Clinical effectiveness and cost-effectiveness of physiotherapy and occupational therapy versus no therapy in mild to moderate Parkinson's disease: a large pragmatic randomised controlled trial (PD REHAB)

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Scientific summary

The PD REHAB trial

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Scientific summary

Background

Parkinson's disease (PD) affects over 1% of people older than 60 years and the prevalence is set to rise with the ageing population. It causes significant problems with activities of daily living (ADL) that are only partially treated by medication and occasionally surgery. Despite treatment, patients go on to develop intractable motor problems (e.g. imbalance and falls), along with mental-health problems and other non-motor symptoms.

Physiotherapy (PT) and occupational therapy (OT) are traditionally used later in the course of PD and both therapies are frequently offered together. PT aims to promote and maintain mobility and activity by treating motor impairments with exercise and task-related practice. OT works in partnership with patients to address personal rehabilitation goals through activity and participation. Both forms of therapy aim to help patients remain as independent as possible and to reduce carer strain.

Cochrane reviews of PT and OT for PD found insufficient evidence of their individual effectiveness, but previous trials were methodologically flawed with small sample size and short-term follow-up. The UK National Institute for Health and Care Excellence guidelines, although recognising these shortcomings and recommending further trials, stated that all patients should have access to both therapies.

Before commencing the PD REHAB trial, we initially performed a pilot study of OT in PD (PD OT), as considerable evidence was already available on outcome measures from PT trials in PD. PD OT provided us with invaluable information on recruitment rate, outcome measures and data to inform the sample size for the main trial.

Objectives

The objective of the PD REHAB trial was to evaluate the clinical effectiveness and cost-effectiveness of individualised PT and OT in patients with PD.

Methods

PD REHAB was a large pragmatic randomised controlled trial performed in 38 neurology and geriatric medicine outpatient clinics in the UK.

Patients

We recruited patients with idiopathic PD (defined by the UK Parkinson's Disease Society Brain Bank Criteria) who had limitations in ADL. We ensured that investigators were uncertain that the patients would require PT and/or OT during the 15 months of the trial, that is that equipoise about the need for therapy existed. We excluded patients with dementia, as locally defined, and those in receipt of PT or OT for PD in the last 12 months. All patients gave written informed consent before randomisation.

Outcome measures

The primary outcome was instrumental ADL measured by the Nottingham Extended Activities of Daily Living (NEADL) scale at 3 months after randomisation. Secondary outcomes were health-related quality of life [Parkinson's Disease Questionnaire-39 (PDQ-39); European Quality of Life-5 Dimensions (EQ-5D)], adverse events, and carer quality of life (Short Form questionnaire-12 items).

Outcomes were assessed before randomisation and at 3, 9 and 15 months after randomisation.

Intervention

Patients were randomised (1 : 1) to combined PT and OT (therapy group) or no therapy (control group) using an online randomisation service at the Birmingham Clinical Trials Unit (BCTU), University of Birmingham. PT and OT were delivered in the community and/or outpatients clinics by qualified therapists working within the NHS. A framework for therapy content was developed and agreed by expert therapist groups based on previous work on standards of NHS PT and OT and European guidelines. Following initial assessments by both a physiotherapist and an occupational therapist, therapy was tailored to the individual patient's requirements using a joint goal-setting approach. Interactions between therapists and patients were quantified using pre-defined recording forms.

Sample size

The sample size was based on detecting a 2.5-point clinically meaningful difference in the 66-point NEADL scale at 3 months, using the observed standard deviation from the PD OT pilot trial of 10.1 points with a 5% significance level and 90% power. This required 340 patients in each group, which was increased to 750 participants (375 per group) to allow for around 10% non-compliance and dropout.

Economic evaluation

An incremental economic analysis was conducted from a NHS and Personal Social Services perspective. This combined prospectively collected data on resource use, costs and the important consequences in terms of quality of life (EQ-5D). We performed a cost–utility analysis over 15 months, examining the cost per quality-adjusted life-year (QALY) gained.

Results

Recruitment

Between October 2009 and June 2012, a total of 762 patients with mild to moderate Parkinson's disease and limitations in ADL were recruited to the study.

Loss to follow-up

In total, 92% of the 381 patients randomised to the therapy arm completed the NEADL at 3 months compared with 92% of 381 patients randomised to the no therapy arm. The equivalent completion rates at 15 months were 85% in the therapy arm and 88% in the no therapy arm.

Therapy content

In the therapy group, the median number of therapy sessions, including initial assessments, was four, with a mean time per session of 58 minutes. The mean duration of therapy was 8 weeks. The intervention logs provided by the therapists demonstrated an eclectic approach consistent with NHS practice.

Physiotherapists prescribed a range of exercise programmes tailored to their assessment of the patient's physical strength and range of movement. Detailed content analysis of a 10% sample revealed that only three centres provided a specific PD exercise programme accompanied by a booklet, and there was no evidence of a formal exercise progression protocol for any patient. PT included the prescription of walking aids.

Occupational therapy assessed the full range of ADL including leisure activity and work. However, the predominant interventions were equipment provision (such as bed levers or adaptive cutlery) and onward referral (such as speech and language therapy and cognitive assessment), with other advice including recommendations on how to manage sleep problems and how to apply for state benefits. At some centres there was a limit on the funding of prescribed aids; however, the trial was able to fund some of them to improve parity. There was little task-related practice.

Effectiveness

At the primary time point of 3 months, there was no difference in NEADL total score [difference 0.5 points, 95% confidence interval (CI) –0.7 to 1.7 points; $p = 0.4$] or PDQ-39 summary index (0.007 points, 95% CI –1.5 to 1.5 points; $p = 1.0$) between groups. The EQ-5D quotient was of borderline significance in favour of therapy (–0.03, 95% CI –0.07 to –0.002; $p = 0.04$).

Repeated measures analysis including all time points showed no difference in NEADL total score, but PDQ-39 summary index (curves diverging at 1.6 points per annum, 95% CI 0.47 to 2.62 points; $p = 0.005$) and EQ-5D quotient (0.02, 95% CI 0.00007 to 0.03; $p = 0.04$) showed significant but small differences in favour of the therapy arm.

There was no difference in adverse events or serious adverse events.

Economic analysis

The economic analysis showed no statistically significant differences in incremental costs (£164, 95% CI –£141 to £468) or QALYs (0.027 QALYs, 95% CI –0.010 to 0.065 QALYs). The incremental cost per QALY was under £4000 but highly uncertain (£3493, 95% CI –£169,371 to £176,358).

Conclusions

Overall, NHS PT and OT did not produce immediate or long-term clinically meaningful improvements in ADL or quality of life in mild to moderate PD. This evidence does not support the use of low-dose, patient-centred, goal-directed PT and OT in patients in the early stages of PD. Future research should include the development and testing of more structured and intensive physical therapy programmes in patients with all stages of PD.

Trial registration

This trial is registered as ISRCTN17452402.

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