

# Paper I

## SUBJECTIVE HEALTH COMPLAINTS AND HEALTH RELATED QUALITY OF LIFE IN A POPULATION OF HEALTH CARE WORKERS

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The aim of this study was to assess whether Subjective Health Complaints (SHC), demands and coping are associated with health-related quality of life in a population of health care workers. One hundred and nineteen employees in two nursing homes for the elderly filled in a questionnaire on health, exercise, psychological factors, and work conditions. Main outcome measures were SHC and quality of life measured by SF-36. High level of SHC was associated to low health-related quality of life. Low coping and high demands were related to low scores (low quality of life), and high coping and low demands to high scores on mental health. Pseudoneurological complaints (e.g. tiredness, sadness), high demands and low coping were associated with low mental health. The expected negative association between SHC and health-related quality of life was found. There was a positive association between coping and quality of life.

*Keywords:* Subjective health complaints; Musculoskeletal; Quality of life; Coping; Demands

### INTRODUCTION

Subjective Health Complaints (SHC) are complaints without objective pathological signs and symptoms (Eriksen *et al.*, 1999). The three main categories of SHC are musculoskeletal, “pseudoneurological” and gastrointestinal complaints (Eriksen *et al.*, 1999). Musculoskeletal complaints is the group with highest prevalence in the general population (Ihlebak *et al.*, 2002), and have been shown to be related to quality of life dependent on level of pain (Hagen *et al.*, 1997; Morken *et al.*, 2002). The term pseudoneurological complaints includes complaints like palpitations, tiredness, dizziness, anxiety and depression (American Psychiatric Association, 1994).

There is a high prevalence of SHC in several European countries (Agreus, 1998; Eriksen *et al.*, 1998; Kind *et al.*, 1998; Bassols *et al.*, 1999; Makela *et al.*, 1999; Picavet and Schouten, 2003). Ninety-six percent of the general Norwegian population reported some SHC during the past month, but few reported substantial complaints

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(Ihlebak *et al.*, 2002). These complaints are normal everyday complaints, however, for some individuals they reach a threshold where sickness leave is necessary. In Norway in 1998 musculoskeletal complaints were the cause of 49% of all cases of sickness leave and 36% of all new cases of disability pension (The National Insurance Service, 2000). Low back pain is the most common single diagnosis in the group of musculoskeletal complaints (Eriksen *et al.*, 1998), accounting for 15% of the total amount of sickness leave (The National Insurance Service, 2000).

Nursing personnel is a high risk occupation group for low back pain (Kaplan and Deyo, 1988; Ljungberg *et al.*, 1989), with a lifetime prevalence of 40–45%, 1.5 times higher than in the normal population (Kaplan and Deyo, 1988). Occupational tasks for nursing personnel often include heavy lifts, which, especially if performed in twisted or flexed positions, increase the risk for work-related back injuries (Svensson and Andersson, 1983; Burdorf and Sorock, 1997).

Psychosocial factors at work have also been shown to be important for musculoskeletal complaints (Bongers *et al.*, 1993). Psychological demands are associated with health (Karasek and Theorell, 1990), but degree of control and social support (Karasek and Theorell, 1990), as well as coping (Eriksen and Ursin, 1999) may modify or buffer this relationship. One of the possible models to explain these associations, is the demand/coping model (Eriksen and Ursin, 1999), based on the demand/control model by Karasek and Theorell (1990) and the stress theories by Levine and Ursin (1991) and Ursin and Eriksen (in press). The demand/coping model focusses on the individual's own coping resources instead of the external control aspects of the job, and predicts that the combination of high demands and low coping may lead to stress induced illness (Eriksen and Ursin, 1999). Using the demand/coping model instead of the demand/control model in this population was motivated from the fact that this was a relatively homogeneous population regarding "objective" job control. In the nursing homes registered and auxiliary nurses work in quite similar conditions, there is not much difference in responsibilities and duties for the groups.

