A randomised controlled trial of acupuncture care for persistent low back pain: cost effectiveness analysis

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Abstract

Objective To evaluate the cost effectiveness of acupuncture in the management of persistent non-specific low back pain.

Design Cost effectiveness analysis of a randomised controlled trial.

Setting Three private acupuncture clinics and 18 general practices in York, England.

Participants 241 adults aged 18-65 with non-specific low back pain of 4-52 weeks' duration.

Interventions Ten individualised acupuncture treatments over three months from acupuncturists trained in traditional Chinese medicine (n = 160) or usual care only (n = 81).

Main outcome measure Incremental cost per quality adjusted life year (QALY) gained over two years.

Results Total costs to the United Kingdom's health service during the two year study period were higher on average for the acupuncture group (£460; £673; €859) than for the usual care group (£345) because of the costs associated with initial treatment. The mean incremental health gain from acupuncture at 12 months was 0.012 QALYs (95% confidence interval −0.033 to 0.058) and at 24 months was 0.027 QALYs gained. This result was robust to sensitivity analysis. The probabilistic sensitivity analysis showed acupuncture to have a more than 90% chance of being cost effective at a £20 000 cost per QALY threshold.

Conclusion A short course of traditional acupuncture for persistent non-specific low back pain in primary care confers a modest health benefit for minor extra cost to the NHS compared with usual care. Acupuncture care for low back pain seems to be cost effective in the longer term.

Trial registration ISRCTN80764175.

Introduction

In a national survey carried out on behalf of the Department of Health in England and Wales, 40% of the adult population reported having experienced back pain within the preceding 12 months. The annual cost of low back pain to the United Kingdom's health service has been estimated at £88 000 in 1994 in 10 000 patients estimated at €901m), with the annual cost to a general practice with a list size of 10 000 patients estimated at £88 000 in 1994.

The use of acupuncture as an approach for the management of chronic pain, including low back pain, is receiving increasing recognition from both the public and professionals. Several randomised trials on this topic have, however, been criticised for their quality. We assessed the cost effectiveness of acupuncture for the treatment of persistent non-specific low back pain.

Methods

Patients (n = 241) with persistent non-specific low back pain of 4-52 weeks' duration, who were diagnosed as suitable for management in primary care, were recruited to the trial through referral from 43 general practitioners. Patients were randomly allocated either to receive up to 10 acupuncture treatments over three months from acupuncturists trained in traditional Chinese medicine (n = 161) or to receive usual care only (n = 81). Randomisation was in a ratio of 2:1 to the offer of acupuncture to test for effects between acupuncturists. The primary clinical outcome was the bodily pain dimension on the SF-36, measured at 12 and 24 months. After adjusting for baseline score and for any clustering by acupuncturist, we found an estimated intervention effect of 5.6 points (95% confidence interval −0.2 to 11.4, P = 0.06) at 12 months (n = 213) and 8.0 points (2.8 to 13.2, P = 0.003) at 24 months (n = 182; see accompanying clinical paper for details). The difference in final pain scores between groups was small, about 10%-15% that of the usual care group.

Costs were measured from both an NHS and a societal perspective. Effectiveness was measured as quality adjusted life years (QALYs) gained. Costs were measured in sterling prices for 2002-3. The primary economic analysis is over the 24 month period, as this incorporates comprehensive data on differentials for resource use and provides the most accurate assessment of costs and QALYs gained in the longer term.

Health outcomes and health resource use

We used the algorithm developed by Brazier et al., to devise a single preference based measure of health related quality of life, the SF-6D, from patients' responses to the SF-36 health status questionnaire at baseline and at 3, 12, and 24 months. The algorithm generates an index value where 0 represents death and 1 perfect health, with intermediate values for all remaining health states. The valuations are based on the preference weights obtained for a series of health states defined by the SF-6D from a sample of 611 members of the UK general population. We calculated the area under the curve to measure the QALY gain for each patient.

