Cost-effectiveness of acupuncture treatment in patients with chronic neck pain
Willich S N, Reinhold T, Selim D, Jena S, Brinkhaus B, Witt C M

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The study examined the use of acupuncture in the treatment of chronic neck pain.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients aged over 18 years who had a clinical diagnosis of chronic neck pain (greater than 6 months' duration).

Setting
The setting was primary care. The economic study was carried out in Germany.

Dates to which data relate
The dates to which the effectiveness and resource use data referred were not reported. The price year was not stated.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The cost data were collected from the same patient sample as that used in the effectiveness study.

Study sample
The authors did not report any power calculations. Patients were identified by contacting participating physicians. The authors did not discuss whether the initial study sample was appropriate for the clinical study question. The trial recruited 3,451 patients, of which 1,753 were randomised to receive acupuncture plus routine care and 1,698 to receive routine care alone. The authors did not report whether any patients were excluded from the study or refused to participate.

Study design
The study was a multi-centred randomised controlled trial involving an unspecified number of centres. The method of randomisation was not reported, but the unit of randomisation was the patient. The groups were followed up for 3
months. The authors did not report any loss to follow-up. The study does not appear to have been blinded.

**Analysis of effectiveness**
The analysis of effectiveness appears to have been conducted on the basis of treatment completers only, excluding patients with missing data. The primary health outcome was neck pain and disability, as measured by the neck pain and disability scale (NPAD). The SF-36 questionnaire was included as a secondary outcome measure. The authors stated that, with the exception of age, the groups were comparable at baseline. Patients randomised to receive routine care alone were, on average, older than patients randomised to acupuncture.

**Effectiveness results**
The effectiveness results were not reported.

**Clinical conclusions**
The study focused on the health economic analysis and the authors did not draw clinical conclusions.

**Measure of benefits used in the economic analysis**
The measure of health-benefits used was the quality-adjusted life-years (QALYs). The SF-36 results were transformed into utility scores using the SF-6D algorithm developed by Brazier et al. QALYs were then calculated from the utility scores at baseline and at 3 months, using the area under the curve method.

**Direct costs**
The resource use quantities and the costs were not reported separately. The study included direct costs that would be reimbursed by a third-party payer. These included the costs of acupuncture, physician visits, medication and hospital stay. The costs and resource use were derived from social health insurance funds’ databases. The cost of acupuncture, which is not currently reimbursed, was based on an authors’ assumption. Resource use for acupuncture was derived from the effectiveness study. Discounting was not relevant as the time horizon was only 3 months. However, in a sensitivity analysis, the authors extrapolated the costs and health outcomes up to 4 years from treatment, applying a discount rate of 1.5% per annum to the health outcomes and 3% to the costs. The authors did not report the dates to which the price data referred.

**Statistical analysis of costs**
The study reported the average costs and the associated standard deviations (SDs). The means for the unadjusted costs in each group were compared using the Wilcoxon-Mann-Whitney test. This test is appropriate when analysing cost data which, typically, do not follow a normal distribution. The authors did not report the level of significance used. Bootstrapping was used to characterise the uncertainty around the cost-effectiveness results.

**Indirect Costs**
The indirect costs were included in the analysis, which was appropriate given the societal perspective. The study included indirect costs arising from the patients’ work incapacity. The productivity losses were valued using the human capital approach. The source of the wage costs was not specified. Discounting was not relevant given the 3-month time horizon.

**Currency**
Euros (EUR).

**Sensitivity analysis**
The authors conducted several one-way sensitivity analyses to explore uncertainty in modelling assumptions about the time horizon and variability in the cost of acupuncture.

**Estimated benefits used in the economic analysis**
The acupuncture group accrued 0.649 QALYs (SD=0.096) over 3 months compared with 0.625 (SD=0.103) in the control group.

The acupuncture group therefore gained 0.024 QALYs (SD=0.0004) in comparison with the control group after 3 months, (p<0.001).

**Cost results**
Over 3 months, the acupuncture group incurred total costs of EUR 925.52 (SD=1,564.76) and the control group incurred total costs of EUR 648.06 (SD=1,496.13).

