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Original Article

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Abstract

Patients with chronic musculoskeletal pain are frequent users of healthcare. Whilst evidence suggests that a multidisciplinary pain management programme (PMP) approach is effective in reducing patients' levels of distress and disability, there is little research examining the cost-effectiveness of such an approach. The present study sought to address this by examining the impact a PMP had on patients' pain-related secondary care healthcare use. A 90.5% reduction in healthcare use was found 12 months after the PMP, compared with 12 months before the PMP. The cost of the pain-related healthcare use 12 months before the PMP was £35,700. Twelve months after the PMP, the cost of healthcare use had reduced to £3879. The findings suggest that a PMP approach could reduce pain-related healthcare use.

Keywords

Chronic pain, cost-effectiveness, healthcare use, healthcare utilisation, musculoskeletal pain, pain management programme

Summary points

- Patients with chronic musculoskeletal pain are frequent users of healthcare services.
- The present study provides strong evidence that a pain management programme approach can reduce pain-related healthcare use.

Introduction

Chronic musculoskeletal pain is a complex health condition which causes significant distress and disability. The onset of the pain can sometimes be associated with an injury or stressor, or it can have no apparent cause. Unfortunately, there is no cure and patients can spend many years seeking help, often getting stuck in a 'revolving door' seeing a variety of specialists.¹ This has a significant impact on NHS resources. The cost to the NHS of chronic non-malignant back pain alone is estimated to be £12.3 billion per year and over half a billion pounds is spent annually by the NHS on pain medication.²

Comprehensive, multidisciplinary, group pain management programmes (PMPs) are recommended as an

effective way of helping patients with chronic pain.³ Rather than attempting to eliminate pain, PMPs aim to tackle the emotional distress and physical disability that chronic pain causes. Research has shown that

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PMPs improve physical function and mood, encourage return to work and decrease the use of prescribed pain medication.⁴⁻⁸ However, in the current economic climate, it is not sufficient for a treatment to be just clinically effective. Commissioners want treatments that deliver results at the lowest possible cost. PMPs can appear to be an expensive service as a group of patients may be seen for up to 100 hours by a number of health professionals. This could make PMPs an easy target for cuts. A handful of studies have sought to examine the impact of PMPs on healthcare use. If PMPs can show a reduction in long-term reliance on healthcare professionals, then they can be established as cost-effective treatments for commissioners.

Jensen et al.⁹ used self-reported data to examine the healthcare use of patients who had participated in a PMP. They found that at 3 years after treatment, there was no significant difference in attendances with healthcare professionals compared with treatment as usual. In contrast, a small-scale study by CIPHER et al.¹⁰ found that, after a PMP, patients reported fewer uses of healthcare services when compared with patients who received only pharmacotherapy. Owing to the inconsistent findings and problems that arise when using self-reported data, these studies do not provide an accurate picture of the impact PMPs have on healthcare use.

Caudill et al.¹¹ examined the medical records of patients 12 months after a PMP and found a 36% reduction in service attendances. Whilst their study used an accurate data collection method, a significant flaw in the study was the inclusion of non-pain-related appointments in their analysis. If a patient's healthcare use had increased because of a co-existing health condition (e.g. chronic obstructive pulmonary disease), any reduction in *pain-related* service use could be missed. The focus of PMPs is on chronic pain; therefore, one would not expect to see behaviour change for co-existing health conditions.

In a large study carried out by Kääpä et al.¹² it was found that a PMP had no significant impact on patients' healthcare use when compared with patients receiving individual physiotherapy. However, no information was provided as to how data were collected. A study that did obtain data from hospital records found no significant difference in healthcare use 9 months after a PMP.¹³

Overall, the use of self-reported data when examining the impact of PMPs on healthcare use is flawed and has given inconsistent results. Studies that make use of reliable data sources (i.e. medical records and hospital databases) have also had their limitations (including, for example, non-pain-related appointments in analyses).

This study aimed to look at the impact a PMP had on healthcare use (i.e. appointments with healthcare professionals), using reliable data collection methods.

It examined the pain-related service attendances (specifically secondary care consultations) of patients with chronic musculoskeletal pain following their participation in a multidisciplinary outpatient PMP, using robust data collection from a hospital appointment system. The cost of these appointments was then calculated to provide an accurate picture of the associated financial impact. It was hypothesised that, at follow-up, patients would display a significant reduction in pain-related healthcare use.

