working and social life in spite of their health complaints? We have attempted to understand this aspect by registering reports of “quality of life” (QoL). This has been identified as a very important outcome particularly in oncological research (Frost & Sloan, 2002). It is also an important outcome variable, particularly for comorbidity seen in physically ill patients (Baumeister, Balke, & Harter, 2005) and in primary care (Fortin et al., 2004). High levels of comorbidity are associated with low QoL (Fortin et al., 2004).

There is no single definition or conceptualisation of the concept QoL (Rogerson, 1995). Meanings of the concept range from individual fulfilment to the ability to lead a “normal” life (Bowling, 1995). In the social sciences it has been suggested that two fundamental sets of processes are important in defining QoL, an internal and an external (Rogerson, 1995). The internal process is a psychological- physiological

mechanism giving a sense of satisfaction with life. The external process consists of the environmental stimuli triggering this internal mechanism (Rogerson, 1995). In medical research the concept most used is “health related quality of life”, which may be thought of as “those aspects of self-perceived wellbeing that are related to or affected by the presence of disease or treatment” (Ebrahim, 1995, p. 1384). Health related QoL measures are usually divided into generic and disease-specific measures (Loge & Kaasa, 1998). SF-36 is a generic measure that has been useful not only in patient populations, but also in the general population (Loge & Kaasa, 1998; Sullivan, Karlsson, & Ware, 1995; Ware et al., 1998).

Feelings of low QoL may be one reason why we have difficulties motivating individuals with high levels of sick leave and high levels of health complaints to participate in our programs. They may have less expectancies of being able to lead a good life, and are less motivated to change life styles and adhere to new programs. This issue will be further discussed under the discussion of social inequalities of health.

The quality of working life has also been introduced as an area in need of attention and research (Hillier, Fewell, Cann, & Shephard, 2005). Hillier and co-workers (2005) argue that investing in the quality of the working lives of the employees may lead to greater organisational success. Quality of working life has also become a

major issue for trade unions, and for the concept of “Healthy Work” (Karasek & Theorell, 1990). In this thesis there was not any specific measure of “Quality of Working Life” in any of the studies, main aspects of this concept are treated by the psychosocial factors at work, and, in particular, by the measurements for job stress and the demand/coping model (see below).

## 1.6 Job stress models

Job stress is thought to be an important factor for the health of employees (Hillier, Fewell, Cann, & Shephard, 2005; Sauter, Hurrell, Murphy, & Levi, 1997). Job stress models aim to explain the relationship between the working conditions and the health of the employees. Some models in addition will recommend a special organisation of the work, designed not to be harmful to the employees. In this thesis the demand/coping model was used (Eriksen & Ursin, 1999).

### 1.6.1 The demand/coping model

The demand/coping model was developed by Eriksen and Ursin (1999) based on CATS (Ursin & Eriksen, 2004) and the demand/control model (Karasek & Theorell, 1990). The focus in the demand/coping model is on individual coping abilities as opposed to the more objective and job defined control concept used in the demand/control model. Individual expectancies of coping determine whether the demands the employees are exposed to will result in ill health or yield a positive training effect.

The demand/coping model is a classification system where employees belong to one of four categories depending on their perception of job demands and individual coping (Eriksen & Ursin, 1999). High levels of job stress are reported by employees with high demands and high coping, but these employees do not report high levels of subjective health complaints (Eriksen & Ursin, 1999). The highest level of subjective health complaints and job stress is found in employees with high demands and low coping (Eriksen & Ursin, 1999). Employees with low demands and high coping reported the lowest level of both job stress and subjective health complaints, whereas employees with low demands and low coping report high levels of subjective health complaints, but not as high as the group with high demands and low coping (Eriksen & Ursin, 1999). The associations between subjective health complaints and the demand/coping model were stronger than when using the demand/control model, indicating the importance of individual factors for the relationship between job stress and health (Eriksen & Ursin, 1999).