There is no consensus in the literature on the definition of stress (Levine and Ursin, 1991). Ursin and Eriksen (in press) argue that all demands are "filtered" by the brain before they get access to the response system. These filters are response outcome expectancy and distorted stimulus expectancy (defence). Whenever there is a discrepancy between what is expected and what is happening in reality, a general unspecific alarm response will occur. This stress response is a neurophysiological activation from one level of arousal to more arousal, an alarm reaction in a homeostatic system in the brain. Coping within CATS is defined as positive response outcome expectancy (Ursin and Eriksen, in press). This definition of coping is used in the demand/coping model (Eriksen and Ursin, 1999) and in this study. When coping is defined as positive response outcome expectancy, it is associated with decreased stress response or activation (Ursin and Eriksen, in press). This has been demonstrated in humans (Ursin *et al.*, 1978) and observed in animals (Coover *et al.*, 1973). In this article high coping is equated with an instrumental mastery oriented coping style (Eriksen *et al.*, 1997). The demand/coping model offers a new way to study differences in health-related quality of life, there is no previous research on this.

The aim of this study was to assess whether SHC and psychological work factors are associated with health-related quality of life in a population of health care workers. Our hypotheses were: (1) High level of SHC is associated with low health-related quality of life; (2) High demands and low coping are associated with low health related-quality of

life; and (3) Coping and demands explain part of the relationship between SHC and health-related quality of life.

## METHOD

The survey was done in two nursing homes for the elderly in Bergen in September 2001. One hundred and nineteen out of a total of 227 employees (52%) completed a comprehensive questionnaire. The data were collected as part of the pre-randomisation screening process for the project "Integrated health program", a combined exercise and health information intervention, and the participants in this study were the employees who accepted the invitation to take part in the intervention. All participants were women, mean age 45.2 years (*SD* 10.2).

### Instruments

All data were measured by Norwegian versions of questionnaires, covering a broad range of factors including demographic variables, physical and psychological variables at work, factors related to work organising and leadership, social support and family relationships, and individual coping resources.

#### *Subjective Health Complaints*

Subjective health complaints were measured by 29 items on subjective somatic and psychological complaints experienced during the last 30 days, using the SHC inventory (Eriksen *et al.*, 1999). The questionnaire has been tested and has satisfactory validity and reliability (Eriksen *et al.*, 1999). Severity was scored on a four-point scale, from 0 – no complaints to 3 – severe complaints. Five sub-scales were computed, allergy (5 items, Chronbach's alpha ( $\alpha$ )=0.64), flu (2 items,  $\alpha$ =0.70), musculoskeletal pain (headache, neck pain, upper back pain, low back pain, arm pain, shoulder pain, migraine and leg pain) (8 items,  $\alpha$ =0.77), "pseudoneurology" (American Psychiatric Association, 1994) (palpitation, heat flushes, sleep problems, tiredness, dizziness, anxiety and sadness) (7 items,  $\alpha$ =0.66), and gastrointestinal problems (heartburn, epigastric discomfort, ulcer/non-ulcer dyspepsia, stomach pain, gas discomfort, diarrhoea and constipation) (7 items,  $\alpha$ =0.63).

#### *Quality of Life*

Health-related quality of life was measured by the generic health status measure SF-36 for health situations during the last four weeks (Ware *et al.*, 1994, 2000; Loge *et al.*, 1998). The 36 items are grouped into eight factors, physical functioning (10 items,  $\alpha$ =0.74), role limitations due to physical problems (4 items,  $\alpha$ =0.87), role limitations due to emotional problems (3 items,  $\alpha$ =0.78), bodily pain (2 items,  $\alpha$ =0.82), social functioning (2 items,  $\alpha$ =0.71), mental health (5 items,  $\alpha$ =0.74), vitality (4 items,  $\alpha$ =0.81) and general health perceptions (5 items,  $\alpha$ =0.85). In addition, health transition over the past year was measured (2 items). The eight factors were then reduced to a physical and a mental health component (Ware and Kosinski, 2001). The scoring of the items varied from dichotomous scales (yes/no) to six-point ordinal scales.

The questionnaire has been tested and has satisfactory reliability and validity (Beaton *et al.*, 1996, 1997; Loge *et al.*, 1998).

Adjusted SF-36 scores were calculated by using each individual's score on the eight SF-36 factors subtracting the corresponding age and gender specific normative score, dividing by the standard deviation in the general population, multiplying with 10 and adding 50 (Loge and Kaasa, 1998; Ware *et al.*, 2000). The mean is 50, and a deviation of 10 points from the mean represents one standard deviation. A low score is a score below 50 and a high score is a score above 50.

