Title: Home-based rehabilitation outcomes similar to those of treatment in a hospital setting: age and severity of initial impairments influence effect of setting.

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CLINICAL SCENARIO:

Client population: This topic is relevant to individuals who were hospitalized due to a CVA and suffered severe enough impairments to warrant rehabilitative therapy afterwards.

Treatment context: All studies reviewed compared the effects of therapy delivered in a home setting to the effects of therapy delivered in a hospital setting. However, temporal context did vary in that some studies involved treatment protocols which accelerated discharge from inpatient acute care while others followed a conventional treatment protocol modified only by providing post-acute therapy in the home instead of an outpatient setting.

Problem/condition: CVA affects approximately 700,000 people each year, and leaves about 85% of survivors with a long-term disability (Woodson, 2008). It is important to investigate the effect of treatment setting on patient outcomes because, not only do the costs associated with providing therapy differ with setting, there may also be differences in effectiveness of therapy that are dependent on the setting. It is possible that a particular setting may be more appropriate or effective for a particular client based on personal factors.

Intervention: Rehabilitative treatment after CVA focuses on facilitating restoration of occupational performance via various treatment methods which broadly include those that aim to restore personal abilities and those that aim to adapt the occupation being performed (Woodson, 2008). This most often occurs in a hospital, in a rehabilitative setting which provides services after a patient's acute medical needs have been met. This topic examines the effect of providing these services in a patient's home, either after early discharge from acute care or continuing treatment after normal discharge.

OT Framework: This topic addresses the context and environment section of the occupational therapy domain. This topic is important for occupational therapists to understand because they often make recommendations about which treatment option, of those that are available, fits the client best.

OT Theory: The person-environment-occupation theory supports the investigation of this topic. Because environment is one of three major factors which interact to affect occupational performance, it follows that the environment in which treatment is provided will determine what factors a therapist needs to pay attention to, which treatment options will be available and what specific techniques and goals will be appropriate (Rigby, 2003). Examination of current knowledge in this area can help clinicians understand what factors contribute to goodness of fit between a client recovering from a CVA, the occupations he or she wants and needs to engage in, and the setting he or she is treated in. Factors such as client motivation, transfer of learned skills, treatment intensity and ease of access to treatment are all affected by setting and have great potential to influence a client's response to therapy.
FOCUSED CLINICAL QUESTION:
- Patient/Client Group: clients who had a CVA and subsequently received rehabilitative therapy
- Intervention (or Assessment): therapy in home setting
- Comparison Intervention: therapy in hospital setting
- Outcome(s): physical and socioemotional function of client, perceived stress of caregiver

SUMMARY:

Clinical question: Does home-based rehabilitation lead to more positive outcomes for CVA patients than treatment in a hospital setting?

Search
- 2 databases
- 11 relevant articles
- 1 systematic review and 2 randomized control trials (RCTs) investigated (article critiqued had PEDro of 7/10)
- Articles critiqued were chosen by evaluating soundness of design. Those with acceptable rigor were then compared to find those which used methods and outcome measures similar enough to allow comparison of results.

Findings: Providing post-CVA treatment in the home instead of a hospital seems to provide no distinct benefits or disadvantages to CVA patients in general but may differentially affect certain subsets of this client population.

CLINICAL BOTTOM LINE: Home-based rehabilitation leads to outcomes which are similar to those of treatment in a hospital setting. Client factors such as age or severity of initial impairments may influence the effect that the setting has on patient outcomes.

Limitation of this CAT: This critically appraised paper (or topic) has been reviewed by occupational therapy graduate students and the course instructor.

SEARCH STRATEGY:

Table 1: Search Strategy
### Databases Searched

- Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, CINAHL Plus, HealthSource: Nursing, Academic Edition, MEDLINE

### Search Terms

- Home + rehabilitation + stroke
- Early supported discharge + stroke

### Limits used

- AND

### Inclusion and Exclusion Criteria

**Included:**
- randomized control trials and systematic reviews
- CVA as primary participant diagnosis
- English, full text

**Excluded:**
- qualitative studies
- studies that measured only caregiver effects
- pilot studies
- studies that compared patients receiving therapy to those receiving no treatment
- studies whose participants had primary diagnoses other than CVA