## 1.7 Social inequalities in health

Research on job stress models has established that health status of the employees reflects the working life hierarchy, the socioeconomic status of the employees is related to health (Bosma, Peter, Siegrist, & Marmot, 1998). Employees with high socioeconomic status have on average better health and better QoL than employees with lower socioeconomic status (Hemingway, Stafford, Stansfeld, Shipley, &

Marmot, 1997). The second principle in the WHO constitution says that: “The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition” (World Health Organisation, 1948). It is an embarrassing fact to most western governments that in spite of all the work put into levelling the socioeconomic differences in health, the gap is still there, even increasing (Dahl & Elstad, 2001; Kristenson, Eriksen, Sluiter, Starke, & Ursin, 2004; Osler et al., 2000; Singh-Manoux, Adler, & Marmot, 2003; Whitehead, 1999). The European Union has put social inequalities as a priority on their public health program and has financed research on social inequalities in health across the countries who are members in the union (Siegrist, 2004).

Several empirical studies link socioeconomic differences in health to psychosocial factors and it is suggested that psychobiological factors related to stress physiology are important mediators for these differences (Kristenson, Eriksen, Sluiter, Starke, & Ursin, 2004). Using instrumental learning theory, it is hypothesised that responses to environmental challenges depend on acquired expectancies (learning) of the relations between stimuli and responses. The perception of the individual of how successful its responses are is the reinforcement of the behaviour. Environmental challenges and reinforcements are related to social status; accordingly learning and the stress response are dependent on social status. The route from social status via stress to health goes either through stress related pathways or through effects on health



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behaviour. It is argued that these paths are in part following a common psychobiological pathway (Kristenson, Eriksen, Sluiter, Starke, & Ursin, 2004).



## **2. Aims of the thesis**

To address the problems raised in the introduction with high levels of sick leave and negative consequences of subjective health complaints, we need more knowledge in several areas. We need to know more about how subjective health complaints influence daily functioning and QoL. Evidence based knowledge about effective work place interventions is needed to design an intervention that may be effective in reducing sick leave and subjective health complaints in a Norwegian work place. Investigating the distribution of sick leave among employees and the characteristics of the employees with much sick leave may help in understanding why designing effective work place interventions is so difficult.

The main aims of this thesis therefore were first to assess how subjective health complaints influence daily functioning. Further it was to identify interventions with a documented effect on sick leave due to low back pain and evaluate if an intervention based on these findings would be effective in reducing sick leave and improving the health of the participating employees. Finally the aim was to investigate the distribution of sick leave among employees and identify risk factors for sick leave.

Based on this, the following research questions were formulated for this thesis:

1. Subjective health complaints are the cause of more than 50% of the sick leave in Norway. Do these complaints have an influence on health related QoL? (Paper 1)
2. Which work place interventions for low back pain have been tried in organisations to reduce sick leave? (Paper 2)
3. Do any of these interventions have documented effects? (Paper 2)
4. Will a program combining physical exercise, health information, and stress management reduce sick leave and subjective health complaints? (Paper 3)
5. What characterises employees with a high level of sick leave? (Paper 4)

### 3. Summary of papers

#### 3.1 Paper 1: Subjective health complaints and health related quality of life in a population of health care workers

Tveito, T.H., Passchier, J., Duivenvoorden, H.J., and Eriksen H.R.

Research question 1: Subjective health complaints are the cause of more than 50% of the sick leave in Norway. Do these complaints have any influence on quality of life?

Subjective health complaints are the cause of more than 50% of the sick leave in Norway (National Insurance Administration, 2005b) and the work group with most sick leave is health workers (Statistics Norway, 2006a). In Paper 1 the results from a screening of subjective health complaints, health related QoL, and psychosocial work factors among health care employees are reported. The screening was done as part of a project aiming to reduce sick leave and level of subjective health complaints, 119 employees in two nursing homes for the elderly participated. The response rate was 52%. The employees filled in a questionnaire on health, exercise, psychological factors, and work conditions. Main outcome measures were subjective health complaints and health related QoL measured by SF-36. High level of subjective health complaints was associated to low health-related QoL. Low coping and high demands were related to low QoL, and high coping and low demands to high QoL (on the mental health dimension). Pseudoneurological complaints (e.g. tiredness,

sadness), high demands, and low coping were associated with low mental health.

Coping and demands explained a very small part of the association between subjective health complaints and QoL. The expected negative association between subjective health complaints and health-related QoL was found. There was a positive association between coping and QoL.

Having established that subjective health complaints are important for sick leave and QoL, the next paper investigates what organisations have done to prevent sick leave and subjective health complaints and if the interventions have had any effect. Work place interventions for low back pain were chosen because musculoskeletal complaints are the main reason for sick leave in Norway and low back pain is the most common diagnosis in this group of complaints (National Insurance Administration, 2005b). Additionally low back pain is often thought to be associated with work factors (Deyo, 1998).

