Received: 20 December 2017 | Revised: 3 January 2018 | Accepted: 5 January 2018

DOI: 10.1002/msc.1235

SERVICE EVALUATION

WILEY

A 12-h combined physical and psychological treatment programme for patients with persistent back pain

David Rogers[1] | Peter Nightingale[2] | Adrian Gardner[1]

[1] The Royal Orthopaedic Hospital, Birmingham, UK

[2] Institute of Translational Medicine, University Hospitals Birmingham, Birmingham, UK

Correspondence
David Rogers, Clinical Lead, Functional Restoration Service, The Royal Orthopaedic Hospital, Birmingham, UK.
Email: david.rogers4@nhs.net

Abstract

This service evaluation analysed the long-term clinical outcomes, as measured by the Pain Self-Efficacy Questionnaire (PSEQ) and Oswestry Disability Index (ODI), of a 12-h group-based, multidisciplinary, combined physical and psychological treatment programme for patients with persistent back pain in a secondary care setting. Between April 2012 and December 2015, 373 patients attended the programme, with outcome measures obtained for 272 patients post-treatment. We randomly selected 120 patients who had completed treatment, for long-term outcome measurement follow-up, and gained outcome measures for 40 patients in total. At a median follow-up of 27 months post-treatment, the results demonstrated significant improvements in both clinical outcome measures. We conclude that a brief combined physical and psychological treatment programme appears to be effective at reducing back disability and pain self-efficacy, with improvements maintained in the longer term

KEYWORDS

Cognitive behavioural approach, Functional restoration, Low back pain

1 | INTRODUCTION

Low back pain is the most common cause of disability worldwide (Hoy, March, & Brooks, 2014), and disability related to back pain continues to increase (Deyo, Mirza, & Turner, 2009). Low back pain is responsible for huge financial costs on a societal level, in terms of healthcare utilization, workplace absence and disability benefits (Deyo et al., 2009; Office for National Statistics, 2017). Updated UK clinical guidelines on back pain recommend the use of group-based, combined physical and psychological treatment programmes (CPPPs) for people with persistent back pain (National Institute for Health and Care Excellence, 2016). A recent systematic review concluded that multidisciplinary biopsychosocial rehabilitation for chronic low back pain, using a combined physical and psychological approach, was more effective than usual care and physical treatments in decreasing pain and disability in people (Kamper et al., 2015). The optimal duration of combined physical and psychological treatment has not been established, but it is recognized that interventions of longer duration were no more effective than those of shorter duration (Kamper et al., 2015)

The aim of the present study was to evaluate the long-term benefits of a 12-h, 4-week, group-based CPPP for the management of back pain.

2 | METHODS

As the study comprised a service evaluation, it did not meet the criteria for research. Ethical approval was therefore not required.

2.1 | Participants

The aim of the present retrospective study of a group-based CPPP in a secondary orthopaedic centre was to analyse the clinical outcomes of patients with persistent back pain of greater than 12 weeks' duration. Patients were referred to the treatment programme predominantly from orthopaedic clinics, and initially underwent a biopsychosocial assessment from a physiotherapist. They were offered a CPPP if they met the inclusion criteria detailed in Table 1.

2.2 | Procedures

Eligible patients attended a 12-h group-based, CPPP over eight sessions in a period of 4 weeks. Groups comprised a maximum of 12 patients, and the content of treatment sessions are detailed in Table 2. The aim of treatment was to address modifiable obstacles to recovery, to effect improvements in pain self-efficacy and back

TABLE 1 Inclusion criteria for combined physical and psychological treatment programme

Adults (18+ years of age) with persistent back pain of greater than 12 weeks' duration
Either: (a) At work, either paid or voluntary but struggling to maintain responsibilities (b) Off work but job remains open (c) Not employed but actively seeking to improve function and quality of life
Not responded to routine primary care management such as general practitioner advice, medication, exercises
Clear functional goals
Modifiable psychosocial factors having an impact on their ability to recover

disability. A cognitive behavioural approach underpinned the content of all sessions, and the multidisciplinary team comprised a doctor, physiotherapist and pain counsellor.