The eight factors were aggregated to one physical and one mental health component (Ware *et al.*, 1998b; Ware and Kosinski, 2001). To reduce the eight SF-36 factors to two components, the standard scoring algorithms were used instead of the country-specific ones (Ware *et al.*, 1998a) as there was a high degree of equivalence between them. (A comparison between the factors scored with standard algorithms and the factors scored with the Norwegian ones, showed correlations from 0.99 to 1.00.)

### **Coping**

Coping was measured by the Instrumental mastery oriented coping factor from the CODE (Eriksen *et al.*, 1997), based on the Utrecht Coping List (UCL) (Schreurs *et al.*, 1988, 1993). The questionnaire has satisfactory reliability and validity (Eriksen *et al.*, 1997). Instrumental mastery oriented coping (22 items,  $\alpha = 0.69$ ) (active problem solving, avoidance and passive expectancy and depressive reaction pattern) implies an instrumental, active, goal-oriented coping style, with strategies like direct intervention, considering different solutions to the problem and considering the problem a challenge (Eriksen *et al.*, 1997). To get a high score on this factor, the score on active problem solving must be high, and the score on avoidance and passive expectancy, and depressive reaction pattern must be low. Instrumental mastery oriented coping is the coping variable in the demand/coping model (Eriksen and Ursin, 1999).

### **Psychological Demands**

This factor was measured by five questions from the short Swedish version (Theorell *et al.*, 1988) of the psychological demands dimension from the demand/control model (Karasek and Theorell, 1990). The questionnaire has satisfactory validity and reliability (Theorell *et al.*, 1988). The questions were scored on a four-point scale, yielding a sum score for psychological demands. High demands are related to working hard and fast, excessive work, insufficient time to work or conflicting demands.

### **Analyses**

Health-related quality of life was compared to the general Norwegian population using normative scores (Loge and Kaasa, 1998; Ware *et al.*, 2000). If a subject had a missing value on any of the variables included in the analyses, the variable was left out in that particular analysis. The SF-36 physical and mental components were dichotomised using the general population mean (50). All other included variables were dichotomised using the median score.

ANOVA was used to test group differences. The demand/coping model splits the subjects in four groups based on the different combinations of demands and coping using median scores, low demands and high coping, high demands and high

coping, low demands and low coping and high demands and low coping. As dependent variables the eight factors and the two health components of the SF-36 were used. Logistic regression was used to calculate odds ratios. For explained variance for dichotomous variables Nagelkerke  $R^2$  was used.

## RESULTS

### Subjective Health Complaints and Health-related Quality of Life

Eighty-nine percent of the sample reported some degree of musculoskeletal complaints, 82% had pseudoneurological complaints, 59% gastrointestinal complaints, 39% allergy and 34% complained about flu (see Table I for mean scores). The most frequent complaint was tiredness, reported by 70% of the population (6% severe), followed by low back pain, 55% (6% severe), sleep problems, 45% (5% severe), pain in the arms, 37% (3% severe) and heat flushes, 34% (3% severe).

Mean standardised scores for the eight SF-36 scales and the physical and mental health component, adjusted for age and gender, are listed in Table I. The scores were significantly worse than in the general Norwegian population on bodily pain, general health and vitality. For bodily pain the mean score was 0.27 *SD* lower than the general population mean, for general health the score was 0.25 *SD* lower, and for vitality the score was 0.21 *SD* lower. Individuals with high score on musculoskeletal and pseudoneurological complaints had low health-related quality of life (see Table II).

### The Demand/Coping Model

When the population was split in the four groups of the demand/coping model, there were significant differences between the groups on four of the SF-36 scales, general

TABLE I Mean score and 95% CI of the mean of SHC, the norm-adjusted eight SF-36 scales and the two SF-36 health components

<i>Variables</i>	<i>Mean</i>	<i>95% CI</i>
<i>SHC</i>		
Musculoskeletal complaints	5.1	4.3–5.9
Pseudoneurological complaints	3.2	2.7–3.7
Gastrointestinal complaints	1.8	1.3–2.2
Allergy	1.0	0.7–1.3
Flu	0.6	0.4–0.8
<i>SF-36<sup>a</sup></i>		
Physical functioning	49.4	48.1–50.7
Role physical	49.9	48.1–51.6
Bodily pain	47.3	45.6–49.1
General health	47.5	45.9–49.1
Vitality	47.9	46.2–49.7
Social functioning	49.2	47.6–50.8
Role emotional	50.3	48.4–52.2
Mental health	50.4	48.9–51.9
<i>SF-36<sup>a</sup></i>		
Physical health component	49.5	48.1–51.0
Mental health component	51.1	49.4–52.8

<sup>a</sup>For the SF-36 scales 50 is the general population mean.

