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For younger patients with stroke, does rehabilitation in the home, compared to rehabilitation in the day clinic, improve early level of activity participation?

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AOTA Critically Appraised Papers Series

Evidence Exchange

**A product of the American Occupational Therapy Association's Evidence-Based Literature Review Project*

CRITICALLY APPRAISED PAPER (CAP)

FOCUSED QUESTION

For younger patients with stroke, does rehabilitation in the home, compared to rehabilitation in the day clinic, improve early level of activity participation?

CITATION AND DOI NUMBER:

Björkdahl, A., Nilsson, Å., Grimby, G., & Sunnerhagen, K. (2006). Does a short period of rehabilitation in the home setting facilitate functioning after stroke? A randomized controlled trial. *Clinical Rehabilitation*, 20(12), 1038–1049. <http://dx.doi.org/10.1177/0269215506071230>

CLINICAL BOTTOM LINE:

Rehabilitation following a stroke is imperative to regaining function and increasing occupational engagement. Although patients often receive rehabilitation in a clinical setting, it is possible that improvement in function does not translate to an increase in activity level once patients are discharged to their natural environments. A study by Gladman and Lincoln (1994) reported improvement in household abilities and engagement in leisure activities among younger stroke patients who received therapy in their natural environments. Therefore, it is important for patients to participate in a top-down rehabilitation program to maximize patients' engagement in meaningful activities following a stroke.

This Level I randomized control trial (RCT) used blinded evaluators to compare the effectiveness of a home rehabilitation program with a day outpatient rehabilitation program. The primary objective of the study was to evaluate home vs. day clinic rehabilitation programs in increasing level of activity participation of patients following their first occurrence of a stroke. Both the home and day clinic groups received 9 hours of therapy per week for 3 weeks. The home group had an average of 4 visits from occupational therapists and physiotherapists in their homes per week. Therapy was tailored to each patient's individual needs and desires, with a focus on activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Information regarding stroke and its consequences and how to deal with them was also provided to the patients and their family, friends, or caregivers. The day clinic group received an average of three visits per week at the outpatient day clinic of Sahlgrenska University Hospital in Sweden. Therapy was provided by a multiprofessional team that focused on providing training on the physical deficits resulting from the stroke to increase patients' performance in daily life activities. After the 3-week intervention period, all patients from both groups followed the ordinary rehabilitation process.

The Assessment of Motor and Process Skills (AMPS) was the main measure used to assess level of activity participation. Although there were no significant differences between the groups, the results of the AMPS show an earlier improvement for the group receiving rehabilitation in their home environment vs. those receiving rehabilitation in the clinic. Other measures used in this study include the Functional Independence Measure (FIM), Instrumental Activity Measure (IAM), Thirty-meter (30-m) Walking Test, National Institute of Health Stroke Scale (NIHSS), and Barrow Neurological Institute Screening for Higher Cerebral Functions (BNIS). Only the day clinic group showed significant changes on the FIM, motor and social/cognitive scale.

There are a few limitations in this study. First, the sample group contained mostly males (74.6%) and younger stroke patients, which might not reflect the usual stroke population. The study included only patients with a first stroke occurrence, who might have a better prognosis compared to patients with multiple strokes. Also, results might have been skewed due to the heterogeneity of diagnoses between the two groups. For example, the day clinic group included patients with cerebellar stroke while the home group did not. Although a subgroup analysis might have been desired to make the groups more homogeneous, the authors were unable to do this because of the randomized nature of the study, because it could have created selection bias. Lastly, all participants from both groups participated in further rehabilitation according to current practice beyond the 3-week intervention, which might have contributed to the lack of differences in improvement between the two groups at the end of the first year.

Nevertheless, the results of this study are valuable for occupational therapists seeking to establish the most effective and cost-efficient methods to increase the activity levels of younger individuals following their first stroke. Although there was not a significant difference in activity levels between both groups, the results demonstrated the efficacy of a top-down therapy approach. In addition, the home group showed earlier improvements than the day clinic group, which is consistent with the findings of previous studies, that there is a tendency for earlier and improved outcomes in groups who receive patient and caregiver education in a natural environment.

RESEARCH OBJECTIVE(S)

List study objectives.

The main purpose of this study was to determine if 3 weeks of rehabilitation in the home setting improves activity to a larger extent and facilitates rehabilitation in younger patients following a stroke compared to patients receiving intervention in an outpatient rehabilitation clinic. Cost effectiveness among these interventions was also described.

