

Rehabilitation of older patients: day hospital compared with rehabilitation at home. A randomised controlled trial

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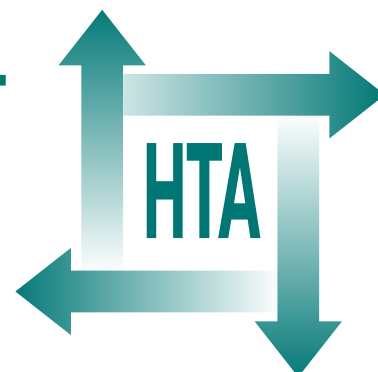


Executive summary

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Executive summary

There is evidence from previous studies that day hospitals are an effective setting in which to provide comprehensive services for older people. Day hospitals provide rehabilitation for older people. In recent years there has been increased interest in the provision of services closer to the patient's home, resulting in the development of home-based rehabilitation services for older people. Most previous randomised controlled trials (RCTs) have not compared day hospital rehabilitation with rehabilitation delivered in the home and evidence has been lacking about the relative costs of these different settings and their influence on psychosocial functioning for patients and carers. This report describes the development and conduct of an RCT comparing home-based with day hospital rehabilitation.

Hypothesis

This study was designed to test the following hypotheses:

1. older people and their informal carers are not disadvantaged by home-based rehabilitation relative to day hospital rehabilitation
2. home-based rehabilitation is less costly.

Research activities

The research comprised a systematic literature review, a national survey of NHS trusts' rehabilitation services and a four-centre, two-arm RCT in which patients were randomised to receive either home-based rehabilitation or rehabilitation at a day hospital, and were followed up for a period of up to 12 months with outcome collection taking place at 3 months, 6 months and 12 months.

Literature review

The literature review was based upon a previous review of place of clinical care for older people (Parker *et al.*, 2000) that had identified randomised and quasi-randomised trials from 1988 to 1999 across a range of care settings and including home-based and day hospital rehabilitation. We updated this review to 2007, repeating the searches

and selection processes for home-based and day hospital rehabilitation, searching specifically for direct comparisons. We found no new reports of RCTs published since 1999 and therefore no reason to alter the conclusions of that review, which were as follows:

- overall, the day hospital has not yet been adequately evaluated as a setting for rehabilitation
- it is unlikely that the day hospital offers significant advantages over alternative settings for the delivery of comprehensive care with respect to mortality, hospital bed use or physical disability
- it is possible that the day hospital carries significant advantages or disadvantages over alternative settings for the delivery of comprehensive care with reference to quality of life, carer strain or health-care provider costs
- costs for patients, carers and social care providers have not been adequately ascertained
- patient and carer preferences for day hospital or alternative settings for the delivery of comprehensive care have not been evaluated.

These conclusions provide justification for a further RCT, with analysis of quality of life, carer strain and costs.

A national survey of NHS trusts

A national survey of NHS trusts' rehabilitation services in England was carried out in part to examine the current status of the research question and in part to develop a sampling frame for the development of a multicentre RCT.

Out of 480 possible replies, 372 (76%) completed an initial questionnaire. Of these, 324 (87%) trusts reported providing rehabilitation services, 184 (46%) reported the provision of both home-based rehabilitation and day hospital rehabilitation, 80 (20%) provided home-based rehabilitation but not day hospital rehabilitation and 60 (15%) day hospital rehabilitation but not home-based rehabilitation.

The survey confirmed that both day hospital and home-based rehabilitation services were currently

being provided. Comparison with a previous survey conducted in 1998 suggested a recent increase in home-based rehabilitation teams.

It was clear from the survey results that both settings for rehabilitation represented current choices for service providers and clinicians recommending service developments and care settings to providers and clients. This provided further justification for an RCT with health economic analysis, to inform these decisions.