TABLE II Pearson correlations between SHC and the SF-36 scales, the physical and mental health component

	<i>Musculoskeletal complaints</i>	<i>Pseudoneurological complaints</i>	<i>Gastrointestinal complaints</i>
Physical functioning	-0.35 <sup>a</sup> <i>p</i> < 0.001	-0.36 <i>p</i> < 0.001	-0.20 <i>p</i> = 0.035*
Role physical	-0.28 <i>p</i> = 0.002	-0.33 <i>p</i> < 0.001	-0.08 <i>p</i> = 0.374
Bodily pain	-0.61 <i>p</i> < 0.001	-0.35 <i>p</i> < 0.001	-0.25 <i>p</i> = 0.006
General health	-0.41 <i>p</i> < 0.001	-0.44 <i>p</i> < 0.001	-0.24 <i>p</i> = 0.008
Vitality	-0.35 <i>p</i> < 0.001	-0.52 <i>p</i> < 0.001	-0.18 <i>p</i> = 0.05*
Social functioning	-0.27 <i>p</i> = 0.003	-0.47 <i>p</i> < 0.001	-0.07 <i>p</i> = 0.455
Role emotional	-0.19 <i>p</i> = 0.038*	-0.31 <i>p</i> = 0.001	0.02 <i>p</i> = 0.816
Mental health	-0.30 <i>p</i> = 0.001	-0.50 <i>p</i> < 0.001	-0.16 <i>p</i> = 0.092

<sup>a</sup>*n* varies between 111 and 119; \**p* > 0.05 after applying the sequentially rejective Bonferroni test.

health, vitality, social functioning and mental health (see Table III). Individuals with high coping and low demands had significantly higher quality of life than the groups with low coping on general health, vitality, social functioning and mental health. After applying the sequentially rejective Bonferroni test (Holm, 1979), the differences in the general health scale were no longer significant.

Coping was the most important factor in the demand/coping model. Individuals with high coping scored significantly better than individuals with low coping on five of the SF-36 scales (see Table IV). Individuals with high demands scored significantly worse than those with low demands on two SF-36 scales (see Table IV). After applying the sequentially rejective Bonferroni test (Holm, 1979) the differences between the coping groups were significant for three of the SF-36 scales, and the differences between the demand groups were significant for one scale.

### **Demands, Coping and Complaints in Relation to Health Related Quality of Life**

Musculoskeletal complaints and coping were most important for the SF-36 physical health component. Pseudoneurological complaints, work demands and coping were most important for the mental health component (see Table V). SHC and demands-coping had 1% of the variation of the physical health component and 6% of the variation of the mental health component in common. Together these variables explained 24% of the variation of the physical health component and 32% of the variation of the mental health component.

## **DISCUSSION**

Subjective health complaints were negatively related to health-related quality of life. High levels of SHC were associated to low quality of life. The group with high

TABLE III Associations between demands, coping and the SF-36 scales. High score on SF-36 means high quality of life

<i>SF-36 scales</i>		<i>Mean (SD)</i>	
Physical functioning	Low demands/high coping	50.7 (6.7)	$F(3, 109) = 2.1, p = 0.104$
	High demands/high coping	51.3 (4.8)	
	Low demands/low coping	47.2 (7.8)	
	High demands/low coping	49.0 (7.2)	
Role-physical	Low demands/high coping	50.9 (10.1)	$F(3, 109) = 0.14, p = 0.938$
	High demands/high coping	49.9 (8.7)	
	Low demands/low coping	49.9 (9.7)	
	High demands/low coping	49.4 (8.6)	
Bodily pain	Low demands/high coping	50.7 (10.2)	$F(3, 112) = 1.69, p = 0.174$
	High demands/high coping	47.6 (8.6)	
	Low demands/low coping	45.7 (8.9)	
	High demands/low coping	46.8 (9.3)	
General health	Low demands/high coping	50.4 (8.9)	$F(3, 111) = 3.03, p = 0.032^a$
	High demands/high coping	48.9 (7.6)	
	Low demands/low coping	44.6 (8.4)	
	High demands/low coping	46.0 (8.4)	
Vitality	Low demands/high coping	52.6 (10.4)	$F(3, 111) = 5.12, p = 0.002$
	High demands/high coping	48.1 (10.5)	
	Low demands/low coping	45.9 (6.0)	
	High demands/low coping	44.4 (7.3)	
Social functioning	Low demands/high coping	53.5 (5.6)	$F(3, 112) = 4.66, p = 0.004$
	High demands/high coping	47.8 (11.5)	
	Low demands/low coping	46.5 (7.7)	
	High demands/low coping	47.9 (8.4)	
Role-emotional	Low demands/high coping	53.0 (6.7)	$F(3, 110) = 1.95, p = 0.126$
	High demands/high coping	47.1 (12.6)	
	Low demands/low coping	51.0 (8.4)	
	High demands/low coping	48.7 (11.6)	
Mental health	Low demands/high coping	54.3 (5.9)	$F(3, 111) = 5.32, p = 0.002$
	High demands/high coping	49.7 (9.6)	
	Low demands/low coping	48.8 (5.5)	
	High demands/low coping	46.8 (9.2)	

