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The Spine Journal 3 (2003) 270–276

THE
SPINE
JOURNAL

Multidisciplinary rehabilitation versus usual care for chronic low back pain in the community: effects on quality of life

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Received 30 July 2002; accepted 22 January 2003

Abstract

BACKGROUND CONTEXT: Multidisciplinary biopsychosocial rehabilitation has been shown in controlled studies to improve pain and function in patients with chronic back pain. However, specialized back pain rehabilitation centers are rare and only a few patients can participate on this therapy. Implementation of multidisciplinary rehabilitation services in community medicine may enhance both early availability and treatment capacity for comprehensive back pain rehabilitation.

PURPOSE: To compare the outcome of a multidisciplinary rehabilitation program (MRP) that was organized by cooperation of local health-care providers in the community with that of the usual care by independent physicians for patients with chronic low back pain.

STUDY DESIGN: A comparison between the outcomes (follow-up time of 6 months) of treatment for chronic back pain in the community in a prospective intervention group versus a prospective observational usual care group.

PATIENT SAMPLE: All patients were recruited from independent physicians in the community of a selected region who participated voluntarily in the study. Patients were included in the study if they were seeking treatment of pain in the back with possible irradiation into the legs, the pain persisted for at least 3 months without decreasing intensity and there was no indication for surgical intervention.

OUTCOME MEASURES: Outcome was assessed from patients' responses in self-report questionnaires at baseline and after an interval of 6 months. For outcome, we evaluated the health-related quality of life (German version of Short Form [SF] 36), the average pain severity (Numeric Rating Scale), the pain-related interference of function (German version of Brief Pain Inventory), depression (Allgemeine Depressionsskele), time off from work within 3 months before entering and leaving the study and the self-appraisal of improvement.

METHODS: In a baseline group, the independent physicians treated the patients with usual care. In the intervention group, the patients were referred by the independent physicians to the study coordinator in the outpatient facilities of the Departments of Neurology or Orthopedics for inclusion in the MRP. The MRP was organized by cooperation of local health-care providers in the community with different specialties (sport teachers, clinical psychologist, physiotherapist and physician) who were experienced in the management of back pain. The MRP (4 hours per day, 3 days per week, 20 days) included 1.5 hours restorative exercise therapy, 0.5 hours physiotherapy, 1 hour cognitive-behavioral therapy, 0.5 hours progressive muscle relaxation and 0.5 hours education.

FDA device/drug status: not applicable.

This work was supported in whole or in part by the German Federal Ministry of Health, Grant GMKP0A004995.

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doi: 10.1016/S1529-9430(03)00028-7

RESULTS: Complete data sets were obtained from 157 patients in the usual care group (documented by 35 independent physicians) and 51 patients in the MRP group. Patients of the MRP group improved in the physical and mental health domains of the SF-36 more than patients treated by usual care ($p < .05$). Furthermore, days off work were more ($p < .05$) reduced by the MRP (16 ± 35 days) than by usual care (-2 ± 39 days). Finally, overall appraisal of successful outcome was better ($p < .01$) after MRP (54% of patients) as compared with usual care (24% of patients). However, the pain intensity (NRS), the pain-related interference with function (Brief Pain Inventory; BPI) and the depression scores (ADS) did not differ significantly between both groups.

CONCLUSIONS: MRP is promising to improve health-related quality of life for patients with chronic back pain in the community. Before implementation of MRP in the repertoire of community medicine, superiority of MRP over usual care should be confirmed by a randomized controlled trial. © 2003 Elsevier Inc. All rights reserved.

Keywords:

Back pain; Multidisciplinary rehabilitation; Functional restoration; Community medicine

Introduction

Back pain is one of the most common medical and socioeconomic problems in the industrialized countries [1]. Most back pain problems are nonspecific in that no underlying pathophysiological or anatomical defects explain the pain on a scientific level of evidence [2,3]. The biopsychosocial model of chronic back pain attributes biomechanical dysfunction, physical deconditioning and psychosocial stressors as interrelating causes of chronic, entrenched disability [4].

