International Journal of Nursing Studies 47 (2010) 826–835

Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns

The effectiveness of a multidisciplinary pain management programme managing chronic pain on pain perceptions, health-related quality of life and stages of change—A non-randomized controlled study

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ARTICLE INFO

Article history:
Received 29 June 2009
Received in revised form 28 September 2009
Accepted 1 December 2009

Keywords:
Chronic pain
Clinical significance
Health-related quality of life
Multidisciplinary pain management programme
Pain perception
Stages of change

ABSTRACT

Background: Cognitive behavioural therapy (CBT) has been useful in the treatment of chronic pain conditions for many years. Given the increasing number of persons with chronic pain and associated psychosocial problems, the development and implementation of effective interventions based on CBT is warranted.
Objectives: The aim of this study is to evaluate the effects of a multidisciplinary pain management programme on health-related quality of life (HRQL), as measured by the Short Form Health Survey (SF-36), pain perception as measured by the Brief Pain Inventory (BPI), and readiness-to-change as measured by the Pain Stages of Change Questionnaire (PSOCQ).
Design: A pretest–post-test quasi-experimental design, with waiting list controls and baseline and post-test measures, was used.
Setting: The study was conducted in the rehabilitation unit of a university hospital.
Participants: Of 117 people suffering from chronic pain, 113 completed the 8-week multidisciplinary pain management programme. The patients were consecutive referrals. Inclusion criteria were: adults (18–67 years), pain lasting over 6 months, motivation and no ongoing litigation. Exclusion criteria were affected by major mental disorders or major medical conditions requiring treatment.
Methods: The intervention was based on a cognitive behavioural approach. Therapeutic dialogues and training, combined with physical activity, were provided to a fixed plan, including homework. The programme has several features that directly address psychosocial aspects of chronic pain. Statistical and clinical significance are considered.
Results: The findings suggest that this programme has the potential to improve HRQL, reduce pain intensity and interference, and contribute to improvement in readiness-to-change. Statistically significant results are supplemented by results showing their clinical significance.
Conclusions: Improvements in HRQL, pain-related disability, and readiness-to-change suggest that the vicious cycle of chronic pain may be alleviated by our programme. As we see it, effective treatment results are about identifying and addressing the important and changeable influences maintaining pain problems such as acceptance, understanding the mind-body connection and self-management. Although further research is needed to evaluate the effectiveness of this work, such group approaches appear to represent a feasible treatment option for many patients with chronic pain.

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0020-7489/$ – see front matter © 2009 Elsevier Ltd. All rights reserved.
doi:10.1016/j.ijnurstu.2009.12.001

What is already known about the topic?

- Cognitive behavioural therapy (CBT) for chronic pain is generally effective as several aspects of it address the psychosocial problems that are thought to develop and maintain the pain problem.
- Because of the scientific language in research reports and the wide gap between research and clinical practice, results are often documented in ways that are not understandable in clinical practice.
- There is consensus in the nursing literature that future pain research should address the transition to intervention studies, which are important to patient care outcome and development of our knowledge base.

What this paper adds:

- Improvements in health-related quality of life (HRQL), pain-related disability and readiness-to-change suggest that the vicious cycle of chronic pain and subsequent impairment may be interrupted by our multidisciplinary pain management programme based on CBT.
- Documents clinical significance.
- Supports the claim that professional nurses have an important place in multidisciplinary pain management programmes, and are also competent to lead such programmes and do research.
- Validates the Pain Stages of Change Questionnaire (PSOCQ) in a Norwegian population.

1. Introduction

Cognitive behavioural therapy (CBT) has been useful in the treatment of chronic pain conditions for many years (McCracken and Turk, 2002; Turk and Burwinkle, 2006). The hallmark of CBT is that in order to understand pain, we must not only consider underlying tissue damage, we must also consider cognitive and behavioural factors that can influence the pain experience (Keefe, 2000). Furthermore, the focus is on the application of learning and coping strategies to bring about change (Linton, 2005). Although such programmes vary considerably in practice, they have several characteristics in common. In this approach, chronic pain should be viewed as a set of biomedical, psychosocial, and behavioural factors contributing to the total experience of pain (Turk and Melzack, 2001). The assumption is that individuals can become active participants in their treatment if they learn skills to deal with their problems and their situation (Vlaeyen and Morley, 2005). A crucial element is a shift in the patient's repertoire from well-established and automatic but ineffective strategies towards systematic problem-solving and planning. Symptoms are reconceptualized so that the participants learn to view their situation as amendable to change by the use of cognitive and behavioural skills (Turk, 2002). Furthermore, understanding pain physiology is crucial because it can change the way people think about pain, reduce its threat and improve self-management (Butler and Moseley, 2003).

