J Rehabil Med 2015; 47: 365–371

ORIGINAL REPORT

IS THERE A GENDER BIAS IN RECOMMENDATIONS FOR FURTHER REHABILITATION IN PRIMARY CARE OF PATIENTS WITH CHRONIC PAIN AFTER AN INTERDISCIPLINARY TEAM ASSESSMENT?

Britt-Marie Stålnacke, MD, PhD[1], Inger Haukenes, PT, PhD[2,3], Arja Lehti, MD, PhD[3], Anncristine Fjellman Wiklund, PT, PhD[4], Maria Wiklund, PT, PhD[4] and Anne Hammarström, MD, PhD[3,5]

From the [1]Department of Community Medicine and Rehabilitation, Rehabilitation Medicine, Umeå University, Umeå, Sweden, [2]Department of Public Mental Health, Division of Mental Health, Norwegian Institute of Public Health, Bergen, Norway, [3]Department of Public Health and Clinical Medicine, [4]Department of Community Medicine and Rehabilitation, Physiotherapy and [5]Umeå Centre for Gender Studies in Medicine, Umeå University, Umeå, Sweden

Objective: **To examine potential gender bias in recommendations of further examination and rehabilitation in primary care for patients with chronic musculoskeletal pain after an interdisciplinary team assessment.**

Methods: **The population consisted of consecutive patients (*n* = 589 women, 262 men) referred during a 3-year period from primary healthcare for assessment by interdisciplinary teams at a pain specialist rehabilitation clinic. Patient data were collected from the Swedish Quality Registry for Pain Rehabilitation. The outcome was defined as the examination or rehabilitation that was specified in the patient's record.**

Results: **Men had a significantly higher likelihood than women of being recommended physiotherapy and radiological examination, and the gender difference was not explained by confounding variables and covariates (age, marital status, ethnicity, education, working status, pain severity, pain interference, pain sites, anxiety and depression). There was no significant gender difference in recommendations to treatment by specialist physician, occupational therapist, psychologist or social worker.**

Conclusion: **Our findings indicate that the interdisciplinary teams in specialist healthcare may discriminate against women with chronic pain when physiotherapy and radiological investigation are recommended. The team's choice of recommendations might be influenced by gendered attitudes, but this field of research needs to be studied further.**

Key words: chronic pain; rehabilitation; assessment; gender.

J Rehabil Med 2015; 47: 365–371

Correspondence address: Britt-Marie Stålnacke, Department of Community Medicine and Rehabilitation, Rehabilitation Medicine, Umeå University, SE-901 85 Umeå, Sweden. E-mail: brittmarie.stalnacke@rehabmed.umu.se

Accepted Oct 28, 2014; Epub ahead of print Jan 12, 2015

INTRODUCTION

Chronic pain implies considerable human suffering and may have adverse effects on work ability and life satisfaction (1, 2). In general, chronic pain conditions are complex and highly influenced by medical, psychological and social factors (3); thus, assessment and appropriate rehabilitation may be a challenge for healthcare.

Approximately 19% of the adult European population experience persistent and activity-limiting pain conditions (4), with a higher prevalence among women than men (5, 6). The suggested explanations for this difference have been multifactorial, with biological factors related to hormones and pain sensitivity. Studies have shown an association between chronic pain and oestrogen (7, 8). Experimental research has documented that women are more sensitive than men to noxious stimuli (9). In studies of pain psychology higher levels of depression are reported in women with chronic pain than in men, and depression has been found to increase the risk of higher pain intensity (10). However, the relationship between anxiety and pain is reported to be stronger in men than in women (11).

In the Swedish population, 20–40% of individuals seeking primary healthcare experience pain conditions (12, 13) and women seek healthcare due to pain more often than men (5, 6). In welfare states, individuals who seek medical advice for chronic pain are referred from primary healthcare to pain clinics where specialist teams examine the patients and recommend a treatment plan for rehabilitation (1, 14). As a rule, severe chronic pain leads to multidisciplinary rehabilitation in a hospital setting, whereas patients with less complex pain are recommended further investigation and specific rehabilitation interventions by a single profession, such as physiotherapy or psychologist sessions, in primary healthcare. In Sweden, the majority of patients with chronic disabling pain are recommended specific rehabilitation in primary healthcare; however, less is known about this group compared with those participating in multidisciplinary rehabilitation in specialist healthcare (15). Rehabilitation in primary care is administered by different health professionals, and there is a need to study whether gender as such influences referral to further investigation and rehabilitation.

