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EFFECTS ON SICK-LEAVE OF A MULTIDISCIPLINARY REHABILITATION PROGRAMME FOR CHRONIC LOW BACK, NECK OR SHOULDER PAIN: COMPARISON WITH USUAL TREATMENT

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Objective: **To test the outcome of active multidisciplinary treatment in an outpatient setting upon sick-leave status among patients with neck, shoulder and low back pain.**

Design: **Multidisciplinary treatment was administered to 121 patients (intervention group) over 4 weeks of structured intervention, followed by 8 weeks of less structured consultations. Effects of treatment were compared with usual treatment (control group: $n = 97$).**

Patients: **All patients were in the chronic stage of pain (average sick-leave: 6 months) with different diagnoses: neck-shoulder pain, low back pain or low back pain with radiating extremity pain.**

Method: **The intervention group programme included posture corrections, pain perception, skills to cope with pain, aerobic and fitness-promoting activities and relaxation techniques administered to groups of 8–10 patients. The Local National Insurance Office referred the patients who were diagnosed by general practitioners. A 12-month follow-up by the Local National Insurance Office provided feedback about sick-leave status of all 218 patients.**

Results: **There was a significant treatment difference in proportion taken off the sick list after 12 months (intervention group: 78.5%; control group: 50.5%; $p < 0.001$). The difference was greater among low back pain ($p < 0.001$) than among neck-shoulder ($p < 0.053$) and low back pain with radiating extremity pain ($p < 0.031$) patients.**

Conclusion: **Long-term effects of active multidisciplinary treatment were superior to treatment as usual in all diagnostic groups.**

Key words: chronic back pain, low back pain, multidisciplinary, neck and shoulder pain, rehabilitation, sick-leave.

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INTRODUCTION

Several early intervention studies for patients with low back pain (LBP) reported negative findings (1). Approximately 10 years ago Cohen et al. (2) reviewed the field of group education for people with LBP and concluded that evidence was insufficient to recommend group education for people with LBP. More recently 4 reviews have been published evaluating interventions to cope with neck, shoulder or LBP (3–6). Effects reported in these studies are encouraging for multidisciplinary interventions although effect criteria reveal large differences. Thus, effects upon health outcome variables appear to be small (e.g. utilization of health care system) and no consistent effect has emerged upon clinical variables such as pain intensity (6). A multidisciplinary approach was adopted in a vocational rehabilitation programme (7) where 54% in the study group reduced their benefit levels after 12 months compared with those at the start, whereas only 26% in the control group reduced their benefit levels.

Few studies have applied sick-leave status as an outcome variable. One recent study proved active intervention for LBP to reduce significantly the duration of sick leave and the recurrence and severity of new LBP episodes at 36 months into follow-up (8). A recent review of ergonomic intervention strategies for sickness absence due to back disorders concluded that in 7 out of 8 studies, return to work was significantly better in the intervention group (9). Intervention in the sub-acute phase, after 60 days of back pain, was the most successful. These authors recommended more studies of recurrence of sickness absence due to back pain over at least a 1-year follow-up period. The aim of the present study was to explore further effects upon sick-leave status of a multidisciplinary and active intervention approach to the rehabilitation of patients with chronic neck and shoulder pain or LBP with or without radiating pain.

Most controlled studies have reported findings based on recruitment of individuals in the sub-acute or early chronic phase (10–16). A majority of these studies included patients not on sick leave although pain may have interfered with daily activities and caused a need for advice from health professionals. Taken as a whole, the results from previous intervention studies are encouraging for the treatment of back pain with a multidisciplinary programme including physical exercise and psychological approaches to improve skills to cope with chronic pain. Bed rest is no longer recommended as a treatment for episodes of acute LBP (17). Encouragement of light mobilization of the lumbar region to increase the flexibility of the lower back has proven to be helpful in early chronic stages, and the combination of multidisciplinary approaches

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appear to be superior to conventional medical care in chronic LBP (18). The complexity of such interventions may improve health along many outcome dimensions including physical endurance and strength, flexibility, body awareness, self image and coping skills as well as pain process understanding, including fear-avoidance behaviour and direct moderation of pain mechanisms. The purpose of the present multidisciplinary intervention programme was to explore further effects upon sick-leave status, rather than to compare intervention efficacy along different outcome dimensions.

Our multidisciplinary programme involved physical exercise as well as medical and psychological approaches to the improvement of pain-related coping skills. These elements may work in favour of sub-chronic patients with mild to moderate pain problems, but will they be of help to patients with the more severe and chronic back pain problems who have been forced to take periods of sick leave, often dispersed repeatedly over several years? At a more specific level, will this approach be superior to traditional medical and physical treatment of patients with different diagnoses of chronic musculoskeletal pain, including neck and shoulder pain as well as LBP with or without radiating pain to the lower extremities?

