

SOCIOECONOMIC POSITION AND VARIATIONS IN COPING STRATEGIES IN MUSCULOSKELETAL PAIN: A CROSS-SECTIONAL STUDY OF 1287 40- AND 50-YEAR-OLD MEN AND WOMEN

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Objective: To examine the association between socioeconomic position and coping strategies in musculoskeletal pain.

Design and subjects: Cross-sectional study of a random sample of 40- and 50-year-old Danes, participation rate 69%, $n = 7125$. The study included 1287 persons who reported functional limitations due to musculoskeletal pain.

Methods: Data was collected by postal questionnaires and scales were developed on problem-solving coping and avoidant coping, based on a range of preliminary studies. Multivariate logistic regression analyses was used to study the correlation with socioeconomic position, measured by occupational social class.

Results: Among women, there was no correlation between social class and avoidant coping, but a significant decrease in the use of problem-solving coping by decreasing social class, adjusted odds ratio (OR) = 2.64 (95% confidence interval (CI) 1.31–5.32) in social class V vs social classes I+II. Among men, there was no correlation between social class and problem-solving coping, but a significant increase in the use of avoidant coping with decreasing social class, adjusted OR = 3.31 (95% CI 1.75–6.25) in V vs I+II.

Conclusion: It is important for clinicians who advise and support patients in their response to musculoskeletal pain to be aware of socioeconomic differences in coping strategies. Gender differences in the association between socioeconomic factors and coping should be further investigated.

Key words: Coping, musculoskeletal pain, socioeconomic position, social epidemiology.

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INTRODUCTION

Musculoskeletal disorders are common and cause extensive sickness absence and work disability in many industrialized countries (1–3). Among adult respondents in the nationwide Danish Health and Morbidity Survey 2000 ($n = 22,500$) 16.5% reported long-standing illness and limiting daily activities caused by musculoskeletal pain (4) and 25% of Danish citizens

who in 2002 qualified for disability pension had musculoskeletal disorders (5). Thus, these disorders cause considerable social and economic burdens on society as well as on the affected individuals who have to meet the difficult challenge of how to cope with the burden of pain.

Several studies have shown an increasing prevalence of musculoskeletal morbidity by decreasing socioeconomic position (6–9). Furthermore, it appears that people with a disadvantaged social situation and high physical job demands are more vulnerable to the consequences of musculoskeletal disorders (10). In this context it is important to include studies of how people cope with pain.

Although exposure to stressors and resources to deal with stressors are not uniformly distributed in the population (11), few studies have focused on the correlation between socioeconomic circumstances and coping (12). Ross & Mirowsky (13) found that highly educated people were more likely to use active problem-solving, and Taylor & Seeman (14) have discussed a correlation between high social class and less avoidant coping. Grossi (15) found that coping was differentially related to sociodemographic factors and financial strain; that is, problem-focused coping was less frequent among individuals with low levels of education and, in a recent study, Christensen et al. (16) showed that differences in coping strategies in unemployment were associated with educational attainment. Socioeconomic factors have been included as confounders in the analyses of different coping strategies in musculoskeletal pain (e.g. 17, 18), however, little is known about the variation in coping responses with musculoskeletal morbidity by socioeconomic position. Insight into the mechanisms that influence variations in coping strategies could be important for clinicians who advise and support patients in their response to pain. Thus, the aim of this study was to examine the association between socioeconomic position and coping strategies in musculoskeletal pain in a sample of Danish men and women who reported that musculoskeletal pain seriously affected their work capacity. According to the transactional coping model by Lazarus & Folkman (19), coping is the process that starts with an event that is primarily appraised by the individual as either threatening, harmful or challenging. As such, the individual faces a condition that exceeds its resources and endangers its well-being (19). Inevitably, this implies that the participants included in this study account for a selected group of individuals who appraised their

pain as being stressful. Active and problem-solving coping strategies have been associated with less pain intensity and less functional loss due to musculoskeletal morbidity (20–22). It was hypothesized that people from higher social classes used more problem-solving and less avoidant strategies to cope with musculoskeletal pain.