Most patients with chronic nonspecific back pain are treated by nonmultidisciplinary therapies of health-care providers in the community. However, in controlled studies, few of the nonmultidisciplinary therapies have been proven to be effective for the treatment of chronic lower back pain [5]. It has been reported from a national survey in the United States that there is little consensus among physicians regarding effective diagnostic tests and therapeutic interventions in the treatment of acute and chronic low back pain [6,7]. Additionally, these diagnostic tests and therapeutic interventions did not agree with the recommendations of the Quebec Task Force on Spinal Disorders [1]. Thus, most patients with chronic back pain in the community are currently managed by many different interventions with uncertain scientific evidence regarding their effectiveness.

In contrast, intensive multidisciplinary biopsychosocial rehabilitation with functional restoration has been shown in controlled studies to improve pain and function in patients with chronic low back pain [8,9]. Originally, functional restoration was characterized by an interdisciplinary, medically directed team approach that is provided by a highly qualified treatment staff with frequent team conferences [4]. However, the more complex structure and higher costs of functional restoration programs as compared with usual care limited the implementation of back pain rehabilitation centers as an option for routine treatment.

To overcome the structural deficits in back pain management in the community, we tested the outcome of a multidisciplinary rehabilitation program (MRP) that was organized by cooperation of interested and qualified local health-care providers in the community. The costs for the MRP could

be kept low and paid by the patients because of treatments in group settings and sharing of health-care structures that are cofinanced from therapies other than MRP. However, less specialization of the treatment staff on therapy of back pain and less interdisciplinary cooperation may cause lower outcome of MRP when compared with the functional restoration program as described by Gatchel et al. [4]. Nevertheless, if this “prototype” of an MRP would prove to be more effective than the nonmultidisciplinary treatments of usual care, the program might be copied in different towns and integrated in the community medicine. As a consequence, treatment capacity and local availability for MRP are expected to increase. Furthermore, MRP could be applied earlier in the progress of back pain chronification and might be more effective.

The aim of the present study was to compare the outcome of MRP versus usual care for treatment of back pain in community settings. Outcome was assessed from self-reported questionnaires as differences from baseline to follow-up after 6 months. As the main outcome measure, we evaluated the health-related quality of life by means of the German version of the Short Form 36 (SF-36) [10]. The SF-36 quantifies different aspects of the health-related physical and emotional well-being in eight domains and has been proven effective as a means of tracking group outcomes after interventions to treat chronic back pain [11–13]. Furthermore, the primary aim of functional restoration—better coping with biomechanical, psychosocial and socioeconomic factors involved in disability behaviors—addresses particularly the role limitations of patients with back pain. The effects of MRP and conventional care on the specific SF-36 domains are compared with those on pain intensity, pain-related interference with function, depression and days off work.

Methods

Study sample

All physicians within a defined region of 1.6 million inhabitants in Bavaria, Germany (Mittelfranken), who regularly treat patients with chronic back pain, were invited to take

part in the study. To increase the participation rate among physicians, time for recruitment of patients and documentation of data was paid.

Physicians were instructed to recruit all consecutive patients between May 1997 and May 1998 who met the following inclusion criteria: seeking treatment of pain in the lumbar and/or thoracic spine with facultative irradiation cranially, caudally or ventrally, persistence of pain for at least 3 months without decreasing intensity and no need for surgical intervention. Patients were excluded from the study if their informed consent for participation in the study could not be obtained by the physician, the patient was not able to answer the questionnaires independently, pain was localized over almost the whole body or there was a history of cancer.

The same inclusion and exclusion criteria were used for patients who participated in our MRP between June 1998 and June 1999. These patients were referred from independent physicians within the selected region to the study coordinator in the outpatient facilities of the Departments of Neurology and Orthopedics for inclusion in the MRP.

Data of the study samples are described in the Results section.

Interventions

Usual care by independent physicians group

No intervention was performed. Patients with low back pain were treated by usual nonmultidisciplinary and nonsurgical treatments of physicians and physiotherapists in the community.

MRP group

These patients participated in a comprehensive multidisciplinary rehabilitation program with functional restoration of 20 days (3 days per week) and 4 hours per day. Health-care providers in the local community organized the program. The MRP team included four sport teachers who ran a sport center for health sport and sport therapy and were qualified in prevention and rehabilitation of diseases; one clinical psychologist with experience in psychosocial problems of patients with back pain; three physiotherapists experienced in rehabilitation of musculoskeletal disorders; one physician who was experienced in management of chronic back pain.

