Arthritis & Rheumatism (Arthritis Care & Research)
Vol. 61, No. 7, July 15, 2009, pp 996–1003
DOI 10.1002/art.24609

ORIGINAL ARTICLE

Effectiveness of an Early Cognitive–Behavioral Treatment in Patients With Work Disability Due to Musculoskeletal Disorders

LETICIA LEON,[1] JUAN A. JOVER,[1] GLORIA CANDELAS,[1] CRISTINA LAJAS,[1] CRISTINA VADILLO,[1] MARGARITA BLANCO,[1] ESTIBALIZ LOZA,[1] MIGUEL ANGEL PEREZ,[2] MARTA REDONDO,[2] AND LYDIA ABASOLO[1]

Objective. **To evaluate whether an early cognitive–behavioral treatment complementary to a rheumatologic care program, for patients with recent-onset temporary work disability caused by musculoskeletal disorders (MSDs) is effective.**
Methods. **Patients with an MSD-related temporary work disability episode from 3–8 weeks' duration who were in a rheumatologic care program were randomized into a control group (rheumatologic care program) or an intervention group (rheumatologic care program plus cognitive–behavioral treatment). Enrollment lasted 24 months and followup lasted 6–24 months. Efficacy variables included duration of temporary work disability episodes, total number of work days saved, relative efficacy, and relative rate to return to work. An economic evaluation was also performed.**
Results. **One hundred eighty-one patients were included (66 control and 115 intervention patients), generating 222 episodes of MSD-related temporary work disability. Episodes tended to be shorter in the intervention group than in the control group (mean 98 versus 127 days; $P = 0.053$), with a relative efficacy of 22.9%. There were no differences in duration of the first episode between groups (mean 105 versus 110 days; $P = 0.79$), but relapse episodes were significantly shorter in the intervention group (mean 63 days versus 197 days; $P = 0.0002$). Costs were also lower in the intervention group. To save 1 day of temporary work disability, $13.50 had to be invested in the program. Each dollar invested generated a benefit of $4.08. The program had a net benefit of $172,607.**
Conclusion. **Early cognitive–behavioral treatment complementary to a rheumatologic care program is cost-effective, adds >20% efficacy to the rheumatologic care program, and reduces the duration of relapses.**

INTRODUCTION

Musculoskeletal disorders (MSDs) are prevalent, potentially disabling conditions (1) with enormous social costs (2–4). In industrialized societies, they are the main cause of permanent work disability and functional loss in adults (3–8) and the second greatest cause of short-term temporary work disability (9), with productivity losses of up to 1.3% of the US gross national product (10). Costs are divided as direct (health system costs) and indirect (loss of productivity). In Spain, 20% of all sick leave days are related to MSDs, generating a remarkable and increasing burden at the work place (11).

In 1998 we initiated a community-based program for recent-onset temporary work disability due to MSDs based upon specific clinical and therapeutic protocols that were carried out by rheumatologists trained in the basics of sick leave administrative tasks as well as on rehabilitation and occupational aspects of MSDs. Specific protocols were created for different diagnoses, including a 3-level clinical management system for attending to patient evolution. The program achieved a significant increase in the rate of patients returning to work (relative efficacy of 39%), a decrease of nearly 50% in permanent work disability proposals, and was also cost-effective (each dollar invested generated a benefit of $11) and increased patient satisfaction (12). However, the program was unable to achieve the same effectiveness in all patients due to the impact of several factors. We have demonstrated that sociodemographic, clinical, and work factors such as age, female sex, marriage, peripheral osteoarthritis and sciatica, self-employment, unemployment, being a manual worker, and

ISRCTN: 17984927.
[1]Leticia Leon, PhD, Juan A. Jover, MD, PhD, Gloria Candelas, MD, PhD, Cristina Lajas, MD, PhD, Cristina Vadillo, MD, Margarita Blanco, MD, PhD, Estibaliz Loza, MD, Lydia Abasolo, MD, PhD: Hospital Clinico San Carlos, Madrid, Spain; [2]Miguel Angel Perez, PhD, Marta Redondo, PhD: Universidad Camilo Jose Cela, Madrid, Spain.
Address correspondence to Lydia Abasolo, MD, PhD, Rheumatology Unit, Hospital Clinico San Carlos, Calle Profesor Martin Lagos S/N, 28040 Madrid, Spain. E-mail: labasolo.hcsc@salud.madrid.org.
Submitted for publication January 15, 2009; accepted in revised form April 3, 2009.

having one's work position covered during sick leave worsen a patient's prognosis and disability, increasing the duration and number of relapse episodes in short-term disability due to MSDs (13,14).

In terms of the biopsychosocial model, work disability is a complex health problem resulting from a combination of several factors, all of which interact and make the return to an optimal functional status difficult. Though psychological factors were not analyzed in our previous studies, it is known that they are implied in the transition from short- to long-term disability (15–17), and that they can be modified by means of different intervention strategies (18–20).