Several studies indicate that there is gender bias, i.e. an unintended and systematic neglect of women in healthcare (16). Gender bias may affect the diagnosis and the treatment a patient receives. Knowledge of potential unjustified gender differences in recommended rehabilitation is of major impor-

 doi: 10.2340/16501977-1936

 ISSN 1650-1977

tance for fulfilling the principle of equity in healthcare supply and treatment (17). However, in most studies of treatment and rehabilitation of chronic pain, gender-stratified results are not shown and the impact of gender is not analysed (15). Thus, knowledge of gender bias in the treatment and rehabilitation of chronic pain is lacking.

The aim of the current study was to examine potential gender bias in the recommendation of further examination and rehabilitation in primary care for patients with chronic pain after interdisciplinary assessment at a pain rehabilitation clinic in northern Sweden.

METHODS

Setting

Patients with chronic pain were referred from primary healthcare to specialized health services at the Pain Rehabilitation Clinic at the Umeå University Hospital in northern Sweden. Individual plans for rehabilitation were based on 2 days of assessment by teams (specialist physician in rehabilitation medicine, physiotherapist, social worker occupational therapist and psychologist) and patient information from self-administered questionnaires. The interdisciplinary teams were composed of both men and women. Individuals who were recommended multidisciplinary rehabilitation were offered enrolment in a multidisciplinary pain rehabilitation programme at the Pain Rehabilitation Clinic. Individuals recommended further examination or rehabilitation intervention by a single profession were followed up in primary healthcare.

Design and data collection

This study included patients who were recommended specific rehabilitation followed up in primary healthcare. The study used data from individual patient records linked to the Swedish Quality Registry for Pain Rehabilitation (SQRP) (18, 19) during 3 years (5 November 2007 to 13 December 2010). SQRP is a database containing self-reported information from patients who are referred to the Swedish pain and rehabilitation clinics (19). Inclusion criteria for entering the registry are aged 18–65 years, non-malign and persisting (≥3 months) complex musculoskeletal pain and being referred to a Swedish pain and rehabilitation clinic (19). Self-administered questionnaires included in SQRP were completed before the team assessment.

Outcome

Outcome was defined as the examination or rehabilitation for each patient who was recommended by the rehabilitation team to the primary healthcare patient: (*i*) radiological examination (X-ray, computer tomography (CT), or magnetic resonance imaging (MR), (*ii*) specialist consultation with a neurologist, psychiatrist or neuro-psychologist, rehabilitation by (*iii*) physiotherapy, (*iv*) occupational therapy, or (*v*) therapy administered by a psychologist or a social worker. Each outcome was computed as a dichotomous variable (0 = not recommended, 1 = recommended). Some patients were unsure about when they had time to participate in rehabilitation in primary care due to family or work. These participants were included in the study as a separate category.

Demographic variables

Age was reported and used as a continuous variable. Country of birth was reported in 4 categories (Sweden, Nordic country outside Sweden, European but non-Nordic country or non-European country), and re-coded into 3 categories (Swedish, European or non-European). Marital status was reported in 5 categories (single, married/cohabitant, divorced/separated, widow/widower, or unknown). Single and widow/widower were merged into "living alone", and unknown into "missing". The final variable had 3 categories: married/cohabitant, living alone or divorced/separated. The highest educational level was reported in 4 categories (primary school, secondary high/vocational school, university/college or other) and used as a 3-level variable after re-coding "other" into missing. Current working status was reported in 4 categories (employed/self-employed, unemployed, student or homemaker/retired/receiving social security benefits), and re-coded into 3 categories (employed/self-employed/student, unemployed or not in work).

Pain measures in Swedish Quality Registry for Pain Rehabilitation

The Multidimensional Pain Inventory (MPI) is an instrument for measuring dimensions of pain in patients diagnosed with chronic pain (20). The MPI is divided into 1 psychosocial dimension and 2 behavioural dimensions. The psychosocial dimension addresses the impact of pain on the individual's life, and the behavioural dimensions address the individual's experiences of response from significant others when expressing pain. The inventory has been widely used to assess the outcomes of treatment interventions and its psychometric properties have been validated and replicated (21).

In the current study we used 2 separate subscales from the psychosocial dimension: pain severity and pain inference with daily life. Participants were asked to respond on a 7-point numeric scale (range 0–6), with higher scores indicating higher impact of pain severity and inference with daily life.

Number of pain sites was measured by the question: "Mark all painful body parts in the following list." A total of 36 body parts (18 at each side of the body) were named and listed.

The sum of locations was used as a continuous variable ranging from 0 to 36 pain sites.

