Adaptive pacing, cognitive behaviour therapy, graded exercise, and specialist medical care for chronic fatigue syndrome: a cost-effectiveness analysis

McCrone P, Sharpe M, Chalder T, Knapp M, Johnson AL, Goldsmith KA, White PD

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.

CRD summary
The study compared the cost-effectiveness of adding adaptive-pacing therapy, cognitive behaviour therapy (CBT), or graded-exercise therapy to specialist medical care for patients with chronic fatigue syndrome in the UK. The authors concluded that CBT had the highest probability of being the most cost-effective treatment option. The methodology of the study was reported appropriately and clearly. The authors' conclusions appear appropriate, although they may be limited by the short time frame.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The study compared the cost-effectiveness of adding adaptive-pacing therapy, cognitive behaviour therapy (CBT), or graded-exercise therapy to specialist medical care for adult patients with chronic fatigue syndrome in the UK from two alternative perspectives (health care and societal).

Interventions
Four alternatives were compared: specialist medical care (at least three sessions) plus CBT (at least 15 individual therapy sessions); 2) specialist medical care (at least three sessions) plus graded-exercise therapy (up to 15 sessions); specialist medical care (at least three sessions) plus adaptive-pacing therapy (up to 15 individual sessions); and specialist medical care alone (at least three sessions).

Specialist medical care was provided by chronic fatigue syndrome doctors and consisted of information about chronic fatigue syndrome, coping advice, and symptomatic pharmacotherapy. Adaptive-pacing therapy involved management of energy expenditure and activity through pacing activity supervised by an occupational therapist. CBT was provided by clinical psychologists or nurse therapists with the aim of changing behaviour responsible for perpetuating symptoms and disability. Graded-exercise therapy was delivered by physiotherapists with the aim of increasing exercise gradually in a personalised manner to achieve appropriate physical activity.

Location/setting
UK/secondary care.

Methods
Analytical approach:
The analysis was based on data collected from a parallel four-arm, multi-centre, randomised controlled trial (RCT - PACE trial). The time horizon of the analysis was 12 months. The authors stated that the perspective adopted was both that of health care and a broader societal perspective.

Effectiveness data:
The PACE trial included 640 patients allocated to the adaptive pacing therapy group (159 patients), CBT group (161 patients), graded-exercise therapy group (160 patients), and specialist medical care alone group (160 patients) over 12 months. Patients were recruited from consecutive new out-patients attending six secondary care specialist chronic fatigue syndrome clinics in the UK. The primary measures of effectiveness were the Chalder fatigue questionnaire (CFQ), and the Short Form-36 physical function sub-scale (SF-36 PF). A clinically important change was defined as
that which achieved a two-point improvement on the CFQ and an eight-point improvement on the SF-36 PF.

Monetary benefit and utility valuations:
Utility valuations were obtained from the EQ-5D questionnaire which was completed by patients in the trial at baseline, 12, 24 and 52 weeks after randomisation. These were combined with UK-specific utility weights, which reflected the UK general population and were estimated using time trade-off methodology. Differences in baseline utilities were controlled for comparisons between treatment groups.

Measure of benefit:
Quality-adjusted life-years (QALYs) were used to produce the ratio of cost per QALY. Ratios of cost per 2-point improvement in fatigue (on the CFQ) and 8-point reduction in disability (on the SF-36 PF) were calculated.

Cost data:
The costs per hour of therapy, services used, informal care and productivity losses were included. Costs per hour of therapy were based on the Personal Social Services Research Unit (PSSRU) costs of health and social care. Service use was collected during the trial using the Client Service Receipt Inventory (CSRI); UK national reference costs were applied. Informal care and productivity losses (human capital approach) were based on national mean earnings. Hours of care provided were obtained directly from patients. Costs were reported in UK £.

Analysis of uncertainty:
Confidence intervals were generated around the cost differences using non-parametric bootstrapping. Cost-effectiveness acceptability curves were used to present the uncertainty using the net benefit statistics (a rearrangement of the incremental cost-effectiveness ratio formula). Sensitivity analyses were conducted around a number of key assumptions.

Results
For adaptive-pacing therapy plus specialist medical care, the mean total health costs were £2,256, the estimated mean total societal costs were £23,317 and the mean QALYs accrued over 12 months were estimated to be 0.53.

For cognitive behavioural therapy (CBT) plus specialist medical care, the mean total health costs were £2,322, the estimated mean total societal costs were £20,288 and the mean QALYs accrued over 12 months were estimated to be 0.60.

For graded-exercise therapy plus specialist medical care, the mean total health costs were £2,224, the estimated mean total societal costs were £20,935 and the mean QALYs accrued over 12 months were estimated to be 0.57.

For specialist medical care alone, the mean total health costs were £1,424, the estimated mean total societal costs were £22,088 and the mean QALYs accrued over 12 months were estimated to be 0.52.

After controlling for baseline utility scores, the only statistically significant difference was between CBT and specialist medical care (0.05, 95% confidence interval 0.01 to 0.09).

Each of the interventions was compared with specialist medical care. Compared with specialist medical care alone, the incremental healthcare cost per QALY for CBT was estimated to be £18,374, £23,615 for graded-exercise therapy, and £55,235 for adaptive-pacing therapy.

The cost-effectiveness acceptability curve demonstrated that, from a health care perspective (at a threshold of willingness to pay of £30,000 per QALY), CBT had a 62.7% likelihood of being the most cost-effective option; from a societal perspective, CBT had a 59.5% likelihood of being the most cost-effective option.

Authors’ conclusions
The authors concluded that CBT added to specialist medical care had the highest probability of being the most cost-effective treatment option for chronic fatigue syndrome.

CRD commentary
Interventions:
The interventions were reported in sufficient detail; it appeared that all of the comparators were relevant to the study setting in the UK.

Effectiveness/benefits:
The effectiveness data came from a study (PACE RCT) which had a strong methodological design, was well reported and outlined steps taken to control for potential confounders at the design and analysis stage. The source of data was highly relevant to the study setting. The derivation of benefit measure was consistent with guidelines for the study setting. The measurement of utilities was fully described and was appropriate.

Costs:
Costs relevant to both stated perspectives appeared to be reported; the authors discussed some of the limitations of the analysis relating to excluded costs. The source of resource use data and the identification of cost data were fully described and were appropriate for the UK setting. The authors did not report the price year explicitly and did not provide details on whether adjustments were made to the data; given the source of data, this appeared to be unlikely. The authors did not apply discounting of future costs, which may have been appropriate given the short time horizon of the study (12 months).

Analysis and results:
The details of the analysis were clearly reported. Each of the interventions was compared with the established practice of specialist medical care. Incremental results that compared the interventions with each other were not presented, although the cost-effectiveness acceptability curve demonstrated that only specialist medical care and specialist medical care plus CBT were cost-effective options when a full incremental analysis was undertaken. The authors acknowledged that the time horizon of 12 months may have been insufficient to fully capture the long-term costs, and the effects and relative differences between the treatments. The methods used to assess uncertainty were appropriate; the level of reporting was good.

Concluding remarks:
The study methodology seemed appropriate and was reported clearly and transparently. The authors' conclusions appear appropriate, although they may be limited by the short time frame.

Funding
This work was supported by the UK Medical Research Council, the Department of Health for England, the Department for Work and Pensions, and the Scottish Chief Scientist Office.

Bibliographic details

PubMedID
22870204

DOI
10.1371/journal.pone.0040808

Original Paper URL
http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0040808#abstract0

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Cognitive Therapy /economics /methods; Costs and Cost Analysis; Exercise Therapy /economics /methods;