Several studies of multidisciplinary intervention (including psychological treatment) in active workers with pain and MSD disability have demonstrated the interventions' effectiveness in a patient's status (18–20), but mostly in long-term disability patients, and usually not including outcomes about patients returning to work. Several studies have shown that it is necessary to implement interventions early, before 12 weeks of temporary work disability have occurred (12,21–23). We observed that what happens during the first 4 weeks of MSD-related temporary work disability can differentiate between patients with good or poor evolution, and that this could be the time period to introduce a complementary tool (12).

The purpose of this study was to evaluate whether an early cognitive–behavioral therapy program, complementary to our routine MSD-related temporary work disability program, had the possibility to modify the transition between acute and chronic disability in daily practice. We measured the duration of all MSD-related temporary work disability episodes, the duration of relapse episodes, and the cost efficacy of the program.

PATIENTS AND METHODS

Setting. Of the 5.5 million people in Madrid, Spain, 98% receive universal health coverage. Care provision is organized into 11 health districts. The present study was performed in Health District 7, which has a total population of 522,742 inhabitants and an active working population of 179,155 people. It has 17 primary centers, including 2 specialized centers and a tertiary hospital. Our rheumatology service provides care to all inhabitants of Health District 7 at the specialized centers and hospital. All workers who require sick leave are given a temporary work disability initiation form and receive disability compensation payments.

Design. A randomized, controlled, unblinded study was performed. The inclusion and randomization period of the study began in October 2004 and concluded in October 2006. Followups were ≥6 months. Patients who were continuing on sick leave at the end of the study were assigned an end date (April 16, 2007). The study protocol was approved by the Institutional Review Board of the Hospital Clinico San Carlos (Ethics Committee).

Patient selection. Since 1998 our health district has provided an early specialized care program to subjects with work disability related to MSDs (International Classification of Diseases, Ninth Revision coding system) (12).

The inclusion criteria for the present study were having MSD-related temporary work disability episodes lasting for ≥4 weeks and having been followed in our early-attention rheumatologic care program (12). Subjects with MSD-related temporary work disability episodes lasting for >8 weeks were excluded. All eligible patients were invited to participate in the study, and those who gave their verbal consent were randomly assigned to either the intervention group, which received a cognitive–behavioral treatment complementary to the rheumatologic care program, or to the control group, which continued with the rheumatologic care program.

Sample. We considered that a 15% reduction in the average duration of temporary work disability in the intervention group would be important from the socioeconomic point of view. To evaluate the difference in the average duration of temporary work disability between groups, we calculated that 120 patients were needed for the intervention group and that ≥120 patients were needed for the control group (power 0.8%, error 0.05%, by bilateral test). However, because temporary work disability duration did not follow a normal distribution and we performed the calculation on the basis of a nonparametric test, we increased the sample size to 10%. The size of the theoretical sample was therefore 264 patients for both groups combined.

Randomization. Computer-generated randomization lists of numbers were produced (with an intervention:control ratio of 3:2 in order to maximize the number of patients treated and to utilize our resources) and allocated to the 2 specialized care centers by means of sealed envelopes. In every specialized care center, 2 rheumatologists attending the routine MSD-related temporary work disability program opened an envelope when patients gave their verbal informed consent. Patients maintained their group assignments in successive episodes of MSD-related temporary work disability during the followup.

Cognitive–behavioral treatment program. The intervention group received a cognitive–behavioral treatment program in an individual form that was distributed weekly. The design of the program was based on the characteristic of disability instead of on the diagnosis, and this was adapted to the psychological and sociodemographic conditions of the patient. We conducted our program in accordance with the Beck cognitive therapy model (24) and the Activating Event, Belief, and Consequent Emotion model proposed by Ellis and MacLaren (25), and used verified techniques for musculoskeletal pain (26–28). The cognitive–behavioral treatment was administered by a trained psychologist (LL) with experience in musculoskeletal diseases and whose telephone was used for consultations or appointment requests.

The cognitive–behavioral treatment was provided weekly in 3 levels, according to the patients' evolution. All patients received the first level, consisting of 2 60-minute

sessions. The first session included education on pain and ergonomics and training in abdominal breathing. Furthermore, patients received a booklet with the objectives and methodology of the cognitive–behavioral treatment with examples to practice. The booklet included a series of chapters about frequent problems in pain and disability conditions and some cognitive–behavioral strategies designed to help patients cope with them. In the second session, doubts and difficulties with the booklet in the first session were resolved. After 2 weeks, patients who continued on sick leave went to the second level, which was composed of 3 sessions. Patients who did not return to work after that started in the third level of the cognitive–behavioral treatment, which had an indeterminate number of sessions depending on the patient's evolution. In this level, a revision of the previous techniques was performed and patients were trained in coping skills for interpersonal and work issues.