Mental health

Mental health was assessed by the Hospital Anxiety and Depression Scale (HADS) (22). The HADS is a questionnaire for the measurement of anxiety and depression and is deemed to have good validity and internal consistency (23). The instrument consists of 7 items for anxiety and 7 items for depression, rated from 0 to 3, to which the respondents indicate how much it had applied to them in the last week. The total scale ranges from 0 to 21 for depression and for anxiety. A higher score indicates a worse condition.

Statistical analysis

Pearson's χ^2 and Student's *t*-test were used to examine differences in the distribution of men and women across outcomes and covariates. Mean, median and standard deviation were examined for continuous variables. Outcomes with statistically significant gender difference were used in further analyses.

Multiple imputation (MI) was performed with IBM SPSS statistics 21. The outcome had no missing values. Therefore we included all covariates with missing values (as main effects), and added gender and age to supply the imputed values with important information. Moreover, we used similar categorization of variables as in the logistic regression models. The MI process generated 20 complete datasets and each of the imputed datasets was analysed by standard methods and the results were combined (pooled results) to produce estimates and confidence intervals that incorporate missing-data uncertainty (24). The pooled results were used in all further analyses.

A multivariate logistic regression analysis was used to examine the association between gender and recommendation to treatment. In model 1 we examined the age-adjusted associations between gender and outcome and covariates and outcome. We then performed separate adjustments by introducing sociodemographic variables (model 2), MPI measures (model 3), pain sites (model 4) and HADS (model 5). This was done to evaluate the relevance of covariates in the association between gender and outcome.

Finally, we included all covariates in the model (model 6). Reference groups were: Swedish, married/cohabitant, educated at university/college level and employed/employer/student. The results are presented as age-adjusted odds ratios (OR) with 95% confidence intervals (CIs).

Risk of multicollinearity was examined by evaluating correlation coefficient (Pearson's correlation test and Spearman's rank order test) for covariates in the model. To examine whether the skewed gender distribution among those who were unsure about participation in rehabilitation influenced the results, we performed sensitivity tests (model 5) without this group.

Ethical approval

The study protocol was approved by the Regional Ethics Vetting Board in Umeå, Sweden.

RESULTS

Population

A total of 851 (262 men and 589 women, age range 18–65 years) consecutive patients were referred to the pain rehabilitation clinic at Umeå University Hospital in the period 5 November 2007 to 13 December 2010. Among these, 209 (80%) of the men and 425 (72%) of the women were recommended further examination or rehabilitation in primary healthcare specified in an individual rehabilitation plan. All patients who were referred to rehabilitation in primary care were eligible for the current study. The remaining group was recommended multidisciplinary rehabilitation 53 (20%) of the men and 163 (28%) of the women). The current study employed the subsample recommended further examination or rehabilitation in primary care.

Statistically significant gender differences were shown for educational level ($p = 0.026$), working status ($p = 0.045$) and pain sites ($p < 0.001$) (Table I). More men were recommended radiological examination ($p = 0.002$) and physiotherapy ($p < 0.001$); radiological examination and physiotherapy were thus used as outcomes in further analyses.

The correlation coefficient for pain severity and pain inference was 0.5 for both women and men. For the remaining pain variables the correlation coefficient was < 0.3. The correlation between demographic variables was < 0.2 for both genders.

Gender was significantly associated with recommendation to physiotherapy after adjustment for age, sociodemographic variables, self-reported pain and anxiety and depression (OR 1.93, 95% CI 1.35–2.77) (Table II). With respect to radiological examination, gender was significantly associated with outcome in the fully adjusted model (OR 1.82, 95% CI 1.09–3.04) (Table III). Separate adjustment for pain sites (Model 4) attenuated the gender OR most (OR 1.63, 95% CI 1.05–2.52) (Table III). Sensitivity tests without the group who were unsure about participation in rehabilitation had little impact on the gender OR.

Performing the multivariate regression analyses with complete cases (missing cases excluded) had limited impact on the ORs. In the final model (model 6) the gender OR for being recommended to physiotherapy was 1.78 (95% CI 1.19–2.66) and radiological examination OR 1.77 (95% CI 1.00–3.13).