We collected details of healthcare utilisation from two main sources: notes from the general practice and a patient completed questionnaire on use of resources. To collect information on the number and type of contacts with general practitioners and practice nurses and drugs prescribed we examined the general practice notes for all participants. Other data on healthcare usage over the 24 months was collected by means of a self com-
NHS visit costs include salary, on-costs, qualifications, overheads, and capital costs.

†Data were missing for one patient who withdrew from the study shortly after randomisation.

Table 2 Characteristics of patients treatment for persistent non-specific low back pain for whom quality adjusted life years could be calculated* compared with those with missing SF-6D scores at any time point. Values are percentages (numbers) unless stated otherwise

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Acupuncture group</th>
<th>Usual care group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Complete SF-6D data (n=110)</td>
<td>Missing SF-6D data (n=49)†</td>
</tr>
<tr>
<td>Male</td>
<td>36 (39)</td>
<td>43 (21)</td>
</tr>
<tr>
<td>In full time employment</td>
<td>50 (55)</td>
<td>37 (18)</td>
</tr>
<tr>
<td>Permanently unable to work because of low back pain</td>
<td>5 (5)</td>
<td>12 (6)</td>
</tr>
<tr>
<td>Low back pain every day in past week</td>
<td>91 (50)</td>
<td>61 (30)</td>
</tr>
<tr>
<td>&gt;5 previous episodes of low back pain</td>
<td>48 (53)</td>
<td>47 (23)</td>
</tr>
<tr>
<td>Mean (SD) age in years (range)</td>
<td>43, 11.0 (21-64)</td>
<td>41, 10.4 (21-64)</td>
</tr>
<tr>
<td>Mean (SD) weeks with current episode of low back pain (range)</td>
<td>17.2, 13.3 (4-48)</td>
<td>17.8, 13.8 (4-48)</td>
</tr>
</tbody>
</table>

*Complete SF-6D scores at baseline and at 3, 12, and 24 months.
†Data were missing for one patient who withdrew from the study shortly after randomisation.
accurate estimates of the standard errors and variances of mean health state values at each time point than other methods of imputation. We discounted costs and outcomes at 3.5% each. We discounted costs and outcomes at 3.5% each during the 12-24 months of the study, the current recommended rate for public sector projects. The cost effectiveness of the intervention to the NHS was assessed bearing in mind recent guidance from the National Institute for Health and Clinical Excellence relating to the threshold the NHS can afford to pay.

Results

Table 2 shows the baseline characteristics of those patients receiving acupuncture care or usual care for persistent non-specific low back pain who completed the SF-36 at all four time points (for whom SF-6D and QALY scores could be calculated) compared with those patients with missing SF-36 data at any time point. The group with complete data also formed the sample for the base case analysis of cost effectiveness.

Compared with the base case sample, patients who were excluded were less likely to be in full time employment and to report more than five previous episodes of back pain.

Patients in the acupuncture group had an average of eight sessions with a study acupuncturist (table 3). Seven patients in the acupuncture group and nine in the usual care group received NHS acupuncture during the trial period. Several patients in the acupuncture arm (n = 19) purchased additional private acupuncture.

An improvement was found in health related quality of life over the 24 months in both groups, with the acupuncture arm reporting a slightly higher mean health related quality of life score at 24 months (table 3). With the exception of acupuncture, the mean differences between groups were not statistically significant at any time point.

Table 4 documents the mean NHS costs of healthcare resource use for low back pain treatment during the trial. The costs of initial acupuncture treatment differed significantly between the groups. The total mean costs of treatment to the NHS for the acupuncture group (£471.10) were higher than for the usual care group (£392.24) and the difference was statistically significant. The initial acupuncture treatment accounts for about 45% of the total NHS costs of treatment for the acupuncture group.

