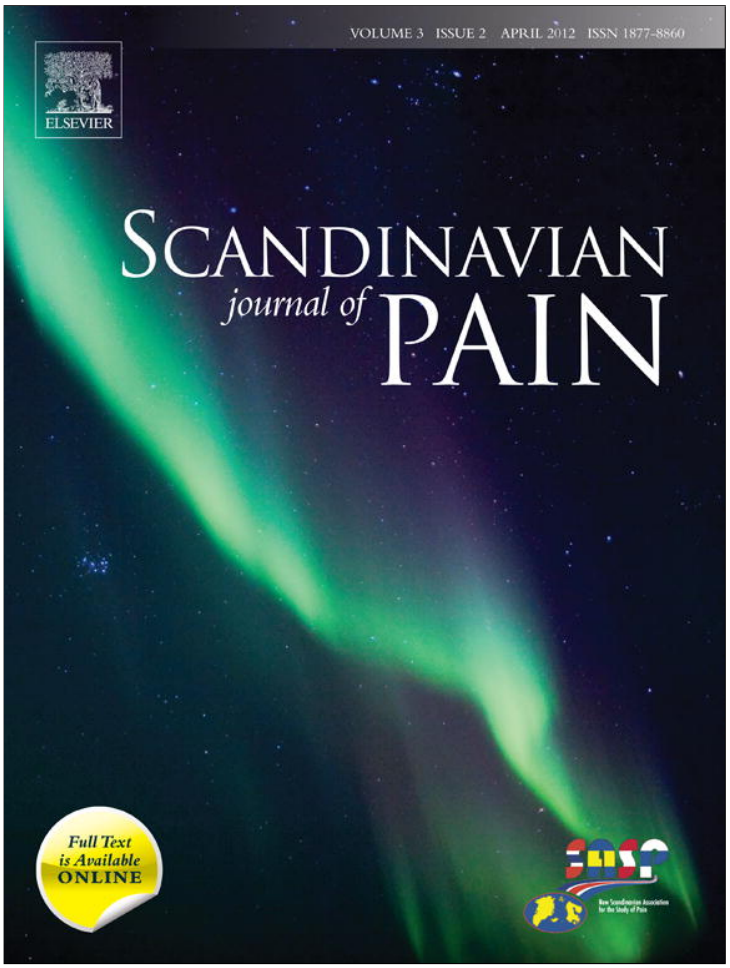

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Clinical pain research

Long-term outcome of multidisciplinary intervention of chronic non-cancer pain patients in a private setting

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ABSTRACT

Background and aim: The present study reports on chronic non-cancer patients who were referred to a private pain clinic, according to a waiting time guarantee and treated within one month from referral. Based on evaluation by members of the multidisciplinary staff at our pain clinic a pain management program could be offered individually or as group therapy.
Methods: Health related quality of life, psychometric tests, use of pain medication; socio-economic status and number of consultations in general practice were recorded at referral to the clinic and by postal questionnaires at follow-up 21 months later. The primary treatment outcome (treatment success) was defined as an improvement of at least 40 points in the physical component and/or the mental component of SF-36 from baseline to follow-up. Secondary outcome measures were changes in Beck's Anxiety Inventory and Beck's Depression Inventory, use of analgesics, work status and transfer income and number of consultations at the GP's office due to the chronic pain condition.
Results: A total of 306 patients were included: 141 were treated individually and 165 were treated in groups. At follow-up, data were obtained from 189 patients (62%). Comparing baseline to follow-up data, 62% of group treated patients were treated successfully, compared with 41% of individually treated patients. Anxiety and depression were significantly improved in group treated patients but not in those treated individually. Significantly more patients had work income (and less patients transfer income) among group treated, compared with individually treated. At follow-up use of antidepressants and anticonvulsants was increased whereas use of tranquilizers and strong opioids was decreased in all patients. Number of consultations at their GPs due to chronic pain was significantly reduced in all patients.
Conclusions: Multidisciplinary treatment in a private pain clinic seems to have a long-term effect in relation to biological, psychological and social aspects of the chronic pain condition. Treatments based on group therapy may offer better results than individual treatment courses.
Implications: The effect of group therapy should be explored further.