Table I. *Distribution of men and women who were recommended further examination or rehabilitation by interdisciplinary teams*

	Men *n* (%)	Women *n* (%)	Between gender *p*-value
Gender	209 (80.0)	425 (72.0)	
Country of birth			0.734
Sweden	177 (84.7)	377 (88.7)	
European	5 (2.4)	15 (3.5)	
Non-European	12 (5.7)	22 (5.2)	
Missing	15 (7.2)	11 (2.6)	
Marital status			0.182
Married/cohabitant	137 (65.6)	297 (73.3)	
Living alone	52 (24.9)	78 (21.3)	
Divorced	17 (8.1)	29 (7.2)	
Missing	3 (1.4)	21 (4.9)	
Educational level			0.026
University/college	33 (15.8)	99 (23.3)	
Higher sec/vocational	124 (59.3)	217 (51.1)	
Primary	28 (13.4)	77 (18.1)	
Missing	24 (11.5)	32 (7.1)	
Working status			0.045
Employed/employer/student	131 (62.7)	246 (57.9)	
Unemployed	42 (20.1)	82 (19.3)	
Not in work	18 (8.6)	68 (16.0)	
Missing	18 (8.6)	29 (6.8)	
Treatment in the rehabilitation plan[a]			
X-ray/CT/MR	38 (18.1)	41 (9.6)	0.002
Consult specialist (physician)	45 (21.5)	82 (19.3)	0.508
Physiotherapy	123 (58.9)	185 (43.5)	< 0.001
Occupational therapy	24 (11.5)	50 (11.8)	0.917
Individual talk therapy[b]	39 (18.7)	89 (20.9)	0.501
Delayed/unsure about participation	5 (2.4)	28 (6.6)	
	Mean (SD)	Mean (SD)	*p*-value[c]
Age	41.1 (10.9)	40.4 (11.1)	0.428
Pain severity (MPI)	4.30 (0.918)	4.44 (0.897	0.890
Pain interference with daily life (MPI)	4.33 (1.087)	4.39 (1.083)	0.560
Number of pain sites	11.20 (6.680)	15.20 (8.251)	< 0.001
Anxiety (HADS)	6.96 (4.482)	7.70 (4.908)	0.080
Depression (HADS)	7.39 (4.577)	7.63 (4.493)	0.550

[a]The sum of proportions is > 100%, i.e. some patients were recommended more than one treatment.
[b]Psychologist or social worker.
[c]Independent sample test.
CT: computed tomography; MR: magnetic resonance; MPI: Multidimensional Pain Inventory; HADS: Hospital Anxiety and Depression Scale.

DISCUSSION

The current study examined potential gender bias in the recommendation of further examination and rehabilitation for patients with chronic pain after assessment by interdisciplinary teams at a pain rehabilitation clinic in Sweden. Men had a significantly higher likelihood than women of being recommended physiotherapy and radiological examination, and adjustments for sociodemographic variables, self-reported pain

Table II. *Gender odds ratios for recommendation to physiotherapy in 6 models of adjustments*

	Model 1[a] OR (95% CI)	Model 2[b] OR (95% CI)	Model 3[c] OR (95% CI)	Model 4[d] OR (95% CI)	Model 5[e] OR (95% CI)	Model 6[f] OR (95% CI)
Gender						
Men (women=ref)	1.87 (1.58–2.23)	2.04 (1.51–2.76)	1.96 (1.46–2.64)	1.93 (1.43–2.61)	1.94 (1.45–2.59)	1.93 (1.35–2.77)
Country of birth						
Sweden	1	1				1
European	0.72 (0.48–1.08)	1.09 (0.46–2.57)				0.90 (0.35–2.33)
Non-European	1.74 (0.93–3.24)	1.08 (0.58–2.01)				1.13 (0.54–2.37)
Marital status						
Married/cohabitant	1	1				1
Living alone	0.72 (0.48–1.08)	0.69 (0.47–1.00)				0.68 (0.45–1.04)
Divorced	1.74 (0.93–3.24)	1.34 (0.77–2.32)				1.72 (0.89–3.32)
Educational level						
University/college	1	1				1
Higher secondary/vocational	0.91 (0.61–1.35)	0.91 (0.64–1.29)				0.84 (0.55–1.27)
Primary	1.17 (0.70–1.94)	1.32 (0.84–2.10)				1.13 (0.66–1.94)
Working status						
Employed/employer/student	1	1				1
Unemployed	0.82 (0.55–1.24)	1.13 (0.78–1.64)				0.82 (0.54–1.26)
Not in work	1.03 (0.65–1.64)	1.26 (0.81–1.96)				1.08 (0.65–1.79)
Multidimensional Pain Inventory (MPI)						
Pain severity (0–6)	1.06 (0.88–1.26)		1.19 (0.99–1.44)			1.07 (0.85–1.35)
Pain, influencing daily life (0–6)	1.03 (0.89–1.20)		0.93 (0.79–1.09)			1.08 (0.88–1.33)
Pain sites (0–36)	0.99 (0.97–1.01)			1.00 (0.98–1.02)	0.99 (0.95–1.04)	0.99 (0.97–1.01)
Hospital Anxiety and Depression Scale (HAD)						
Anxiety	0.99 (0.96–1.02)					0.99 (0.95–1.04)
Depression	0.99 (0.96–1.03)					0.98 (0.93–1.04)