<sup>a</sup> $p < 0.05$  when figures are in bold.

coping and low demands reported the highest quality of life. Musculoskeletal complaints and coping were most important for the physical aspect of quality of life. Pseudoneurological complaints, demands and coping were most important for the mental aspect.

Frequency of SHC in this nursing population was about the same as in a representative sample of the general Norwegian population (Ihlebak *et al.*, 2002), with the exception that about 10% more reported pseudoneurological complaints. On allergy and flu the mean scores were substantially lower, but also on gastrointestinal, pseudoneurological and, perhaps surprisingly, musculoskeletal complaints, the scores were lower than in the general Norwegian population (Ihlebak *et al.*, 2002). Intensity of SHC was lower than scores found in the general Norwegian population (Ihlebak *et al.*, 2002). Earlier research has reported nursing staff to be a high risk group for musculoskeletal complaints (Kaplan and Deyo, 1988; Hignett, 1996; Skargren and Oberg, 1996), but this population reported about the same frequency



TABLE IV Differences on the SF-36 scales between individuals with high/low coping and high/low demands, and the interaction between coping and demands

<i>SF-36 scales</i>		<i>Mean (95% CI)</i> <i>(low coping/low demands)</i>	<i>Mean (95% CI)</i> <i>(high coping/high demands)</i>	
Physical functioning	Coping	48.2 (46.2–50.2)	50.9 (49.1–52.3)	$F = 4.2, p = 0.043^{a,*}$
	Demands	49.0 (46.9–50.7)	50.1 (48.2–51.8)	$F = 1.1, p = 0.296$
	Coping* demands			$F = 0.1, p = 0.701$
Role-physical	Coping	49.8 (47.2–52.1)	50.5 (47.5–52.8)	$F = 0.1, p = 0.765$
	Demands	50.4 (47.5–52.7)	49.8 (47.1–52.0)	$F = 0.1, p = 0.779$
	Coping* demands			$F = 0.0, p = 0.915$
Bodily pain	Coping	46.3 (43.6–48.3)	49.4 (46.1–51.4)	$F = 2.0, p = 0.156$
	Demands	48.3 (45.1–50.1)	47.4 (44.5–49.5)	$F = 0.1, p = 0.770$
	Coping* demands			$F = 1.4, p = 0.238$
General health	Coping	45.2 (43.1–47.5)	49.7 (47.5–52.1)	$F = 7.1, p = 0.009$
	Demands	47.6 (45.2–49.9)	47.6 (45.1–49.7)	$F = 0.0, p = 0.965$
	Coping* demands			$F = 0.5, p = 0.471$
Vitality	Coping	45.6 (43.5–47.1)	50.7 (47.7–53.7)	$F = 9.2, p = 0.003$
	Demands	49.4 (47.0–51.9)	46.2 (43.4–48.6)	$F = 3.4, p = 0.069$
	Coping* demands			$F = 1.0, p = 0.322$
Social functioning	Coping	47.2 (45.0–49.2)	51.1 (49.0–53.7)	$F = 6.0, p = 0.016^*$
	Demands	50.2 (48.1–52.0)	47.5 (45.6–50.9)	$F = 1.1, p = 0.292$
	Coping* demands			$F = 3.8, p = 0.053$
Role-emotional	Coping	50.0 (47.3–52.6)	50.6 (47.9–53.4)	$F = 0.0, p = 0.838$
	Demands	52.1 (50.1–54.1)	48.1 (44.6–51.4)	$F = 4.8, p = 0.031^*$
	Coping* demands			$F = 1.1, p = 0.287$
Mental health	Coping	48.0 (46.1–50.1)	52.3 (50.7–55.0)	$F = 10.1, p = 0.002$
	Demands	51.6 (50.5–53.6)	48.2 (45.6–51.0)	$F = 6.1, p = 0.015$
	Coping* demands			$F = 0.9, p = 0.339$