However, patients vary in their readiness to adopt a self-management approach that includes specific skills. Such differences may account for varying degrees of participation and success, and dropout and relapse rates. The transtheoretical model of behavioural change proposes that individuals vary in the degree to which they are prepared for significant behavioural change (Prochaska and DiClemente, 1983), and this understanding is adapted in pain research (Kerns et al., 1997). Readiness for change is conceptualized as varying along a continuum, with distinct and characteristic attitudes and behaviours apparent at each stage (Kerns et al., 2005). Results from Kerns and Habib (2004) provide encouraging evidence that moving forward through the stages might reflect increased motivation and enhanced commitment to a self-management programme, and that these improvements might influence important outcome variables. Recent refinements in the readiness-to-change model and its instrument suggest that readiness to adopt a self-management approach might be multidimensional, and that increased learning and the application of adaptive coping strategies might reflect a continuum of change rather than stepwise movements through discrete stages (Kerns and Habib, 2004). The cognitive behavioural perspective on chronic pain is consistent with these notions (Kerns et al., 1997).

Although previous reviews have documented the effects of such pain management programmes (McCracken and Turk, 2002; Turk and Burwinkle, 2006), several challenges remain. There is little theorizing and research on the process of change in chronic pain (Morley and Williams, 2002). As statistical significance does not in itself provide exact information on a given intervention and clinically meaningful effects, evaluation of clinical significance is needed (Hechler et al., 2009). Given the increasing rates of chronic pain and associated severe psychosocial interferences (Breivik et al., 2006), it is crucial to investigate and improve treatment effectiveness. Forbes (2009) suggests that there is little nursing activity directed towards the development of nursing interventions, and a lack of research undertaken in a theoretically integrated way.

Previous research performed by the first author considering the effectiveness of a CBT programme provided promising results. Although the programme was successfully implemented, the conclusion was that further efforts were required to improve the results and accommodate the needs of those who withdrew (Dysvik et al., 2004). Consequently, based on a previous CBT programme, a major aim of the present study was to improve the results by implementing several efforts described in the treatment procedure section below. Another major aim was to evaluate the effectiveness of the multidisciplinary pain management programme using primary outcome measures such as health-related quality of life (HRQL), pain perceptions, and stages of change. On the basis of these considerations, we hypothesized that: (1) the multidisciplinary pain management programme would be effective in improving HRQL and decreasing pain intensity and pain interference; (2) advances in the pain stages of change from pretest to post-test can be identified; (3) and those who received an "additional

package", containing a contract to be signed and two individual follow-up meetings, would have better results than to those who only received the core programme. As a secondary outcome measure, we wanted to evaluate patient satisfaction with the programme. As there is an increasing interest in calculating clinical significant change due to treatment (Hechler et al., 2009), this will also be outlined and reported.

2. Methods

2.1. Design

A pretest–post-test quasi-experimental design with waiting list controls was used to examine the effects of an 8-weeks multidisciplinary pain management programme with baseline and primary outcome measures including HRQL, pain experience and pain stages of change. The study was conducted in the rehabilitation unit of a university hospital.

2.2. Participants and sample

A consecutive sample of 117 outpatients from 11 treatment groups referred to a rehabilitation unit was included in this intervention study. Four patients did not complete the programme, reducing the sample to 113. Participants from every second group were defined as waiting list controls during the 8-week basic course, and out of these, 39 formed the control group. After the control period they were included in the 113 final participants. A total of 48 participants selected at random received an "additional package", containing a contract to be signed and two individual follow-ups. The participants were recruited through their general practitioners, and were considered a representative sample for this purpose. They met the following inclusion criteria for admission:

- aged between 18 and 67 years
- chronic non-malignant pain lasting for longer than 6 months
- medical investigation and/or treatment completed before referral
- motivated to participate in an active rehabilitation programme
- no ongoing litigation due to their pain problem

Exclusion criteria:

- affected by major mental disorders
- affected by major medical conditions requiring treatment

Prior to inclusion, all participants were given an introduction day where the programme, expectations and obligations were discussed. In addition, a clinical interview was performed by one of the counsellors to assess suitability. Written instructions were handed out. It was emphasized that participation was voluntary and that they could leave the programme at any time. Confidentiality was guaranteed and a written consent was obtained. An informed consent form for the waiting list group was returned together with the questionnaire. The study was approved by the Ethical Committee and the Data Inspectorate responsible for this region.