Groups of 7 to 12 persons participated in the center for health sport and sport therapy on each treatment day with the following therapies:

1. 90 minutes physical exercises conducted and supervised by one of the sport teachers. After initial functional analysis, an individual training program with a quantitatively directed exercise progression was tailored for each patient. The training focused on functional exercises of the extensors and flexors of the lumbar spine (lumbar extensors and abdominal wall muscles), the hips (gluteal and ileopsoas muscles) and knees (hamstrings and quadriceps muscles) by means

of medical training therapy machines (Keller, Balzheim, Germany) and pullies. Additionally, training included general strengthening of the major muscle groups of the upper and lower extremities by means of sequential training tools with computer-supported biofeedback systems, endurance training with pulse monitoring, general schooling in position and movement of the body, specific training for demands in daily living and work and recommendations for future fitness maintenance.

2. 30 minutes individual physiotherapy in order to optimize individual biomechanical problems, for example, shortening of muscles.
3. 60 minutes cognitive-behavioral therapy, directed by the psychologist. Therapy included group therapeutics and individual counseling focusing on disability management, improvement in coping skills for back pain-related problems and stress management.
4. 30 minutes learning and training of progressive muscle relaxation with the psychologist.
5. 30 minutes education by the physician, sport teacher or physiotherapist. The education focused on the anatomic, physiologic and movement-related basics of the back and the evidence-based knowledge about the effectiveness of back-related therapies. Information was based on the biopsychosocial model of chronic low back pain [14,15].

The total costs for this program were 600,- DM and were paid by the patients.

Measurements and outcome parameters

Both groups, the MRP group and the usual care (UC) group, were investigated in the same standardized way.

The patients had to complete self-report questionnaires at time of recruitment in the study and after a follow-up of 6 months. To avoid contamination of patients' responses with possible influences of their physicians, the patients had to return their questionnaires in self-addressed stamped envelopes to the study center.

The patients documented their demographic data, pain duration (months) and pain dynamic (intermittent, constant with and without fluctuating intensity) at the start of the study. For outcome, we assessed:

- Health-related quality of life, as indicated by the German version of the SF-36 [10];
- Mean pain intensity in the last 24 hours, as indicated on a numeric rating scale (NRS) with 0 indicating no pain and 10 indicating worst pain, as part of the German version of the Brief Pain Inventory [16];
- Pain-related interference (0=no interference, 10=complete interference) with function as indicated on seven subscales (activity, mood, walking, work, relations with others, sleep, enjoyment of life) in the German version of the Brief Pain Inventory [16];

- Extent of depression, as indicated on a German depression scale, the Allgemeine Depressionsskala [17];
- Days off from work in the last 3 months;
- An overall appraisal for successful outcome. The patient was asked: “How do you estimate the restriction in your whole life situation due to pain as compared to the time before begin of the study?” Possible responses included better, unchanged and worse.

The physicians had to document the prescribed therapy for their patients.

Statistical analysis

The *t* test for independent samples was used to test differences in continuous variables, except the skew deviated data for pain duration that were analyzed by the Mann–Whitney *U* test. The chi-squared test was used to test differences in proportions. Differences in outcomes between the MRP and UC groups were compared by univariate analysis of variance. Skew deviated variables were normalized by logarithmical transformation ($\ln [x + 1]$) before statistical analyses. Multiple analysis of variance was used to control for age (categorized into tertiles), gender (male vs. female) and the detected differences for education (no completion of training, grade school, high school and university) and gross income per month in German marks (up to 3,000, up to 5,000, 5,000 and more). Because of significant differences between the MRP and UC groups, multivariate analyses were also adjusted to the baseline values of the physical functioning score of the SF-36 (categorized into tertiles) and the pain-related interference of function (BPI) (categorized into tertiles). All tests were two tailed, and statistical significance was determined at an alpha level of .05. Statistical analyses were performed with the SPSS 10.0 software packet.

Results

Study sample

Usual care group

Thirty-five independent physicians (17 orthopedics, 10 general practitioners, 5 neurologists, 1 neurosurgeon, 1 internist, 1 gynecologist) participated on the study. They included 157 patients with complete data sets in the study.

MRP group

Fifty-six patients were included in the MRP group. Five patients finished their participation in the program before the fifth session and were excluded from evaluation because they did not received the standardized intervention. Two of these patients broke off the MRP because of increase of back and leg pain, and the other three patients finished MRP without success because they felt it too strenuous. Baseline and follow-up data were obtained from the 51 patients who completed the MRP.