[a]Model 1. Adjusted for age.
[b]Model 2. Adjusted for age, gender + socio-demographic variables.
[c]Model 3. Adjusted for age, gender + pain intensity and pain interference with daily life (MPI variables).
[d]Model 4. Adjusted for age, gender + pain sites.
[e]Model 5. Adjusted for age, gender + anxiety and depression (HADS).
[f]Model 6. Adjusted for all variables in the model.

and/or levels of anxiety and depression had limited impact on the gender OR. One exception was the number of pain sites, which contributed considerably to the gender difference in recommendation to radiological examination; however, the likelihood of being recommended was not equalized across gender after adjustment.

Several of the interdisciplinary team's recommendations of treatment, such as occupational therapy and individual psychotherapy, did not differ between women and men. A possible explanation could be the findings of no difference regarding pain interference and depressive symptoms, factors that may contribute to the recommendations of these treatments.

The finding that men more often than women were recommended physiotherapy by interdisciplinary teams was surprising. We found no significant gender differences in the reporting of pain severity and pain inference with daily life, measures that are considered strong indicators of disabling chronic pain (19) in need of subsequent treatment. Furthermore, one might expect that women's higher number of pain sites would strengthen the indication for physiotherapy treatment, since several studies have shown that physical activity interventions are effective for patients with widespread pain (25, 26). Consistent findings point to a higher number of pain sites as characteristic of chronic pain conditions among women (27), whereas levels of pain severity seem to be more equally distributed across the genders (28). However, the literature has shown divergent results, and higher levels of pain intensity/severity in women have been reported (29). The inconsistent results may be due to differences in study populations and the investigated variables.

The finding that pain sites considerably attenuated the gender OR for recommendations to radiological examination may have a rational explanation. In general, radiological investigation is recommended for localized pain and not multiple pain sites or widespread pain with diffuse aetiology. In the current study we had no information about the particular locations of the pain sites or the individual diagnoses; however, the significantly higher number of pain sites among women compared with men may indicate a higher female prevalence of widespread musculoskeletal pain. Moreover, a gender difference in prevalence of widespread pain is supported in the literature (30) and may thus explain the difference in recommendations to radiological investigation.

A possible contributing factor that may influence the recommendation made by the interdisciplinary teams could be that men and women put different demands on healthcare; however, there is a lack of research in this area. Some studies have focused on how the patients view and express their pain condition during the assessment. Studies have reported that women and men communicate differently when presenting

Table III. *Gender odds ratios for recommendation to radiological investigation, in 6 models of adjustments*

	Model 1[a] OR (95% CI)	Model 2[b] OR (95% CI)	Model 3[c] OR (95% CI)	Model 4[d] OR (95% CI)	Model 5[e] OR (95% CI)	Model 6[f] OR (95% CI)
Gender						
Men (women=ref)	2.09 (1.64–2.67)	1.82 (1.18–2.82)	1.87 (1.21–2.87)	1.63 (1.05–2.52)	1.82 (1.23–2.71)	1.82 (1.09–3.04)
Country of birth						
Sweden	1	1				1
European	1.24 (0.35–4.39)	2.42 (0.84–6.95)				1.54 (0.40–5.86)
Non-European	1.18 (0.44–3.14)	1.29 (0.52–3.23)				1.04 (0.35–3.08)
Marital status						
Married/cohabitant	1	1				1
Living alone	0.75 (0.40–1.41)	0.76 (0.43–1.35)				0.78 (0.41–1.49)
Divorced	0.43 (0.13–1.45)	0.35 (0.11–1.18)				0.51 (0.14–1.80)
Educational level						
University/college	1	1				1
Higher secondary/vocational	1.47 (0.75–2.88)	1.09 (0.62–1.89)				1.44 (0.71–2.88)
Primary	0.63 (0.25–1.63)	0.62 (0.27–1.40)				0.62 (0.23–1.67)
Working status						
Employed/employer/student	1	1				1
Unemployed	1.05 (0.59–1.88)	0.96 (0.55–1.66)				1.24 (0.67–2.29)
Not in work	0.41 (0.16–1.08)	0.52 (0.21–1.25)				0.57 (0.21–1.56)
Multidimensional Pain Inventory (MPI)						
Pain severity	1.30 (0.99–1.72)		1.48 (1.11–1.98)			1.75 (1.22–2.50)
Pain, influencing daily life	0.94 (0.75–1.17)		0.77 (0.61–0.98)			0.76 (0.55–1.05)
Pain sites (0–36)	0.96 (0.93–0.99)			0.97 (0.94–0.99)		0.96 (0.93–0.996)
Hospital Anxiety and Depression Scale (HADS)						
Anxiety	0.98 (0.93–1.03)				0.99 (0.93–1.06)	0.97 (0.90–1.15)
Depression	1.00 (0.95–1.06)				0.99 (0.93–1.06)	1.06 (0.98–1.15)