## 3.2 Paper 2: Low back pain interventions at the work place: a systematic literature review

Tveito, T.H., Hysing, M., and Eriksen, H.R.

Research question 2: Which work place interventions for low back pain have been tried in organisations to reduce sick leave?

Research question 3: Which of these interventions have any documented effects?

The aim of the second paper was to assess the effect of controlled workplace interventions on low back pain through a review of controlled studies. The rising costs of employees with low back pain have resulted in an abundance of offers to society and organisations of interventions to prevent and/or treat the problem. A systematic literature search was done based on the inclusion criteria: controlled trial, work setting, and assessment of at least one of the four main outcome measures, sick leave, costs, new episodes of low back pain, and pain. The search was run in the databases Medline Advanced, PsycINFO, the ISI base and the Cochrane Controlled Trials Register. Effects of the interventions were reported for the four main outcome measures. 31 publications from 28 interventions were found to comply with the inclusion criteria. All interventions were scored on methodological quality.

Exercise interventions to prevent low back pain among employees (6 studies) and multidisciplinary interventions to treat employees with low back pain (4 studies) have documented effect on sick leave, costs, and new episodes of low back pain.

Multidisciplinary preventive interventions (2 studies) have documented effect on level of pain. The results show that caution is important when considering interventions aiming to prevent low back pain among employees.

Paper 2 showed that only physical exercise and the comprehensive multidisciplinary preventive and treatment interventions have documented an effect on low back pain.

The third paper investigates the effect of an intervention containing physical exercise on sick leave and subjective health complaints in a Norwegian population of health care workers.

### 3.3 Paper 3: Improving health in health workers: A randomised controlled trial of physical exercise, health information, and stress management

Tveito, T.H. and Eriksen, H.R.

Research question 4: Will a program combining physical exercise, health information, and stress management reduce sick leave and subjective health complaints?

The aim of this study was to assess if an intervention consisting of physical exercise, health information, and stress management training would succeed in reducing sick



leave and level of subjective health complaints in employees in a nursing home for the elderly. After a baseline screening the employees who had agreed to participate (n = 40) were randomised to intervention and control group. The intervention group was allowed by their employer to participate in an “Integrated Health Programme” twice weekly during working hours for 9 months. The “Integrated Health Programme” consisted of physical exercise, stress management training, health information, and a visit at the actual work place of each of the participants. The control group was offered the same intervention after the study was finished.

There were no significant effects from the intervention on sick leave and health related QoL. The intervention group had significantly less neck complaints than the control group, otherwise there were no effects on subjective health complaints. Sick leave more than doubled in both groups during the intervention period. Despite the lack of effect on sick leave and subjective health complaints, there were large and highly significant subjective effects. The intervention group reported improvement in health, physical fitness, muscle pain, stress management, maintenance of health, and work situation.

Contrary to our expectations based on the results from Paper 2, there was no effect of an intervention including physical exercise on sick leave. Paper 2 was a review of the international literature and sick leave may be difficult to compare across countries.

Unemployment, possibility to get disability compensation, and rights to benefits for sick listed employees are all factors that influence level of sick leave and these factors vary a lot between countries. In the next paper we assess sick leave among employees in Norway.

### 3.4 Paper 4: Room for everyone in working life? 10% of the employees – 82% of the sickness leave

Tveito, T.H., Halvorsen, A., Lauvålien, J.V., and Eriksen, H.R.

Research question 5: What characterises employees with a high level of sick leave?

As part of a screening process of a project called “Reorganisation in the power companies”, a survey was done in 13 power plants during the autumn of 1999 where self reported sick leave was included. The response rate was 73%, 2435 Norwegian power plant employees participated. The employees were asked to fill in a questionnaire about sick leave, physical work environment, stress, coping, psychological demands, control, and subjective health complaints.

A group of 10% of the employees reported 82% of the sick leave. Average number of days of sick leave was 44 days in the group with much sick leave and 1 day in the group with low level of sick leave. The group with much sick leave were characterised by heavy physical work, low education, and high levels of many health risk factors, such as smoking, low job satisfaction, poor quality of sleep, high reports

of job stress, and low levels of physical exercise. They also had more health complaints. The person most at risk for high levels of sick leave was the traditional manual labourer with low education and heavy physical work.