2.3. Description of the intervention

The intervention model guiding the counsellors in the present study was based on CBT. This emphasizes that treatment outcomes may be improved and better maintained if attention is given to the cognitive and behavioural factors in chronic pain. CBT for chronic pain involves a variety of interventions and major features are summarized in the following points (Turk, 2002):

1. problem oriented
2. educational
3. collaborative
4. homework included
5. encourages expression of feelings
6. addresses the relationship between thoughts, feelings and behaviour
7. anticipates setbacks and relapses

The original CBT programme described elsewhere (Dysvik et al., 2004) is based on a group approach and consists of therapeutic dialogues and training, combined with physical activity and associated homework. Basic assumptions are acceptance of the chronic pain diagnosis, understanding of the body-mind connection and an active orientation towards self-management. Furthermore, the programme has several features that directly address the psychosocial aspects in chronic pain, which are further specified in Appendix A. The major aim of this programme is not primarily to eliminate pain but to enable the participants to be more functional and manage their pain more effectively by reducing pain interference and improving HRQL.

The main changes in the treatment programme made for the present study were:

- A 1-day introduction before initiation
- Inclusion in the team of a volunteer patient who has gone through the programme and who has been trained to provide some counselling, in addition to the two counsellors
- Extending each meeting from 3 to 5 h, with a lunch break included
- In addition to the core programme, development of an additional package administered at random, which included two individual consultations and signing a contract.

Each group met with the two counsellors (a nurse and a physiotherapist) and the volunteer for 5 h a week over an 8-week period. A psychologist and a physician also took part in the training.

2.4. Outcome measures

Data were routinely collected before starting (time t1) and after termination of the course (time t2). For the

waiting list controls, data were also collected 8 weeks before start (time t0), and the time span from t0 to t1 was approximately the same as from t1 to t2. Demographic data were collected at t1. The following instruments were used in the data collections for baseline data and outcome measures.

2.4.1. Health-related quality of life

The Short Form Health Survey (SF-36) is a frequently used measure of HRQL. The instrument has been validated and tested for reliability in several international and Norwegian studies (Loge et al., 1998). Norm-based comparisons are available (Loge and Kaasa, 1998). Eight scales are included, measuring physical functioning (PF), physical role (RP) (referring to limitations in daily activities), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), emotional role (RE) (referring to limitations in daily activities) and mental health (MH) (Ware et al., 2000). An additional item reports health transition in the past year and provides useful information about actual changes in health status in the year prior to administration of the SF-36. Two global scores, physical health (PCS) and mental health (MCS) can be calculated (Ware and Kosinski, 2001). Higher scores indicate better HRQL. The SF-36 is considered useful in measuring changes in clinical trials (Ware et al., 1994).

2.4.2. Pain intensity and interference

The Brief Pain Inventory (BPI) is designed to measure the intensity of pain and impairment caused by pain. The BPI consists of four questions related to pain severity (PS) and seven questions related to pain interference (PI) on functioning. The pain severity items are presented as numeric rating scales ranging from 0 = no pain to 10 = pain as bad as you can imagine. A pain severity index is calculated by adding the scores on the first four items. The next seven items of pain interference are also presented as numeric rating scales with 0 = does not interfere to 10 = interferes completely. These items deal with general activity, mood, walking, work, relationships with others, sleep and enjoyment of life. The BPI has been validated across cultures and languages, is sensible to change, and has also been found to have satisfactory psychometric properties in a Norwegian sample (Klepstad et al., 2002). This instrument is widely used for pain assessment in clinical trials (Anderson et al., 2001).

2.4.3. Pain stages of change

The Pain Stages of Change Questionnaire (PSOCQ) is a multidimensional measure of the individual's readiness to adopt a self-management approach to his or her chronic pain. It reflects a different approach to pain belief assessment as it measures cognitions relevant to readiness for change (Kerns et al., 1997). This questionnaire consists of 30 items that comprise four distinct scales relevant to self-management: Precontemplation (PC), Contemplation (C), Action (A) and Maintenance (M). Participants are instructed to respond to each of the items using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. High scores on PC characterize little personal pain or interest in behavioural change. In contrast, high scores on C represent a consideration of behavioural change and awareness of personal responsibility. The A scale assesses the degree to which someone is actively involved in learning self-management skills, whereas the M scale addresses the degree to which self-management skills have been integrated in daily life combined with a strong sense of responsibility (Kerns and Rosenberg, 2000). The instrument seems to have good reliability and validity (Kerns et al., 2005). The PSOCQ has previously been used in a Norwegian sample where in a factor analysis validation a three-factor solution was suggested (Strand et al., 2007).

2.4.4. Patient satisfaction

As a secondary outcome measure, patient satisfaction was measured on a three-point Likert scale (1 = little extent to 3 = great extent), and was related to the therapeutic dialogue, physical activity, education, own contribution and the total course. Furthermore, to measure clinical significance, two separate items investigated whether patients had experienced any changes after the course (using a five-point Likert scale), and if this change was considered important to them (one yes or no question) (Fayers and Machin, 2000).