### RESULTS OF SEARCH:

**Table 2: Summary of Study Designs of Articles Retrieved**

<table>
<thead>
<tr>
<th>Level of Articles Retrieved</th>
<th>Study Design/ Methodology</th>
<th>Number Located</th>
<th>Source</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td>Systematic review</td>
<td>1</td>
<td>Cochrane Database of Systematic Reviews</td>
<td>(Langhorne, 2005)</td>
</tr>
</tbody>
</table>
### STUDIES INCLUDED

#### Table 3: Summary of Included Studies (add more columns if necessary)

<table>
<thead>
<tr>
<th></th>
<th>Langhorne, 2005</th>
<th>Gladman, 1993</th>
<th>Young, 1992</th>
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</table>
| **Intervention Investigated** | • Early supported discharge (ESD) after CVA  
• Defined ESD as “any service intervention which has provided rehabilitation and support in a community setting with an aim of reducing the duration of hospital care”  
• Individual studies differed in terms of amount, frequency and duration of treatment as well as method of service delivery but all involved skilled therapy performed in the client’s home | • Traditional acute care followed by home-based rehabilitation after discharge following CVA  
• Therapy included OT, PT and other relevant services coordinated by one of the two therapists, the group received a median of 7 visits in the 6 month intervention period | • Traditional acute care followed by home-based PT following a CVA. Ten of the 52 individuals in the group also received home-based OT  
• The group received a median of 15 visits during the 6 month intervention period |
| **Comparison Intervention** | • Traditional acute and inpatient or outpatient rehabilitative treatment following a CVA  
• Individual studies differed as described above but all involved services delivered in a hospital setting | • Traditional acute care followed by outpatient rehabilitation after discharge following a CVA  
• The authors do not specify the content of the rehabilitation sessions however report a group median of 16 attendances during the 6 month intervention period | • Traditional acute care followed by outpatient PT and OT coordinated by the hospital following a CVA  
• Therapy sessions occurred at a day hospital twice per week and the group attended a median of 31 sessions over the 6 month intervention period |
| **Outcome variables and measures** | • Objective health status (death, need for institutional care, dependency)  
• ADL and IADL ability  
• Caregiver satisfaction with services | • Barthel index, extended ADL scores  
• Nottingham health profile  
• Brief assessment of social | • Barthel index  
• Motor Club assessment  
• Frenchay activities index  
• Nottingham health profile |
### Findings

- **Interventions** that involved therapy directly from a multi-disciplinary team or care coordinated by such a team decreased the likelihood of client death, institutionalization or dependency but care provided by a community service with no access to a multi-disciplinary team increased these outcomes.
- No type of ESD showed a strong effect on ADL or IADL performance, subjective health status, mood, carer’s subjective health status, carer’s mood.
- Larger proportion of people in the home-based group got some type of treatment but total number of sessions was similar for both groups.
- Oldest participants appeared to do better with outpatient care, younger ones appeared to improve more with home-based treatment.
- In general, outcomes were similar between groups for both client and carer measures.
- Participants in home-based group scored better on ADLs and functional movements at 6 months post-CVA. Additionally, a higher proportion of these participants could walk independently, manage stairs and reported higher social participation.
- A smaller percentage of the home-based group was still requiring PT at 6 months than that of the outpatient group.
- 33% of participants in both groups indicated a depressed mood, 25% of the caregivers associated with both groups reported emotional distress.
- Even though participants in the treatment group reported a higher amount of social activity than those in the control group, both groups scored in the low range on the scale.

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<tr>
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SYNTHESIS: IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

Does home-based rehabilitation lead to more positive outcomes for CVA patients than treatment in a hospital setting?

Overall Conclusions:

The articles reviewed indicate the effects of home-based treatment are largely similar to those of conventional treatment. One of the RCTs (Young, 1992) provided evidence that home-based treatment led to a greater improvement in ADL performance and functional movement but this was conflicted by the other RCT and the systematic review which used similar measures and found no differences between the treatment and control groups (Gladman, 1993; Langhorne, 2005). The systematic review seemed to indicate that home-based therapy decreased the likelihood of death or dependency when it was provided or coordinated by therapists from the client’s acute treatment setting as opposed to being provided by community-based services, which actually appeared to increase these negative outcomes in comparison to conventional treatment (Langhorne, 2005). Although the effect sizes for both the decrease (d = .70) and the increase (d = 1.23) associated with the different methods of service coordination were quite large, this result should be interpreted with caution because the rigor of the methodology of some trials included in the review was low. In addition, this was conflicted by both RCTs which found no statistically significant differences in death rates between treatment and control groups (Young, 1992; Gladman, 1993).