Variables. The following variables were analyzed in this study: sociodemographic (age, sex, and job), clinical (cause of temporary work disability episode), temporary work disability duration (defined as days of sick leave per episode), and costs (direct and indirect). MSD-related temporary work disability episodes were defined by a beginning (the day the initiation form was issued by the rheumatologist) and an end (the day the end form was issued by the rheumatologist), irrespective of the date of the entry to the cognitive–behavioral treatment.

Efficacy was defined as the difference between groups in the number of days spent on sick leave per temporary work disability episode. We expressed the efficacy in terms of 1) the differences in mean and median duration of the temporary work disability episodes, 2) the total number of days saved in the intervention group, obtained by multiplying the total number of episodes in the intervention group by the days saved per patient, 3) the relative efficacy of the intervention expressed as the percentage of days of sick leave saved per process in the intervention group, and 4) the relative rate to return to work (see the statistical analysis below). We analyzed the efficacy of the treatments in all episodes and also in the relapse episodes alone.

Costs were classified as direct (health system costs) and indirect (losses of productivity). Cost efficacy was defined as the amount of money required to save 1 day of temporary work disability. The cost–benefit was defined as dollars invested divided by dollars saved. The net benefit was defined as dollars saved minus dollars invested.

Data acquisition. Patient age, sex, job data, and cause and dates of temporary work disability episodes were recorded by the rheumatologist at the time of the randomization. Costs were obtained as follows. First, the receipt of medical and surgical specialized care related to MSDs was considered, including diagnostic tests, physiotherapy, and rehabilitation. This information was obtained for both groups from the Information System of Specialized Care. Second, the information on the patients' medications, joint aspirations, or joint injections was obtained from their clinical records. Costs related to diseases other than MSDs or complications during followup were not included in the study. Monetary values were assigned to each cost item on the basis of the Instituto Madrileño de Salud reference prices, the National Institute of Statistics, the Instituto Nacional de la Seguridad Social, and the National Pharmacotherapeutical Catalogue, and were converted into 2007 US dollars. To estimate the indirect costs, we multiplied the number of sick leave days by the average daily wage in Madrid in 2007 ($57.79). Intervention costs were $56,016 (for a part-time psychologist for 2.5 years and book-keeping costs including administrative staff, photocopies, and phone calls).

Statistical analysis. All patients who were randomly assigned to a study group received followup contacts. Differences between groups related to baseline characteristics were tested using the Mann-Whitney U test and contingency tables. The number of episodes of temporary work disability was assessed with the Mann-Whitney U test. The differences in duration of temporary work disability episodes were tested by *t*-test and survival techniques (the log rank test). Kaplan-Meier curves were set to account for duration of temporary work disability within patients, as in a Poisson model. Cox regression analyses were adjusted by variables that were unevenly distributed between groups at baseline and had an association with outcome. In all models, the dependent variable was the number of days spent off work, and the results were expressed as the hazard ratio (HR; or relative rate to return to work) in the intervention group compared with the control group (with a 95% confidence interval [95% CI]). Differences between groups in direct and indirect costs were estimated using the Student's *t*-test and contingency tables. A sensitivity analysis including all costs analyzed was performed to investigate the robustness of the model, and therefore to verify the validity of our results. In this analysis, the efficacy of the cognitive–behavioral intervention in terms of reduction of days of temporary work disability and the totality of costs was reduced and increased 15% in each group (in opposite directions, depending on whether the best- or worst-case scenario was used).

Analyses were performed with Stata software, version 9.0 (StataCorp, College Station, TX). For all comparisons, 2-tailed *P* values less than 0.05 were considered statistically significant.

RESULTS

A total of 181 patients were invited to participate (all accepted the invitation to be included in the study), were consecutively recruited, and generated 222 episodes of MSD-related temporary work disability during the study period. We found 66 patients allocated to the control group and 115 to the intervention group, generating 82 and 141 temporary work disability episodes, respectively. Approximately two-thirds of the patients (75.7% in the control group and 77.3% in the intervention group) had only 1 episode; the rest of them had ≥2 episodes (24.2% in the control group and 22.6% in the intervention group). On average, patients were randomly assigned to a study group

Table 1. Baseline characteristics of the study groups*

	Control (n = 66)	Intervention (n = 115)	P†
Female sex	71.2	80.8	ns
Age, mean ± SD years	46 ± 10	44 ± 10	ns
Cause of TWD			
Neck pain	24.2	30.4	ns
Back pain	50	45.2	ns
Soft tissues	19.7	15.6	ns
Others‡	6	8.7	ns
Type of work			
White-collar	34.8	50.4	ns
Service	22.7	14.4	ns
Blue-collar	42.4	35.1	ns

* Values are the percentage of patients unless otherwise indicated.
ns = not significant; TWD = temporary work disability.
† Only shown if $P \leq 0.05$.
‡ Included inflammatory diseases (56%), osteoarthritis (25%), and joint pain without arthritis (18.7%).