Paper 4 documented that a minor part of the employees reported the major part of the sick leave and they had high levels of subjective health complaints. Most interventions at the work place are offered to all employees, but Paper 4 shows that 90% of the employees do not have an improvement potential regarding sick leave. However, some interventions may have a preventive effect on sick leave. Lack of improvement potential regarding sick leave for the majority of the employees may be part of the explanation of why it is so difficult to show effect on sick leave when intervening on employees.



## 4. Discussion

### 4.1 General summary of results

The main aims of this thesis were to assess how subjective health complaints influence daily functioning, to identify interventions with a documented effect on sick leave, to evaluate if an intervention based on these findings would be effective in reducing sick leave and improving health, and, finally, to examine risk factors for sick leave.

Subjective health complaints do affect daily life, and contribute to high levels of sick leave. There are interventions in the literature that prevent and reduce sick leave. Our own combined program did have significant effects on wellbeing, but did not reduce sick leave. This may be related to the finding that only a small group of the employees have the major part of the sick leave.

### 4.2 Subjective health complaints influence health related quality of life

(Research question 1, Paper 1)

Musculoskeletal complaints did have a negative relationship with health related QoL, in accordance with results from other studies (Morken et al., 2002; Salaffi, De Angelis, Stancati, & Grassi, 2005). Pseudoneurological complaints were related to

low mental health. This was a population of supposedly healthy employees who had a fairly high QoL, average score was the same for physical health and a little better for mental health than the mean score for the general population. Still we found significant associations between high levels of subjective health complaints and low health related QoL. Finding this in an employee population indicates that probably stronger associations will be found in patient populations.

The results demonstrate that high levels of subjective health complaints influence the daily functioning of the individual, and that individuals with much subjective health complaints are at risk for sick leave. Registering the health related QoL appears meaningful. It may also relate to the basic pathophysiology explaining why subjective health complaints may develop from what is part and parcel of everyday life to conditions that are intolerable for the individual, making it impossible to participate in normal social and working life. Low QoL is associated with high levels of comorbidity seen in physically ill patients (Baumeister, Balke, & Harter, 2005) and in primary care (Fortin et al., 2004). High levels of comorbidity are characteristic for the subjective health complaints that lead to sick leave (Hagen, Svensen, Eriksen, Ihlebaek, & Ursin, 2006; Vandvik, Wilhelmsen, Ihlebaek, & Farup, 2004). Even more important, it is also very important for the prognosis, high levels of comorbidity are associated with poor prognosis (Hagen, Svensen, Eriksen, Ihlebaek, & Ursin, 2006; Von Korff et al., 2005).

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### 4.3 Work place interventions for low back pain

(Research question 2 and 3, Paper 2)

Physical exercise and comprehensive multidisciplinary prevention interventions were the only interventions with documented effect on low back pain, a result in accordance with the European Guidelines for Prevention in Low Back Pain (Burton et al., 2005, 2006). In general the physical exercise interventions had a high drop out rate, typically between 50 and 60% of the intervention group completed the study (Horneij, Hemborg, Jensen, & Ekdahl, 2001; Kellett, Kellett, & Nordholm, 1991; Oldervoll, Ro, Zwart, & Svebak, 2001). These studies are often small with number of participants in each group around 20 – 50 and therefore are vulnerable even for small numbers of drop outs (Gundewall, Liljeqvist, & Hansson, 1993; Horneij, Hemborg, Jensen, & Ekdahl, 2001; Kellett, Kellett, & Nordholm, 1991; Oldervoll, Ro, Zwart, & Svebak, 2001).

One exercise study was entirely different from the others, with more than 200 participants in each group and no drop out (Hilyer, Brown, Sirles, & Peoples, 1990). This study reported from a physical exercise intervention where the Fire Chief ordered that 30 minutes every day were to be used for mandatory exercises and the exercise leader would report daily to the Captain on any difficulty with compliance among the employees. This intervention significantly reduced the costs of sick leave, but is probably not applicable in many work settings.

It is difficult to get methodologically strong studies when intervening on employees in organisations. One of the inclusion criteria in our systematic review was that the intervention had to be compared to some form of control group. This narrowed the field of eligible studies considerably, so most of the literature in this area has not been evaluated. However, documentation from studies with serious and maybe systematic methodological flaws may be systematically biased.