METHODS

Study population

The population for this cross-sectional study included a random sample of Danish adults aged 40 and 50 years old by October 1, 1999. It is part of the Danish Longitudinal Study on Work, Unemployment and Health. The sample is drawn from the AKF Longitudinal Register at the Statistics Denmark (AKF = Amternes og Kommunernes Forskningsinstitut/ Institute of Local Government Studies in Denmark), which comprises information on a 10% random sample of the Danish population aged 15 years or older ($n=408,000$). The register includes data on demographic factors, household, housing conditions, migration, employment status, education, income, capital assets and transfer incomes.

The present data is based on a postal survey on sociodemographic, psychosocial and health issues, which was carried out in spring 2000. The sample size was 11,082 and the response rate was 69% ($n=7588$). Data on non-participants were derived from the AKF Longitudinal Registers. The participation rate was significantly higher among women than men, among native-born Danes than immigrants, among employed than unemployed, and among persons with vocational/higher education than non-trained/semi-skilled (χ^2 test, all p -values <0.01). No significant differences were detected in the number of contacts with a general practitioner between participants and non-participants. In this study variables were selected from the survey on physical health, demographic and socioeconomic factors, occupational environment, social relations and coping.

Information on social class was not obtained for 463 of the participants. Of the remaining 7124 eligible persons, 657 men and 630 women were included in the present study. Inclusion criteria were functional limitations due to musculoskeletal pain. This information was based on the following question: Have you ever experienced so much pain in your back or other joints or muscles that it has been difficult for you to perform your usual daily activities (e.g. work, household activities, sports, physical exercise)? Response options were: "no", "yes somewhat", and "yes very much". Only persons having reported that they were very much limited were included.

Measurements

Socioeconomic position. Socioeconomic position was measured by occupation and coded into social class I–V in accordance with the standards of the Danish National Institute of Social Research, which is similar to the British Registrar General's Classification I–V. For the sake of power in the analyses the 5 classes were grouped into social classes I–II (high; including professionals, executives and medium-level white-collar employees), social classes III–IV (medium; including low-level white-collar employees and skilled workers) and social class V (low; including unskilled and semi-skilled workers).

Coping strategies. As recommended by Folkman & Lazarus (23), a coping questionnaire was developed to measure coping strategies in relation to a specific stressor, in this case musculoskeletal pain. The questionnaire was developed in several successive steps, as follows.

Items were developed from 2 sources, semi-structured qualitative interviews with 11 patients who participated in a Danish intervention project about physical activity among patients with back pain and from the analysis of a base-line survey ($n=207$) of reactions to pain experiences (24).

From this measure, and from the qualitative interviews, 10 items which fitted 6 of the dimensions in the 66-item Ways of Coping Questionnaire (WOCQ) were developed (19, 23) (confronting coping, self-controlling, seeking social support, accepting responsibility, escape-

avoidance, strategic problem-solving). The items were then validated by 2 focus group interviews with outpatients in a rehabilitation unit, in which the interviewees were also encouraged to discuss positive reappraisal of their pain experiences. None of the group members referred to elements of this dimension and consequently it was not included in the questionnaire.

A test-retest of the 10 items was conducted among 112 adult individuals attending different kinds of rehabilitation and exercise programs designed for individuals with back pain. The time interval was 8 days. The weighted Kappa coefficients ranged from $\kappa=0.76$ to $\kappa=0.54$ for the items on strategic problem-solving (3 items), escape-avoidance (1 item), seeking social support (2 items) and self-controlling (1 item), while the coefficients for items on confronting coping (2 items) and accepting responsibility (2 item) were 0.27 and 0.25, respectively. In order to clarify the content, 1 item on confronting coping was split into 2 separate items and the wording on accepting responsibility was changed. Finally, the remaining items were pilot-tested in a study population drawn from the same sampling frame as the main survey ($n=993$). The pilot-test showed good distribution of scores across all the response categories apart from the item on accepting responsibility, which consequently was reformulated.