30 days after starting their first episode of temporary work disability.

The mean age of the patients was 45.5 years, and most were women (77.3%). In all patients, back pain, neck pain, and soft tissue problems were the most common causes of MSD-related temporary work disability episodes. Most patients (44.6%) were white-collar workers (including management, intellectual, and secretarial jobs), 37.8% were blue-collar workers (including all manual jobs), and 17.5% were service workers (Table 1).

The mean ± SD duration of MSD-related temporary work disability episodes was 108.64 ± 108.73 days, with a median of 67 days. Episodes tended to be shorter in the intervention group (mean 97.94 days versus 127.03 days in the control group; $P = 0.053$) (Table 2). The program achieved a relative efficacy of 22.9%, saving 29.09 days per episode, and saving a total of 4,101.69 days during the study period. The relative rate to return to work did not reach statistical significance between groups (HR 1.28, 95% CI 0.96–1.71).

When we analyzed only the first episodes of temporary work disability, there were no differences between groups related to duration (mean 105.68 days in the intervention group versus 109.92 days in the control group; $P = 0.79$). Nevertheless, there were differences between the relapse episodes in each group. The program achieved the greatest effect related to the relapse episodes, which were significantly shorter in the intervention group (mean 63.69 days versus 197.62 days in the control group; $P = 0.002$), with a relative efficacy of 67.7% (Table 3). The relative rate to return to work in the relapse episodes was also significantly higher in the intervention group (HR 3.84, 95% CI 1.78–8.26; $P = 0.001$). However, there were no statistical differences between the groups in the relative rate to relapse (per year), and patients in both groups had a similar probability of relapse (HR 0.63, 95% CI 0.32–1.23; $P = 0.17$).

The survival curves for return to work also show the efficacy of the program. The effect of the program or the difference in duration of temporary work disability episodes between groups started at 10 weeks, with the period of major efficacy lasting until the seventh month (Figure 1). The effect of the program with regard to relapse episodes began early, around the fourth week, and the most efficacy was achieved between the second and the third month, but the effect continued throughout the year.

Direct and indirect costs were significantly lower in the intervention group (Table 4), saving $1,796 per patient. Important savings were also obtained in pharmaceuticals ($66 per patient) and rehabilitation ($157 per patient), and the highest savings were related to productivity loss ($1,546 per patient). The program achieved a net benefit of $172,607. Moreover, to save 1 day of temporary work disability, a maximum of $13.50 had to be invested in the program. In terms of cost–benefit, every dollar invested produced a savings of $4.08 at the end of the second year.

In the worst-case scenario, the sensitivity analysis showed a cost efficacy of $15.70 invested to save 1 day of MSD-related temporary work disability, a cost–benefit of $3.01 returned per $1 invested, and a net benefit of $129,911 (Table 5). In the best scenario, it showed a cost efficacy of $11.60 invested to save 1 day of MSD-related

Table 2. Efficacy of the early cognitive–behavioral treatment*

Variable	Control	Intervention	P†	Efficacy
Patients with only 1 TWD episode	50	89		
Patients with TWD relapse episodes	15	26		
Total TWD episodes	81	141		
Duration of TWD episodes, mean ± SD days	127 ± 116	97.9 ± 102		
Duration of TWD episodes, median (25th, 75th percentiles) days	82 (46, 179)	64 (43, 107)	0.053	
Total TWD days	10,343	13,810		
Days of TWD per 100 patients	15,671	12,008		
Days of TWD saved				4,102
Relative efficacy of the program, %				22.9
Relative rate to return to work, HR (95% CI)				1.28 (0.96–1.71)

* See Table 4 for definitions.
† Only shown if $P \leq 0.05$.

Table 3. Efficacy of the early cognitive–behavioral treatment related to first and relapse TWD episodes*

Variable	Control	Intervention	*P*†	Efficacy
First episode	66	115		
Duration, mean	110	106		
Duration, median (25th, 75th percentiles)	68 (45, 147)	66 (44, 115)		
Total TWD	7,255	12,154		
TWD saved				488
Relative efficacy, %				3.8
Relative rate to return to work, HR (95% CI)				1.03 (0.74–1.40)
Relapse episodes	16	26		
Duration, mean	198	64	0.0002	
Duration, median (25th, 75th percentiles)	136 (81, 330)	48 (23, 86)	0.002	
Total TWD	3,088	1,656		
TWD saved				3,482
Relative efficacy, %				67.7
Relative rate to return to work, HR (95% CI)			0.001	3.84 (1.78–8.26)

* Values are the number of days unless otherwise indicated. TWD = temporary work disability; HR = hazard ratio; 95% CI = 95% confidence interval.
† Only shown if $P \leq 0.05$.

temporary work disability, a cost–benefit of $5.52 returned per $1 invested, and a net benefit of $215,308.