The present study recruited patients with chronic pain in the neck, shoulders or low back. This pain had forced them to be on sick leave for an average of almost 6 months. The outcome variable in the 12-month follow-up period was work status (back to work or still on sick leave).

METHOD

Patients

The Local National Insurance Office identified all patients in the intervention as well as a balanced control group based on diagnoses given by their general practitioner (GP). Recruitment was gradual due to the capacity of approximately 24 patients in the intervention programme per 4 weeks at the clinic. Perfect randomization was not possible mainly due to reasons given at the end of this paragraph. Diagnoses fell in 3 groups based on International Classification of Primary Care (ICPC) criteria for non-specific neck and shoulder pain, LBP or LBP with radiating pain. The intervention group (I) comprised 121 patients (46 males and 75 females; mean age 43 years, range 22–66). The treatment as usual group (control patients: C) comprised 97 patients (36 males and 61 females; mean age 44 years, range 25–66). This meant that the I and C groups were balanced for age and gender (see Table I for details). Five patients referred to the I group dropped out. Three withdrew before the intervention programme started due to expected high exercise load and their decision to go back to work, one dropped out after 2 weeks due to subjective improvement that took the patient back to work and one left with no given reason.

The Local National Insurance Office recruited patients from one area of the city to the I group, whereas the C patients were recruited from other town areas. This arrangement reduced the risk of between-group communication during the intervention period. The Local National Insurance Office was instructed to avoid any bias between the groups for gender, age, socio-economic status and professional workload. The clinic was never involved in any aspect of the recruitment of patients. This arrangement was possible because the Local National Insurance Office is responsible for keeping records of sick-leave prevalence in the county. All patients (I, C) were identified in this public health database on the basis of initial diagnosis, given by their GP and time since being sick-listed (more than 4 and less than 12 months: average of 6 months). All participants took part in regular clinical treatment (I or C intervention) which was sanctioned by the local health authorities. This meant that no further approval was requested for ethical reasons and all patients maintained their anonymity throughout the study.

Table I. *Distribution of males and females across the 3 diagnostic sub-groups within the intervention group (I) and the control group (C: treatment as usual). Means (M) and standard deviations (SD) as well as age range are given*

	I group	C group
Diagnoses	M (SD) Range	M (SD) Range
Neck/shoulder		
Age (years)	43.4 (10.2) 22–63	45.5 (10.7) 26–61
Gender (males/females)	7/23	6 /19
LBP		
Age (years)	42.9 (10.4) 29–65	44.5 (13.1) 25–66
Gender (males/females)	15/33	20 /26
LBP + radiation		
Age (years)	41.6 (9.3) 25–66	43.2 (9.0) 25–63
Gender (males/females)	24/19	10 /16
Overall female percentage:	62.0%	62.8%

LBP: low back pain.

Design and intervention programme

In the 12-month follow-up period (I and C groups), GPs were responsible for reporting to the Local National Insurance Office patients to be taken off the sick list. The clinic had no further contact with the patients in the I group after they completed the intervention programme and the clinic was never in touch with the C group patients. Data on prevalence of being sick-listed in the follow-up period were given to the authors from the database in the Local National Insurance Office that handled data in coded form to assure patient anonymity. Thus, none of the authors were involved in any discussion or decision related to taking patients in the I and C groups off the sick list. Follow-up checkpoints were defined at 1, 3, 6 and 12 months after enrolment in the I and C groups.

The intervention programme counted 24 hours distributed evenly over 4 weeks to groups of 8–10 patients, with males and females as well as different diagnoses being represented in every group. The clinic is located within the building of a fitness centre that offered opportunities for aerobic as well as strength-promoting training, including also access to swimming pools. At enrolment, the specialist in physical medicine saw all patients, and a careful diagnosis was established which not always confirmed the diagnosis given by the GP. Thus, 25 patients were found to have general pain rather than any specific back or neck diagnosis. However, they were included in intervention on the premise of the original diagnosis given by their GPs. This validating procedure was not available to the C group that was never in contact with the clinic although the balanced recruitment procedure gave reason to assume a similar proportion of non-specific pain also in the C group.

Motivation for active involvement in the intervention was encouraged during the initial consultation that described the bio-psycho-social orientation of the programme. The groups met 3 times per week for 2 hours and were exposed to a medical doctor, a physiotherapist and a psychologist. This treatment team assisted the group in developing greater insight into the process of pain perception, more self-confidence, reduction of fear-avoidance behaviour, and greater skills to cope with pain reduction and these professionals sometimes addressed the patients together. Physical exercises were tailored to each individual in terms of intensity and dose and they aimed at posture improvement, the improvement of aerobic capacity and strength as well as flexibility of skeletal muscles related to pain perception. Exercises also offered practice of techniques for better relaxation and body awareness. For 4 hours the patients were taught about mechanisms of pain perception and how pain can be influenced by psychological and behavioural factors in ways that can be self-reinforcing and, thus, account for a complex "vicious circle" of chronic pain (14, 15).