Finally, the items were defined into 2 scales that covered 2 conceptually, but not mutually exclusive, coping strategies, 6 items on active problem-solving, and 4 items on avoidant coping (Table I). The item on getting in contact with general practitioner was included in both scales because it encompasses aspects of both active problem-solving and avoidant coping: active problem-solving, because in the Danish healthcare system you need referral from a general practitioner for medical examination and treatment from hospitals, specialists, physiotherapists and chiropractors. Seeing the general practitioner could also reflect a more avoidant way of coping, as it is the only way to obtain prescription drugs.

The Cronbach's coefficient alpha was 0.71 for the avoidant scale and 0.64 for the problem-solving scale, which indicated a fair degree of internal reliability for the 2 scales. The Cronbach's coefficient is, however, sensitive to departure from normality and the coping scales did not fit a normal distribution. Therefore, confirmative factor analysis was used to study how well the pattern of intercorrelations between items fitted the 2 conceptually developed coping scales. The goodness-of-fit-index was 0.96 and thus confirmed the 2-factor structure of the included coping items.

Response options in the questionnaire were: all of the time (0), some of the time (1), a little of the time (2), not at all (3). The scores for the 2 scales were summed separately, ranging from 0 to 12 for the avoidant subscale and from 0 to 18 for the problem-solving subscale. It was investigated whether the coping scales could be used as dichotomized outcome measures. For each of the 2 scales, sensitivity analyses were performed with a range of alternative cut-off points, which confirmed that the bottom quartile of the avoidant scale (scoring <5)

Table I. Items on coping strategies in musculoskeletal pain in the subscales for problem-solving and avoidant coping

Problem-solving coping

I demanded changes that were not met with understanding, e.g. changes in my work environment, change in my residence.
I was in contact with a medical doctor.
I received treatment from a chiropractor, physiotherapist or other therapist.
I asked advice from others who have experienced pain in back, joints and muscles.
I participated in gymnastics, swimming or other kinds of physical activity, including exercises recommended by a physiotherapist.
I changed things in my daily life to reduce pain, e.g. change in working posture, new mattress on my bed.

Avoidant coping

I was less physically active than usual.
I used stronger medicine than usual.
I stayed in bed most of the time and rested because of pain.
I was in contact with a medical doctor.

separated participants who used avoidance coping to a high degree and that the top quartile for the problem-solving coping scale (scoring ≥ 15) separated participants who used problem-solving coping to a low degree.

Covariates

Based on the well-documented association between musculoskeletal disorders and physical as well as psychosocial occupational factors (6, 10, 25, 26), variables on work environment were included in the analyses. Items were all developed and used in surveys at the National Institute of Occupational Health in Copenhagen (27). Stressors due to physical exposures in the work environment consisted of 6 items: work in a stooping posture; work involving twisting the back; lifting more than 30 kg; pulling or pushing heavy burdens; repeating the same working procedures several times every hour; and vibrations. Response options were never (0), sometimes (1), often (2), and always (3). Items were summed to obtain a scale score with a range of 0–18. The distribution curves were studied in order to choose appropriate cut-off points and finally, 3 categories were used: no exposure (scoring 0), some exposure (scoring 1–4) and high exposure (scoring >4).

Measures of psychosocial stressors at work were derived from The Copenhagen Psychosocial Questionnaire, which has been tested empirically in a survey of a representative sample of 1858 working Danes between 20 and 60 years (28). For the present study 4 items on quantitative demands were used: working at a very high pace; job demands unevenly distributed so work load accumulates; being unable to overcome work load; the necessity of working extra hours. Response code was: never (0), sometimes (1), often (2), always (3). Items were summed for a scale score ranging from 0 to 12. Based on graphical examination of the distribution these demands were grouped into 3 categories: none or some exposure (scoring 0–3), recurrent exposure (scoring 4–5) and continual exposure (scoring >5). From the Copenhagen Psychosocial Questionnaire a further item on emotional demands was chosen: “Does your work cause emotional demanding situations?” Response code: always (1), often (2), sometimes (3), never (4). Using the same response options, a question on getting help or support from colleagues was also included.