Method

Participants

A total of 66 patients were offered the PMP, and 11 dropped out without completing the programme. Unfortunately, the patients who dropped out of the PMP did not provide a reason for their decision. Of the 11 who dropped out, five did so before the start of the PMP, and the dropout rate was consistent with previous research.¹⁴ Overall, a total of 55 patients who completed the PMP were included in the present study.

Study design and intervention

The sources of referrals for the 55 participants who took part in this study are shown in Table 1.

During the study the PMP was run as a pilot service (because of temporary funding). As such, the local Primary Care Trust (PCT) limited referrals to the PMP to a select number of hospital specialists and GPs. This decision was taken to ensure that the service did not receive more referrals than it could process during the pilot period. Therefore, the sources of referrals for the study may not represent a true picture of referrals for an established PMP service. It would be interesting to examine the influence of referral sources on healthcare use; however, this is beyond the scope of the current article.

Upon referral, all patients were invited to attend a group information session that lasted no more than 1 hour. The purpose of this session was to explain what the PMP would involve and to answer patients' questions about the programme. At the end of the session, those who were interested in the PMP approach were given a consent form and asked to opt in.

Those patients who opted in to the PMP were then invited to an individual assessment and were seen separately by a physiotherapist, specialist pain nurse and clinical psychologist. Exclusion criteria included patients with a co-morbid condition that was the primary cause of distress, or a condition that required urgent medical attention/other specialist opinion. Patients undergoing litigation were enrolled on the programme only once the court case was complete.

Table 1. Sources of referrals

Department of referral	Number of patients
Chronic pain service	29
Chronic pain services from other hospitals	3
Physiotherapy	9
Rheumatology	8
GP	4
Musculoskeletal community assessment triage	1
Orthopaedics	1

After the assessments, patients who were accepted to the PMP were offered a place on the next available programme. The average waiting time between patients being offered a place to start the programme was 8 weeks. This consisted of a 3-hour group session that ran once a week for 10 consecutive weeks. Two follow-up sessions were offered at 6 weeks and 6 months after a PMP. The programme aimed to promote a self-management approach and covered topics such as safe movements, communication, thoughts and feelings, relaxation, problem-solving and understanding pain. All groups had the same structure and were facilitated by the same staff members. The estimated cost for one patient completing the PMP is £1048, including the cost of a 2.5-hour multidisciplinary assessment.

Data collection

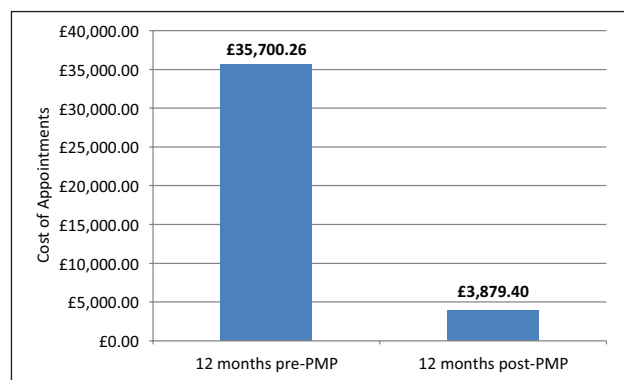
Data regarding healthcare use 12 months before the PMP and 12 months after the PMP were collected from the hospital appointment system. Only appointments that were related to the patients' pain conditions were included in the analysis. These included appointments with pain consultants, rheumatologists, neurologists, orthopaedic consultants and physiotherapists. Appointments that patients attended, or those classed as 'did not attend' (and therefore cost the PCT money), were counted in the analysis. Rescheduled or cancelled appointments were not included, nor were appointments for the delivery of the PMP. The cost of appointments was then calculated based on the hospital's outpatient tariff (2010–11), providing an accurate picture of the cost of patients' pain-related healthcare use.

Statistical analysis

Descriptive statistics were used to summarise the sample characteristics. As the number of consultations before and after a PMP did not follow a normal distribution, a Wilcoxon signed-rank test was used to test the average reduction in the appointments. Clinical

Table 2. Mean number of appointments for the 12-month period before the PMP and after the PMP

	12 months before PMP	12 months after PMP
Total number of appointments	348	33
Mean number of appointments (\pm SD)	6.3 (\pm 5.9)	0.6 (\pm 1.3)

**Figure 1.** Total costs of appointments 12 months before and 12 months after the PMP.

outcome data were analysed using paired *t*-tests after checking for normality assumptions.