At the end of the 4-week intervention programme, each patient met

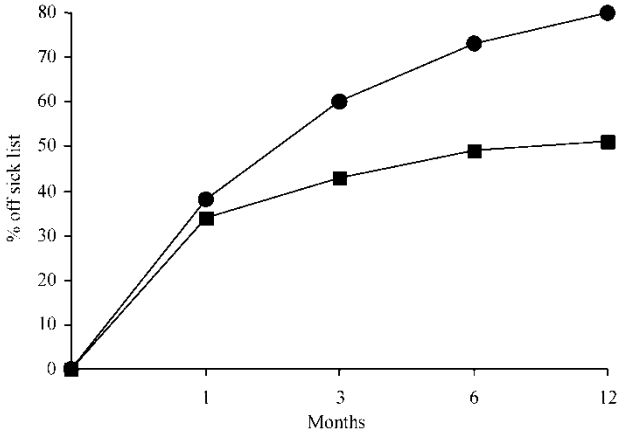

Fig. 1. Trends for number of patients taken off the sick list at 1, 3, 6 and 12 months of follow-up in the treatment as usual (controls) group (■) ($n = 97$) and in the intervention group (●) ($n = 121$).

with the specialist of physical medicine once more to discuss intervention outcome. Part of this consultation offered the opportunity to continue functional training at the clinic with continued monitoring by the staff. The main purpose of this offer was to motivate the patient for further exercise, to become more responsible for the development of pain management skills and to consult with staff related to special needs.

Patients in the C group were offered "treatment as usual" where the general practitioner refers the patient to the physiotherapist, chiropractor etc., and the patient often initiates a range of paramedical "treatments" to cope with everyday pain problems adjunct to the recommendations given by their doctor.

Statistics

All data were organized for statistical analyses using the SPSS software for the Windows and Macintosh computers. Analyses included 2 approaches. First, an overall two-way repeated measures ANOVA was applied to the testing of group differences (C vs I groups) by time (at start, after 1, 3, 6 and 12 months). Data on sick listing ("yes" or "no") were also analysed in pair-wise comparison by the Crosstab procedure. It computed Pearson's chi-squares for differences in frequencies of sick listing between the C and I group patients, within separate diagnoses, and at 1, 3, 6 and 12 months of follow-up (note that all were sick-listed at start). Criterion for significant effects was set at the 5% alpha level. Greenhaus-Geisser epsilon correction of *p*-values was applied in the two-factor (groups by time) repeated measures ANOVA.

RESULTS

A repeated measures ANOVA was performed to test trends for the C and I samples in sick list status over time in the follow-up period (at 1, 3, 6 and 12 months after starting on treatment across all diagnostic groups: see Fig. 1). Results confirmed a highly significant overall group difference ($F(212/1) = 10.87$, $p < 0.001$), as well as improvement over time for the total patient sample ($F(636/3) = 28.96$, $p < 0.001$). The former effect was due to more patients being taken off the sick list over time in follow-up in the I group than in the C group. The second effect reflected a general trend for being taken off the sick list over time among both groups of patients.

Follow-up tests revealed significant group differences in probability of being taken off the sick list after 3 months when all patients in the I were compared with those in the C group ($p < 0.033$). This difference increased after 6 months ($p < 0.001$) and was still more pronounced after 12 months ($p < 0.0001$). These differences were due to an increasingly higher probability of being taken off the sick list among the patients in the I group, compared with patients in the C group. Table II shows that patients in the I group returned to work at a higher frequency than did those in the C group. This difference was also observed when patients with neck and shoulder pain were compared separately and this approach revealed particularly high levels of significance of group differences after 6 and 12 months in the LBP groups. Also in the C vs I groups of patients with LBP and radiating pain, a significantly higher

Table II. *Number (and %) of patients who were taken off the sick list (NS) and who were still sick-listed (SL) after one, 3, 6 and 12 months of follow-up. Pearson's chi-square scores and level of significance for comparisons of patient status across the treatment as usual (C) and intervention (I) groups are given for each time-period*