Overall the incremental cost effectiveness ratio for acupuncture in the treatment of low back pain was positive (table 5), with a mean of £4241 at 24 months. The figure shows the probability of the intervention being cost effective using the base case data for a range of cost effectiveness ceilings. Assuming an implicit threshold of a maximum willingness to pay of £20,000 for a QALY, the probability of the cost per QALY of acupuncture for low back pain falling below this threshold value was over 90%.

Table 6 Sensitivity analyses

Table 3 Resource use of patients receiving treatment for persistent non-specific low back pain over 24 months and health related quality of life measured by SF-6D

Table 4 Mean NHS costs (£) of healthcare resource use for treatment for persistent non-specific low back pain over 24 months

Table 5 Cost effectiveness of acupuncture care or usual care for treatment of persistent non-specific low back pain

Table 6 Sensitivity analyses

*See table 5.
†Using multiple imputation to predict missing values.
We assessed the cost effectiveness of acupuncture treatment for low back pain using systematic and transparent methods. A previous study assessed the cost effectiveness of acupuncture for headache using similar methods to those reported here but over a shorter period (12 months) and estimated the incremental cost effectiveness ratio to be £9180. As the authors note, however, the incremental cost effectiveness ratio is likely to reduce over longer periods because of increased gains in QALYs. It is difficult to assess the extent to which our results are comparable to those of other studies assessing interventions for low back pain because few studies have assessed the relative costs and effectiveness of treatments for low back pain. Studies have tended to assess effectiveness or costs in isolation and have tended not to use a generic outcome measure such as QALYs that would facilitate comparisons across alternative interventions. One study concluded that chiropractic treatment was more effective than outpatient management for patients with chronic or severe low back pain but did not assess the relative costs of each intervention. More recently trials have been reported of physiotherapy, exercise, and manipulation for low back pain. The trial of physiotherapy did not report cost effectiveness. The United Kingdom back pain exercise and manipulation trial showed exercise to have an incremental cost effectiveness ratio of £8300 compared with “best care,” but it did not compare interventions with usual care. The open and pragmatic nature of our trial allowed acupuncture care to be compared with usual care in everyday practice. Given that usual care comprised a mix of interventions, it was, however, not possible to isolate the costs and effectiveness of individual treatments as part of the package of usual care.

Recent guidance from NICE indicates that a ceiling ratio of £20 000 per QALY represents the threshold of what the NHS can afford to pay for additional QALYs, unless other arguments exist for adopting the technology. If £20 000 is taken as the maximum acceptable cost effectiveness ratio, then acupuncture for the treatment of low back pain seems cost effective.

On the basis of our findings of cost effectiveness, longer term reduction in pain, and the acceptability of acupuncture care to patients as reported in the accompanying clinical paper, commissioners of musculoskeletal services would be justified to consider making available the referral of patients in primary care to a short course of traditional acupuncture care for persistent non-specific low back pain.

An evidence base showing the cost utility of acupuncture and other short term packages of care, such as massage, osteopathy, chiropractic, or physiotherapy could facilitate the development of NHS policy on the basis of affordability and allow patients with low back pain to choose their treatment.

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Contributors: KJT was principal investigator and implemented the study, JB developed the economic evaluation protocol. LT, HMacP, and JB secured funding for the 24 month follow up. LT collected costing data. JR and JB carried out the economic analysis. JR wrote the original draft with JB. All authors commented on the draft and the interpretation of the findings. JR and JB are guarantors.

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Nicholl is currently chair of the National Coordinating Centre for Health Technology Assessment commissioning group.

Competing interests: None declared.

Ethical approval: This study was approved by York research ethics committee.


What is already known on this topic

Many people seek acupuncture care for low back pain.

No rigorous assessments have been made of the cost effectiveness of such care.

What this study adds

A short course of acupuncture (up to 10 sessions) for low back pain is associated with increased costs to the United Kingdom’s health service but improved health related quality of life in the long term.

If decision makers are willing to pay up to £20 000 to gain one quality adjusted life year, then acupuncture for low back pain seems cost effective.