DESIGN TYPE AND LEVEL OF EVIDENCE:

Level I
Randomized control trial

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *Circle yes or no, and if no, explain.*

YES NO

SAMPLE SELECTION

How were subjects selected to participate? Please describe.

Younger, first-time stroke patients who were discharged home and admitted to the outpatient rehabilitation department of Sahlgrenska University Hospital were asked to participate in the study.

Inclusion Criteria

Criteria used to select participants for this study was that

- The stroke that the patients experienced had to be their first occurrence and
- The patient had to be well enough to be discharged home after inpatient rehabilitation.

The study aimed to recruit younger patients with stroke. Though specific age group was not described in the inclusion criteria, examination of the participants' demographic information revealed that the study recruited patients younger than age 65 years.

Exclusion Criteria

Not specifically reported by the study authors.

SAMPLE CHARACTERISTICS

N= 59

% Dropouts

#/ (%) Male

#/ (%) Female

Ethnicity

Disease/disability diagnosis

Check appropriate group:

<20/study group	<input checked="" type="radio"/> 20–50/study group	<input type="radio"/> 51–100/study group	<input type="radio"/> 101–149/study group	<input type="radio"/> 150–200/study group
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INTERVENTION(S) AND CONTROL GROUPS

Group 1: Home Group

Brief Description	Patients ($n = 30$) received therapy that was tailored to their individual needs in their natural contexts without use of specific equipment. Specifically, therapy was focused on IADL and ADL training. Stroke education was also provided to the patients and their family, friends, or caregivers.
Setting	Homes of the patients.
Who Delivered?	An occupational therapist and a physiotherapist.
Frequency?	9 hours/week, with an average of 4 visits per week.
Duration?	3 weeks.

Group 2: Day Clinic Group

Brief Description	Patients ($n = 29$) received training on the physical deficits or functional impairments resulting from stroke to increase their performance in daily life activities.
Setting	Outpatient day clinic at the Sahlgrenska University Hospital in Sweden
Who Delivered?	Multiprofessional team.
Frequency?	9 hours/week, with an average of 3 visits per week.
Duration?	Three weeks.

Intervention Biases: Circle yes or no and explain, if needed.

Contamination

YES/NO

Participants in the clinic group did not inadvertently receive home interventions, and vice versa.

Co-intervention

YES/NO

After the initial 3-week intervention, all participants participated in outpatient rehabilitation program for up to 1 year post-stroke. This might have contributed to their continuous improvement during their first year after stroke.

Timing

YES/NO

Intervention was only provided for 3 weeks, which may not be adequate to bring about significant and lasting changes.

Site

YES/NO

The participants in the home group had individual training at their home where they were able to work on activities within their natural environment, with the involvement and support of their friends, families, and caregivers. The participants in the day clinic group worked on the remediation of physical deficits and functional impairments resulting from the stroke in an environment outside of their natural context. The differences in the locations between the groups might also contribute to the differences in the results between the two groups. The home group receiving services in the natural setting makes for easier generalization of skills and transfer of learning.

Use of different therapists to provide intervention

YES/NO

An occupational therapist and a physiotherapist provided care to the home group, while a multiprofessional team (unspecified) provided care to the day clinic group.

MEASURES AND OUTCOMES

Complete for each relevant measure when answering the evidence-based question:

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article—yes/no/NR [not reported]), and how frequently the measure was used.

Name of measure: AMPS

Outcomes of measure: A standardized assessment that measures quality of a person's motor and process skills for basic and IADLs essential to living independently in the community. The AMPS measures 16 ADL motor skills and 20 ADL process skills. However, only 2–3 Unspecified tasks were scored in this study.

Reliable: NR. However, it is known that only trained clinicians can administer the AMPS and thus is likely to have a high inter- and intrarater reliability.

Valid: Yes. Validated for use in Sweden, but validity was not reported.

Frequency: Discharge from the hospital (baseline), after three-week intervention, three-month follow-up, one-year follow-up

Name of measure: FIM.

Outcomes of measure: FIM consists of 13 motor items and 5 social-cognitive items. The FIM measures the level of assistance needed to complete specific self-care, mobility, and social-cognitive tasks.

Reliable: NR

Valid: Yes. Validated for use in Sweden, but validity was not reported.

Frequency: Discharge for the hospital (baseline), after 3-week intervention, 3-month follow-up, and 1-year follow-up

Name of measure: IAM.

Outcomes of measure: 8 items that measure dependence in everyday activities for people living in the community.

Reliable: NR

Valid: NR

Frequency: Discharge from the hospital (baseline), after 3-week intervention, 3-month follow-up, and 1-year follow-up.

Name of measure: 30-m Walking Test.