A randomised controlled trial

Trusts that were found to provide both home-based and day hospital rehabilitation were contacted to ascertain interest in participating in the trial. A total of 19 sites expressed initial interest and eventually four sites were recruited to carry out a pragmatic RCT in which patients were randomised between home-based and day hospital rehabilitation.

The primary outcome measure was change on the Nottingham Extended Activities of Daily Living (NEADL) scale at 6 months. Secondary outcome measures included the EuroQol 5 dimensions (EQ-5D), Hospital Anxiety and Depression Scale (HADS), Therapy Outcome Measures (TOMs), hospital admissions and the General Health Questionnaire (GHQ-30) for carers.

Originally a sample size of 460 subjects was proposed. However, as well as time-consuming difficulties in recruiting participating sites and implementing research processes, we experienced lower than anticipated rates of recruiting subjects into the trial in participating sites. We developed an exit strategy and stopped recruiting after 89 subjects had been randomised between the services. Overall, 42 subjects received rehabilitation in each arm of the trial.

At the primary end point of 6 months there were 32 patients in the home-based rehabilitation arm and 33 patients in the day hospital rehabilitation arm. In analyses conducted on this group of patients (the observed case data set), estimated mean scores on the primary outcome (the NEADL scale) at 6 months, after adjustment for baseline, were not significantly in favour of either home-based or day hospital rehabilitation [mean (SD) NEADL: total 30.78 (15.01) for day hospital rehabilitation versus 32.11 (16.89) for home-based rehabilitation ($p = 0.37$); mean difference after adjustment for baseline characteristics was -2.139 (95% CI -6.870 to 2.592)].

The trial hypothesis was expressed in terms of the non-inferiority of home-based rehabilitation over day hospital rehabilitation. To examine this directly, a 'non-inferiority' limit (10%) was applied to the confidence interval estimates for the primary and the secondary outcome measures at the 6-month follow-up. This analysis demonstrated non-inferiority for the NEADL scale, EQ-5D and HADS anxiety scale. The HADS depression scale suggested some advantage for home-based rehabilitation in some of the analyses, which was of borderline statistical significance.

A similar pattern of results was seen at the 3-month and 12-month follow-up points, although a statistically significant difference in the mean EQ-5D_{index} score was seen in favour of day hospital care at 3 months ($p = 0.047$).

Following the end of rehabilitation, a greater proportion of patients in the day hospital group showed a positive direction of change from their initial assessment with respect to therapist-rated clinical outcomes. Conversely, however, a lower proportion of home-based care patients showed a negative direction of change and, overall, median scores on the TOMs scales did not differ between the two groups.

Hospital admission rates over the 12-month follow-up period were available for all 84 patients who were randomised and received treatment. Although fewer patients in the home-based care group were admitted to hospital on any occasion over the observation period [18 (43%) versus 22 (52%)], this difference was not statistically significant.

The psychological well-being of patients' carers, as measured by the GHQ-30 at 3, 6 and 12 months, was unaffected by whether rehabilitation took place at day hospital or at home.

As the primary outcome measure and EQ-5D_{index} scores at 6 months showed no significant differences between the two arms of the trial, a cost-minimisation analysis was undertaken. Costs at the 6- and 12-month follow-up points were used when both a rehabilitation log and the appropriate number of economic questionnaires had been received. Neither the public costs nor the total costs at the 6-month follow-up point (an average of 213 days' total follow-up) or the 12-month follow-up point (an average of 395 days' total follow-up) were significantly different between the groups.

Conclusions

Implications for practice

- Compared with day hospital rehabilitation, providing rehabilitation in patients' own homes confers no particular disadvantage for patients and carers.
- Our results are consistent with the non-inferiority of home-based rehabilitation compared with day hospital rehabilitation.
- The cost of providing home-based rehabilitation does not appear to be significantly different from that of providing rehabilitation in a day hospital.
- Rehabilitation providers and purchasers need to consider the place of care in the light of local needs, to provide the benefits of both kinds of services.