1. Introduction

Treatment outcome of chronic non-cancer pain patients has been shown to be better if the treatment was offered in multidisciplinary pain centre compared with treatment based in general practice under supervision of a pain specialist [1]. During the last 6 years, patients on waiting lists for public multidisciplinary pain clinics have been granted a waiting time guarantee, i.e. the possibility to choose treatment in a private multidisciplinary pain clinic if treatment could not be offered by a public pain clinic within one month. Waiting time for Danish public pain centres is now up to two years. Consequently, chronic pain patients can achieve earlier intervention than before. The present outcome study is the first report on multidisciplinary pain management from a primary care based multidisciplinary team, recruiting patients from waiting lists to public pain centres. In spite of the differences in time expenditure and costs, we have focused on the outcomes of group therapy versus individual treatment. Most studies reporting outcomes from group therapy have been based on cognitive behavioral therapy programs and the generally positive outcomes have been demonstrated in systematic reviews as well as meta-analyses [2,3]. However, not much attention has been devoted to the effects of group therapy independently of the specific content. Chronic pain patients often live in isolation and experience difficulties in communicating about their condition, which furthermore is not well understood and accepted by society, by family or friends; thus, patients may doubt their 'sensations' to an extent of disbelief in their own judgment

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Table 1
Biological, psychological and social variables recorded at baseline.

	Groups $N = 165$	Individual $N = 141$	Total $N = 306$
Age, mean (range)	49 (21–79)	53 (26–79)	51 (21–79)
Females (%)	72	60	66
Married (%)	62	60	61
Children <16 years old at home (%)	44	34	39
Duration of pain in yrs, mean (SD)	7 (6)	8 (6)	8 (6)
Cognitive disturbances %	51	35	44
Pain medication, all (%)	76	81	78
Non opioids (%)	53	53	53
Week opioids (%)	33	40	36
Strong opioids (%)	22	29	26
Mean dose morphine eq. (SD)	79 (81)	126 (221)	102 (168)
Antidepressants (%)	31	33	32
Anticonvulsants (%)	18	17	18
Tranquilizers (%)	16	22	18
Mean SF-36, physical, normal (SD)	321 (22)	312 (28)	317 (26)
Mean ST-36 physical, baseline (SD)	117 (53)	103 (62)	111 (58)
Mean SF-36, mental, normal (SD)	327 (9)	326 (13)	326 (11)
Mean SF-36, mental. baseline (SD)	169 (81)	152 (88)	161 (85)
Beck Anxiety Inventory, mean (SD)	19 (12)	19 (13)	19 (12)
Beck Depres Inventory, mean (SD)	19 (10)	20 (12)	19 (11)
Childhood neglect (%)	36	28	33
Parental psychiatric illness (%)	26	8	18
Loss of significant ones (%)	39	10	23
Life threaten event (%)	27	13	20
Psych. illness/personality dist. (%)	35	36	35
Sleep disturbed (%)	88	72	80
Socially isolated (%)	31	31	31
In job	29	13	21
Sick pension	19	36	27
Sick leave	32	21	27
Other	20	30	25
Unsettled insurance issue	21	15	18

and sanity. Therefore, being together with other pain patients can be a powerful experience, because of a mutual understanding and the possibility of rebuilding self-confidence, self-esteem and 'basic trust in life'. New ways of coping with the chronic pain condition can be established and feedback from the rest of the group may help patients to adapt and adhere to new strategies. Group interaction also requires structure and for many chronic pain patients daily life has lost structure and routines – 'day' and 'night' may not be well defined anymore. Participation in a group can force the patient to start restructuring the day, which means increased activity and decreased 'resting periods'. This may encourage the patient to take responsibility for his/her own life in a context of wellbeing – and stop striving for a 'cure' [4].

The aim of the study was to evaluate the outcomes of multidisciplinary pain management in a private setting and compare group therapy with individual therapy in patients with chronic non-cancer pain.