2.5. Statistical analyses

SPSS, version 15 and R version 2.9.0 were used for handling and analysing the data (Pallant, 2007; R Development Core Team, 2009). Calculation of the sample sizes needed to detect minimal clinically important differences was based on standard *t*-tests for differences on a 5% level having 90% power. Simple frequency distributions were used to describe patients' characteristics at admission and patient satisfaction with the course. Chi-square tests and Mann–Whitney *U*-tests were used to test for differences in patient characteristics between waiting list controls and patients not used as waiting list controls. Paired samples *t*-tests were conducted on the change in the outcome measures of HRQL, pain and the stages of change. Between those who received the core programme and those who received the additional package, independent samples *t*-tests were used to compare changes in mean scores on the outcome variables and chi-square tests to compare the results from evaluation of the course. The appropriateness of using *t*-tests was checked by normal plots of all relevant difference scores. The SF-36 values were calculated according to the manual for each of the subscales (Ware et al., 2000) and the two global scores, physical (PCS) and mental health (MCS), were obtained (Ware and Kosinski, 2001). A factor analysis was performed on the 30 items of the PSOCQ. Bar graphs were used to illustrate the mean scores for the different dimensions of PSOCQ. A reliable change index (RC) was calculated to determine whether the magnitude of change for the patients was statistically reliable (Jacobsen and Truax, 1991). According to this index, a change is regarded as clinically significant if it is at least twice the standard deviation of difference in scores due to measurement errors. In the calculation of this index, the standard deviation of the difference in scores

just due to measurement errors was estimated from the waiting list controls (Temkin, 2004).

3. Results

3.1. Demographics

Table 1 gives the background data from this group. The average age for the participants was 45 years. There were 92 females and 25 males. Information on educational status showed that 14% had completed compulsory school, 56% had completed upper secondary school, while 30% had some college or university education. In addition, 12% were currently employed either full time or part time, 35% were engaged in retraining programmes, 19% were on sick leave, while 34% were receiving disability compensation because of their pain problem or where not at work. The average time since diagnosis related to their pain problem was 7.5 years. The participants suffered from a variety of pain complaints, such as musculoskeletal, back and neck, pelvic/visceral, neuropathic and headaches. When we compared those belonging to the waiting list to those who did not, the results indicated that they differed in marital status and pain intensity now.

3.2. Power analysis

For the PSOCQ scale, using information about typical standard deviations reported in Kerns and Rosenberg (2000) and a 10% mean change as the smallest clinically important difference, we found that from 24 to 81 patients were required to reach an approximate 90% power for tests based on each of the four summary measures. Further, based on standard deviations found in Dysvik et al. (2004) and with a 10% change as the smallest clinically important difference, we found that about 68 patients were required for tests based on pain intensity using a Visual Analogue Scale compatible with a numeric rating scale in BPI. In addition, 64 patients were required for testing of physical health (PCS) and 57 for mental health (MCS) using SF-36. These were the required sample sizes for some of the important summary measures, and we scaled our study according to these. Because we were considering many different measures, we believed we should aim for a somewhat larger sample size than that required by the highest single test sample size, so as keep a good overall power. Hence, our starting point was that we wanted completed data from at least 100 patients, and we achieved this with completed data from 113 patients.

3.3. Differences in outcome measures

The distributions of all difference scores considered below were examined using normal plots and found to be sufficiently normal for *t*-tests to be used. As Table 2 indicates, significant improvements in HRQL were related to the global scores PCS and MCS and individual scores, except for RP and RE. In the waiting list control group no significant changes were identified. Results of paired *t*-tests, comparing pretest and post-test scores on pain

Table 1
Sociodemographic and medical data at admission ($n = 117$).

Variables	All patients, *n* (%)	Waiting list, *n* (%)	Not waiting list, *n* (%)	*p*, Chi-square
Sex				
Female	92 (79)	30 (77)	62 (79)	
Male	25 (21)	9 (23)	16 (21)	0.81
Marital status				
Married/cohabiting	88 (75)	24 (62)	64 (82)	
Widow/widowers/single	29 (25)	15 (38)	14 (18)	0.023
Education				
Compulsory school	16 (14)	7 (18)	9 (12)	
Upper secondary school	66 (56)	18 (46)	48 (61)	
College/university	35 (30)	14 (36)	21 (27)	0.28
Working status				
Full/part time	14 (12)	5 (13)	9 (12)	
Retraining	41 (35)	6 (15)	16 (21)	
Sick leave	22 (19)	13 (33)	28 (36)	
Disability/not at work	40 (34)	15 (39)	25 (32)	0.88
Diagnosis				
Musculoskeletal pain	48 (41)	15 (38)	33 (42)	
Back pain	25 (21)	9 (23)	16 (21)	
Neck pain	16 (14)	8 (21)	8 (10)	
Neuropathic pain	12 (10)	2 (5)	10 (13)	
Headaches	9 (8)	3 (8)	6 (8)	
Pelvic/visceral pain	7 (6)	2 (5)	5 (6)	0.60
Variables	Mean (range)	Mean (range)	Mean (range)	*p*, Mann–Whitney
Age (years)	45 (21–66)	44 (22–64)	45 (21–66)	0.80
Pain				
Duration (years)	7.5 (0.5–31)	8.5 (0.5–22)	7.0 (1.0–31)	0.15
Intensity last week	75 (30–100)	77 (50–100)	74 (30–100)	0.36
Intensity now	60 (0–100)	67 (20–100)	58 (0–100)	0.023