Randomising is a problem in work place research; usually employers are not happy about letting half of the employees being in a control group, especially if the control group is not offered any kind of intervention. Blinding the participants to the intervention is also impossible, pharmacological interventions are not usually part of the spectre of interventions done at the work place and most employees will know the difference between participating in a physical exercise group or in a control group. The inability to live up to the gold standard of randomised controlled studies should not preclude the aim to design and perform studies of the highest methodological standard possible.



## 4.4 Effects of an intervention combining physical exercise, health information, and stress management

(Research question 4, Paper 3)

The employees were satisfied with the intervention and thought it had positive effects for them. If sustained, this should have effect on their QoL, as well as on their perception of quality of their working life. However, there were no effects on sick leave. This is in accordance with the results from an earlier trial using the same integrated health promotion program (Eriksen et al., 2002). The simple and brutal conclusion is that our “Integrated Health Program” has no effect on sick leave. Still, some caution should be advocated. There maybe long term preventive effects we do not discover with such a brief observation period. The intervention did have a positive effect on the satisfaction of the participants, and job satisfaction is an important predictor for sick leave (Paper 4). More important is that we do not reach those that really need the intervention; they do not participate, partly because they are on sick leave.

Another explanation of why the intervention had no effect on sick leave even if similar interventions found in the international literature were effective, may be that as discussed in the introduction, sick leave is a concept difficult to compare across countries with different benefit systems, different rates of unemployment, different

income relative to the costs of daily living, and different culture (Brage et al., 2002; Engstrom & Eriksen, 2002).

There was a large increase in sick leave from one year before the intervention to one year after the intervention in both the intervention and the control group; we have no explanation for this. The importance of having a design with a randomised controlled trial is emphasised by this finding, without a control group the conclusion might have been that physical exercise increases sick leave. There was an increase in sick leave among health workers in Norway in the same period, but not nearly as large as in the study group (Statistics Norway, 2006a). The same phenomenon of an increase in total sick leave during a corresponding intervention was found in a Norwegian study of a corresponding population conducted some years earlier (Brox & Froystein, 2005). However, this was a small study with few participants in each group and thus vulnerable for changes in sick leave in a small number of the participants. If the increase in sick leave was due to adverse effects of the intervention, one would not expect to find the increase also in the control group. The burden of extra work for the control group because of the intervention group participating in the intervention might have attributed to the increased sick leave, but then one would not expect to see an increase in the intervention group. Data from a process evaluation performed after the intervention show that the employees were positive to the intervention regardless of belonging to the intervention or control group (Sivertsen & Saksvik, 2002).

High rates of drop-out are often thought a likely explanation of lack of effect (Alvestad et al., 1998) and our trial had a drop-out rate of 28%. This is about the same as and in some cases a little better than most trials including physical exercise report (Brox & Froystein, 2005; Horneij, Hemborg, Jensen, & Ekdahl, 2001; Kellett, Kellett, & Nordholm, 1991; Oldervoll, Ro, Zwart, & Svebak, 2001). It is interesting to note that one of the trials included in Paper 2 that had a strong effect on costs of sick leave was done among fire-fighters where the exercise was mandatory, there were no drop-outs, and lack of compliance among the participants was to be reported to the leader (Hilyer, Brown, Sirles, & Peoples, 1990). Physical exercise interventions may yield a positive effect on sick leave under ideal conditions (efficacy), but may not be effective when used in the field of routine circumstances (effectiveness).

## 4.5 Characteristics of employees with high level of sick leave

(Research question 5, Paper 4)

A major source for our failure to intervene successfully to reduce sick leave seems to be that as few as 10% of the employees in our large study was involved in as much as 82% of the sick leave. Those without or with minimal sick leave had only one day of sick leave per 6 months. This means that for 90% of the employees there is simply no potential for any reduction in sick leave.

Psychosocial work factors are also associated to social inequalities in health (Marmot, 1999). In the well known Whitehall II studies there was an inverse relationship between employment grade and sick leave (Feeney, North, Head, Canner, & Marmot, 1998). Blue collar workers show elevated physiological stress levels compared to white collar workers and it is suggested that blue collar workers are exposed to larger allostatic loads both at work and in their leisure time (Lundberg, 1999; McEwen, 1998). This may indicate that time for recovery is less than needed, which is a risk factor for health complaints (Sluiter, van der Beek, & Frings-Dresen, 1999).