2.3 | Outcome measurements

Patients completed the Pain Self-Efficacy Questionnaire (PSEQ) (Nicholas, 2007) and Oswestry Disability Index (ODI) questionnaire (Fairbank, Couper, Davies, & O'Brian, 1980) at baseline and following completion of the 4-week programme. The ODI is a self-administered questionnaire for patients with low back pain, and is divided into 10 sections, each of which measure various daily living activities. Each section is scored on a scale between 0 and 5, with 5 indicating the greatest level of disability. The score is attained by dividing the summed score by the total score. This score is multiplied by 100, to express a percentage total score, with higher scores indicating a greater degree of low back pain disability. The PSEQ is a 10-item questionnaire developed to measure people's level of confidence in performing activities of daily living while experiencing persistent pain. It covers various daily living activities and asks patients to rate how confidently they are able to perform them, using a seven-point Likert scale, where 0 = not at all confident and 6 = completely confident. The total score is added together and can range from 0 to 60, with higher scores indicating a higher degree of self-efficacy. Pain self-efficacy has been identified as a significant factor in the development of back pain disability, and is recognized as indicative of an individual's confidence in their ability to complete a particular activity (Main & Spanswick, 2004). Research indicates that patients with low self-efficacy have a greater degree of back pain disability. Interventions that can enhance self-efficacy are therefore likely to have a positive effect on low back disability (Main & Spanswick, 2004). No consensus has yet been reached on what constitutes a mean clinically important difference (MCID) score for the ODI or PSEQ.

TABLE 2 Content of treatment sessions

Pain biology education
Activity management
Goal setting
Relaxation/guided imagery training
Graded exercise
Medication management
Managing flare-ups
Maintaining improvements

We then used a randomized stratification method on a sample of patients, to gain long-term outcome data. Using data obtained at the 9-month follow-up in a previous study which had evaluated the same service (Rogers, Gardner, MacLean, Brown, & Darling, 2014), we estimated the mean change in ODI between baseline and the 4-week follow-up to be 9.3 and the standard deviation of the change to be 17.3. Assuming these values, we found that a sample size of 39 would be sufficient to provide 90% power to detect a change at the 5% significance level, using a two-tailed test.

Statistics were performed using SPSS (IBM Corporation, Armonk, NY, USA). Paired and unpaired t-tests were used for comparisons of age, ODI scores and PSEQ scores. Gender distributions were analysed using Fisher's exact test. Significance was set at $p < 0.05$. Box plots were created using R (R Core team, Vienna, Austria).

3 | RESULTS

A total of 373 patients attended the CPPP between April 2012 and December 2015. All patients were asked to complete an ODI and PSEQ at baseline and at the 4-week follow-up, but there were 101 non-responders. A random sample of patients ($n = 120$) was asked to complete an ODI and PSEQ at long-term follow-up. Non-responders were sent reminders to complete both PSEQ and ODI on a second occasion, but there still remained a substantial number of non-responders. The duration of the long-term follow-up for those who responded was a median of 27 months (interquartile range 19–38 months). Table 3 illustrates the responders and non-responders from the original cohort and the long-term follow-up. As the age and gender distributions were similar for the responders and non-responders in the original cohort, in March 2017 we randomly selected a sample of 120 patients for long-term follow up of PSEQ and ODI questionnaire scores. Table 4 shows the distributions of gender and age, and the significance of the differences between responders and non-responders to long-term follow-up. This showed no statistically significant difference in gender and a statistically significant but clinically insignificant difference in age.

We also evaluated ODI and PSEQ scores between responders and non-responders, to assess whether there was any significant difference between the two groups at baseline and follow-up. The baseline PSEQ score was significantly higher for responders than for non-responders ($p = 0.017$), but there was no significant difference for any of the other data sets (PSEQ follow-up [$p = 0.403$], ODI baseline [$p = 0.051$] and ODI follow-up [$p = 0.218$]).

TABLE 3 Age and gender details of responder and non-responders, from original cohort and long-term follow-up

	Responders from the original cohort	Non-responders from original cohort	Number followed up for long term	Responders to long-term follow-up
N	272	101	120	40
Male (number and percentage)	102 (37.5%)	40 (39.7%)	45 (37.5%)	13 (32.5%)
Female (number and percentage)	170 (62.5%)	61 (60.3%)	75 (62.5%)	27 (67.5%)
Age (mean and standard deviation [SD])	45 SD 10.5	45 SD 10.3	45 SD 10.5	49 SD 10.9

TABLE 4 Total number of responders/non-responders to long-term follow-up

	Responders	Non-responders	Significance
N	40	80	
Female (number and percentage) Male (number and percentage)	27 (67.5%) 13 (32.5%)	48 (60%) 32 (40%)	$p = 0.549$ (Fisher's exact test)
Age in years (mean and standard deviation [SD])	49.2 (10.9)	43.4 (9.8)	$p = 0.004$ (unpaired t-test)

Tables 5 and 6 illustrate the mean scores and standard deviations for ODI and PSEQ at baseline, 4-week follow-up and long-term follow-up.

The distributions of the changes in ODI and PSEQ were assessed using Q-Q plots. As all the changes were approximately normally distributed, comparisons of baseline, 4-week and long-term follow up PSEQ and ODI scores were carried out by paired t-test, and the results are detailed in Figure 1 (ODI) and Figure 2 (PSEQ).