DISCUSSION

The results of our study show that an early cognitive–behavioral treatment coupled with our routine MSD-related temporary work disability program, offered to patients with work disability due to MSD, is effective, achieving a faster return to work, shorter relapse episodes, and a very positive economic result. To our knowledge, this is the first time that an early cognitive–behavioral treatment has been analyzed with an economic evaluation in a nonselected population of workers with MSD-related temporary work disability episodes.

As expected, patients in the study were mostly middle-aged, and back pain was the most prevalent symptom (29,30). Especially noteworthy is the high percentage of women. As we reported in our previous study (12), women and men enter the MSD-related temporary work disability program in equal proportions, but women's episodes were longer, and therefore more women were attended to in our program. The impact of female sex on pain and disability episodes, and especially as a prognostic factor for duration of sickness-related work absence, has been persistently shown in previous studies (14,31–35). The longer duration of women's pain and disability probably indicates a complex process with a large set of associated factors.

Early cognitive–behavioral treatment coupled with a routine MSD-related temporary work disability program achieved a reduction in days of work disability. We would like to emphasize that the MSD-related temporary work disability program is already effective, obtaining savings of ~40% in days of temporary work disability (12); therefore, the cognitive–behavioral treatment was offered to patients who were already being attended to in an effective way.

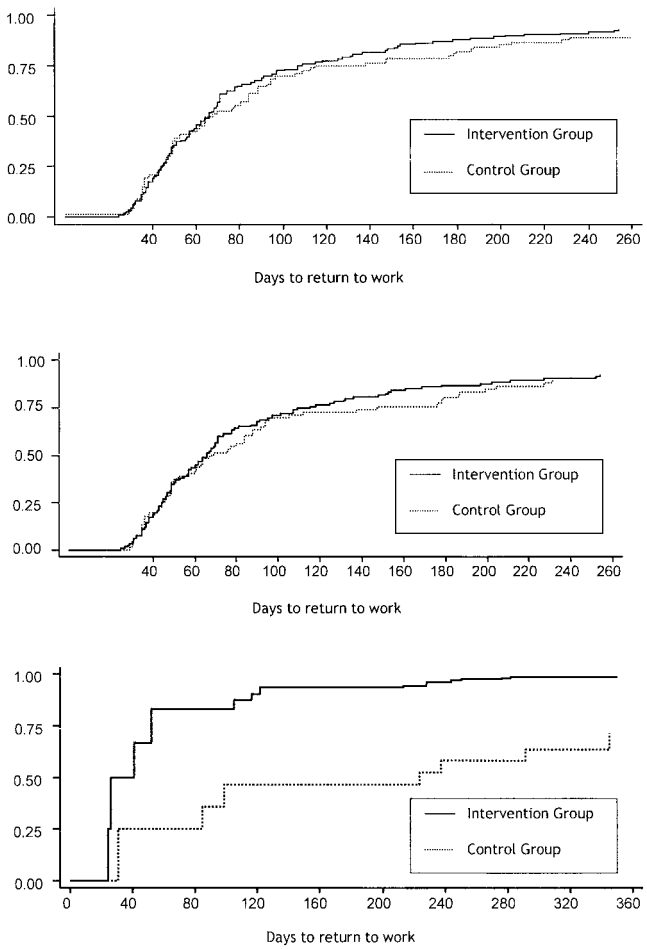

Figure 1. Survival curves showing the efficacy of the early cognitive–behavioral treatment, related to **A**, total temporary work disability, **B**, the first episodes of temporary work disability only, and **C**, the relapse episodes of temporary work disability only.

Table 4. Economic evaluation of the early cognitive–behavioral treatment*

Variable	Control group (n = 66)	Intervention group (n = 115)	Economic results
Mean cost per patient			
Rheumatologist's time	176	162	
Specialist's time	33	24	
Diagnostic test	100	105	
Pharmaceuticals	240	174	
Rehabilitation	191	34	
Therapeutic procedures	21	11	
Psychologist's time	NA	487	
Direct	761	510	
Indirect	8,343	6,798	
Total†	9,104	7,795	
Cost in all patients			
Direct	50,226	114,655	
Indirect	590,238	781,770	
Total	640,464	896,425	
Savings per patient‡			
Direct costs			251
Indirect costs			1,545
Total saved			228,623
Intervention costs			56,016
Cost efficacy§			13.5
Cost–benefit¶			4.08
Net benefit#			172,607

* Values are in 2007 US dollars. NA = not applicable.
† Psychologist's time costs + direct cost + indirect costs.
‡ In the intervention group compared with the control group.
§ Amount needed to save 1 day of temporary work disability.
¶ Amount saved per amount invested.
# Total amount saved minus total amount invested.