2. Material and methods

2.1. Baseline evaluation

Patients who were treated in the clinic from October 2006 to April 2008 were eligible for the study. Being a quality assurance study, local ethical committees were not involved, but informed consent was given by the participating patients. Patients consecutively referred to The Private Pain Clinic were evaluated by a pain physician, a psychologist, a physiotherapist and a social worker, followed by a conference where the treatment plans were made. All types of chronic non-cancer pain conditions were included. At baseline demographic, biological, psychological and social variables were recorded (Table 1). In all patients the Short Form-36 [5], Beck's Anxiety Inventory (BAI) [6] and Beck's Depression Inventory (BDI) [7] were recorded. Furthermore, pain medication use and economic status was registered.

2.2. Treatment options

The Private Pain Clinic offered treatment courses individually or as group-therapy. The individualized treatments consisted of one or more of the following programs: pharmacological pain management, psychological advice (6 sessions) or treatment (12 sessions), physiotherapy, relaxation therapy or socio-economic counseling. Group therapy consisted of: Pain School (education for 3 h twice a week for 5 weeks), Cognitive Behavioral Therapy based on Kabat-Zinn's principles for Mindfulness (MB-CBT) (3 h per week for 8 weeks) or a Rehabilitation Program comprising education and psychotherapy, physiotherapeutic sessions, relaxation sessions and socio-economic counselling (3 h three times per week for 13 weeks). Pain School was offered to patients who needed a better understanding of the pain condition in order to plan daily activities and optimize use of physical resources. MB-CBT was offered to patients who did not benefit from pharmacological pain management and who were motivated for self-development and were able to practice mindfulness sessions on a daily basis. The Rehabilitation Program was offered to patients who had been forced to give up their former identity, i.e. job, social and economic position or self-perception, and to patients with substantial problems of acceptance, i.e. patients who needed re-orientation of their life perspectives. Exclusion criteria for all group programs were unwillingness or inability to interact in a group and inability to understand and speak Danish.

When all treatments were finalized the patients were discharged from the clinic and referred back to the general practitioner, who received a summary of the management plan. At discharge the observation period of the study started. The treatment period and the observation period comprised the entire study period.

2.3. Follow-up evaluation

In June 2009 follow-up material was posted to the patients, comprising SF-36, BAI, BDI and a questionnaire about the long-term effect of acceptance of the chronic pain condition in relation to activities of daily living: knowledge, skills and social functioning scored on a 3-point scale (improved, unchanged, deteriorated). Pain medication and economic status were recorded. If the patients consented, the general practitioners (GPs) were asked to report the number of pain-related contacts in a 12 months period before study start and a 12 months period after the patient was discharged from the clinic.

Patients and GPs who did not respond to the questionnaires were contacted by phone once more. Fig. 1 displays a flow-chart of the study.

2.4. Endpoints of the study

SF-36 was chosen as the primary endpoint. The physical health component (4 dimensions: limitations in physical activities, limitations in everyday activities, bodily pain, general health perception) and the mental health component (4 dimensions: mental health, social function, emotional role, vitality) of the SF-36 were evaluated separately. Other studies have used separate physical and mental scores for SF-36 as outcome measures [8,9]. As no data on 'clinically relevant differences' in SF-36 was available for chronic pain patients, we used data from patients with chronic congestive lung disease, asthma, heart disease and rheumatology [10,11]. Although 'clinical relevant differences' vary among the eight components of SF-36, an average of 10 points difference is considered as a 'clinical