Results

The final sample consisted of 55 patients, of whom 47 were female and the remaining eight were male. The average age of the patients taking part in the study was 46.0 years with a standard deviation of 9 years. The median duration of pain was 9 years with a minimum of 1 year and a maximum of 50 years. The mean duration of pain was 12 years with a standard deviation of 11 years. The mean number of appointments before and after the PMP are summarised in Table 2.

There was a 90.5% reduction in pain-related secondary care appointments 12 months after the PMP compared with 12 months before the PMP ($p < 0.001$). A dramatic reduction in the cost of appointments after the PMP can be seen in Figure 1. One could argue that a disproportionate number of secondary care appointments will take place in the 12 months leading up to a PMP referral. In order to assess this, data regarding pain-related healthcare use 10 years before the PMP were also analysed using a trend analysis based on moving averages. These data were also collected using the hospital appointment system, with only appointments that patients attended or classed as 'did not attend' included in the analysis. A three-point (year

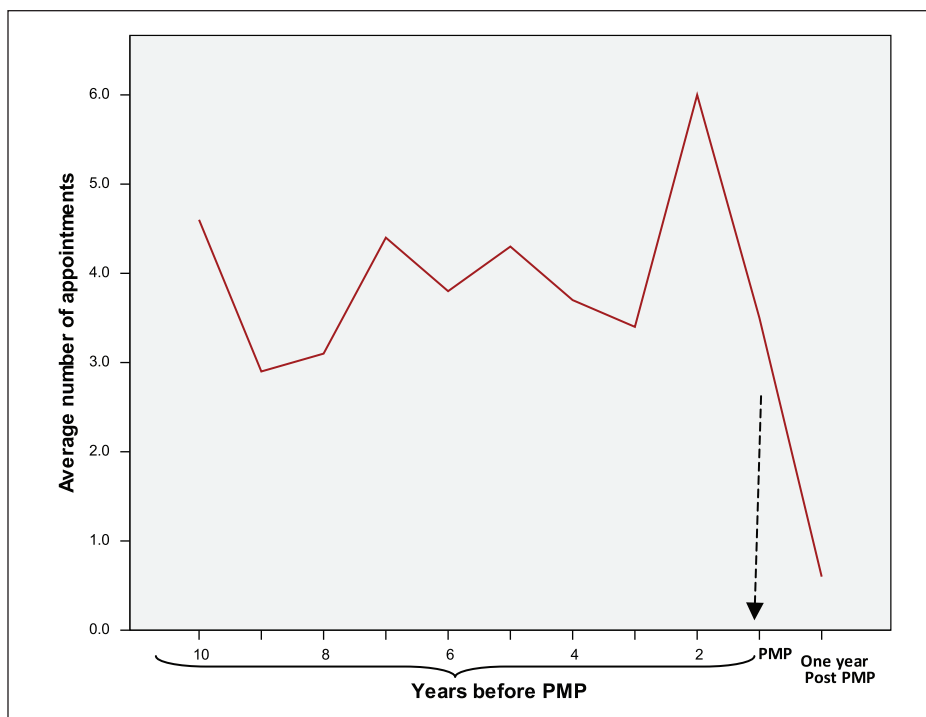


Figure 2. Average number of appointments 10 years before the PMP.

Table 3. Clinical outcome measures 12 months before the PMP and 12 months after the PMP

Measure	Mean (SD)		N	t-test	p-Value
	Pre PMP	Post PMP			
BDI	28.8 (10.8)	21.8 (12.3)	49	4.7	< 0.001
PSEQ	24.9 (13.2)	27.8 (13.0)	50	1.4	0.18
TSK	43.8 (8.4)	37.1 (9.2)	50	6.0	< 0.001
PCS	34.3 (11.0)	25.2 (13.3)	50	6.9	< 0.001
BPI Pain	6.5 (1.8)	6.0 (2.1)	50	1.9	0.07
BPI Interference	7.4 (1.9)	6.2 (2.3)	50	4.9	< 0.001
Sit to stand	8.5 (5.1)	11.4 (6.1)	46	4.7	< 0.001

BDI: Beck Depression Inventory II; BPI Interference: Brief Pain Inventory Pain Interference; BPI Pain: Brief Pain Inventory Pain Levels; PCS: Pain Catastrophising Scale; PSEQ: Pain Self Efficacy Questionnaire; TSK: Tampa Scale for Kinesiophobia.

moving average was calculated for the number of appointments and the trend line was fitted (Figure 2). No definitive trend in the number of appointments was observed.