The additional 20% reduction in days of temporary work disability that the cognitive–behavioral treatment added to the current program supports the implementation of this intervention in order to save additional sick leave days and economic resources.

As revealed by survival curves, the efficacy of the program was mainly achieved due to shortening the duration of relapse episodes. In contrast to medical treatments, the learning of the cognitive–behavior techniques, similar to most psychological therapies, requires more time to be effective, and this could be a possible reason for the lack of differences between the groups in the duration of the first episodes. Previous studies have found that patients with sick leave receiving a cognitive–behavioral treatment continue improving with time, but only when the patients are treated early (21). Other studies have demonstrated that the probability of relapse in active workers with musculoskeletal disease is very high (21,36,37), so reducing the duration of relapses is an important goal.

When we compared our program with other cognitive–behavioral treatment programs that have not produced significant improvement (22,23), we found some differences and believe that the success of our therapy was based on the following aspects. First and foremost, patients in our study had direct and faster access to the psychologist during the initial episode and during every

Table 5. Sensitivity analysis of the efficiency of the early cognitive–behavioral treatment in control and intervention groups*

	Worst-case scenario†			Base-case costs			Best-case scenario‡		
Variable	Control	Intervention	Efficacy	Control	Intervention	Efficacy	Control	Intervention	Efficacy
Direct cost per patient	647	586		761	510		875	434	
Indirect cost per patient	7,092	7,818		8,343	6,798		9,594	5,778	
Duration of TWD, days	121	104		127	98		133	92	
Efficacy, %			14			22.9			30.8
Cost efficacy			15.7			13.5			11.6
Cost–benefit			3.01			4.08			5.52
Net benefit			129,911			172,607			215,308

* Values are in 2007 US dollars unless otherwise indicated. TWD = temporary work disability.
† Direct costs were reduced 15% in the control group and increased 15% in the intervention group in relation to the actual costs.
‡ Direct costs were increased 15% in the control group and reduced 15% in the intervention group in relation to the actual costs.

relapse. Second, our patients had the possibility of receiving personal support and/or support via telephone at all times, including after the end of the temporary work disability episode.

We thought that having support via telephone from the psychologist available when the patient needed it, in order to receive more advice or to ask for an appointment, would allow the patient to not feel helpless. Another reason for the efficacy we found might be our individualized application of the cognitive–behavioral treatment. Our program, adapted to the individual needs of the patients, differs from other, structurally rigid cognitive–behavioral treatment intervention programs.

Furthermore, the reduction in loss of productivity was accompanied by a decrease in use of the health system, thereby reducing health costs, especially in terms of pharmaceuticals and rehabilitation. As a consequence, direct and indirect costs were significantly lower in the intervention group. Data from the full economic evaluation are complex to compare with cognitive–behavioral treatments applied to MSD-related temporary work disability in other studies because other studies have differed in terms of intervention programs, outcome measures, and health and social security systems. However, the efficacy of our study method, demonstrated in terms of costs and supported in the sensitivity analysis, is clear in spite of these differences.

Our results demonstrate that a cognitive–behavioral treatment performed in the subacute moment in the disability process helps subjects manage pain and disability, and could contribute to avoiding the transition to long-term work disability in some cases. The importance of an early intervention is also supported by the fact that returning to work becomes unlikely if the time taken off of work exceeds 12 weeks (12,38–40). In this sense, our intervention might represent an intermediate approach prior to the use of more intensive programs in rehabilitation clinics. We are in agreement with previous studies (41,42) that a brief intervention may be all that is required for the majority of patients, but that others will need a more extensive intervention. Our aim was for a non-time based intervention using specific effective techniques, such as a stepped approach.

The present study has several limitations. First, our inability to reveal statistical differences in bivariate analyses might be related to the sample size, and to sizeable dispersion in the SDs. As a consequence of the positive results obtained in our temporary work disability program (12), after 2 years it was integrated into the daily routine of our rheumatology practice. As a result of this integration, there was a progressive reduction in the total number of attended patients, and therefore the total number of patients included in the study diminished. However, the sample size here was larger than in other previous studies. Another limitation is that the treatment was conducted by one psychologist, and although this avoids experimental contamination, it could reduce the generalization of the results to treatment conducted by other psychologists.

Several strengths are found in this study. First of all, it is necessary to consider that the study was undertaken in real-life conditions, taking into account all workers without exclusion for age or sex. Neither patients with specific pathologies (inflammatory diseases, lumbar hernias, or the like) nor those with work litigations were excluded from our sample. It is also notable that high-quality measures such as returning to work and direct and indirect costs were used as outcome variables.