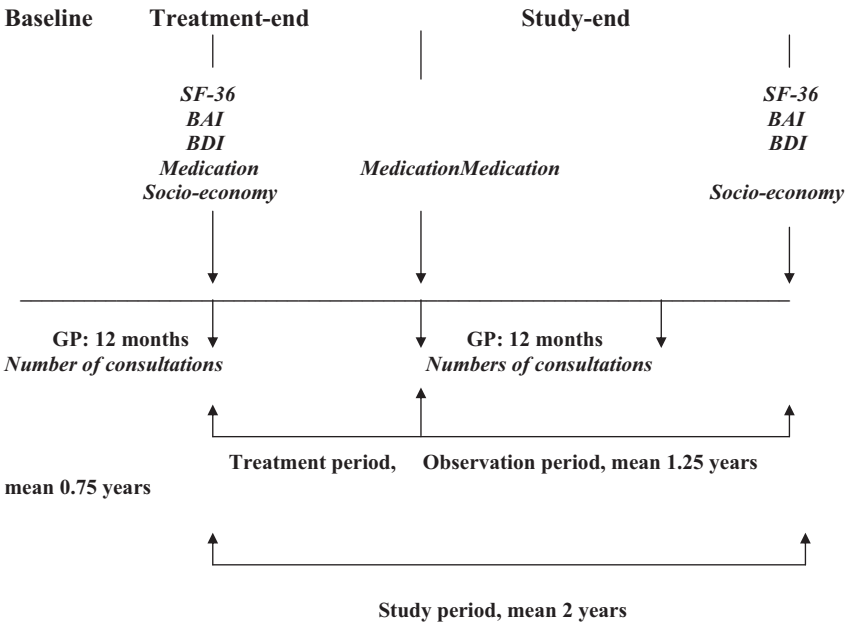

Fig. 1. Flow-chart of the study including assessments.

relevant difference'. This is a more stringent endpoint than using the standard error of measurement (SEM) for 'clinical relevant difference'; in the US population 1 SEM will equal 6–8.5 points on SF-36 [10]. Thus 'treatment outcome success' was defined as an increase of ten or more points in all dimensions within the physical or the mental component, i.e. increase of at least 40 points in the physical and/or the mental component.

Secondary end points were changes in mean scores of SF-36, BAI and BDI from baseline to follow-up. Changes in use of analgesics were compared from baseline to end of treatment and at follow-up. To evaluate the total use of opioids, the daily consumption of opioid doses, converted to equi-analgesic doses of oral morphine was used [12–14]. The mean daily morphine equivalents were compared between baseline, end of treatment and at follow-up.

Additional secondary endpoints were number of consultations at the GP's in relation to chronic pain (comparison between a 12 months period before referral to the pain clinic and a 12 month period after discharge from the pain clinic and change in socio-economic status was compared from baseline to follow-up (Fig. 1).

In the present study we have also involved other variables: Neglect in childhood, parental psychiatric disease or abuse, life-threatening events and psychiatric distress and personal disturbances in adolescence.

2.5. Statistics

Comparison between individually treated and group treated patients was done using χ^2 test for treatment outcome success regarding the primary endpoint, use of analgesics and change in socio-economic status. Wilcoxon's Signed Paired Test was used for mean values of SF-36, mean values of BAI and BDI, consumption of mean daily morphine equivalents and number of pain-related consultations at the GPs.

To evaluate the significance of baseline differences in the study population for treatment outcomes logistic and linear regression analyses were performed including baseline values for age, sex, duration of the pain condition, use of analgesics, BAI, BDI, parental psychiatric illness or abuse, socio-economic status and pending insurance issues. To evaluate the significance of baseline differences in the study population and the effect of pain management in the clinic for returning to work, logistic regression analysis was performed including the above mentioned baseline variables and changes from baseline to end-of-treatment for the use of analgesics, BAI, BDI, physical and mental components of SF-36. All data from baseline and follow-up questionnaires were registered in a SPSS database and all analyses were performed using SPSS for Windows, version 7.

3. Results

3.1. Response rates

The overall response rate was 62%. Patients who were managed in the clinic by group therapy responded to a higher degree (73%) than patients managed by individual treatment (51%). Non-responders were slightly younger and more often unemployed than responders, whereas no difference was found in relation to gender, education, SF-36 scores, BAI, BDI, use of analgesics, unsettled insurance issues and duration of the pain condition. Fifteen patients returned the SF-36 questionnaires incomplete, leaving 174 patients eligible for analysis of the primary endpoint. Among the responders, 86% (163) consented to obtain information from GPs. The response rate from the GPs was 68%, thus information was obtained for 110 patients.

3.2. Treatment options

A total of 306 patients entered the study: 141 were treated individually and 165 were treated by the following therapies: 89 patients attended Pain School, 35 patients MB-CBT and 41 the Rehabilitation Program. Parallel individual treatment was offered to 95% of the patients attending Pain School, to 70% of the patients attending MB-CBT and to none of the patients attending the Rehabilitation Program (however, individual psychological treatment, medical treatment, physiotherapy and relaxation therapy was part of the Rehabilitation Program). On average, patients were treated in the clinic for 237 days (32–659).