[a]Model 1. Adjusted for age.
[b]Model 2. Adjusted for age, gender+socio-demographic variables.
[c]Model 3. Adjusted for age, gender+pain intensity and pain interference with daily life (MPI variables).
[d]Model 4. Adjusted for age, gender+ pain sites.
[e]Model 5. Adjusted for age, gender+anxiety and depression (HADS).
[f]Model 6. Adjusted for all variables in the model.

their health problems and whether they suggest treatment to the health professionals. Ahlgren et al. found that men with chronic pain more often requested medical tests, such as X-rays, while women more often asked for help or advice when visiting healthcare (31). Ahlsen et al. showed that men with chronic muscle pain in relation to women with chronic muscle pain are more actively seeking an answer to their pain within a medical context (32). Men portray their pain history as being dependent on future healthcare services.

Due to lack of information on the interplay between the interdisciplinary teams and the patients, we cannot rule out that gendered communication may have contributed to the difference in the recommendations of investigations and rehabilitation for women and men who underwent the 2-day assessment. Furthermore, information from the clinical assessment of the patients might have revealed the medical grounds for unequal distribution of men and women to physiotherapy and radiological investigation. On the other hand, the included measures of pain combined with measures of common mental disorders (HADS) are important indicators of need of treatment, irrespective of gender. Therefore it was reasonable to assume that these measures would contribute to explaining a potential gender difference in recommendation.

Indications of differences regarding medical treatment of women and men with chronic pain and the possibility of gender bias in this context have only recently received attention in the literature. A study of patients with disabling back pain found that men more often received surgery and joint manipulation, whereas women were treated with drugs and psychological therapy, although the differences in symptoms did not indicate differential treatment (33). Studies of gender differences in the treatment of chest pain suggest that women are less likely to receive advanced technical diagnostic and interventional procedures compared with men displaying similar symptoms (34).

Since chronic pain is a common health problem, it is of great importance that women and men are treated equally and receive the same opportunities in healthcare. The findings in the current study may indicate that the recommendations of radiological investigation and rehabilitation by the interdisciplinary teams could be affected by gendered norms that may have had an impact on their decisions. Moreover, our findings point out the importance of not viewing men and women with chronic pain as stereotypical groups and to be aware that the professionals' expectation may affect the management of these patients.

How health professionals deal with the patient's pain symptoms seems to be crucial for their decision about investigation and treatment. Hamberg et al. have investigated gender differences in the diagnosis and management of neck pain in paper cases in a national examination for Swedish interns and found that physicians' gendered expectations were involved in their

actions. Non-specific diagnoses, psychosocial questions, drug prescriptions, and the need for help from a physiotherapist and an orthopaedist were more often ascribed to the female cases, while laboratory tests were requested more often in the male cases (35). The patients in the present study were assessed by several experienced professionals. However, the gender differences in the team's recommendations suggest that their attitudes and preconceptions may have affected the results. Differences between women and men in the choice of pain treatment have been suggested to reflect different aspects; men are considered to have a mechanical view while psychological and social factors have been described as affecting the treatment of women (36).

The current study is based on a clinical population and has some limitations. Most patients were referred from general practitioners to a specialist clinic because of chronic musculoskeletal pain. Thus, the patients represent a selected group of patients with more severe consequences of pain than patients being treated in primary care. Furthermore, one might question why multidisciplinary rehabilitation in specialist healthcare was not included among the treatment options in the study. The reason for this decision was that multidisciplinary rehabilitation in specialist care is a substantially different rehabilitation intervention from rehabilitation administered by a single profession in primary healthcare. Thus, we decided to restrict our examinations to rehabilitation interventions organized by a single level in the healthcare system.