Table 2
Difference in sum scores on SF-36 from t1 (pretest) to t2 (post-test), $n = 113$, and from t0 to t1 for the waiting list controls, $n = 39$.

Sum score	Mean diff.	95% CI	p^*
Mental health, t2-t1[a]	6.0	3.3, 8.7	<0.001
Vitality, t2-t1[a]	7.6	4.3, 10.8	<0.001
Bodily pain, t2-t1[a]	5.2	2.6, 7.8	<0.001
General health, t2-t1[a]	5.7	3.1, 8.2	<0.001
Social function, t2-t1[a]	7.9	3.5, 12.2	<0.001
Physical function, t2-t1[a]	4.0	1.4, 6.6	0.003
Role physical, t2-t1[a]	2.0	−2.0, 5.9	0.32
Role emotional, t2-t1[a]	7.4	−2.2, 16.9	0.13
PCS, t2-t1[a]	1.1	0.04, 2.2	0.042
MCS, t2-t1[a]	3.6	1.5, 5.6	0.001
Mental health, t1-t0[b]	0.2	−3.6, 4.0	0.91
Vitality, t1-t0[b]	−0.1	−4.9, 4.6	0.96
Bodily pain, t1-t0[b]	−1.7	−5.6, 2.2	0.39
General health, t1-t0[b]	−2.9	−7.2, 1.5	0.19
Social function, t1-t0[b]	−3.8	−12.2, 4.5	0.36
Physical function, t1-t0[b]	2.0	−1.5, 5.4	0.26
Role physical, t1-t0[b]	−4.5	−10.9, 1.9	0.16
Role emotional, t1-t0[b]	2.6	−9.2, 14.3	0.66
PCS, t1-t0[b]	−0.4	−1.9, 1.0	0.56
MCS, t1-t0[b]	−0.7	−3.2, 1.8	0.57

Mean diff. = mean difference, CI = confidence interval. PCS = global score physical health, MCS = global score mental health.
[a] Effect of treatment on all patients.
[b] Waiting list control group.
[*] p-values are calculated by paired t-tests.

perceptions using BPI, indicated a significant reduction in pain intensity and in the pain interference index from t1 to t2, while no changes were found in the waiting list control group from t0 to t1 (Table 3). As regards PSOCQ data, we identified higher post-test scores for the subscales A and M, while for PC and C lower scores were found. However, no changes were found in the control group except for a decrease in the C scale as illustrated in Table 4 and Fig. 1. The results of the independent t-tests, comparing changes in mean scores on the outcome variables and the Chi-square test comparing the results from evaluation of course satisfaction between those who received the core programme and those who received the additional package, revealed no differences (data not shown).

3.4. Validation of the PSOCQ

We validated the PSOCQ by running a factor analysis on all items for both pretest and post-test data. This showed a three-factor analysis to be appropriate, with the first factor being a combination of M and A. Based on a combination of inspection of the scree plot and interpretation of the

Table 3
Difference in sum scores on brief pain inventory (BPI) from t1 (pretest) to t2 (post-test) $n = 113$, and from t0 to t1 for the waiting list controls, $n = 39$.

Sum score	Mean diff.	95% CI	p^*
Pain intensity, t2-t1[a]	−2.0	−2.9, −1.0	<0.001
Pain interference, t2-t1[a]	−5.2	−7.9, −2.5	<0.001
Pain intensity, t1-t0[b]	0.1	−0.9, 1.2	0.81
Pain interference, t1-t0[b]	2.1	−0.8, 5.0	0.14

Mean diff. = mean difference, CI = confidence interval.
[a] Effect of treatment on all patients.
[b] Waiting list control group.
[*] p-values are calculated by paired t-tests.

Table 4
Difference in sum scores on the pain stages of change questionnaire (PSOCQ) from t1 (pretest) to t2 (post-test), $n = 113$, and from t0 to t1 for the waiting list controls, $n = 39$.