In summary, our findings support that cognitive–behavioral treatment offered to patients with 4 weeks of work disability caused by MSDs results in an efficient complement for a rheumatologic care program, increasing the benefits both for the patient and for the economy of the health and social security system. Further complementary studies should be performed in order to verify our results in different settings and health systems, and to demonstrate the effectiveness of the multidisciplinary approach in working-age adults with musculoskeletal pain (43,44).

AUTHOR CONTRIBUTIONS

All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version to be submitted for publication. Dr. Abasolo had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study conception and design. Leon, Jover, Candelas, Lajas, Vadillo, Blanco, Loza, Perez, Redondo, Abasolo.

Acquisition of data. Leon, Jover, Candelas, Lajas, Vadillo, Blanco, Loza, Perez, Redondo, Abasolo.

Analysis and interpretation of data. Leon, Jover, Candelas, Lajas, Vadillo, Blanco, Loza, Perez, Redondo, Abasolo.

REFERENCES

1. Lawrence RC, Helmick CG, Arnett FC, Deyo RA, Felson DT, Giannini EH, et al. Estimates of the prevalence of arthritis and selected musculoskeletal disorders in the United States. Arthritis Rheum 1998;41:778–99.
2. Prevalence of disabilities and associated health conditions among adults: United States, 1999. MMWR Morb Mortal Wkly Rep 2001;50:120–5.
3. Badley EM, Rasooly I, Webster GK. Relative importance of musculoskeletal disorders as a cause of chronic health problems, disability, and health care utilization: findings from the 1990 Ontario Health Survey. J Rheumatol 1994;21:505–14.
4. Felts W, Yelin E. The economic impact of the rheumatic diseases in the United States. J Rheumatol 1989;16:867–84.
5. Reynolds DL, Chambers LW, Badley EM, Bennet HJ, Goldsmith CH, Jamieson E, et al. Physical disability among Canadians reporting musculoskeletal diseases. J Rheumatol 1992; 19:1020–30.
6. Van Schaardenburg D, van den Brade KJ, Ligthart GJ, Breedveld FC, Hazes JM. Musculoskeletal disorders and disability in persons aged 85 and over: a community survey. Ann Rheum Dis 1994;53:807–11.
7. Meerding WJ, Bonneux L, Polder JJ, Koopmanschap MA, van der Maas PJ. Demographic and epidemiological determinants of healthcare costs in Netherlands: cost of illness study. BMJ 1998;317:11–5.
8. Yelin EH, Henke CJ, Epstein WV. Work disability among persons with musculoskeletal conditions. Arthritis Rheum 1986;29:1322–33.
9. Badley EM. The economic burden of musculoskeletal disorders in Canada is similar to that for cancer, and may be higher [editorial]. J Rheumatol 1995;22:204–6.
10. Yelin EH, Felts WR. A summary of the impact of musculoskeletal conditions in the United States. Arthritis Rheum 1990;33:750–5.
11. Blanco M, Candelas G, Molina M, Banares A, Jover JA. Car-