The main strength of the present study is the relatively high number of patients included during 3 years and that recruitment of participants was restricted to 1 specific rehabilitation clinic. In addition, the procedures for the 2-day interdisciplinary team assessments did not change during this period; the team assessment was performed by experienced professionals with high staff continuity, thus confirming the reliability of the data. In accordance with national data, more women than men are referred to pain clinics for assessment and recommendation of rehabilitation (18). Moreover, the current study population consists of men and women who were not selected to multidisciplinary rehabilitation by the specialist teams, and in accordance with literature the majority in this group was women (15). Furthermore, SQRP is a national register and the procedure used by the interdisciplinary teams for the assessment is similar to that in the majority of the Swedish pain rehabilitation clinics (19), and thus we can assume that the generalizability of the study is good on a national level, but also to countries with similar organization of the rehabilitation of patients with chronic pain.

Use of the already established SQRP that included validated instruments restricted the possibility to include other measures of interest. On the other hand, these instruments have been widely used in clinical practice for assessment of pain severity, anxiety and depression. We are aware that there may be additional information that was not included in this study, such as pain locations. Since there were higher numbers of pain sites in women than in men we could assume that these sites were spread at several different locations. In a previous study by Wijnhoven et al., a higher percentage of women reported pain in most of 10 different anatomical locations (37). Further clinical studies are needed to determine how patients and professions experience healthcare from a gender equity perspective; qualitative methods could preferably be used in order to supplement the findings not shown by the instruments.

In conclusion, the present study found that men had a significantly higher likelihood than women of being recommended radiological investigation and physiotherapy for their chronic disabling pain after assessment by interdisciplinary teams in specialist healthcare. The team's choice of recommendations might be influenced by gendered norms and attitudes, but this field of research requires further study.

ACKNOWLEDGEMENTS

The study was financed by the Swedish Research Council (dnr 344-2009-5839). The authors would like to thank Vanja Nyberg and Ylva Persson for valuable assistance in collecting the data.

REFERENCES

1. Scascighini L, Toma V, Dober-Spielmann S, Sprott H. Multidisciplinary treatment for chronic pain: a systematic review of interventions and outcomes. Rheumatology 2008; 47: 670–678.
2. Turk DC. A diathesis-stress model of chronic pain and disability following traumatic injury. Pain Res Manag 2002; 7: 9–19.
3. Turk DC, Okifuji A. Psychological factors in chronic pain: evolution and revolution. J Consult Clin Psychol 2002; 70: 678–690.
4. Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. Eur J Pain 2006; 10: 287–333.
5. Bergman S, Herrstrom P, Hogstrom K, Petersson IF, Svensson B, Jacobsson LT. Chronic musculoskeletal pain, prevalence rates, and sociodemographic associations in a Swedish population study. J Rheumatol 2001; 28: 1369–1377.
6. Wijnhoven HA, de Vet HC, Picavet HS. Prevalence of musculoskeletal disorders is systematically higher in women than in men. Clin J Pain 2006; 22: 717–724.
7. Wijnhoven HA, de Vet HC, Smit HA, Picavet HS. Hormonal and reproductive factors are associated with chronic low back pain and chronic upper extremity pain in women – the MORGEN study. Spine 2006; 31: 1496–1502.
8. Musgrave DS, Vogt MT, Nevitt MC, Cauley JA. Back problems among postmenopausal women taking estrogen replacement therapy: the study of osteoporotic fractures. Spine 2001; 26: 1606–1612.
9. Wiesenfeld-Hallin Z. Sex differences in pain perception. Gend Med 2005; 2: 137–145.
10. Adams H, Thibault P, Davidson N, Simmonds M, Velly A, Sullivan MJ. Depression augments activity-related pain in women but not in men with chronic musculoskeletal conditions. Pain Res Manag 2008; 13: 236–242.
11. Elklit A, Jones A. The association between anxiety and chronic pain after whiplash injury: gender-specific effects. Clin J Pain 2006; 22: 487–490.
12. Mantyselka P, Kumpusalo E, Ahonen R, Kumpusalo A, Kauhanen J, Viinamaki H, et al. Pain as a reason to visit the doctor: a study in Finnish primary health care. Pain 2001; 89: 175–180.
13. Hasselstrom J, Liu-Palmgren J, Rasjo-Wraak G. Prevalence of pain in general practice. Eur J Pain 2002; 6: 375–385.
14. Morley S, Eccleston C, Williams A. Systematic review and meta-analysis of randomized controlled trials of cognitive behaviour therapy and behaviour therapy for chronic pain in adults, excluding