Sum score	Mean diff.	95% CI	p^*
Precontemplation, t2-t1[a]	−1.9	−2.5, −1.2	<0.001
Contemplation, t2-t1[a]	−1.1	−2.1, −0.2	0.016
Action, t2-t1[a]	3.9	3.1, 4.6	<0.001
Maintenance, t2-t1[a]	4.6	3.7, 5.5	<0.001
Precontemplation, t1-t0[b]	0.1	−1.0, 1.2	0.81
Contemplation, t1-t0[b]	−2.6	−3.9, −1.2	<0.001
Action, t1-t0[b]	0.2	−1.2, 1.6	0.76
Maintenance, t1-t0[b]	−0.3	−1.7, 1.0	0.62

Mean diff. = mean difference, CI = confidence interval.
[a] Effect of treatment on all patients.
[b] Waiting list control group.
[*] p-values are calculated by paired t-tests.

components, we found a similar relationship in both cases. The three factors explained 41–47% (pretest) and 43–48% (post-test) of the variance.

3.5. Clinical significance

As shown in Fig. 2, reliable improvements according to the RC index (Jacobsen and Truax, 1991) were reported in from 3% of patients (for social function) to 19% of patients (for pain interference) on the SF-36 and BPI sum scores. On the various sum scores, from 14% of patients (physical role) to 69% of patients (pain interference) reported improvement, but not solely beyond the limits defined for the RC index.

3.6. Patient satisfaction

Patient evaluation of the total pain management programme (Table 5) indicated that 78% of the group was satisfied to a large extent. The therapeutic dialogue seemed to be the most successful component of the

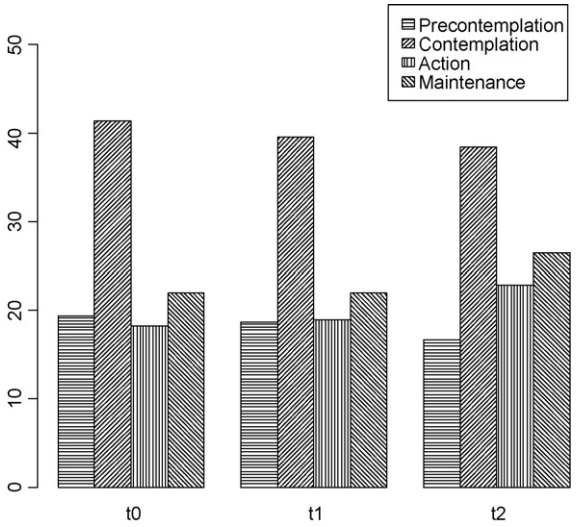

Fig. 1. PSOCQ subscores for the waiting list control group (t0), and pretest (t1) and post-test (t2) for the experiment group.

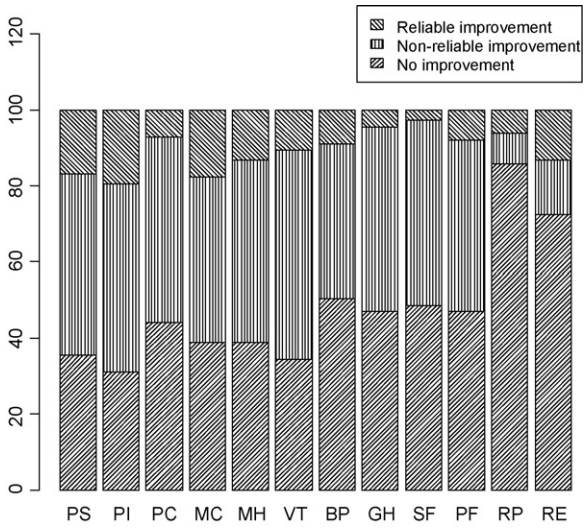

Fig. 2. Calculation of a Reliable Change Index (RC) for the BPI and SF-36. $n = 113$.
Percentage of patients reporting respectively a reliable improvement according to the RC index, percentage of patients reporting an improvement but not beyond the RC index and percentage of patients reporting no improvement.
BPI: PS = pain severity, PI = pain interference. SF-36: PC = physical health global score, MC = mental health global score, MH = mental health, VT = vitality, BP = bodily pain, GH = general health, SF = social function, PF = physical function, RP = role physical, RE = role emotional.

programme. However, their homework seemed to be the least appreciated component. Half (50%) of the group evaluated their own contribution to be successful to a great extent. Furthermore, by using two separate items to measure clinical significance, 92 people reported that they had improved and that they also considered the change as important, while 21 reported that their situation was the same.

4. Discussion

Major findings according to the primary outcome measures suggest that this programme has the potential to improve HRQL, reduce pain intensity and interference, and contribute to advances in readiness-to-change. The statistically significant results are supplemented by results showing their clinical significance. The results showed no difference between those who received the additional package and those who received the core programme only. According to the secondary outcome measure, patient evaluation of the total pain management programme indicated that 78% of the group was satisfied to a large extent.