Table 2
Short form 36, physical dimension (physical) and mental dimension (mental), difference in scores from baseline to follow-up.

	Groups	Individual	Total
	N = 117	*N* = 72	*N* = 189
Incomplete data	9	6	15
	N = 108	*N* = 66	*N* = 174
Physical worse/unchanged	33	35	68
Physical improved <40	36	19	55
Physical Improved ≥40	39	12	51
Mental worse/unchanged	27	25	52
Mental Improved <40	22	18	40
Mental improved ≥40	57	23	80
Treatment success[a]	65	27	90
Treatment success (%)	61	41	52

SF-36 physical and/or SF-36 psychological improved ≥40 points when values at baseline are compared with values at follow-up. Comparison between group treated and individually treated patients: Fisher's exact test = 0.02.

[a] Definition of treatment success.

3.3. Primary outcome: SF-36

According to SF-36, health-related quality of life was severely impaired in all patients. Compared to normal values the mental health component score of the participating patients was reduced to half and the physical health component score to one third, respectively.

Treatment outcome success was obtained by 27 of 66 individually treated patients (41%) and of 67 of 108 group-treated patients (62%) as follows: 57% attending Pain School, 58% attending MB-CBT and 72% attending the Rehabilitation Program. In all patients significant improvement was obtained more often in the mental health component than in the physical health component of the SF-36 (Table 2)

Mean SF-36 physical health component scores increased from 117 to 150 in group treated patients ($p < 0.001$), and from 103 to 110 in individually treated patients ($p = 0.7$) (Table 3). Mental health component scores increased significantly in all patients (Table 3).

3.4. Secondary outcomes

3.4.1. Psychometric tests

BAI decreased from mean 19 to mean 14 ($p < 0.001$) and BDI from mean 19 to mean 15 ($p = 0.01$) in group treated patients. In patients treated individually no significant differences were found in BAI ($p = 0.06$) or in BDI ($p = 0.19$) (Table 3).

3.4.2. Consultations in general practice

The mean number of consultations at the GP's office due to chronic pain was reduced from 8.0 to 5.3 in group treated patients ($p < 0.001$) and from 10.9 to 6.2 in individually treated patients ($p < 0.001$).

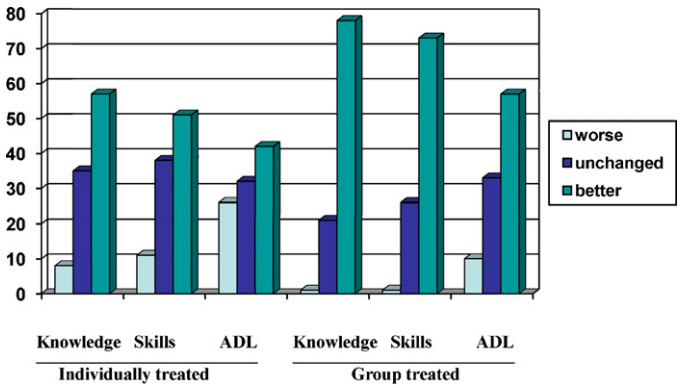

Fig. 2. Per cents of patients reporting changes in knowledge, skills in coping with the pain condition and impact on activities of daily living (ADL) at follow-up.

3.4.3. Use of pain medications

The use of analgesics was recorded three times: at baseline, after treatment in the pain clinic and at follow-up. As no difference in consumption of analgesics was seen when individually treated patients were compared to group treated patients, the results are reported for the total patient population. Compared to baseline significantly fewer patients were treated with non-opioids (primarily NSAIDs) and tranquilizers and significantly more patients were treated with anticonvulsants at discharge from the clinic. In the follow-up period significantly more patients used pain medications (all types) than at discharge and the use of non-opioids had increased to the baseline level. The increase in consumption of anticonvulsants and the decrease in consumption of tranquilizers that occurred from baseline to discharge from the clinic were maintained at follow-up. On average, one patient in four used strong opioids at referral and this did not change during the entire study period. However, the mean daily dose of morphine equivalents was reduced from 102 mg to 83 mg during the management period ($p = 0.01$) and further reduced to 79 mg at follow-up (Table 4).