4 | DISCUSSION

The aim of the present study was to evaluate the long-term outcomes of pain self-efficacy and back disability scores in patients with persistent back pain who attended a 12-h group-based, multidisciplinary CPPP. The long-term results demonstrated significant improvements in pain self-efficacy and back disability, as measured by PSEQ and ODI, respectively, compared with the scores at initial assessment, prior to the start of the programme. These results concur with current evidence supporting the role of multidisciplinary biopsychosocial rehabilitation for persistent low back pain (Kamper et al., 2015), and the present service evaluation provides further evidence of the longer-term benefits of a shorter duration intervention of 12 h.

In terms of the PSEQ scores, the data demonstrated a significant improvement in pain self-efficacy scores immediately following treatment ($p < 0.001$), with these improvements being maintained at long-term follow-up ($p = 0.146$). The data also demonstrated a significant improvement in pain self-efficacy scores at long-term follow up compared with pre-treatment ($p < 0.001$). There is a strong association between high PSEQ scores (40 and above) and the maintenance of functional gains (Cohen, 2000; Nicholas, 2007), with lower scores predicting smaller long-term functional gains (Coughlan, Ridout, Williams, & Richardson, 1995). The present current service evaluation concurs with this previous research, with scores of 40 immediately following treatment being maintained at long-term follow-up. Indeed, the proportions of patients with PSEQ scores greater than or equal to 40 were 21% at initial assessment, 71% at 4 weeks and 65% at long-term follow-up.

In terms of ODI scores, the data demonstrated a significant improvement in disability outcome scores immediately following treatment ($p < 0.001$), and at long-term follow-up compared with pre-treatment ($p = 0.016$). ODI score after treatment was significantly better than of long term follow-up ($p = 0.027$). While patients were encouraged to continue with maintaining behavioural change once the programme had finished, they may have struggled with doing this in a less structured environment. This is reflected in the evidence, which suggests that poor adherence to treatment principles negatively affects the effectiveness of treatment in the long term (World Health Organization, 2003). In the present study, this appears to have had a greater impact on back disability compared with pain self-efficacy.

We accept that there were limitations to the present service evaluation, including the low response rate to follow-up, which would have affected the validity of the data. Also, while the gender distribution was similar in those followed up and those lost to follow-up, the age distribution was not. This may have resulted in a non-response bias in the results, although the changes in ODI and PSEQ at 4 weeks were not significantly different for responders and non-responders.

TABLE 5 Mean and standard deviation for Oswestry Disability Index at baseline, 4-week follow-up and long term

Oswestry Disability Index	Number	Mean	Standard deviation
Baseline	40	35.3	11.6
4-week follow-up	40	23.75	13.2
Long term	40	28.7	18.1

TABLE 6 Mean and standard deviation for Pain Self-Efficacy Questionnaire at baseline, 4-week follow-up and long term

Pain Self-Efficacy Questionnaire	Number	Mean	Standard deviation
Baseline	40	32.3	9.3
4-week follow-up	40	45.2	11.9
Long term	40	42.4	15.4

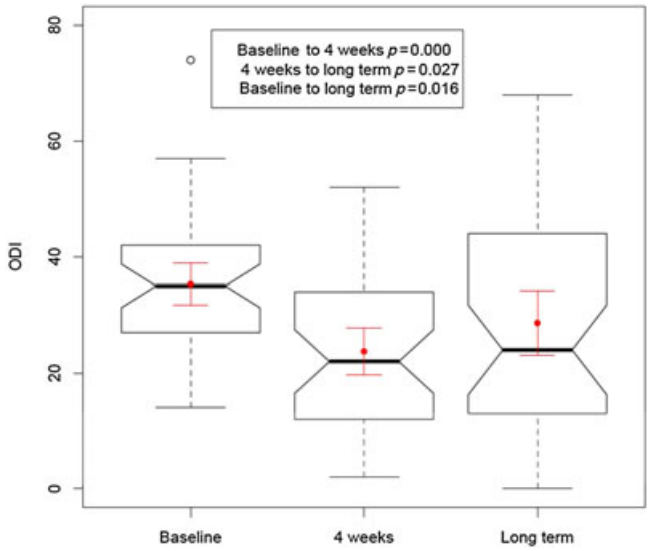

FIGURE 1 Box plots for Oswestry Disability Index (ODI) at baseline, 4 week and long-term follow-up. The median value is shown as a horizontal line at the level of the pinch in the box. The whiskers show the range covered by the data points up to 1.5 times the interquartile range from the box, and outliers beyond this range are shown as open circles. The mean and 95% confidence interval of the mean are shown as a solid red dot and whiskers around that dot in the box