<sup>a</sup> $p < 0.05$  when figures are in bold; \* $p > 0.05$  after applying the sequentially rejective Bonferroni test.

TABLE V Odds ratios (95% confidence interval) for having a lower (worse) score than the general population mean on the SF-36 physical and mental health components

<i>n = 109</i>	<i>Age-adjusted OR</i>	<i>OR adjusted for age and the other factors in the model</i>
<i>Physical health component</i>		
Musculoskeletal complaints	<b>4.2 (1.83–9.69)<sup>a</sup></b>	<b>2.9 (1.11–7.68)</b>
Pseudoneurological complaints	<b>3.3 (1.48–7.15)</b>	1.9 (0.76–4.73)
Gastrointestinal complaints	<b>3.1 (1.41–6.76)</b>	1.9 (0.77–4.6)
Low coping	<b>2.2 (1.03–4.8)</b>	1.6 (0.7–3.85)
High demands	0.8 (0.38–1.74)	0.6 (0.28–1.52)
Nagelkerke $R^2$ SHC, coping and demands = 0.24; Nagelkerke $R^2$ SHC = 0.20; Nagelkerke $R^2$ coping and demands = 0.05.		
<i>Mental health component</i>		
Musculoskeletal complaints	<b>3.4 (1.45–8.09)</b>	2.1 (0.73–6.05)
Pseudoneurological complaints	<b>6.4 (2.63–15.67)</b>	<b>4.8 (1.76–13.3)</b>
Gastrointestinal complaints	1.6 (0.75–3.58)	0.7 (0.25–1.83)
Low coping	<b>2.9 (1.27–6.48)</b>	2.4 (0.96–6.16)
High demands	<b>2.5 (1.13–5.6)</b>	<b>2.7 (1.08–6.63)</b>
Nagelkerke $R^2$ SHC, coping and demands = 0.32; Nagelkerke $R^2$ SHC = 0.24; Nagelkerke $R^2$ coping and demands = 0.14.		

<sup>a</sup> $p < 0.05$  when figures are in bold.

and a little lower intensity than the general population (Ihlebak *et al.*, 2002). Tiredness was reported by a higher proportion in this population compared to the general population, 70 *versus* 57%, and low back pain and pain in the arms had about 10% higher prevalence (Kaplan and Deyo, 1988; Ljungberg *et al.*, 1989; Ihlebæk *et al.*, 2002). It may be that nursing staff are not at higher risk for musculoskeletal complaints in general, but at higher risk for getting their complaints in certain areas of the body, such as the low back and the arms.

The mean scores were worse than in the general Norwegian population on three of the eight SF-36 scales, bodily pain, general health and vitality. The differences were small, but significant. These findings are in accordance with the results in a study from the aluminium industry in Norway (Morken *et al.*, 2002) where mean scores on bodily pain, general health and vitality were also slightly, but significantly, lower than in the general Norwegian population. Two Norwegian "manual" working populations had mean scores on three areas of health-related quality of life lower than in a representative sample of the general population. Some of these results may be explained by the fact that in a representative sample all age and health categories are included, also people on disability pension and handicapped persons. In addition, one must have in mind the way some of the questions of the SF-36 are formulated, asking about limitations in work or daily activities. Perhaps a disabled population have adjusted their daily activities, and a working population have higher expectations to what their daily activities and exertion should be. The results also seem compatible with an earlier study showing manual workers with heavy physical work to be the persons with the highest level of sickness leave (Tveito *et al.*, 2002).

There was a negative association between musculoskeletal and pseudoneurological complaints on the one hand and health-related quality of life on the other, both for physical and mental aspects. There was a negative association between gastrointestinal complaints and the two SF-36 scales general health and bodily pain, but not for the other scales. The negative relation between musculoskeletal complaints and quality of life is in accordance with the findings from the aluminium industry in Norway (Morken *et al.*, 2002).