3.4.4. Acceptance

Knowledge and understanding of the pain condition, achieved skills in coping with the pain condition and the impact on activities of daily living were significantly more improved in patients, who were treated in groups, compared with individually treated patients. Knowledge was more easily obtained than skills, and the impact on daily living was even more difficult to achieve (Fig. 2).

3.4.5. Socio-economic status

At baseline the economic status of individually treated patients were: 10% had a job, 41% were on sick pension at baseline, 32% on sick leave and 18% on social benefits. Comparable figures for patients, who were offered group therapy were: 33%, 20%, 39% and 8%. At follow up 81% of individually treated patients were on social benefits (sick pension or social benefit), compared to 53% of group treated patients (Fig. 3). Patients who were on sick pension

Table 3
Changes in SF-36 physical and mental dimensions, Beck's Anxiety Inventory and Beck's depression inventory from baseline (BL) to follow-up (FU).

	Groups *N* = 108		Individual *N* = 66		Total *N* = 174	
	BL	FU	BL	FU	BL	FU
SF-36, physical, mean (SD)	**117** (53)	**150** (76)	103 (62)	110 (70)	**111** (58)	**135** (76)
SF-36, psychological, mean (SD)	**169** (81)	**225** (89)	**152** (88)	**174** (89)	**161** (84)	**205** (92)
Beck anxiety invent. mean (SD)	**19** (12)	**14** (11)	19 (13)	17 (12)	**19** (12)	**15** (12)
Beck depression invent. mean (SD)	**19** (10)	**15** (12)	20 (13)	17 (10)	**19** (11)	**16** (11)

Significant changes in bold (Wilcoxon signed rank test).
Beck's Anxiety Inventory: 0–7: normal; 8–15: mild; 16–25: moderate; >25: severe anxiety.
Beck's Depression Inventory: 0–9: normal; 10–18: mild; 19–29: moderate; >29: severe depression.

Table 4
Use of analgetics at baseline, at discharge from the pain clinic and at follow-up for all patients. Statistically significant values of comparison between baseline and discharge and between discharge and follow-up.

	Baseline $N = 302$	p-Value	Discharge $N = 302$	p-Value	Follow-up $N = 192$
Any pain medication (%)	78	0.15[a]	73	0.01[a]	83
Non opioids (%)	53	0.0001[a]	37	0.0003[a]	54
Opioids (%)	26	0.2[a]	22	0.4[a]	25
Antidepressants (%)	32	0.8[a]	33	0.2[a]	27
Anticonvulsants (%)	18	0.0001[a]	41	0.7[a]	39
Tranquilizers (%)	19	0.0001[a]	4	0.3[a]	6
Mean (SD) (mg/day)	102 (168)	0.01[b]	83 (125)	0.003[b]	79 (87)

[a] χ^2 test.
[b] Wilcoxon signed pair test.

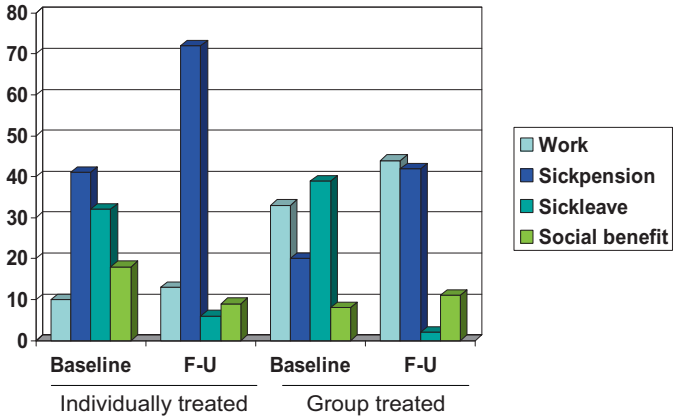

Fig. 3. Per cents of patients reporting economic status at baseline and at follow-up.

at baseline, maintained this status at follow up and most patients (75%), who had a job at baseline were still working at follow-up - independent of the treatment offered.