	1 month		3 months		6 months		12 months	
Diagnoses	NS	SL	NS	SL	NS	SL	NS	SL
Neck/shoulders								
C	12 (48)	13 (52)	13 (52)	12 (48)	14 (56)	11 (44)	15 (60)	10 (40)
I	18 (60)	12 (40)	22 (73)	8 (27)	24 (80)	6 (20)	25 (83)	5 (17)
	$\chi^2 = 0.79$ (n.s.)		$\chi^2 = 2.68$ $p < 0.10$		$\chi^2 = 3.68$ $p < 0.055$		$\chi^2 = 3.74$ $p < 0.053$	
LBP								
C	14 (30)	32 (70)	20 (44)	26 (56)	19 (41)	27 (59)	22 (48)	24 (52)
I	16 (33)	32 (67)	25 (52)	23 (48)	37 (77)	11 (23)	39 (81)	9 (19)
	$\chi^2 = 0.09$ (n.s.)		$\chi^2 = 0.70$ (n.s.)		$\chi^2 = 12.49$ $p < 0.001$		$\chi^2 = 11.52$ $p < 0.001$	
LBP + radiation								
C	8 (31)	18 (69)	9 (35)	17 (65)	13 (50)	13 (50)	12 (46)	14 (54)
I	12 (28)	31 (72)	23 (54)	20 (46)	27 (63)	16 (37)	31 (81)	12 (28)
	$\chi^2 = 0.07$ (n.s.)		$\chi^2 = 2.32$ $p < 0.13$		$\chi^2 = 1.09$ (n.s.)		$\chi^2 = 4.62$ $p < 0.03$	

probability of being taken off the sick list was found for patients in the I group after 12 months.

DISCUSSION

The results of this study clearly support a favourable conclusion to the question of implementing a multidisciplinary treatment model in an outpatient clinical setting for chronic musculoskeletal pain rehabilitation. They also support the use of this multidisciplinary approach in the rehabilitation of groups of patients with musculoskeletal pain in the chronic stages. The most encouraging result relates to the fact that all 3 diagnostic sub-groups of patients, treated in this outpatient clinical model, responded with improvements that were significantly better at bringing them off the sick list after 12 months in follow-up, compared with patients in treatment as usual.

In sum, the results support a multifactorial approach to the treatment of chronic musculoskeletal pain. Correspondingly, they indicate that rehabilitation is more effective when addressing a number of different functional challenges simultaneously. Our findings provide further support, therefore, to a multidisciplinary model of back pain rehabilitation where the physiotherapist, medical doctor and psychologist contribute in a co-ordinated and well-integrated programme of pain management.

A multifactorial understanding of causality in chronic musculoskeletal pain has developed with contributions from many disciplines over several decades (19–25). However, a bio-psycho-social understanding of the multifactorial challenge in rehabilitation is of little use to the patient unless this complex approach can be modelled into a form that is clinically applicable. Our approach has been successful in addressing this challenge within an outpatient clinical setting that is more cost effective than is the setting of the traditional medical hospital. From a public health care funding perspective the intervention reduced the time on sick leave among more patients over a 12-month follow-up period than was the case in treatment as usual. It has been indicated in previous research that light mobilization and informative intervention can significantly reduce the recurrence of sick-leave due to LBP over a 1-year (26) as well as 5-year follow-up period (27). The present intervention programme reduced time on sick-leave among chronic patients with LBP with or without radiation pain as well as patients on sick-leave due to neck and shoulder pain.

One might object to the composition of the present intervention group that these patients may have been relatively less impaired than those who ended up in the C group. To the extent that this question can be resolved retrospectively, there is no indication to support that the Local National Insurance Office was selectively sending less disabled cases to the clinic than those who were allocated to the C group. Patients in the I group had on average been on sick-leave for almost 4 weeks more than those in the C group which also suggests a slightly more elevated stage of chronic pain among these patients than for those in the control group. In this way, there is reason to believe that slightly more severely impaired patients were offered treatment in our model than was the level of impairment among the control patients. These differences notwithstanding, all patients had been sick-listed for at least 4 months.

Despite the fact that sex was almost perfectly balanced across the I and C groups, differences appeared between subgroups. In the LBP groups 68.7% were females in the I group as opposed to 56.5% in the C group. Again, this difference may have worked in favour of the 0-hypothesis: There is some support from previous research to the assumption that females may have greater difficulty than have men in returning to working life after sick-leave. This may be due to a somewhat higher prevalence of somatic complaints, anxiety and depressive mood in women than in men (28). From this perspective the high success rate in bringing patients in the I-group of LBP patients back to work may be taken as particularly encouraging.

We acknowledge the superior power of a randomized control, double-blinded, clinical trial. In the present study, a balanced blinded recruitment procedure proved to be the best possible method available due to referral routines in the city area which permitted a recruitment solution that came close to a purely randomized recruitment design. One major strength of the present study may be the fact that none of the staff involved in the intervention programme was ever involved in recruitment nor in deciding among all patients in both groups who should be taken off the sick list. From this perspective, the present findings contribute to the empirical support for multidisciplinary intervention in neck, shoulder and back pain outpatient treatment for helping patients off the sick list and back to work. Where possible, the present findings should be validated in a randomized and blinded follow-up study of corresponding patients with chronic musculoskeletal pain.

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