Analysis of the differences on the SF-36 scales between individuals with high and low coping showed coping to have an impact on general health, vitality and mental health. The corresponding analysis for high and low demands revealed an impact on mental health. Both coping and demands had an impact on the mental health component, but neither had any influence on the physical health component. Coping was important for some of the physical aspects of the SF-36 in addition to the psychological ones, in accordance with earlier research (Pascual *et al.*, 2003; Verhoeven *et al.*, 2003). Previous research has found that demands are important for health and psychological well-being (Karasek and Theorell, 1990; Verhoeven *et al.*, 2003), our results are in accordance with that. The group with high coping and low demands reported the highest quality of life. Earlier research has found that the group with high coping and low demands report low levels of SHC (Eriksen and Ursin, 1999), this is compatible with our findings. The interaction between coping and demands was not significant in relation to quality of life.

Musculoskeletal complaints and coping were most important for the SF-36 physical health component. Subjects with musculoskeletal complaints had more than four times the risk for a score worse than the general population mean on the physical health

component, showing musculoskeletal complaints to be perceived most important for the physical dimension of health-related quality of life. This is in accordance with earlier research (Patrick *et al.*, 1995; Beaton *et al.*, 1997; Morken *et al.*, 2002). Low coping was associated with twice the risk for low scores on the physical health component. However, when controlling for SHC and job demands, coping was not significant. The confidence intervals were very wide, so the estimated odds ratios were not very precise.

Most important for the mental health component were pseudoneurological complaints, demands and coping. Pseudoneurological complaints gave an odds ratio of six for a low score on the mental health component, five when controlling for coping and demands. Coping was strongly associated to the mental health component, but not to the physical health component. This suggests that the interpretation and handling of the complaints by the individuals is important, may be more than the physical symptoms themselves. This is in accordance with findings in low back pain research (Haldorsen *et al.*, 2002). However, the confidence intervals were very wide, so the estimates were not very accurate.

Coping and demands explained only a small part of the association between SHC and quality of life, 1% of the variation for the physical aspect, 6% for the mental aspect, so our hypothesis received little support. Together with SHC, coping and demands explained nearly one fourth of the variation in the physical health component, and nearly one third of the variation in the mental health component. So, even if, SHC are reported by 96% of the general population (Ihlebak *et al.*, 2002) and it is more common to have complaints than not to have any, the implication is that the complaints must be taken seriously as individuals with high level of complaints report reduced quality of life. Interventions aiming to prevent or treat these problems will have a better chance of success if the coping abilities of the subjects are improved, as has been shown in low back pain research (Linton *et al.*, 1989; Haldorsen *et al.*, 2002).

### **Limitations**

The response rate in this study was low, only 52% of the employees in the nursing homes chose to participate. We have no data on the non-responders, and accordingly do not know if there are important differences between the responders and the non-responders. This may have caused selection bias. For instance, individuals with high levels of complaints may not have wanted to participate, which would lead to an underestimation of the prevalence of SHC in this population. On the other hand, it may be that individuals with few complaints have thought they did not need to participate, which would lead to an overestimation of the prevalence of SHC.

Some of the items in the SF-36 mental health component may be interpreted as meaning almost the same as some of the questions in the sub scale pseudoneurological complaints. This gives a problem when interpreting the association between the two scales since some of the association may be due to asking very similar questions. The mental health scale consists of the questions "During the last four weeks have you been very nervous, felt so down in the dumps that nothing could cheer you up, felt calm and peaceful, felt downhearted and depressed, been happy?", scored from all of the time to none of the time. The pseudoneurological complaints scale consists of the questions "During the last thirty days have you had no/a little/some/serious complaints

from extra heartbeats, heat flushes, sleep problems, tiredness, dizziness, anxiety, sadness, depression". Especially anxiety, depression and to a certain degree tiredness overlaps with the mental health scale questions.

## CONCLUSION

Subjective health complaints were negatively associated with health-related quality of life. Even if SHC are normal phenomena because of their high prevalence in the normal population, they may still influence the quality of life of some individuals. High coping abilities were positively related to high quality of life. Interventions aiming to improve SHC and thereby health-related quality of life will, based on these findings, have a better chance of success if they in addition try to improve coping.

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