Table 1
Demographic characteristics

	MRP (n=51)	Usual Care (n=157)	p Value
Age (years) (mean±SD)	53±10	53±12	.8
Body height (cm) (mean±SD)	171±9	169±9	.3
Body weight (kg) (mean±SD)	74±13	78±16	.1
Gender (female) (%)	57	60	.7
Marital state (%)			.9
Single	14	19	
Partnership	86	81	
Education (%)			<.001
No completion of training	0	6	
Grade school	36	64	
High school	46	25	
University	18	5	
Occupation (%)			.08
Blue-collar workers	6	18	
White-collar workers	43	29	
Housewives	28	18	
Pensioned	23	33	
Unemployed	0	3	
Gross income per month in German marks (%)			<.01
<2,000	26	44	
<3,000	10	20	
<4,000	21	15	
<5,000	5	7	
>5,000	38	14	

MRP=multidisciplinary rehabilitation program.

Patients

The demographic data of the MRP and UC groups are shown in Table 1. Statistically significant differences were found for level of education ($p<.001$) and income per month ($p<.01$).

Data of pain history are summarized in Table 2. Pain duration, frequencies of pain area, pain dynamic and previous surgical interventions on the lumbar spine (mainly nucleotomia) did not differ significantly between both groups.

Usual care of independent physicians

Treatments of the UC group included drug therapy (91%), conversations about pain-related somatic and psychosocial

Table 2
Pain history

	MRP (n=51)	Usual care (n=157)	p Value
Baseline values			
Pain duration in years (median/25%/75% percentiles)	12/7/20	9/3/18	.09
Pain area (% patients)			.6
Low back	47	43	
Low back and leg	53	57	
Low back and leg below knee	26	32	
Pain dynamic			.4
Continuous pain	80	79	
Intermittent pain	20	21	
Previous lumbar surgery (% patients)	18	22	.6

MRP = multidisciplinary rehabilitation program.

problems (65%), injections of local anesthetics and corticoids (53%), physiotherapy (44%), chirotherapy (33%), acupuncture (16%), transcutaneous electrical nerve stimulation (9%) and muscle relaxation (2%).

Concurrent care of subjects in the MRP group

Thirty-two patients (63%) continued their analgesic medication over the observation period. No other cotreatments were reported.

Baseline data

The MRP group differed significantly from the UC group by higher baseline values in the SF-36 domain physical functioning and the SF-36 physical component summary score and by a lower baseline value of the pain-related interference of function (BPI) (Table 3). No other statistical differences were found.

Twenty-four patients (47%) of the MRP group and 69 patients (45%) of the UC group indicated time off work before starting the study. In these patients, the number of days off work during the 3 months before starting the study did not differ significantly between the MRP group (30 ± 41) and the UC group (31 ± 38).

Comparisons of changes from baseline to follow-up between MRP and UC groups

The patients in the MRP group improved significantly in the SF-36 domains role limitations, physical; bodily pain; social functioning; role limitations, emotional; emotional well-being and the physical and mental component summary scores as compared with the UC group. In addition, a reduction of days off from work was noted for the MRP group (16 ± 35 days) as compared with the UC group (-2 ± 39 days; $p = .05$). Reduction of days off work correlated with improvements of the SF-36 domains social functioning ($r = 0.34$, $p < .001$, $n = 104$) and emotional well-being ($r = 0.24$, $p < .05$, $n = 104$), not with changes of pain intensity (NRS) or pain-related interference of function (BPI).

In contrast, no significant group differences could be observed in the treatment effects on intensity of pain (NRS), on the sum scores of the pain-related interference of function (BPI) and on the depression score (ADS). However, subscale analysis of the BPI revealed group differences in the subscale pain-related interference with work in favor ($p < .05$) of the MRP group (1.5 ± 2.4) as compared with the UC group (0.7 ± 2.2).