Age group (40 or 50 years) and cohabitation status (living with or without a partner) were also included as covariates. Vocational training (some education or no training) was not included as it did not confound the association between social class and the 2 coping strategies in the preliminary analyses.

Statistical analyses

The analyses of the association between social class and coping included several steps: bivariate contingency analyses, analyses of whether the covariates were associated with the determinant social class and the 2 coping scales and, finally, multivariate analyses by logistic regression analyses. The regression analyses were stratified by gender and performed separately for the 2 outcome measures: avoidant and problem-solving coping. The initial regression models included each covariate separately. Next, stepwise backwards elimination was conducted to reduce the full models to a stage where only significant predictor variables remained. All analyses were performed in SAS, version 8.02.

RESULTS

Descriptive statistics

Table II shows the proportion of men and women in high (I–II), medium (III–IV) and low (V) social class by avoidant coping, problem-solving coping, work-related stressors and cohabitation. Among men, scores for avoidant coping showed a higher prevalence in social class V, while the same association was not seen for women. Among women, but not for men there was a graded increase in low use of problem-solving coping along the social classes. Stressors due to physical exposures in work environment and the prevalence of no support from colleagues

Table II. Avoidant coping, problem-solving coping, self-reported occupational stressors, cohabitation and age by social class: 40- and 50-year-old Danish men and women, $n=1287$

Social class	n	Age cohort (% 50 year-olds)	Avoidant coping (% with high use, scoring <5)	Problem-solving coping (% with low use, scoring ≥ 15)	Stressors due to physical exposures in work environment (% with score >4)	Stressors due to quantitative demands in work environment (% with score >5)	Stressors due to emotional demands at work (% with persistent stress)	Support from colleagues (% with no support)	Cohabitation (% with no partner)
<i>Men</i>									
I–II	180	57.8	18.3	42.2	21.1	57.2	2.2	3.3	11.8
III–IV	347	47.3	18.4	39.8	68.0	41.2	2.0	7.5	13.5
V	130	55.4	32.3	40.0	75.4	32.3	1.5	8.5	20.0
<i>Women</i>									
I–II	137	51.1	35.8	16.1	23.4	52.6	3.7	1.5	16.1
III–IV	369	48.0	29.0	26.0	45.0	38.8	2.7	5.4	18.2
V	124	50.8	37.1	29.0	71.0	22.6	3.2	8.9	13.7

also showed a graded increase along the social classes. In contrast, a graded decrease was found along social classes in stressors due to quantitative demands in work environment and, likewise, a decrease in stressors due to emotional demands at work.

Socioeconomic position and avoidant coping

Table III shows the multivariate logistic regression analyses of the association between social class and high use of avoidant coping. The association was statistically significant, with a crude odds ratio of 2.13 (95% CI 1.26–3.60) in social class V for men. When adjusted by the covariates the odds ratios were further increased, OR = 3.31 (95% CI 1.75–6.25) in social class V. The stepwise backwards elimination showed that the association was increased when stressors due to physical exposures and due to quantitative demands were eliminated. There was no statistically significant association between high use of avoidant coping and social class among women.

Socioeconomic position and problem-solving coping

Table IV shows the crude odds ratio for low use of problem-solving coping and social class. For women, a graded and statistically significant association was found, OR = 1.82 (95% CI 1.09–3.04) in social classes III–IV and 2.12 (95% CI 1.17–3.86) in social class V. The adjusted logistic regression analyses of the full model, including all the covariates further added to the association, OR = 2.22 (95% CI 1.27–3.88) in social classes III–IV and OR = 2.64 (95% CI 1.31–5.32) in social class V. When a backwards elimination of the model was conducted it was found that stressors due to quantitative demands in work environment and no support from colleagues increased the odds ratio for women (data not shown). There was no significant association between low use of problem-solving coping and social class among men.

