

Pain rehabilitation – outcome of an 8-week rehabilitation program

J.R. Norrefalk and K. Borg

Karolinska Institutet Danderyds Hospital, Sweden

Abstract. The prevalence of persistent pain has been estimated to be around 20-50% in a normal population. Musculoskeletal related pain is the most common form of persistent pain. In patients with persistent pain there are alterations in the peripheral as well as the central nervous system and patients develop a dysfunctional behaviour which, in many cases, leads to severe suffering for the patient. In the European countries an increasing problem has emerged consisting of more people on long-term sick-leave, increased number of early retirements and high social costs. After an 8-week structured multiprofessional rehabilitation programme at the Karolinska Institute in Stockholm, Sweden 63% of patients with long-standing non-malignant pain returned to work and half of the patients were still at work at a 6-year follow-up. Half of the patients reported pain reduction and almost half of the patients had reduced their consumption of analgesics. The rehabilitation program was estimated as economically beneficial on a society level. It is concluded that pain rehabilitation should have a multiprofessional approach. Pain rehabilitation programs are beneficial for the possibility for the patient to return to work pain and leads to pain reduction in the long run. Furthermore, they are beneficial from a socio-economical aspect.

Key words: *persistent musculoskeletal pain, multiprofessional rehabilitation program, return to work, socio-economic benefit*

The prevalence of persistent pain is estimated to be 20 and even up to 50 % in the normal population (Brattberg et al., 1989; Andersson et al., 1993; Gerdle et al., 2004; Elliott et al., 1999; Brevik et al., 2006; Pain proposal. Improving the Current and Future Management of Chronic Pain, 2010; Pain in Europe. The Swedish Association of Pain Management in cooperation with Mundipharma, 2003). Suffering from pain over a long period of time negatively affects a person's family life, spare time, economy, psychosocial well-being and ability to work. It also leads to rising costs for society. Rehabilitation in a structured program with a multiprofessional team has shown beneficial effects on sick-leave, disability pension and /or return to work. The clinical effectiveness of such programs has also been documented in systematic reviews (Malone, Strube, 1988; Flor et al., 1992; Morley et al., 1999; Karjalainen et al., 2001; Karjalainen et al., 1999; Guzmán et al., 2001; Nielson, Weir, 2001; Marhold et al., 2001; Oliver, 2001; Shonstein et al., 2003; SBU, 2000; SBU, 2006; SBU, 2010).

The Department of Rehabilitation Medicine at Huddinge University Hospital in Stockholm, Sweden, offered an 8-week multiprofessional work-related rehabilitation program for patients on long-term sick-leave suffering from persistent musculoskeletal related pain.

The objectives of the clinical rehabilitation program were: 1) return-to-work, 2) increased activity level, and 3) reduced pain intensity.

The 8-week medical and work-related multiprofessional rehabilitation program ran 7.5 hours a day and 5 days a week.

The program consisted of 2 parts: A 3-week Impairment and Disability Evaluation Analysis (IDEA) and a 5-week work-related program.

The idea of the IDEA included the different tools of the multiprofessional team to measure, observe and evaluate the patients' medical, physical, psychological and social functions, ability to work. This,

in spite of and considering the patients' remaining pain situation and from a bio-psycho-social point of view (Norrefalk et al., 2005).

Materials and methods

The main objective was to evaluate the program at follow-ups at 1, 3 and 6 years. Further aims were to find predictors for those patients who would gain most from the program and whether immigrants had more difficulties to reach the objectives than non-immigrants. An economic analysis was carried out to evaluate the socioeconomic benefits and the cost effectiveness of the program (Norrefalk et al., 2005; Norrefalk et al., 2006; Norrefalk et al., 2007; Norrefalk et al., 2008).

Sixty seven patients enrolled in the program were analysed after 1 and 3 years and another 122 patients after 6 years. The socioeconomic cost of the program was analysed at the one-year follow-up. The multiprofessional rehabilitation team evaluated impairment and disability (IDEA) to assess possible work ability. The patients' own perceptions of returning to work were evaluated. The return-to-work rate was also evaluated. All patients completed questionnaires and estimated their pain intensity, filled out a pain drawing and answered questions about their level of activity and sleeping habits, before entering the program. The consumption of analgesics was also recorded. The same questions were asked at the follow ups.

For comparison, a group of patients completed an evaluation but were not referred to a work-related multiprofessional rehabilitation program were used.

Patient selection, inclusion and exclusion criteria

The patients in the studies were selected groups referred to an 8-week multiprofessional rehabilitation program at the Pain Unit at the Department of Rehabilitation Medicine, at the Huddinge University Hospital, in Stockholm. A detailed description of patients, methods and results is found in program (Norrefalk et al., 2005; Norrefalk et al., 2006; Norrefalk et al., 2007; Norrefalk et al., 2008). Earlier treatment or rehabilitation had failed. One-third of the patients were referred from general practitioners, one third from hospitals and one third from the local social insurance office.