These data clearly show that patients in the present study attended pain-related secondary care appointments up to 10 years before the PMP, and that there was no significant increase in healthcare use for patients in the year prior to starting the PMP.

Clinical outcome

Clinical outcomes consisted of the Beck Depression Inventory II, Pain Self Efficacy Questionnaire (PSEQ),

Tampa Scale for Kinesiophobia, Pain Catastrophising Scale, Brief Pain Inventory Pain Levels (BPI Pain), Brief Pain Inventory Pain Interference and the number of sit to stands in one minute.

The analysis of clinical data showed a significant improvement in all of the outcomes except PSEQ and BPI Pain 12 months after the PMP (Table 3).

Discussion

The present study found that patients who attended an outpatient PMP showed a significant reduction in pain-related secondary care consultations from the 12 months prior to attending the programme to the 12

months afterwards. Consequently, there was a dramatic reduction in the cost of appointments after the programme. Patients no longer went round 'the revolving door', attending appointments with different specialists to seek help with their pain. It could be argued that a disproportionate number of secondary care appointments will take place in the 12 months leading up to a PMP referral; however, long-term analysis of pain-related healthcare use up to 10 years before a PMP shows clearly that this is not the case. Patients in the current study consistently visited healthcare professionals in secondary care for their chronic pain for many years, and displayed a significant reduction only after attending a PMP. This suggests that the PMP approach helped patients to effectively self-manage the problems that their pain caused, so they sought less help from healthcare professionals.

Overall, the results of the present study showed that the PMP was clinically effective. It was disappointing that there was not a significant improvement in patients' self-efficacy but there were significant improvements in patients' levels of depression, fear of movement, catastrophising thoughts and the number of sit to stands per minute after the PMP. Although pain levels showed no significant improvement, this was to be expected as it was not a target of the PMP, and a significant improvement was shown in patients' assessment of how much their pain interfered with their lives. These findings support past research (e.g. ref. 8), suggesting PMPs are a clinically effective approach.

The costs associated with the reduction in healthcare use is perhaps the most important finding. It adds weight to past research that suggests PMPs are a cost-effective approach (e.g. ref. 11). PMPs can be unfairly perceived as expensive. However, dramatic reductions in healthcare use, as demonstrated here, suggest that they pay for themselves with the savings they make in terms of reduced pain-related secondary care attendance.

The present study was limited as it looked at only a 12-month follow-up period. One could argue that as patients also attended their two follow-up appointments during this period (one 6-week follow-up appointment and one 6-month follow-up appointment), patients might be less likely to seek further medical attention during this period. However, this is in line with past research in which the cessation of the PMP was counted as the end of treatment (e.g. ref. 11). The decision to limit the data analysis in the present study to a 12-month follow-up period was a pragmatic one due to funding limitations. It is intended that the present study's cohort will be followed up for a longer period to establish whether these results are maintained.

Additionally, the present study compares healthcare use pre-treatment with post-treatment. Whilst these data are important, one could argue that the results simply represent a natural decline in reliance on healthcare professionals that would have occurred even if patients did not attend the PMP. However, taking into account the duration of their pain and the fact that the dramatic reduction in healthcare use (90.5%) occurred only after the PMP, this explanation seems unlikely. Also, comparison of the average number of appointments for a period of 10 years before the PMP showed no evidence for a natural decline, and hence the reduction in appointments could be attributed to the effect of the PMP. The next step in research would be to use a randomised controlled trial to assess whether this decline in healthcare use can be attributed to a PMP when compared with a control group and other treatments.

In conclusion, the results in the present study provide further support for the suggestion that a PMP approach can reduce secondary care pain-related healthcare use. The reduction in costs associated with this can be used to justify the cost-effectiveness of the PMP approach to commissioners. There are a number of directions for future research within the area, and more work needs to be done to continue to build upon the growing body of evidence. It is intended that a follow-up study will be carried out to examine whether the reduction in healthcare use found in the present study's cohort continues in the long term. Additionally, there is a need for a study directly comparing the impact PMPs have on healthcare use with the impact of other types of treatments such as invasive interventions.

Conflict of interest

The author declares that there is no conflict of interest.

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