Statistical interaction between social class and stressors due to physical exposures in the work environment, quantitative demands and no support from colleagues was evaluated, but showed no significant association with the outcome measure in either of the analyses.

Table III. Crude and adjusted* odds ratio for high use of avoidant coping by social class. 40- and 50-year-old Danish men and women, n = 1287

Social class	Crude analysis (95% CI)	Adjusted analysis (95% CI)
<i>Men</i>		
I–II	1	1
III–IV	1.01 (0.63–1.60)	1.43 (0.83–2.47)
V	2.13 (1.26–3.60)	3.31 (1.75–6.25)
<i>Women</i>		
I–II	1	1
III–IV	0.73 (0.48–1.11)	0.64 (0.41–0.99)
V	1.06 (0.64–1.76)	0.75 (0.42–1.35)

*Adjusted for physical exposure and quantitative demands in work environment, emotional demands at work, no support from colleagues, age and cohabitation status. CI: confidence interval.

Table IV. Crude and adjusted* odds ratio for low use of problem-solving coping by social class. 40- and 50-year-old Danish men and women, n = 1287

Social class	Crude analysis (95% CI)	Adjusted analysis (95% CI)
<i>Men</i>		
I–II	1	1
III–IV	0.91 (0.63–1.32)	0.82 (0.54–1.26)
V	0.91 (0.58–1.44)	0.82 (0.48–1.40)
<i>Women</i>		
I–II	1	1
III–IV	1.82 (1.09–3.04)	2.22 (1.27–3.88)
V	2.12 (1.17–3.86)	2.64 (1.31–5.32)

*Adjusted for physical exposure and quantitative demands in work environment, emotional demands at work, no support from colleagues, age and cohabitation status. CI: confidence interval.

DISCUSSION

In this study both avoidant coping and problem-solving coping were associated with socioeconomic position, although differently for men and women. A much higher use of avoidant coping was found among men in the lowest social class when adjusted for stressors due to the occupational environment. For women, the risk of using less problem-solving coping was significantly increased along the social classes, and the association was further strengthened when adjusted for the stressors due to the psychosocial work environment. Inclusion of covariates such as stressors due to physical exposures in the work environment, quantitative demands and no support from colleagues did confound but did not modify the association between social class and coping strategies.

The main focus of this study was the association between socioeconomic position and coping with musculoskeletal pain, but different patterns were found among men and women. Tamres et al. (29) found that gender differences in stressor appraisal is more likely to occur for personal health stressors, and that women engage in more coping strategies for personal health stressors than do men. In contrast, Jensen et al. (17) found female patients in a hospital clinic used more dysfunctional coping strategies, such as “catastrophizing” than did men. Moreover, these coping strategies were associated with lower educational levels for women but not for men. In our study a reverse pattern was found, i.e. whereas the risk of using avoidant coping was significantly increased for men in the lowest social class, this was not the case for women. Thus, although gender differences are found in coping behaviour, socioeconomic position seems to influence this difference.

In this study, problem-solving coping was not associated with socioeconomic position for men. This may be due to the applied inclusion criteria as only respondents who reported that they had been very much limited by musculoskeletal pain were included in the analyses. In a study among 95 male chronic low back pain patients attending a general orthopaedic clinic, Klapow et al. (30) found that patients with high levels of pain reported more reliance on passive/avoidant

coping strategies in contrast to patients with low levels of pain.

Our study is potentially limited by selection bias. Only individuals reporting pain which seriously affected their well-being were included in the analyses. Since it is reasonable to assume that avoidant coping strategies may prolong duration of pain and that problem-solving coping would reduce such periods, one may expect a widespread use of avoidant coping strategies and a modest use of problem-solving coping in this sample. Unfortunately, information on duration of pain or change of coping response over time is not available, and because of the cross-sectional design the risk of potential bias cannot be excluded, i.e. the way the participants answered the coping questions may have been influenced by their current experience of pain. However, the aim of this study was to examine the association between socioeconomic position and coping strategies in musculoskeletal pain. Although only a selected group of individuals participated in the study, the significant association found between both avoidant coping and problem-solving coping and socioeconomic position do suggest a mechanism that may contribute to the explanation of why people with lower socioeconomic position are more vulnerable to the social and economic consequences of musculoskeletal disorders.