Inclusion criteria

Inclusion criteria were that the patient should:

- be of working age,
- has suffered from persistent musculoskeletal-related pain for more than three months,
- has been on sick-leave for more than three months,
- has no ongoing drug or alcohol abuse or major cognitive deficit,
- understand Swedish sufficiently well to profit from the theoretical parts and the concluding meetings of the program. Interpreters were used when needed.
- has relevant medical and surgical investigations and treatment completed prior to referral to the program,
- has a rehabilitation plan drawn up by the local social insurance office,
- agree to reference being made to their earlier medical records.

Exclusion criteria

Patients were excluded from the program if:

- they were at work or had a well-structured, continuing presence at work of more than two hours per day,

Table 1. Correlations of the return-to-work rate at the 1-year follow-up. (Spearman's correlation coefficient).

Variable	Correlation (r-value)
IDEA	0.5135
Patients own prediction	0.12
Time out of work before rehabilitation	-0.18
Age	-0.43
Pain intensity (VAS)	-0.008
MSPQ	-0.10
DRI	-0.03

- there was no rehabilitation plan. The referring physician was asked to initiate production of such a plan together with the patient and the rehabilitation coordinator at the local social insurance office.
- their Swedish was too poor to permit them to follow the theoretical parts of the program,
- they had ongoing drug, narcotics or alcohol problems or major cognitive deficits.

According to data from the National Register of Pain, the patients referred to the 8-week rehabilitation program had the highest proportions of immigrants and the lowest level of education. They also estimated higher pain intensity, poorer health and lower self-estimated ability than the average for patients on other work-related rehabilitation program in Sweden during the same period of time. The typical patient was a woman (80%), 40 years of age (immigrant 45%) who had been on sick-leave for 22 months, caused of generalized pain. The pain intensity was 68 out of 100 (max). They were low educated and had been working in health care or cleaning work. They also had low expectation of returning to work before rehabilitation (80%).

Results

None of the patients were at work at the start of the eight-week program. At the 1-year follow up, 63% had returned to work, or were in work-related activities, for at least four hours a day (Norrefalk et al., 2005). There was a statistically significant correlation ($p < 0.01$) between the multiprofessional rehabilitation team IDEA and the actual outcome of the return-to-work rate 1 year after completing the program.

It was not possible to predict the return-to work rate at individual level, only at group level. In the comparison group, three of 14 had returned to work but far more were on full disability pension. No statistically significant difference in pain intensity was found between the two groups. The results on the Modified Somatic Perception Questionnaire (MSPQ) and the Disability Rating Index (DRI) (Main, 1983; Salén et al., 1994), the patient's own perceptions about returning to work and pain intensity, their ages or their period out of work did not predict return-to-work following the structured multiprofessional rehabilitation program.

The IDEA developed by the rehabilitation team was shown to be the best predictor of the return-to-work rate, of the instruments compared in this group of patients (Norrefalk et al., 2005).

At the one-year follow up, 57% of the immigrants and 68% of the natives had returned to work for at least four hours a day. At the three year follow-up, 48% of the immigrants and 50% of the native Swedes were still at work or in work-related activities (Norrefalk et al., 2006). The difference was not statistically significant.

A statistically significant difference ($p = 0.023$) between the groups was found regarding their own estimation of their ability to go back to work. Twenty eight (93%) of the immigrants estimated it "hard" or "very hard" to go back to work after the rehabilitation program compared to twenty five (68%) of the non-immigrant patients.

The activity level was lower ($p = 0.011$), and pain intensity and analgesics use were higher, among the immigrants than among the non-immigrants at the 3-year follow-up ($p = 0.016$, and $p = 0.034$). Logistic regression analysis was performed for the 1- and 3-year follow-up data, seeking prognostic factors for the dependent variable return-to-work, with a description of odds ratios and confidence intervals for unadjusted and adjusted values of different independent factors. Variables controlled were; age, sex, white-collar / blue-collar work, immigrants/ non-immigrants, time out of work, VAS outcomes and use of analgesics. None of these variables showed statistical significance and none could be used in this study as predictors for return-to-work (Norrefalk et al., 2006).

At the 6-year follow up 52% of the 122 patients were back at work compared to 13% in the control group ($p < 0.001$) (23). Further, compared with before entering the program there was a statistically significant difference in the return-to-work rate within the study group ($p < 0.001$) (Norrefalk et al., 2007). None of the present patients who returned to work was working less than 4 hours a day. Concerning the actual change in working hours, there was a difference regarding age: older patients in the study group had decreased their working hours or were not working at all compared to the rest of the group ($p = 0.008$) (Norrefalk et al., 2007).

Compared to before entering the program, the patients had a statistically significant higher level of activity ($p = 0.037$) (Norrefalk, 2007). Pain reduction was experienced by 58% of the patients ($p < 0.001$), 16% reporting no pain at all (Norrefalk et al., 2007).

Forty-seven percent of the patients had decreased their consumption of analgesics ($p < 0.001$). Nineteen percent of the patients took no analgesics before program start compared to 41% at the follow-up. No statistically significant difference in pain intensity was found between the working patients and those not working at the long-term follow-up. There was a statistically significant gender difference ($p = 0.029$) among patients that had not returned to work at the 6-year follow up: all patients still on full sick-leave were women. The men had either full temporary disability allowance or full disability pension, none in the study group being still on sick-leave. No other difference were found between the patients in the study group who returned to work and those who did not, regarding level of activity, pain intensity, consumption of analgesics, gender origin, diagnosis or duration of work absence. Those variables had no value for predicting the return-to-work rate (Norrefalk et al., 2007).

