Does a short period of rehabilitation in the home setting facilitate functioning after stroke?

A randomized controlled trial

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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 two approaches for managing stroke rehabilitation, namely home rehabilitation and day clinic rehabilitation. Both interventions consisted of 9 hours of training per week for 3 weeks after discharge from the rehabilitation ward. Home rehabilitation also involved family and helpers in addition to the patient, and both an occupational therapist and a physiotherapist offered individually tailored training. Training at the day clinic was offered by a multi-professional team following a bottom-up approach, which focused on the training of deficits or components of function in order to generate better ability to perform daily life activities. After the intervention period, all patients in both groups followed the ordinary rehabilitation process and most of them attended at least one period (6 weeks, 3 days/week).

Type of intervention
Rehabilitation.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised younger stroke patients.

Setting
The setting was both the home and day clinic. The economic study was carried out in Sweden.

Dates to which data relate
The clinical and economic data were gathered between January 1998 and December 2001. The price year was 2004.

Link between effectiveness and cost data
The costing was carried out prospectively on the same sample of patients as that used in the analysis of effectiveness.

Study sample
A sample of consecutive patients identified at the authors’ institution over the study period was contacted. Of the initial group of 109 patients, 19 were not eligible because they were not discharged to their own home. Of the remaining 90 patients, 29 declined and 2 dropped out immediately after inclusion in the study. Thus, the final study sample included 59 patients. There were 30 patients (22 men) in the home group and 29 patients (22 men) in the day clinic group. The median age was 52 years (age range: 28 to 61) in the home group and 55 years (age range: 27 to 64) in the day clinic group. Reasons for patients’ refusal to participate were reported. At discharge, the mean time in the rehabilitation unit was 66 days in the home group and 61 days in the day clinic group. Power calculations were performed after enrolment.
of the first 20 patients. These suggested that 25 patients in each group would be required to detect a statistically (and clinically) significant difference of 0.5 logits in the primary clinical measure between groups with a power of 80%. Eleven non-participants were identified and were evaluated for comparative purposes.

**Study design**
This was a prospective, randomised clinical trial (RCT) that was carried out at a single institution, the Sahlgrenska University Hospital in Sweden. Randomisation took place 1 week before discharge using sealed envelopes. The overall length of follow-up was 1 year, with most clinical end points being assessed after 3 weeks, 3 months and 1 year. Only 1 patient in the home group was lost to follow-up at the final assessment point. Single-blinding was performed for assessors making the evaluations.

**Analysis of effectiveness**
The primary clinical end point was the Assessment of Motor and Process Skills, an observational measure of functional competence in instrumental activities of daily living tasks. Other clinical measures were a 30-m walking test, the Functional Independence Measure, the Instrumental Activity Measure, the National Institutes of Health Stroke Scale and the Barrow Neurological Institute Screening for higher cerebral functions. An extensive description of all measures was provided. The analysis of the clinical study was conducted on an intention to treat basis. At study entry (hospital discharge), the study groups were comparable with respect to their clinical and demographic characteristics.

**Effectiveness results**
Both groups showed statistically significant improvements in most clinical end points from discharge to end of follow-up. However, there were no statistically significant differences between groups either after the intervention or at follow-up.

For both groups there was a greater improvement on the activity level than on the impairment level.

In general, improvements in the home group were obtained immediately after the intervention, with statistically significant differences from baseline already found at 3 weeks. Less immediate improvement was seen in the day clinic group.

Clinical outcomes improved similarly in the small group of non-participants, although they had less neurological deficit and higher ability at discharge than the whole group of participants.

**Clinical conclusions**
The clinical analysis showed that the two rehabilitation strategies were substantially equivalent at the end of follow-up, although there was a trend towards an earlier improvement in the home group.

**Measure of benefits used in the economic analysis**
The health outcomes were left disaggregated and no summary benefit measure was used. In effect, a cost-consequences analysis was performed.

**Direct costs**
The authors did not state explicitly which perspective was adopted in the study. The categories of costs included in the analysis were salary of occupational therapist or physiotherapist, travel time and cost for the occupational therapist and physiotherapist, overhead costs and day cost at the clinic. Physician costs were not considered. The unit costs and the quantities of resources used were presented separately. Resource use was derived not only from the actual consumption of health services in the sample of patients included in the analysis of effectiveness, but also from some assumptions. The costs were based on Swedish sources. Discounting was not relevant given the short timeframe of the analysis. The price year was 2004.
Statistical analysis of costs
No statistical analyses of the costs were performed.

Indirect Costs
Productivity costs were not included.

Currency
Euros (EUR).

Sensitivity analysis
The issue of uncertainty was not addressed.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The total costs were EUR 1,830 in the home group and EUR 4,410 in the day clinic group. The difference of EUR 2,580 corresponded to a 42% reduction of total costs in the home group in comparison with the day clinic group.

Synthesis of costs and benefits
A synthesis of the costs and benefits was not relevant as a cost-consequences analysis was performed.

Authors' conclusions
Home rehabilitation for stroke patients after hospital discharge was at least as effective as conventional day clinic rehabilitation and was associated with lower costs.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparators was clear in that the proposed rehabilitation approach was compared with the conventional approach. Both approaches were described in detail. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The clinical data came from an RCT, which was appropriate for the study question. The process of sample selection was extensively described, and the reasons for the patients’ refusal or exclusion were explicitly reported. The randomisation procedure was successful as the two groups were well balanced with respect to their baseline characteristics. Although the clinical evidence came from a single institution, the authors stated that the patient sample was representative of the general population of stroke patients of this age group in Sweden. Blinding of end point assessors was performed, which represents a further strength of the analysis. Several clinical outcomes that covered both activity and functional level were considered. The rate of loss to follow-up was negligible and the analysis was based on intention to treat. Finally, the size of the sample was justified on the grounds of statistical considerations regarding the primary clinical end point. These issues tend to enhance the internal validity of the study.

Validity of estimate of measure of benefit
No summary benefit measure was used, which was appropriate as a cost-consequences analysis was carried out.

Validity of estimate of costs
The analysis of the costs was restricted to those resources strictly related to the rehabilitation programmes and did not investigate the impact of the interventions on other health services. The cost/resource boundary of the analysis was not stated clearly. Extensive information on resource use and unit costs was provided, which will assist the replication of the analysis in other settings. The sources of the data were reported for most items, which appear to reflect the costing system in Sweden. The costs were treated deterministically and the impact of varying cost estimates was not investigated. The price year was reported, which will facilitate the replication of the analysis in other time periods.

Other issues
The authors stated that their findings were consistent with other studies that showed the clinical benefits of home rehabilitation programmes. The issue of the generalisability of the study results to other settings was not addressed. Since no sensitivity analyses were performed, the external validity of the analysis was low. The authors stated that a potential limitation of their study was the enrolment of a rather small group of patients with heterogeneous diagnoses of stroke, which did not enable any sub-group analysis.

Implications of the study
The study results support a home rehabilitation strategy for young stroke patients. The authors stated that it would be interesting to assess whether the home rehabilitation programme might be more effective for some sub-groups of stroke patients. Future studies should also evaluate other aspects such as caregiver strain, self-confidence and well-being.

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