acterísticas de la Incapacidad Laboral Transitoria de origen musculoesquelético en la CAM durante un año. Rev Esp Reum 2000;27:48–53.
12. Abasolo L, Blanco M, Bachiller J, Candelas G, Collado P, Lajas C, et al. A health system program to reduce work disability related to musculoskeletal disorders. Ann Intern Med 2005; 143:404–14.
13. Abasolo L, Carmona L, Hernandez-Garcia C, Lajas C, Loza E, Blanco M, et al. Musculoskeletal work disability for clinicians: time course and effectiveness of a specialized intervention program by diagnosis. Arthritis Rheum 2007;57: 335–42.
14. Abasolo L, Carmona L, Lajas C, Candelas G, Blanco M, Loza E, et al. Prognostic factors in short term disability due to musculoskeletal disorders. Arthritis Rheum 2008;59:489–96.
15. Waddell G. The back pain revolution. Edinburgh (Scotland): Churchill Livingstone; 1998.
16. Linton SJ. A review of psychological risk factors in back and neck pain. Spine 2000;25:1148–56.
17. Pincus T, Burton AK, Vogel S, Field AP. A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. Spine 2002;27:E109–20.
18. Haldorsen EM, Kronholm K, Skouen JS, Ursin H. Multimodal cognitive behavioral treatment of patients sicklisted for musculoskeletal pain: a randomized controlled study. Scand J Rheumatol 1998;27:16–25.
19. Schiltenwolf M, Buchner M, Heindl B, von Reumont J, Muller A, Eich W. Comparison of a biopsychosocial therapy (BT) with a conventional biomedical therapy (MT) of subacute low back pain in the first episode of sick leave: a randomized controlled trial. Eur Spine J 2006;15:1083–92.
20. Nyusten P, Hagen KB. Solution-focused intervention for sick listed employees with psychological problems or muscle skeletal pain: a randomised controlled trial. BMC Public Health 2006;6:69.
21. Marhold C, Linton SJ, Melin L. A cognitive-behavioral return-to-work program: effects on pain patients with a history of long-term versus short term sick leave. Pain 2001;91:155–63.
22. Jensen IB, Bodin L. Multimodel cognitive-behavioural treatment for workers with chronic spinal pain: a matched cohort study with an 18-month follow-up. Pain 1998;76:35–44.
23. Schweikert B, Jacobi E, Seitz R, Cziske R, Ehlert A, Knab J, et al. Effectiveness and cost-effectiveness of adding a cognitive behavioral treatment to the rehabilitation of chronic low back pain. J Rheumatol 2006;33:2519–26.
24. Beck AT. Cognitive therapy and the emotional disorders. New York: International University; 1976.
25. Ellis A, MacLaren C. Rational emotive behavior therapy: a therapist's guide. Atascadero (CA): Impact; 1998.
26. Airaksinen O, Brox JI, Cedraschi C, Hildebrandt J, Klaber-Moffett J, Kovacs F, et al, and the COST B13 Working Group on Guidelines for Chronic Low Back Pain. Chapter 4: European guidelines for the management of chronic nonspecific low back pain. Eur Spine J 2006;15 Suppl 2:S192–300.
27. European Commission COST B13 Management Committee. European guidelines for the management of low back pain. Acta Orthop Scand Suppl 2002;73:20–5.
28. Op de Beeck R, Hermans V. Research study for the European Agency for Safety and Health at Work: work-related low back disorders. Luxembourg: Office for Official Publications of the European Communities; 2000.
29. Badley EM, Ibanez D. Socioeconomic risk factors and musculoskeletal disability. J Rheumatol 1994;21:515–22.
30. Carmona L, Ballina J, Gabriel R, Laffon A. The burden of musculoskeletal diseases in the general population. Ann Rheum Dis 2001;60:1040–5.
31. Steenstra IA, Verbeek JH, Heymans MW, Bongers PM. Prognostic factors for duration of sick leave in patients sick listed with acute low back pain: a systematic review of the literature. Occup Environ Med 2005;62:851–60.
32. Lotters F, Burdorf A. Prognostic factors for duration of sickness absence due to musculoskeletal disorders. Clin J Pain 2006;22:212–21.
33. Dufton JA, Kopec JA, Wong H, Cassidy JD, Quon J, McIntosh G, et al. Prognostic factors associated with minimal improvement following acute whiplash-associated disorders. Spine 2006;31:E759–65.
34. Pransky GS, Verma SK, Okurowsi L, Webster B. Length of disability prognosis in acute occupational low back pain: development and testing of a practical approach. Spine 2006; 31:690–7.
35. Jensen IB, Bergstrom G, Ljungquist T, Bodin L, Nygren AL. A randomized controlled component analysis of a behavioral medicine rehabilitation program for chronic spinal pain: are the effects dependent on gender? Pain 2001;91:65–78.
36. Waddell G, Burton AK. Occupational health guidelines for the management of low back pain at work: evidence review. Occup Med (Lond) 2001;51:124–35.
37. Pengel L, Herbert R, Maher C, Refshauge K. Acute low back pain: systemic review of its prognosis. BMJ 2003;327:323–5.
38. Pransky G, Benjamin K, Hill-Fotouhi C, Fletcher KE, Himmelstein J, Katz JN. Work-related outcomes in occupational low back pain: a multidimensional analysis. Spine 2002;27:864–70.
39. Linton SJ, Bradley LA. Strategies for the prevention of chronic pain. In: Gatchel RJ, Turk DC, editors. Psychosocial approaches to pain management: a practitioner's handbook. New York: Guilford; 1996.
40. Marhold C, Linton SJ, Melin L. Identification of obstacles for chronic pain patients to return to work: evaluation of a questionnaire. J Occup Rehabil 2002;12:65–75.
41. Haldorsen EM, Grasdal AL, Skouen JS, Risa AE, Kronholm K, Ursin H. Is there a right treatment for a particular patient group? Comparison of ordinary treatment, light multidisciplinary treatment, and extensive multidisciplinary treatment for long-term sick-listed employees with musculoskeletal pain. Pain 2002;95:49–63.
42. Von Korff M, Moore JC. Stepped care for back pain: activating approaches for primary care. Ann Intern Med 2001;134: 911–7.
43. Karjalainen K, Malmivaara A, van Tulder M, Roine R, Jauhiainen M, Hurri H, et al. Multidisciplinary biopsychosocial rehabilitation for subacute low back pain among working age adults. Cochrane Database Syst Rev 2003;2:CD002194.
44. Skouen JS, Grasdal A, Haldorsen EM. Return to work after comparing outpatient multidisciplinary treatment programs versus treatment in general practice for patients with chronic widespread pain. Eur J Pain 2006;10:145–52.