The major aim of this study was to evaluate the effectiveness of a multidisciplinary pain management programme on HRQL, pain perceptions and stages of change. In recent years, HRQL has become an essential component of assessment of treatment outcomes due to interventions as it reflects the patients' core values. In line with our first hypothesis, the results indicate that this programme has the potential to improve HRQL. More specifically, the majority of the subscores as well as the global scores on HRQL were improved. These findings were also supported by more optimistic general health beliefs compared with 1-year prior, which may indicate a direction towards an active role in rehabilitation. Furthermore, pain intensity and interference with daily activities were reduced, suggesting that the participants had become more functional and were managing their pain more effectively in daily life. According to Dworkin et al. (2001), treatment that both relieves pain and improves HRQL is of greater value than pain reduction alone. Although necessary, a test of statistical significance may not have any direct relevance to patient care. Therefore, it is suggested that intervention studies should report both the statistical and clinical significance of the results (Hechler et al., 2009; Turk, 2000).

Our method for measuring clinical significance based on calculating an RC index, is said to have several benefits as it operationalizes improvements in a relatively objective and unbiased way. It has general applicability and provides information on variability in outcomes (Jacobsen and Truax, 1991). As indicated in Fig. 2, reliable improvements were identified for only some of the patients. However, more patients registered improvements, but not beyond the limits defined for the RC index. One possible explanation may be that there are a number of unresolved problems with this method (Jacobsen and Truax, 1991). Those authors emphasize the fact that clinical significance calculations may make treatments look less effective than standard statistical comparisons would imply. This may also be demonstrated in our study. Moreover, we have estimated the standard deviation of the variability in scores in a population with no true change from the two measurements in the waiting list control, assuming no real change took take place for these patients from t0 to t1. This is in line with the recommendations by Temkin (2004), but we note that we obtained considerably more conservative limits for a reliable change than, for instance, those reported in Ferguson et al. (2002) for the SF-36 subscales.

Table 5
Participant satisfaction with the pain management programme. Frequencies and percentages. $n = 113$.

Degree of satisfaction	Great extent		Moderate extent		Minimal extent	
	n	(%)	*n*	(%)	*n*	(%)
Therapeutic dialogue	90	(79)	21	(19)	2	(2)
Physical activity	77	(68)	32	(28)	4	(4)
Education	71	(63)	40	(35)	2	(2)
Homework	69	(61)	40	(35)	4	(4)
Own contribution	57	(50)	56	(50)		
Total course	88	(78)	25	(22)		

Another interesting aspect of the clinical significance consideration is to notice that a total of 92 (81%) people reported that they had experienced a positive change after the course, and that this change was perceived to be important to them. As these areas were primarily related to positive thinking, relaxation and breathing, their experiences may be reported in more complex patterns than can be easily captured by instruments. However, the clinical importance of these results will depend on the characteristics of the condition being treated (Dworkin et al., 2001). As chronic pain is supposed to be related to a life-long condition with different underlying disease processes, it is natural to assume that for some patients their health will remain the same or naturally decline. Furthermore, it seems unreasonable to expect sustained benefits after a short course offered to patients who have suffered from chronic pain for an average of 7.5 years. Taken together, these findings are considered promising because they demonstrate that positive changes have taken place and that the major goals of the treatment programme have been achieved.

Our second hypothesis, suggesting that advances in the PSOCQ would take place because of treatment was confirmed. More specifically, a decline in the precontemplation score among the patients indicates that interest in behavioural change has increased, which was a major aim of the present programme. In addition, higher scores on action were identified, referring to active participation learning self-help skills and modifications in lifestyle, while higher maintenance scores point to the fact that some of the skills have already been integrated in daily life. Given different starting points and the multifaceted nature of chronic pain problems, it is reasonable to assume that patients' clinical needs are unbalanced and multifaceted. Therefore, varying degrees of support at each stage of the PSOCQ model must be considered, to match the programme to patients' readiness to adapt at several points in time.

There was no support for our third hypothesis suggesting that those who received an additional package would have better results than those who received the core programme, when examining the outcome variables including evaluation of course satisfaction. These results may be explained by the fact that the screening interview gave patients the individual attention they needed, and being part of the group, group interactions and the climate during the course may have provided a sense of belonging and support.