The acupuncture group therefore cost an additional EUR 293.91 (SD=51.79), (p<0.001).

**Synthesis of costs and benefits**
The costs and benefits were synthesised to calculate the cost per QALY gained with acupuncture compared with no treatment.

The incremental cost-effectiveness ratio (ICER) was estimated to be EUR 12,469.

A sensitivity analysis that included only disease-specific costs produced an ICER of EUR 13,618. The probability that acupuncture was cost-effective in comparison with no treatment was estimated to be approximately 100% for a cost-effectiveness threshold value of EUR 50,000 per QALY gained.

**Authors' conclusions**
Acupuncture in addition to routine care is cost-effective relative to routine care alone.

**CRD COMMENTARY - Selection of comparators**
Acupuncture was compared with routine care in the study setting. You must decide whether routine care for chronic neck pain in Germany is representative of routine care in your own setting.

**Validity of estimate of measure of effectiveness**
The effectiveness data were derived from a single study. The randomised controlled design was suitable for the study question. However, given the subjective nature of the primary health outcomes, a blinded analysis should have been undertaken and this was not the case. The patient groups were shown to be comparable at analysis in all but age. The authors do not appear to have controlled for age in the analysis, and this could be a potential confounder. Failing to control for age and to conduct a complete case analysis might have affected the study results.

**Validity of estimate of measure of benefit**
The measure of health benefits was calculated from a single effectiveness estimate. The SF-6D algorithm has been developed to calculate utility scores from the SF-36. While there are some problems with this algorithm, its use is appropriate given the lack of a direct measure of utility in the clinical trial.

**Validity of estimate of costs**
The study was undertaken from a societal perspective and the authors included the indirect costs. However, the authors
excluded the costs of private health care and included only direct costs that would be reimbursed by a third-party payer. The authors estimated that these private costs would most likely be negligible and so were unlikely to affect their conclusions. The quantities were not reported separately from the costs. The resource use data were derived from the same patient sample as that used in the effectiveness study. A statistical analysis of the costs was undertaken and appropriate statistical tests were applied. The costs of acupuncture were varied in a one-way sensitivity analysis and a full probabilistic analysis was undertaken using non-parametric bootstrapping. The costs were derived from health insurance reimbursement rates. The price year was not reported. Discounting was not relevant for the base-case analysis which had a time horizon of only 3 months.

Other issues
The authors stated that they were unaware of any previous cost-effectiveness analyses of acupuncture for the treatment of chronic neck pain with which to compare their findings. However, they did compare their findings with those from studies that evaluated the use of acupuncture in other disease areas. The issue of generalisability to other settings was not addressed. The authors do not appear to have presented their results selectively and their conclusions reflected the scope of the analysis. The authors stated that the short-term time horizon represented a limitation of the study.

Implications of the study
The authors recommended that long-term investigations be conducted to investigate the long-term health economic effects of providing acupuncture for the treatment of chronic neck pain.

Source of funding
Funded by various German social health insurance funds.

Bibliographic details

PubMedID
16842918

DOI
10.1016/j.pain.2006.06.006

Other publications of related interest
Because readers are likely to encounter and assess individual publications, NHS EED abstracts reflect the original publication as it is written, as a stand-alone paper. Where NHS EED abstractors are able to identify positively that a publication is significantly linked to or informed by other publications, these will be referenced in the text of the abstract and their bibliographic details recorded here for information.

Indexing Status
Subject indexing assigned by NLM

MeSH
Activities of Daily Living; Acupuncture Therapy /economics /statistics & numerical data; Chronic Disease; Cost-Benefit Analysis; Disability Evaluation; Female; Germany /epidemiology; Health Care Costs /statistics & numerical data; Health Expenditures /statistics & numerical data; Humans; Male; Middle Aged; Neck Pain /diagnosis /economics /epidemiology /therapy; Prevalence; Risk Assessment /methods; Risk Factors; Treatment Outcome

AccessionNumber
22006002169