The results of the analyses may be further affected by the study design and measurements. First of all, the study population was part of a random community sample, although highly selected. The selection of 2 age groups prevents the generalization of results to younger and older adults. However, the study sample is an appropriate age group for the study of coping with back pain, as the incidence of several musculoskeletal conditions increases after the age of 50 years (31).

The non-respondents in the total population study were more exposed to a range of stressors, possibly also musculoskeletal pain, although this was not manifested in significant differences in number of contacts with general practitioner between participants and non-participants. The present study population included only those people who experienced so much pain that their work capacity was severely restricted. Still, the study population was large and comprised a wide variation across the determinant, social class.

The measurement of key variables were self-reported and the risk of negative affectivity cannot be excluded, i.e. people who reported both their pain intensity and coping responses in a negative manner. This risk may not be too serious, since a study by Brekke et al. (9) demonstrated an association between use of analgesics and passive coping even after adjustment for pain intensity.

The measurement of social class in the present study was derived from sociological theory that defines social class as an indicator of access to resources to manage and control life circumstances. This definition was appropriate for the present analyses, which interpreted social class as a proxy for resources to deal with severe pain and restricted work capacity.

The measurement of coping requires further comments. Basing the questionnaire in this study on the Folkman &

Lazarus WOCQ measurement (23) was appropriate because the initial qualitative studies demonstrated that many WOCQ-items applied to the life situation of adults who suffered from severe back pain. Moreover, as the aim was to examine how contextual factors, such as socioeconomic position, were associated with coping strategies, Lazarus process-oriented measure of coping was the most obvious measure. This measure is based on the notion that what a person does to cope depends on the context in which the disease occurs (32). This study did not, however, comply with the basic distinction between problem-focused and emotion-focused coping suggested by Lazarus & Folkman and all 8 sub-scales of the WOCQ measurement were not applied in the analyses. The measurements reflected what was learned from the extensive pilot studies. The measurements captured the essence of what was suggested by Lazarus & Folkman (19), although not in every detail. The distinction between only 2 coping strategies is in accordance with many other coping studies, e.g. the work by Brown & Nicassio (20) based on their Vanderbilt Pain Management Inventory. They showed that passive coping, such as taking to bed and restricting social activities was correlated with reports of depression, pain activity and functional impairment. Holmes & Stevenson (33) examined the effectiveness of attentional and avoidant coping strategies for somatic, behavioural and psychological adaptation to clinical pain. Among 60 patients with chronic and recent-onset pain, avoidant strategies predicted less adaptation among the chronic patient than did the attentional strategies (33). The items that were finally included in the questionnaire were carefully evolved and validated and it was also found that they were largely in accordance with the prevailing recommendation for patients with low back pain and for musculoskeletal symptoms in general (34).

Lazarus & Folkman (19) defined coping as "the constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person". These cognitive efforts include the individual's beliefs about the capabilities to control the situation, e.g. their pain and the degree of disability they are suffering because of pain. Because perceived control over life is consistently observed to buffer the negative effects of stress, it has been reasoned that perceived personal control probably increases the use of effective coping strategies. Perceived control over life circumstances is assumed to be unevenly distributed by social class as are the coping resources applied (12, 13). The feeling of personal control is virtually synonymous with related concepts, such as the feeling of mastery or self-efficacy, and can be assumed a health-promoting factor in itself (11). Thus, self-efficacy makes people less vulnerable to external stressors and further studies of the association between socioeconomic position, self-efficacy and coping is needed. Gender differences in the association between socioeconomic factors and coping should also be investigated further.

Treatment that includes training of coping skills has shown improvement in patients' use of coping strategies and related outcomes (35). It seems important for clinical staff to be aware

that patients with a lower socioeconomic position may have a greater need for counselling about how to response to musculoskeletal pain.

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