A randomised controlled equivalence trial to determine the effectiveness and cost-utility of manual chest physiotherapy techniques in the management of exacerbations of chronic obstructive pulmonary disease (MATREX)


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
This study estimated the effects of manual chest physiotherapy on quality of life and costs for patients hospitalised with chronic obstructive pulmonary disease. The authors concluded that manual chest physiotherapy was cost-effective, but this was very uncertain, making it difficult to justify its provision. The reporting and methods were good, and the sources were appropriate. The authors' conclusion appears to be appropriate.

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

Study objective
This study estimated the effects of manual chest physiotherapy on the quality of life and costs for patients hospitalised with chronic obstructive pulmonary disease.

Interventions
Manual chest physiotherapy was compared with no manual chest physiotherapy. The physiotherapy was designed to improve the flow of bronchial fluids, match ventilation and perfusion, and normalise functional residual capacity, using gravity and external manipulation. Techniques included turning, postural drainage, percussion, vibration, and cough. All patients (in both groups) were taught the Active Cycle of Breathing Technique.

Location/setting
UK/in-patient care.

Methods
Analytical approach:
This economic evaluation was undertaken alongside the Manual Therapy for Respiratory Exacerbations (MATREX) trial. The trial outcomes were assessed at six months. The authors stated that they took the perspective of the UK NHS and Personal and Social Services (PSS).

Effectiveness data:
The MATREX trial was a UK multicentre randomised controlled trial, statistically powered to show equivalence on the St. George’s Respiratory Questionnaire (SGRQ). The results were analysed using intention to treat. The primary effectiveness outcome was disease-specific quality of life, at six months, measured by the SGRQ. Other outcome measures were the Breathlessness Cough and Sputum Scale, the EQ-5D, oxygen saturation and sputum volume, and the Medical Research Council's dyspnoea scale.

Monetary benefit and utility valuations:
The net monetary benefit was used to summarise the cost-effectiveness of the physiotherapy. The utility scores were from patients in the MATREX trial, valued using UK tariffs. Patients who died were assigned a zero utility value. Multiple imputation was used to replace missing utility values.

Measure of benefit:
The primary measure of benefit was quality-adjusted life-years (QALYs). A secondary measure was the patients’
SGRQ scores.

Cost data:
The costs were gathered alongside the trial. The cost categories were the physiotherapy, hospital admissions, out-patient visits, rehabilitation and early discharge service, and other NHS and PSS costs. The costs of physiotherapy and early discharge were calculated, using the average length of treatment, multiplied by the labour cost from the Personal and Social Service Research Unit (PSSRU) for 2007 to 2008. Hospital costs were estimated by Health Resource Group (HRG) code and NHS Reference costs for 2006 to 2007. Other NHS and PSS costs were assessed using patient questionnaires, and NHS Reference costs and PSSRU costs. The costs were reported in UK £.

Analysis of uncertainty:
The authors conducted a complete-case analysis, and several scenario analyses, in which the costs or utilities were changed. A probabilistic sensitivity analysis was undertaken, and cost-effectiveness acceptability curves were created. A subgroup of patients, with greater than 15mL of sputum produced in a 24-hour period, was analysed.

Results
The trial found equivalent results, for the SGRQ, between manual chest physiotherapy and control. The mean change in SGRQ total score at six months was -5.22 (negative denotes improvement) with the physiotherapy, compared with -6.1 with control. The incremental QALYs with manual chest physiotherapy, after multiple imputation, were -0.002.

Manual chest physiotherapy resulted in a saving of £410.79, compared with control. The net benefit of physiotherapy was £376.14, at a cost-effectiveness threshold of £20,000 per QALY gained.

Complete-case analysis produced similar results, as did the scenario analyses. For an improvement in the SGRQ, manual chest physiotherapy was only cost-effective at a willingness-to-pay threshold of £464.02 or less. For a QALY, it was cost-effective up to a willingness-to-pay of £237,101.

The probabilistic sensitivity analysis showed that at a willingness-to-pay for a QALY of £20,000, manual chest physiotherapy was cost-effective in 52.6% of simulations. The subgroup analysis demonstrated that physiotherapy was more effective and more costly in patients with less severe disease.

Authors' conclusions
The authors concluded that manual chest physiotherapy was cost-effective, but this was very uncertain, making it difficult to justify its provision.

CRD commentary
Interventions:
The interventions were thoroughly described. It was not clear whether other interventions were relevant, as the MATREX trial did not consider other interventions. The manual chest physiotherapy protocol in the MATREX trial was established due to variability in manual physiotherapy, and may not be representative of usual practice.

Effectiveness/benefits:
The primary outcomes were well reported, and appropriate methods and valid instruments were used to obtain the data. Appropriate measures were taken to account for missing data. The authors acknowledged that the lack of measurement of drug costs was a limitation of their study. This affects more than the costs, as differences in drug use could lead to different outcomes for patients and could confound the results. No discounting was necessary as the time horizon was less than one year.

Costs:
The costs were generally well reported, and were from appropriate UK sources. Details of resource use and unit cost calculations were given. Reporting HRG codes, and using NHS Reference costs and PSSRU costs, allows the results to be generalised to anywhere in the UK. The omission of the drug costs may have been inappropriate, and was not sufficiently justified. The authors tried to explain the reduced costs with manual chest physiotherapy, as due to fewer comorbidities than control patients. The price year was not reported, but appears to have been 2007. No discounting was necessary as the time horizon was less than one year.
Analysis and results:
The results were adequately reported and there was appropriate analysis of uncertainty. The authors provided a thorough account of the limitations of their study.

Concluding remarks:
The reporting and methods were good, and the sources were appropriate. The authors’ conclusion appears to be appropriate.

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