Sustained activation will occur when time for rest and recovery is too short and may explain the association with health complaints (Ursin & Eriksen, 2004).

Unhealthy life style is associated to social inequalities in health, it is well documented that people with low socioeconomic status eat more unhealthy food, smoke more, and have a sedentary life style (Jarvis & Wardle, 1999; Sallis, Zakarian, Hovell, & Hofstetter, 1996). Health information campaigns seem to be unable to change the health behaviours of those who need them most, maybe because the message is not pinpointed to the actual population most in need of it (Murphy & Bennett, 2004). In a psychobiological model for explaining socioeconomic differences in health, the unhealthy choices are linked to feelings of helplessness and hopelessness (Kristenson, Eriksen, Sluiter, Starke, & Ursin, 2004). An individual having learned that whatever I do, nothing helps for me, will have a low motivation to change life style habits based

on new health information (Kristenson, Eriksen, Sluiter, Starke, & Ursin, 2004; Ursin & Eriksen, 2004). These relationships are accentuated further by feelings of low QoL. When these are low, the motivation and rewards for prolonging life by life style changes may be insufficient to produce change.

## 4.6 Patophysiology and psychobiology of illness due to subjective health complaints

In the introduction of the thesis subjective health complaints were described as the normal everyday complaints we all have. However, in some individuals at some point in time these complaints become more than normal and everyday complaints. The complaints become too much of a burden to carry alone and may be described as an illness for which the individual seeks help from the health service and maybe gets sick listed. This cut-off point where the complaints go from being a tolerable nuisance in everyday life to an intolerable illness for which help is needed is different for different individuals. Our data on subjective health complaints support this, we do not find a clear cut-off point defining the transformation from being healthy to having an illness, but a straight curve that trails off to the right (see Fig. 2) (Eriksen, Hellesnes, Staff, & Ursin, 2004; Ihlebaek, Eriksen, & Ursin, 2002). As stated in the introduction and confirmed in Paper 4, where on the scale this point will be found for each of us may be influenced by socioeconomic status, work factors, job stress, education, coping, and other personal characteristics (Ihlebaek & Eriksen, 2003; Tveito & Eriksen, Submitted).

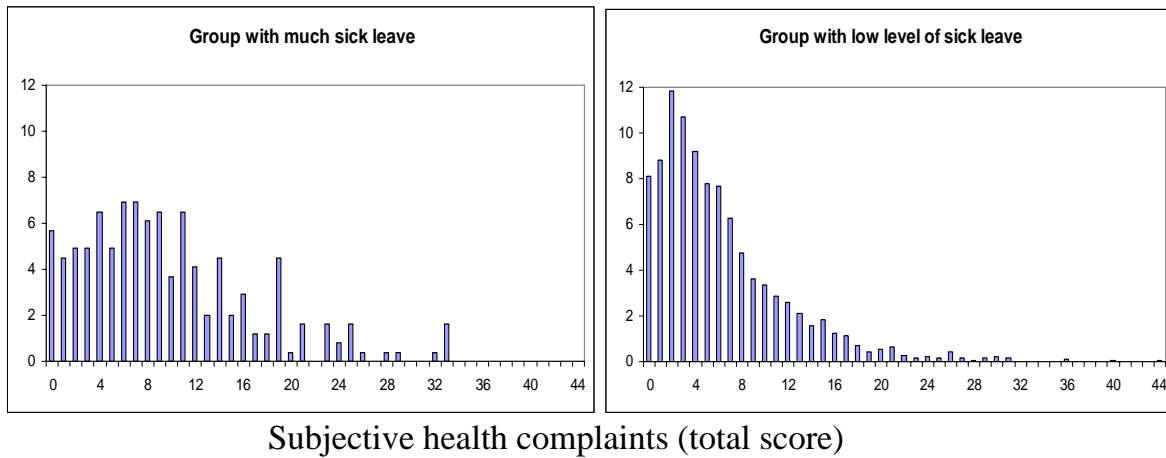


Figure 2. Percentage of employees with increasing severity of the total score of subjective health complaints (from Paper 4).