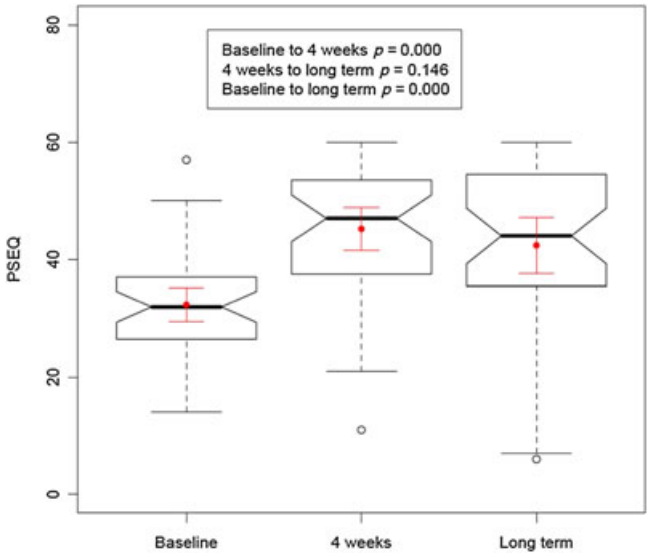

FIGURE 2 Box plots for Pain Self-Efficacy Questionnaire (PSEQ) at baseline, and 4-week and long-term follow-up. The details of the box plots are as in Figure 1

5 | CONCLUSION

The present service evaluation established that a short-duration, group-based, multidisciplinary CPPP for patients with persistent back pain in a secondary care setting provides a clinically significant improvement in pain self-efficacy and back disability at long-term follow-up. Further work is planned on developing this CPPP service to ensure that outcomes in back disability are maintained in the long term.

ORCID

David Rogers http://orcid.org/0000-0002-6627-8238

REFERENCES

Cohen, M. (2000). Medical assessment and management of work-related low back or neck/arm pain. *Journal of Occupational Health and Safety*. Australia and New Zealand, *16*, 307–317.

Coughlan, G., Ridout, K., Williams, A., & Richardson, P. (1995). Attrition from a pain management program. *British Journal of Clinical Psychology*, *34*, 471–479. https://doi.org/10.1111/j.2044-8260.1995.tb01481.x

Deyo, R. A., Mirza, S. K., & Turner, J. A., & Martin, B. I. (2009). Over treating chronic back pain: Time to back off? *Journal of American Board of Family Medicine*, *22*, 62–68. https://doi.org/10.3122/jabfm.2009.01.080102

Fairbank, J. C. T., Couper, J., Davies, J. B., & O'Brian, J. P. (1980). The Oswestry low back pain disability questionnaire. *Physiotherapy*, *66*, 271–273.

Hoy, D., March, L., Brooks, P., Blyth, F., Woolf, A., Bain, C., … Burchbinder, R. (2014). The global burden of low back pain: Estimates from the Global Burden of Disease 2010 study. *Annals of Rheumatic Disease*, *73*, 968–974. https://doi.org/10.1136/annrheumdis-2013-204428

Kamper, S., Apeldoorn, A., Chiarotta, A., Smeets, R., Ostelo, R., Guzman, J., & van Tulder, M. (2015). Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis. *BMJ*, *350*, h444. https://doi.org/10.1136/bmj.h444

Main, C. J., & Spanswick, C. C. (2004). *Pain Management: An Interdisciplinary Approach*. Edinburgh: Churchill Livingstone

National Institute for Health and Care Excellence. 2016. Guideline [NG59]. Low back pain and sciatica in over 16s: Assessment and management. Retrieved from https://www.nice.org.uk/guidance/ng59

Nicholas, M. K. (2007). The pain self-efficacy questionnaire: Taking pain into account. *European Journal of Pain*, *11*, 153–163. https://doi.org/10.1016/j.ejpain.2005.12.008

Office for National Statistics. 2017. Sickness absence in the labour market: 2016. Newport. Retrieved from https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/2016

Rogers, D., Gardner, A., MacLean, S., Brown, G., & Darling, A. (2014). A retrospective analysis of a functional restoration service for patients with persistent low back pain. *Musculoskeletal Care*, *12*, 239–243. https://doi.org/10.1002/msc.1078

World Health Organization (2003). Adherence to long-term therapies: Evidence for action. Retrieved from http://www.who.int/chp/knowledge/publications/adherence_report/en

How to cite this article: Rogers D, Nightingale P, Gardner A. A 12-h combined physical and psychological treatment programme for patients with persistent back pain. *Musculoskeletal Care*. 2018;1–4. https://doi.org/10.1002/msc.1235