headache. Pain 1999; 80: 1–13.
15. The Swedish Council on Health Technology Assessment. [Rehabilitation of patients with chronic pain conditions. A literature survey.] SBU: Stockholm; 2010 (in Swedish).
16. Hamberg K. Gender bias in medicine. Women's Health 2008; 4: 237–243.
17. Socialdepartementet: [Health care law]. Stockholm: Svensk författningsamling (SFS); 1982. Available from: http://www.riksdagen.se/sv/Dokument-Lagar/Lagar/Svenskforfattningssamling/Halso--och-sjukvardslag-1982_sfs-1982-763/?bet=1982:763 (in Swedish).
18. Swedish Quality Registry for Pain Rehabilitation (SQRP). [Cited 2013 Sep 30]. Available from: www.ucr.uu.nrs.
19. Nyberg V, Sanne H, Sjolund BH. Swedish quality registry for pain rehabilitation: purpose, design, implementation and characteristics of referred patients. J Rehabil Med 2011; 43: 50–57.
20. Kerns RD, Turk DC, Rudy TE. The West Haven-Yale Multidimensional Pain Inventory (WHYMPI). Pain 1985; 23: 345–356.
21. Bergstrom KG, Jensen IB, Linton SJ, Nygren AL. A psychometric evaluation of the Swedish version of the Multidimensional Pain Inventory (MPI-S): a gender differentiated evaluation. Eur J Pain 1999; 3: 261–273.
22. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983; 67: 361–370.
23. Mykletun A, Stordal E, Dahl AA. Hospital Anxiety and Depression (HAD) scale: factor structure, item analyses and internal consistency in a large population. Br J Psychiatry 2001; 179: 540–544.
24. Allison PD. Missing data. Iowa City: Sage Publications; 2002.
25. Thompson JM. Exercise in muscle pain disorders. PM R 2012; 4: 889–893.
26. Busch AJ, Barber KA, Overend TJ, Peloso PM, Schachter CL. Exercise for treating fibromyalgia syndrome. Cochrane Database Syst Rev. 2007: CD003786.
27. Peolsson M, Börsbo B, Gerdle B. Generalized pain is associated with more negative consequences than local or regional pain: a study of chronic whiplash-associated disorders. J Rehabil Med 2007; 39: 260–268.
28. Hooten WM, Townsend CO, Decker PA. Gender differences among patients with fibromyalgia undergoing multidisciplinary pain rehabilitation. Pain Med 2007; 8: 624–632.
29. Castro-Sanchez AM, Mataran-Penarrocha GA, Lopez-Rodriguez MM, Lara-Palomo IC, Arendt-Nielsen L, Fernandez-de-las-Penas C. Gender differences in pain severity, disability, depression, and widespread pressure pain sensitivity in patients with fibromyalgia syndrome without comorbid conditions. Pain Med 2012; 13: 1639–1647.
30. Overland S, Harvey SB, Knudsen AK, Mykletun A, Hotopf M. Widespread pain and medically certified disability pension in the Hordaland Health Study. Eur J Pain 2012; 16: 611–620.
31. Ahlgren C, Hammarstrom A. Back to work? Gendered experiences of rehabilitation. Scand J Public Health 2000; 28: 88–94.
32. Ahlsen B, Bondevik H, Mengshoel AM, Solbraekke KN. (Un) doing gender in a rehabilitation context: a narrative analysis of gender and self in stories of chronic muscle pain. Disabil Rehabil 2014; 36: 359–366.
33. Mullersdorf M, Soderback I. The actual state of the effects, treatment and incidence of disabling pain in a gender perspective – a Swedish study. Disabil Rehabil 2000; 22: 840–854.
34. Hvelplund A, Galatius S, Madsen M, Rasmussen JN, Rasmussen S, Madsen JK, et al. Women with acute coronary syndrome are less invasively examined and subsequently less treated than men. Eur Heart J 2010; 31: 684–690.
35. Hamberg K, Risberg G, Johansson EE, Westman G. Gender bias in physicians' management of neck pain: a study of the answers in a Swedish national examination. J Health Gend Based Med 2002; 11: 653–666.
36. Colameco S, Becker LA, Simpson M. Sex bias in the assessment of patient complaints. J Fam Pract 1983; 16: 1117–1121.
37. Wijnhoven HA, de Vet HC, Picavet HS. Explaining sex differences in chronic musculoskeletal pain in a general population. Pain 2006; 124: 158–166.