When the subjective health complaints go from being complaints to become an illness, the illness may be said to belong to either the medically explained symptoms – disease, disorder – or the medically unexplained symptoms or a combination of these. Subjective health complaints may be thought of as a continuum starting with the small everyday complaints we hardly notice. At some point along the curve, the complaints become an illness or a pack of symptoms, how far along will be individual and probably be different at different times in life. This illness or the symptoms may be medically explained or medically unexplained. Somewhere along this continuum behavioural manifestations of the consequences will be evident, QoL will be affected, health service will be contacted, and maybe a sick leave or, in the worst cases, in the long run a disability pension will be the result.

Reporting high levels of subjective health complaints is associated with sick leave in patient populations (Hagen, Svensen, Eriksen, Ihlebaek, & Ursin, 2006; Post, Krol, & Groothoff, 2006; Roskes, Donders, & van der Gulden, 2005). Patients with high comorbidity do not respond to treatment as well as the patients with less generalised complaints and accordingly stay sick listed for a longer period of time (Hagen, Svensen, Eriksen, Ihlebaek, & Ursin, 2006; Von Korff et al., 2005). Our results complement these findings by showing that high report of subjective health complaints is associated with sick leave not only in patient populations but also in a population of employees (see Fig. 3).

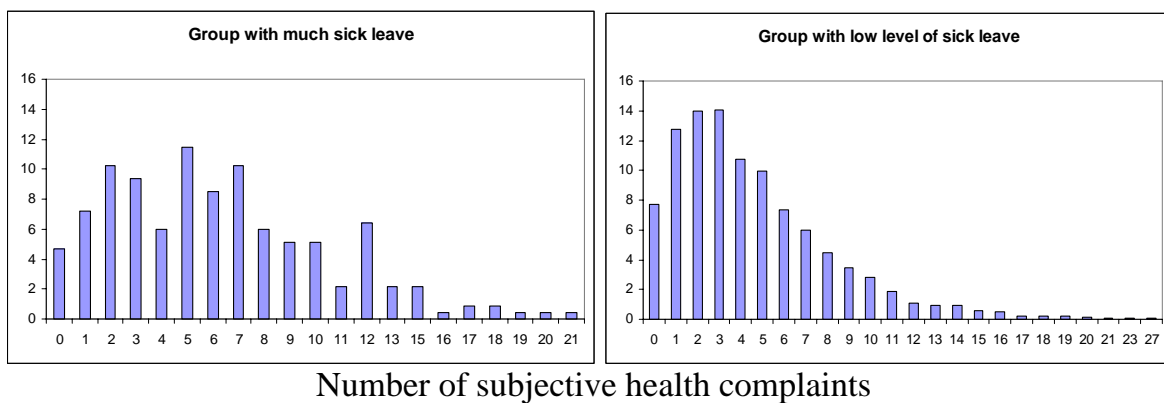


Figure 3. Percentage of employees with increasing number of subjective health complaints (from Paper 4)

Job satisfaction is an important factor for sick leave both in this study and in other research (Hoogendoorn et al., 2002; IJzelenberg & Burdorf, 2004; van den Heuvel,

Ariens, Boshuizen, Hoogendoorn, & Bongers, 2004; van der Giezen, Bouter, & Nijhuis, 2000). This indicates that investing time and money in a good work environment where the employees in addition to or – maybe even more important – in lack of an interesting job have a good and supportive relationship with their colleagues and leaders, may be an investment with a good return for organisations concerned about sick leave.

#### 4.7 Quality of life and coping (positive expectancies)

The consequences of a low QoL are negative seen from a societal perspective, from an organisational perspective, and from an individual perspective (Hillier, Fewell, Cann, & Shephard, 2005; Norges offentlige utredninger, 2000; Olsen, Svendal, & Amundsen, 2005). Putting forward quality of working life as an important area of research and investment for organisations is a result of having acknowledged the importance of the health of the employees for performance (Hillier, Fewell, Cann, & Shephard, 2005). Attempts at defining QoL are heterogeneous, but most agree that a feeling of wellness is part of the concept (Hillier, Fewell, Cann, & Shephard, 2005; McDaid, Curran, & Knapp, 2005; Ramon, 2005). As established by earlier research and confirmed by Paper 4, job satisfaction is an important predictor for sick leave (Hoogendoorn et al., 2002; IJzelenberg & Burdorf, 2004; Tveito, Halvorsen, Lauvaalien, & Eriksen, 2002). Intuitively the concept of job satisfaction is related to wellness, so increasing job satisfaction, as we may have done with the intervention reported in Paper 3, may in a longer perspective be important for the QoL of the employees, including the quality of their working life.