The results suggest that home-based rehabilitation produces outcomes in respect of the primary measure (NEADL) and all secondary measures at 3 months (with the possible exception of the EQ-5D_{index}) and at 6 months (with the possible exception of the HADS depression scale) that are at least as good as those expected if rehabilitation had taken place at the day hospital.

We have to be cautious in interpreting the results of the RCT because a large proportion of potentially eligible subjects were not recruited to the trial, the required sample size was not achieved and there was a relatively large loss to follow-up. Further, there were only four randomising sites and the majority of randomisations came from two centres.

However, considered together, the statistical analyses of the trial outcomes do not provide sufficient evidence to conclude that patients in receipt of home-based rehabilitation were disadvantaged compared with those receiving day hospital rehabilitation.

The finding that patients receiving rehabilitation in their own homes are not disadvantaged is complemented by the observation that the cost of providing home-based rehabilitation is not markedly different from that of providing rehabilitation in the day hospital.

Therefore, neither the new evidence provided by this RCT nor the existing evidence from previous trials suggests any advantage or disadvantage of providing rehabilitation in the day hospital or providing it in the patient's own home.

Although the results of the literature review, national survey of NHS trusts and this small RCT taken together can be informative for local providers, purchasers, commissioners and other stakeholders in relation to rehabilitation for older people, local decisions will need to be made in the context of local service delivery infrastructure and development needs. Therefore, in deciding about the settings in which to provide rehabilitation services, stakeholders will need to consider the benefits of home-based rehabilitation and ambulatory support provided in day hospitals in the light of local need and services to take advantage of (for example) local geography, existing infrastructure and stakeholder preferences.

Implications for research

- Future research in this area should examine syndrome- or condition-specific approaches to providing for the needs of older people in ambulatory care.
- Further attempts to address issues of cost-effectiveness and place of care in elderly rehabilitation research should focus more on the cost-effective use of specific day hospital services, rather than whether they compete with community care settings.
- The development and assessment of approaches and instruments for measuring outcomes for older people in receipt of rehabilitation in ambulatory care remains a justifiable focus for future research and development.
- Rather than comparing these settings for efficacy, future research might focus on identifying those services that are better provided in one or other setting, taking account of the current commissioning environment that explicitly supports choice in the provision of health services for patients.

Trial registration

This trial is registered as ISRCTN71801032.

Publication

Parker SG, Oliver P, Pennington M, Bond J, Jagger C, Enderby PM, *et al.* Rehabilitation of older patients: day hospital compared with rehabilitation at home. A randomised controlled trial. *Health Technol Assess* 2009;**13**(39).



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The research findings from the HTA programme directly influence decision-making bodies such as the National Institute for Health and Clinical Excellence (NICE) and the National Screening Committee (NSC). HTA findings also help to improve the quality of clinical practice in the NHS indirectly in that they form a key component of the 'National Knowledge Service'.

The HTA programme is needs led in that it fills gaps in the evidence needed by the NHS. There are three routes to the start of projects.

First is the commissioned route. Suggestions for research are actively sought from people working in the NHS, from the public and consumer groups and from professional bodies such as royal colleges and NHS trusts. These suggestions are carefully prioritised by panels of independent experts (including NHS service users). The HTA programme then commissions the research by competitive tender.

Second, the HTA programme provides grants for clinical trials for researchers who identify research questions. These are assessed for importance to patients and the NHS, and scientific rigour.

Third, through its Technology Assessment Report (TAR) call-off contract, the HTA programme commissions bespoke reports, principally for NICE, but also for other policy-makers. TARs bring together evidence on the value of specific technologies.

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Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

The research reported in this issue of the journal was commissioned by the HTA programme as project number 97/26/01. The contractual start date was in September 2002. The draft report began editorial review in December 2007 and was accepted for publication in January 2009. As the funder, by devising a commissioning brief, the HTA programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

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