3.4.6. Other 'risk factors'

In the present study one third of the patients reported childhood neglect, one fourth loss of a 'significant person' in childhood or adolescence and one fifth a life threatening event during their lifetime. In relation to treatment outcome success, childhood neglect, life threatening event and loss of a 'significant person' did not predict outcome.

Overall one patient in five had a pending insurance issue at baseline. Treatment outcome success was not dependent on a pending insurance issue in individually treated patients or in group treated patients.

4. Discussion

As the outcome of multidisciplinary intervention in chronic non-cancer pain patients should be long lasting, it is mandatory to include a sufficient follow-up period to ensure that treatment outcomes are persistent. When the present study was planned, a 12 months follow-up period was decided; however, this period was expanded to 15 months before the follow-up deadline was reached.

4.1. Comparisons to other studies

Other cohort studies have reported different follow-up periods: 6 months [16], 9 months [17], 10 years [15] and 13 years [18]. Follow-up studies are generally hampered by low response rates and our 15 months follow-up study had a modest response rate of 62%. However, comparable to two other Danish studies: 55% in a 9 months follow-up study [17] and 67% in a 6 months follow-up [16]. The response rate in our study was clearly associated with the patients' involvement with the pain clinic e.g. as patients participating in the Rehabilitation Programs responded to a higher degree than patients treated individually. The response rates obtained from general practitioners reflected the primary care system in Denmark, where GPs are in private practice and responding to questionnaires is strongly based on goodwill.

Two former Danish cohort studies from public pain centres have reported on outcomes of multidisciplinary intervention making comparisons between study populations possible [16,17].

The two studies and our study population are comparable regarding sex (65%, 67% and 66% females, respectively), age (mean age 58, 49 and 51 years, respectively), civil status (52%, 47% and 61% were married, respectively), duration of chronic pain (8, not reported and 8 years, respectively), SF-36 physical component (29%, 32%, 36% of normal values, respectively) and SF-36 mental component (40%, 42% and 51% of normal values, respectively). Psychological distress was reported in all study populations, but measured differently. Significant anxiety = HAD score >8 or BAI >16 (59%, 50% and 43%, respectively), significant depression = HAD score >8 or BDI score >19 (41%, 40% and 35%, respectively). However, the use of strong opioids differed significantly between the study populations (73%, 58% and 26%, respectively). Also the socio-economic status differed concerning work (11%, 20% and 21%, respectively), sick pension (45%, 66% and 27%, respectively) and sick leave (not reported, 13% and 27%, respectively). These data suggest that our patients were less 'chronified', which might reflect the difference in waiting time: public pain centres have waiting times exceeding one year whereas the patients in our study were evaluated within one month from referral.

4.2. HQOL

Treatment outcome success was reached by 62% of patients who were offered group therapy, compared with 41% of patients treated individually. With average baseline values of 111 (physical component) and 161 (mental component) treatment outcome success would demand an increase from baseline values of 33% and 25%, respectively. As the patients were not randomised to the treatments and selection to treatments was based on different criteria outlined above, this difference could be due to selection bias. We have addressed this issue by conducting a number of multivariate analyses to investigate if differences in baseline variables could explain the difference in treatment outcome. However, no baseline variables predicted treatment outcomes and in the final model, only participation in a group was predictive for treatment outcome success with an OR = 2.09 (1.11–3.93). However, the decision to offer group treatment was primarily based on the willingness and ability of a patient to participate in a group (manage the Danish language, accept personal involvement, be able to interact in a reflective manner) and the possibility and acceptance of fulfilling the time schedule for the group sessions. This process may identify patients with specific motivation for treatment and probably

motivation is the single most important factor for successful treatment outcome in chronic pain patients. On the other hand, the group process in itself may be responsible for the better outcomes.