Overall appraisal of successful outcome

In the MRP group, 54% of the patients indicated 6 months after the program that the restriction in their whole life situation by the pain as compared with the time before the beginning of the study was better. This frequency was

Table 3

Health-related quality of life (SF-36), pain intensity (NRS), pain-related interference with function (BPI) and depression (ADS)

	MRP (n=51)	Usual care (n=157)	*p Value
Health-related quality of life (SF-36)			
Physical functioning			
Baseline value	53±22	34±22	<.001
Difference to follow-up	10±17	8±18	.1
Role limitations, physical			
Baseline value	27±37	14±27	.8
Difference to follow-up	19±39	7±31	<.01
Bodily pain			
Baseline value	27±21	26±20	.8
Difference to follow-up	18±25	7±23	<.01
General health			
Baseline value	52±16	42±15	.07
Difference to follow-up	3±13	2±10	.2
Vitality			
Baseline value	46±18	37±19	.5
Difference to follow-up	7±17	6±17	.5
Social functioning			
Baseline value	64±25	56±25	.4
Difference to follow-up	15±21	5±24	<.05
Role limitations, emotional			
Baseline value	66±43	40±44	.3
Difference to follow-up	16±50	3±42	<.05
Emotional well-being			
Baseline value	59±18	54±20	.9
Difference to follow-up	8±17	3±16	<.05
Physical component summary score			
Baseline value	32±9	28±8	<.05
Difference to follow-up	4.9±8.0	2.6±6.8	<.05
Mental component summary score			
Baseline value	47±11	42±12	.7
Difference to follow-up	4.4±11	1.8±10	.1
Pain intensity (NRS)			
Baseline values	4.4±1.5	5.0±1.9	.3
Difference to follow-up	1.1±1.4	0.8±1.8	.3
Pain-related interference of function (BPI)			
Baseline value	23±12	33±15	<.05
Difference to follow-up	7±12	5±13	.2
Depression (ADS)			
Baseline value	15±8	21±10	.2
Difference to follow-up	4±8	2±8	.2

Values are mean±SD.

*p value for differences between MRP and usual care group; p values were adjusted for age, gender, education, gross income per month, pain-related interference with function (BPI) and physical functioning (SF-36).

ADS=Allgemeine Depressionsskale; BPI=Brief Pain Index; MRP=multidisciplinary rehabilitation program; NRS=Numeric Rating Scale; SF-36=Short Form 36.

higher ($p < .01$) than the 24% of patients in the UC group with “better” responses.

Discussion

We compared the outcomes of a multidisciplinary rehabilitation program (MRP) with that of usual care by

independent physicians. Patients who received MRP had better outcome than those who were treated with usual care with respect to health-related quality of life (SF-36), days off work and self-reported overall appraisal of successful outcome. These effects are clinically relevant as indicated by the self-reports of the patients and the positive economic consequences of fewer days off work. Therefore, implementation of MRP in community medicine might improve the outcome of usual care for treatment of chronic back pain in the community.

Contrary to outcome studies of the rare highly specialized back pain rehabilitation centers, MRP was organized by cooperation of local health-care providers in the community. These MRP teams can be multiplied in different towns more easily. Consequently, the availability and capacity of effective back pain rehabilitation in the community would be increased. These aims are in line with the recommendations for effective back pain management by the UK Clinical Standards Advisory Group [18], who emphasized improvement of the low availability of back pain rehabilitation facilities at present.

Quality of life is concerned with whether disease or impairment limits a person's ability to fulfill a normal role. The judgment about a role limitation depends not only on the extent of the pain-related interference with function but also on patients' expectations for their health [19]. It is well known that many patients with chronic back pain hold unrealistic and maladaptive expectations, for example, about the attributed causes for back pain or the effectiveness of different therapies. As a major part of our MRP, counseling and education on the basis of a scientific level of evidence tried to change the patients' unrealistic beliefs and expectations. Additionally, experience of successful exercising may reinforce patients' beliefs in their physical abilities. Thus, superiority of MRP over usual care regarding health-related quality of life might result from effects of MRP on patients' behavior and coping strategies for pain and pain-related interference with function. The group differences in the effects on health-related quality of life cannot be explained by effects of MRP on depression and activity, because their scores did not differ significantly between both groups.

Positive effects of MRP compared with usual care on physical health are indicated in the SF-36 domains role limitations, physical, and bodily pain. The greatest differences in mental health between MRP and usual care patients were seen in the SF-36 domain social functioning, although significant differences were also found in the SF-36 domains role limitations, emotional, and emotional well-being. These positive results of the MRP on the different SF-36 domains were comparable to previous findings [11,12]. However, restorative exercise without cognitive-behavioral therapy in the study of Leggett et al. [12] produced stronger effect than MRP of the present study on the physical health domains but was less effective in the mental health domains. In contrast, the intensive interdisciplinary restorative functional

rehabilitation program in the study of Gatchel et al. [11] that included cognitive-behavioral therapy produced stronger effects than MRP in both the physical and health domains. Thus, different intensities and components of functional rehabilitation programs might result in different effects in the domains of the SF-36.