Lastly, we also wanted to evaluate patient satisfaction with the programme. Interestingly, when compared with a previous study, the ranking was about the same, although the group reporting satisfaction to a "great extent" was increased (Dysvik et al., 2004). The supervised dialogue still seemed to be the most successful component of the programme. Several factors might have contributed to explain this result. Meeting other group members with similar problems might have created a feeling of community and a place to ventilate feelings. Hearing about the success of other group members is often said to be more convincing than recommendations coming from counsellors or other health care workers. Furthermore, the counsellors now had gained increased experience in conducting these groups, and they acknowledged the importance of getting the group off to a good start and knowing how to handle challenges, both expected and unexpected. CBT approaches generally require active engagement, and the performance of tasks is critical in this approach. Such programmes also require patients to make a number of lifestyle changes. As half of the group reported that they were satisfied to a great extent with their own contribution, while the reminder reported moderate satisfaction, this indicates that a great deal of responsibility and engagement in the group has taken place. We should also mention that several changes (outlined in Section 2.3) to improve our previous programme might have contributed to the results. As noted in the introduction, there are many dimensions and factors that contribute to the experience of chronic pain, making the assessment complex and difficult in clinical settings. Therefore, outcomes from the present study are likely to be determined by the interactive effects of multiple factors, as a single factor may not account for a statistically significant or clinically meaningful proportion of the variance in outcome.

4.1. Implications for nursing

We believe that learning to live with chronic pain, as demonstrated by our programme, is a matter of several key shifts in perspective. Acceptance of the chronic pain diagnosis is one shift. This means, among other things, a need for a new orientation and avoidance of passive strategies. Understanding the body-mind connection is another basic shift, and is explained by the gate control theory of pain and introduction of autogenic training and progressive relaxation (Keefe, 2000; Keefe et al., 2002; Butler and Moseley, 2003). We also consider that an active orientation towards self-management is needed by focusing on the patients' own resources, improving self-esteem and being aware of healing mechanisms within the body. As we see it, effective treatment results are about identifying and addressing the important and changeable influences maintaining pain problems and finding a good match between the needs of the patients treatment options provided. To guide our work, the transtheoretical model may provide a framework for conceptualization of the several stages through which individuals may proceed as they consider making changes in their behaviour following the pain management programme. We support several authors (Dunajcik, 1999; Brown and Richardson, 2005) who argue that nurses have an important place in multidisciplinary pain management programmes and that we are capable of leading such programmes and doing research. As this programme follows international and standardized knowledge based on research, we also believe that our suggestions may be of general relevance for nurses engaged in chronic pain management.

4.2. Study limitations

Some limitations to this study should be acknowledged. The sample consisted of patients with various chronic pain conditions, which made classification difficult. Despite the

heterogeneity of the sample, Turk and Gatchel (1999) argue that research that includes such a sample is useful, as the patients may have more in common than those with a similar diagnosis. We used waiting list controls and the results indicate that no changes, except one in a negative direction, took place during the control period, although several of these participants dropped out because of their unstable situation. As the experience of pain is multi-dimensional and modified by many factors, the causative processes are also uncertain. These factors might reduce internal validity and limit the conclusions that can be drawn. However, the study extends and supports our previous study (Dysvik et al., 2004). Although well-controlled randomized controlled trials are of high value, we believe that well-designed non-randomized trials and naturalistic studies including waiting list controls may substantially enhance our understanding of how to improve nursing practice. Differences in factor structure of the PSOCQ may be because of different samples, socio-cultural backgrounds, and treatment circumstances. Further consideration is needed to decide whether a three- or four-factor solution should be used in future work.

5. Conclusion

Our particular concern about nursing care is to propose treatment that is both statistically and clinically effective. Improvements in HRQL, pain-related disability and readiness-to-change suggest that the vicious cycle of chronic pain and subsequent impairment may be interrupted by our programme based on CBT. To sum up, the authors believe that several key shifts in perspective are needed for people suffering from chronic pain to manage their condition effectively:

1. acceptance of the chronic pain diagnosis
2. understanding the mind-body connection
3. active orientation towards self-management
4. advances in the PSOCQ

Considering the complexity of the pain problems treated and the pain management programme used, the approach used here has been shown to be an effective means of reducing the unfavourable effects of chronic pain. We conclude that such group approaches appear to represent a feasible treatment option for many patients with chronic pain. However, as relapse is often documented, further research is needed to evaluate treatment effectiveness at least at 6-month and preferably at 12-month follow-up.

Acknowledgement

The authors would like to thank Torbjørn Aarsland, Research Director at Stavanger Health Research, for setting up the database

Conflict of interest. None declared.

Funding. None.

Ethical approval. Local ethical committee: Sak nr. 06/2489.

Appendix A. Topics covered in the course

Session	Topics	Homework
1	Establishment of the group. Goals	Develop own goals
2	Physical activity and pain	Develop own plan for activity
3	Pain as a complex phenomenon	Awareness of factors increasing or decreasing pain
4	Muscle tension, relaxation and pain	Awareness of muscle relaxation and tension. Practice in relaxation techniques
5	Coping and pain	Awareness of coping strategies and alternative ways of coping
6	Self-esteem, social network and pain	Awareness of self-esteem and social network and alternative ways of behaving
7	Thoughts, feelings and behaviour	Awareness of the relationship between thoughts, feelings and behaviour
8	Communication. Self-help	Awareness of important factors in communication Summing up, how to continue working

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