Measuring QoL with a questionnaire is not unproblematic in relation to what is measured versus what is important in the life of the individual (Ebrahim, 1995). Is QoL the perspective of the health worker observing the individual, is it the perspective of the report of the individual on what the experts mean should be important factors for QoL, or is it the perspective of what the individual actually thinks is important for his or her QoL (Bowling, 1995)? This last perspective is the most difficult to capture as a researcher, but it is also the most interesting perspective. In a way it is trying to measure and quantify “the good life”.

However, one way around this difficulty may be to measure coping – coping defined as in CATS, positive response outcome expectancy (Ursin & Eriksen, 2004). The important distinction here is that coping is defined as an expectancy, which means that the actual result of the response does not necessarily influence the expectancy, at least not for a while (Ursin & Eriksen, 2004). Intuitively the concepts of coping, happiness, wellbeing, and satisfaction are related, and are also related to QoL. Expecting that no matter what the challenge is, my resources to meet it will be ample, may be positively related to the mental aspect of QoL, to happiness, and to wellbeing. Measuring coping will not capture the physical limitations usually measured with QoL instruments, how important these limitations are for QoL, will have to be evaluated. Using coping as a measure of QoL will enable us to navigate around the difficulties of finding out what is important in the lives of each and everyone,

expecting to be able to cope no matter what the challenge indicates a positive attitude to life and a feeling of wellness. This concept of coping have much in common with the concept of “sense of coherence” (Antonovsky, 1987) and the concept of “self-efficacy” (Bandura, 1997). It also fits in with the modern trend of positive psychology with its focus on not only relieving suffering, but in addition making people happier (Seligman, Steen, Park, & Peterson, 2005) – i.e. increasing wellness?

Self-rated health is sometimes termed subjective health, as opposed to objective or medically defined health. Medically defined health often depends on the clinical evaluations and perceptions of physicians (Bjorner et al., 1996). This discussion of subjective and objective is also frequent in other fields, is it better to ask the individual how he or she feels or to measure blood or saliva levels of hormones?

Since the levels of the different hormones are very much influenced by the cognitions and emotions of the individual, it is probably not more objective to measure than to ask or to ask a physician than to ask the individual.

Good health, both personal and for the ones nearest and dearest, is one of the first things people mention when they are asked about what the important things in life are (Bowling, 1995). Self-rated health is a predictor of both mortality and morbidity (Bjorner et al., 1996). Individuals who report high levels of subjective health complaints still report their health as good (Tveito, Halvorsen, Lauvaalien, &

Eriksen, 2002). This implies that in public opinion a definition of health that is wider than health as absence of disease and infirmity has credibility. The WHO definition of health is not what most of us think of when thinking of health, maybe it is too all-consuming to be useful? Even individuals with serious diseases like cancer or with severe handicaps as lacking a leg or an arm may report that their health is good. To most of us it makes sense to report that our health is good although we may be far from the ideal of “complete physical, mental, and social wellbeing”.



## 5. Conclusions

Subjective health complaints are important for daily life functioning. High levels of subjective health complaints and negative psychosocial work factors are associated to low health related QoL. An intervention aiming to reduce sick leave and subjective health complaints was not effective. This may be explained, at least partly, by the fact that it is a small group of the employees that have the major part of the sick leave. The intervention had large subjective effects, the participants reported less muscle pain, improved health and physical fitness. The participants in the intervention group were satisfied with the intervention and thought it important. Since job satisfaction is a predictor of sick leave, there may have been a prophylactic effect of the intervention, but the follow-up time of one year was not long enough to capture that. The group with much sick leave is characterised by low socioeconomic status, negative psychosocial work factors, high level of health complaints, and an unfortunate life style.

Implications from this thesis on future research are that interventions aiming to reduce sick leave for the total employee population at work places have a large chance for failure. When only 10% of the employees have a potential to have their sick leave reduced, effect sizes have to be large to get statistically significant results. Secondly, the group with high sick leave is a group with low socio-economic status and this must be taken into consideration when planning interventions. Thirdly, when

planning interventions with physical exercise or any other life style modification, plans for keeping up adherence to the intervention should be considered, thus keeping drop-out rate as low as possible. Lastly, interventions should be of long enough duration to show possible prophylactic effects.

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