Outcomes of measure: Indoor walking performance.

Reliable: NR

Valid: NR

Frequency: Discharge from the hospital (baseline), 3-month follow-up, and 1-year follow-up.

Name of measure: NIHSS.

Outcomes of measure: Quantitative measure of neurological deficit .

Reliable: NR

Valid: NR

Frequency: Discharge from the hospital (baseline), 3-month follow-up, and 1-year follow-up.

Name of measure: BNIS.

Outcomes of measure: Screening assessment of cognitive functions.

Reliable: NR

Valid: Yes. Validated for use in Sweden, but validity was not reported.

Frequency: Discharge from the hospital (baseline), 3-month follow-up, and 1-year follow-up.

Measurement Biases

Were the evaluators blind to treatment status? *Circle yes or no, and if no, explain.*

YES NO

Recall or memory bias. *Circle yes or no, and if yes, explain.*

YES NO

The possibility of recall or memory bias could be due to the fact that all participants were measured multiple times (pre-test and three follow-up measurements), this is unlikely though due to the participatory nature of most of the instruments.

Others (list and explain):

Not applicable.

RESULTS

List results of outcomes relevant to answering the focused question.

Include statistical significance where appropriate ($p < 0.05$).

Include effect size, if reported.

Although there were not any significant differences in activity levels between the home and day clinic groups by the end of this study, improvement was made by both groups at different points in time. During the intervention period, only the home group made significant improvements on the AMPS motor and process skills scales. Significant improvement was also noted on the IAM after intervention for the home group. From the end of the intervention to the 3-month follow-up, both groups had significant improvements on the AMPS motor scale, the IAM, and the 30-m Walking Test. Only the day clinic group made significant improvement during this period on the NIHSS. When looking at the results from the 3-month to 1-year follow-up, only the day group improved significantly on the AMPS motor skills scale, and only the home group improved significantly on the AMPS process skills scale. Both groups improved significantly during this period on the IAM. Neither group improved significantly during the entire follow-up period on the BNIS. When looking at the FIM motor and social-cognitive scales, only the day clinic group made significant improvements during the entire 1-year follow-up.

These results suggest that although the home intervention did not prove to be superior in terms of final outcomes compared to the day clinic group, the home group did improve earlier, as indicated by the AMPS, the main instrument used in this study. Thus, it can be implied that early in-home intervention could be offered as an alternative intervention, especially when considering cost-effectiveness. The total cost for the home group during the 3-week intervention was less than half (1830 euros vs. 4410 euros) of the costs for the day clinic group. It should also be noted that almost all patients continued to receive rehab services after the three-week intervention, which could have contributed to improvement made during the follow-up periods thereafter.

Was this study adequately powered (large enough to show a difference)? *Circle yes or no, and if no, explain.*

YES NO

Power analysis was completed and 25 subjects in each group yielded a power of 80%

Were appropriate analytic methods used? *Circle yes or no, and if no, explain.*

YES NO

Intention-to-treat data analysis was used

Were statistics appropriately reported (in written or table format)? *Circle yes or no, and if no, explain.*

YES NO

Inconsistencies exist with the reported sample size in the result table. Only one dropout was reported during the study, however the n-values reported in result table do not reflect that. Additionally, no statistical significance values were provided.

CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

Overall, the results showed a significant difference in activity levels in younger patients with stroke who received rehabilitation in the home vs. at the day clinic upon completion of the three-week intervention. This suggests that receiving diagnosis-management information along with individually tailored training in the natural context can lead to earlier improvement in activity participation. However, there was no significant difference between the two groups in three-month and one-year follow-ups when both groups continued to receive the standard outpatient rehabilitation program. This indicated that the early improvements made in the home group did not maintain over time. This might be attributed to the heterogeneous diagnoses of strokes between the two groups and to the short intervention time. The authors stated that a longer time period might be needed to adapt to the new condition and situation to develop sustaining skills for activity participation.

In addition, costs of the home group (1830 Euros) were less than half of the cost for the day clinic group (4410 Euros), which is an important consideration when evaluating for cost-effectiveness of the two intervention programs.

Reference

Gladman, J.R., & Lincoln, N.B. (1994). Follow-up of a controlled trial of domiciliary stroke rehabilitation (DIMINO study). *Age and Ageing*, 23(1), 9–13.
<http://dx.doi.org/10.1093/ageing/23.1.9>

This work is based on the evidence-based literature review completed by Elizabeth Brown, Alex Shragg, Jovita Vazquez, and Kitsum Li, OTD, OTR/L, Faculty Advisor, Dominican University of California.

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