Regarding the economic benefit of the program the following factors were considered. At the one-year-follow up, none of the patients in either group were at work at the start of the program. Sixty-three percent of the study group had returned to work or were in work-related activities. In the control group the corresponding figure was 13-24%, ($p < 0.001$). Taking the number of working hours per day into account, the corresponding return-to-work rate measured in full-time jobs was 30.5 in the study group and 16 in the control group, a difference of 14.5 in the 67 pairs included in this study ($p < 0.001$) (Norrefalk et al., 2008).

The study documented the amount of sickness absence one year after the end of the rehabilitation program and compared this with a similar groups (67 and 322) of matched patients who were not referred to any rehabilitation program (gender, ethnic background, age and time of sick-leave before intervention).

Each individual resuming work after a period of long-term sick-leave reduced the cost of allowances coming from the national social insurance system, thereby reducing the amount of transfers from the tax-payers.

However, the important economic gain from the perspective of society is that it ends a period of indirect costs in terms of the loss of that person's productive work.

We focused exclusively on the benefits in terms of a reduction in production loss and interpret the results as a lower bound of the estimated economic benefits of the rehabilitation program.

The total cost for the program was estimated to be €5,406 (US \$ 7,568) per patient, this includes the wages for the whole team consulting costs, other running costs, cost for facilities, overheads and miscellaneous. The benefit of the program was estimated to be €3,799-7,515 (US \$ 5,319–10,521) per treated patient and year in comparison to the control group (Norrefalk et al., 2008).

The economic break-even point was calculated as the time needed for the successfully rehabilitated to work in order for the economic benefits to exactly equal the total costs of the program, including those for patients remaining on sick-leave. It occurred between 8.6-10.8 months after completing the program. Any additional work after that yields net economic benefits. After 3 years the economic benefit for society will be more than 5 times the running cost, and after 6 years the benefit will be at least 10 times the running cost. This included the cost for the patients in the program that did not return to work (Norrefalk et al., 2008).

Discussion

The return-to-work rate is a common measure for multiprofessional rehabilitation programs. However, the return-to-work rate varies a great deal in different studies. Chapman (Chapman et al., 1981) reported 6% while Roberts and Reinhardt (Roberts, Reinhardt, 1980) as well as Mayer et al. (Mayer et al., 1987) reported a successful return-to-work rate of slightly above 80%. Other studies show a rate somewhere in between these extreme figures. This can partly be explained by the huge differences in the randomisation, methodology, input effort and length of the programs. Another explanation is the differing national insurance systems and laws in different countries. Hence the present program showed good results at national and international levels regarding the return-to-work rate. However, the circumstances of the present patients regarding origin, education, activity levels, pain problems and time out of work were not ideal for return to work. Surprisingly, at the 6-year follow up, more than half the patients had in fact returned to work.

It was not possible to identify individual parts of the program responsible for the outcome, nor to isolate individual outcomes so as to characterize the patients who returned to work as opposed to the ones who did not.

Several circumstances could have contributed to the relatively good results. The program was well structured and run by an experienced, multiprofessional team actively engaged in the patients' pain situation. The length of the program and the fact that it required active attendance for 7½ hours, 5 days a week, over eight weeks, corresponded to at least a half-time job. A change in patients' pain behaviour, coping strategies and social behaviour was seen by the end of the program, if not before. The patients were not left alone with their anxiety, catastrophising thoughts or failures to cope with their pain. The team members were always there to discuss and support the patients to get used to a life that included work and to remain at work, despite their pain. The active cooperation and involvement of other people and organisations such as family, employers and the social insurance office were important in the rehabilitation. Lastly, their long sick-leave and the fact that they had exhausted the medical possibilities before entering the program could have played an important role. After being excluded from the labour market, with restricted social contacts, they had got a chance to return to normal life often including work that would generate substantial net economic gains not only for the patient but also for society and employers.

Furthermore, this study shows that the 8-week rehabilitation program for patients on long-term sick-leave suffering from persistent musculoskeletal-related pain will most likely generate substantial net economic gains for society, employers and the patients, i.e., a "win-win-win" situation for society, employers and the patients.

Conclusions

The results support the hypothesis that within a structured, multiprofessional, rehabilitation program a majority of patients on long term sick-leave and suffering from persistent musculoskeletal-related pain can gain much and return to work – and remain at work – despite their pain. It was, however, not possible to predict the return-to work rate at individual level, only at group level. A correlation was found between the IDEA ie the evaluation of impairment and disability to assess possible work

ability performed by the multiprofessional rehabilitation team and the actual return-to-work outcome. Immigrants and non-immigrants benefited equally from the program.

In economic terms, the rehabilitation program paid off within a year after the successfully rehabilitated returned to work. The estimated economic benefits for society are estimated to be more than five times the running cost after three years and at least ten times the running cost after six years.

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