4.3. Socio-economic outcome

Socio-economic outcomes in a chronic pain patient population have been recognized as important endpoints, although not easy to evaluate, as the majority of the patients treated in multidisciplinary pain centres in Denmark were permanently out of work [17]. In our study, almost all patients were economically stable at follow-up and almost twice as many patients, who were treated individually, ended up on social benefits, compared with those treated in groups. With a mean age in the study population of 51 years, this difference accumulates until retirement at age 65 years. Looking at return to work versus all other outcomes, patients who were offered group therapy, performed better than patients treated individually. We have addressed this finding by conducting a number of multivariate analyses to investigate whether differences in baseline variables could explain the difference in returning to work, including the effect of the multidisciplinary intervention, i.e. the differences in SF-36 scores, BAI and BDI from baseline to end of treatment. Neither baseline variables nor changes in SF-36, BAI and BDI were predictive for returning to work. In the final model only participation in a group was predictive for returning to work, with an OR = 5.69 (1.98–16.35).

4.4. Use of pain medications

Overall only small differences were seen when group treated patients were compared to individually treated patients, so changes in use of analgesics and other pain related medications were analysed for the total number of patients. Compared to other Danish studies [16,17], the use of analgesics at baseline was different in several aspects. In our study 24% of patients did not use analgesics at all, 55% used non-opioids, 25% used strong opioids and 18% tranquilizers or hypnotics. The comparable figures in Becker's study [16] were: 7%, 60%, 73% and 36%, respectively, and in Thomsen's study [17]: not reported, 65%, 58% and 55%, respectively. Data from waiting list patients for multidisciplinary treatment showed: 11%, 75%, 68% and not reported, respectively [19]. In our study population significantly fewer patients were treated with strong opioids and tranquilizers, compared with patients referred to public multidisciplinary pain centres or clinics in Denmark. Among patients treated with strong opioids, the mean daily dose of morphine equivalents was higher in our patient population (102 mg), compared with Becker (64 mg) [14] and Eriksen (74 mg) [19]. During management in our clinic a reduction of mean daily dose of opioid was observed to levels comparable to those described by Becker and Eriksen [16,19]. The use of tranquilizers was almost eliminated during management in our clinic, probably endorsed by much more public awareness of these drugs in 2007 compared to 8–10 years earlier. The use of anticonvulsants increased substantially during management, and 41% were treated with these drugs at discharge compared to 29% in the study by Thomsen [17]. In our study, the number of patients treated with antidepressants and/or anticonvulsants was unchanged at 15 months follow up. In Thomsen's study the percentage of patients treated with antidepressant dropped from 63% to 43% and patients treated with anticonvulsants dropped from 29% to 16% (9 months follow-up) [17]. We believe that the adherence to analgesics in the follow-up period should be interpreted as a treatment outcome success. At discharge from our clinic significantly fewer patients were treated with NSAIDs, which, however, was reversed in the follow up period. This finding can be interpreted as due to efficacy of NSAIDs, however, the costs of medications may also play a role as NSAIDs are much cheaper than most other analgesics.

4.5. Other risk factors

In population-based studies, childhood neglect has been shown to increase the risk of developing chronic pain in adulthood [20] and a meta-analysis has confirmed this finding [21]. Severe behavioural disturbances in childhood have also been demonstrated to be a risk factor for development of chronic pain in adulthood [22], whereas the hypothesis of pain as a learned behaviour from parents has been rejected [23]. The factors are self-reported and recall bias as well as underreporting of traumatic events may be a problem. In the present study none of these risk factors predicted treatment outcomes.

4.6. Limitations of the study

The present study is a pragmatic documentation of long-term effect of multidisciplinary intervention in a population of chronic non-cancer patients. The study results may be biased by the relative low response rate and comparison between individual and group intervention should be taken with caution due to a lack of randomisation. Furthermore, the total time spent with the patients differed. Individually treated patients and patients offered Pain School or MB-CBT consumed equal treatment time, whereas patients on Rehabilitation courses consumed twice as much time. Finally, the treatment groups were not compared to a control group receiving standard treatment. Our finding of superior outcomes in group therapy compared to individualized interventions need to be confirmed in a randomised controlled clinical trial.

5. Conclusion

The overall results of the study indicate that multidisciplinary intervention in a private setting may have a long lasting effect on the biological, the psychological and the social parts of the chronic pain condition. Furthermore, it can be hypothesized that group therapy may be superior to individual treatment regarding the beneficial effect on QOL, concomitant depression and anxiety and socio-economic outcome in terms of return to work and social benefits.

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