Smaller effects of MRP by cooperation of health-care providers in the community versus intensive back pain rehabilitation programs by institutionalized back pain rehabilitation centers [11,12] are likely to result from structural differences in the intervention teams. As a consequence of less specialization of the MRP staff in the present study, the interdisciplinary team strength of the staff was lower and the physical training and the disability behavior-oriented interventions were less individualized; they were described to be essentially for a functional restoration program in an institutionalized back pain rehabilitation center [4]. This weakness of MRP should be improved in the organization of future MRP teams.

The mean baseline values of the SF-36 domains in the patients of the usual care group were generally lower than those in the MRP group, although only the values of the SF-36 domain physical function and the physical health component summary score differed significantly between both groups. Therefore, possible dependence of treatment effects from baseline values must be considered. However, in the study by Leggett et al. [12] the baseline values of most SF-36 domains were higher and those in the study by Gatchel et al. [11] were lower than the baseline values of the MRP group. Yet, both restorative exercise [12] and functional restoration rehabilitation [11] were more effective than MRP in the present study. This indicates that differences in the SF-36 baseline values between the UC and the MRP groups of the present study are unlikely to cause the changes in the SF-36 values from baseline to follow-up.

Superior effects of MRP on work readiness as compared with usual care are indicated by two independent results. First, the days off work were reduced by MRP and, second, pain interfered with work less after the MRP. Interestingly, the changes in days off work after treatments correlated with psychosocial variables, that is, the SF-36 domains social functioning and emotional well-being indicated the importance of cognitive behavioral interventions in the MRP. In contrast, changes in pain intensity or pain-related interference in global function in daily life showed no effects on work readiness.

Contrary to the effects on health-related quality of life, MRP exerted no better treatment effect on pain intensity (NRS) or interference of pain with daily functions (BPI) than usual care. This result is, however, in line with reports in the literature. Treatment time of MRP (85 hours) was in the middle between two extremes that have been stratified in a systematic review of randomized controlled trials on multidisciplinary rehabilitation for low back pain [9]. This review described strong evidence of improving function and moderate evidence of improving pain with intensive

(greater than 100 hours) daily multidisciplinary biopsychosocial rehabilitation. Less intensive (less than 30 hours) once or twice weekly multidisciplinary biopsychosocial rehabilitation could not show improvements in pain or function when compared with usual care [9]. Thus, to improve pain intensity (NRS) and pain-related interference with function (BPI) more than usual care, treatment time might be increased and possibly staff–patient relationships might be improved.

The German version of the SF-36 was psychometrically tested for outpatients with chronic back pain [20] and proved to be a valid, reliable, responsive and appropriate measure. In follow-up comparisons, 5 to 10 points can be recognized by the patients [21], and these differences are assumed to be clinically and socially relevant effects [20]. Thus, results of the present study demonstrate that quality of life (SF-36) assessments disclose treatment effects of MRP that are missed by evaluation of pain intensity (NRS) and pain-related interference with function (BPI).

There are several limitations of the study. Voluntary participation of independent physicians and patients on the study hampered the recruitment of random study samples and a larger number of participants. Therefore, the present data cannot be regarded as representative for the outpatient management of all independent physicians and patients. However, participation of the motivated colleagues and patients suggests that the results do not underestimate the outcome of back pain management in the community setting. In addition, as a result of nonrandomization of the patients in the present study, there were group differences in some demographic data. Therefore, we cannot exclude the possibility that some of the detected differences were caused by a different selection of the MRP and the usual care patients, although we tried to control for potential confounders by adjusting the *p* level for socioeconomic data. Finally, the small number of patients in the MRP and usual care group limited the validity of our study. Our study might be underpowered to detect an existing moderate difference between both groups. Therefore, we cannot exclude the possibility that the small number of patients in our study caused some of the negative findings.

We conclude that MRP is a promising method to improve health-related quality of life for patients with chronic back pain in the community. To extend effectiveness of MRP on pain intensity (NRS) and pain-related interference with function (BPI), intensity of MRP should be increased. Before implementation of MRP in the repertoire of community medicine, superiority of MRP over usual care should be confirmed by a randomized controlled trial.

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