Outside of these two examples, measures in all studies demonstrated a lack of statistically significant differences between treatment and control groups when the population of people with CVA was treated as a uniform whole. However, when the groups were divided by variables such as age or severity of initial impairments, some evidence of an interaction between these factors and treatment setting emerged. There is moderate evidence suggesting that client age may interact with treatment setting to affect functional outcomes and conflicting evidence suggesting the interaction may affect death rates. Gladman found the youngest participants in the home-based care group had greater
improvements in ADL performance than the youngest participants in the hospital-based care group (1993). The same difference was not observed between the oldest participants in each group. However, the difference only reached statistical significance on two of the three scales included in the Barthel index and unfortunately the authors did not include information necessary to calculate an effect size. This same study found a non-significant trend towards higher death rates in the oldest participants allocated to the home-based care group as compared to their counterparts in the hospital-based care group. An opposite, also non-significant trend towards lower death rates in the youngest participants allocated to the treatment group as compared to those in the control group was also observed (Gladman, 1993). This relationship was conflicted by the Cochrane review which found evidence of lower death rates for all participants receiving hospital-associated home-based therapy, regardless of age (Langhorne, 2005). This finding had a large effect size (d = .85); however, it should be interpreted with caution due to methodological concerns.

There is moderate evidence suggesting that severity of initial impairments may interact with treatment setting. The included systematic review found participants with more severe initial impairments (Barthel < 10) had lower death rates with traditional treatment (d = 1.41) while those with more mild initial impairments (Barthel > 10) had lower death rates with home-based treatment (d = .73) (Langhorne, 2005). Although both of these effect sizes are large, these results should be interpreted with caution due to methodological concerns. Neither of the RCTs provided information that would allow investigation of this relationship.

It should be noted that the Cochrane review found a very large effect size (d = 1.56) for increased caregiver satisfaction associated with home-based treatment but did not observe any effects on caregiver mood or perceived health (Langhorne, 2005). Neither Gladman nor Young’s study found differences in any caregiver measures but they did not examine satisfaction with services (1993; 1992).

**Boundaries:**

Because the youngest mean age of participants in any reviewed study – including those in the systematic review – was 66 years, it is unknown how providing therapy at home would affect the youngest CVA patients. Although the majority of CVA patients tend to be in the age group which was included, patients younger than this represent the fastest growing portion of this population (Wolf, et al, 2009). The effects of home based care for these younger patients with CVA has not yet been studied. In addition, all studies took place in European countries and therefore may not be generalizable to other countries with different cultures and non-universal healthcare systems. Different billing structures and variable insurance coverage may reduce the feasibility of this type of care.

**Implications for practice:**

The research concerning this topic is extensive but leaves some important questions unanswered. Providing post-CVA treatment at home instead of in a hospital seems to provide no distinct benefits or disadvantages to CVA patients in general but may differentially affect certain subsets of this client population. Until the relationships between treatment setting and client factors such as age and severity of initial impairments are clarified, therapists should keep in mind that setting may affect individual patients differently. It is important to note that the home-based care delivered to patients in these studies was comparable in intensity to the care that would have been delivered in a hospital, and should not be confused with typical home healthcare services.

Although the articles reviewed provide conflicting evidence as to whether home-based therapy reduces death rates, both studies included in the systematic review, which provided non-professionally coordinated home-based therapy, found an increase in death rates. This highlights not only the importance of communication with medical professionals but also the necessity of professional training of those coordinating care after a CVA. Therapists providing home-based care should make every
effort to facilitate communication and coordination between all professionals and other workers providing services to a client.

The apparent increase in caregiver satisfaction with services when their loved one’s therapy was provided at home may indicate a need for the expansion of services provided to caregivers during a client’s hospitalization. This point merits further examination to determine which precise factors in the care provided or what actions on the part of the therapists increased the caregivers’ satisfaction and whether those can be replicated in a hospital environment.
REFERENCES

Included articles


Additional Reading

Overview of diagnosis, typical occupational therapy treatments, and theoretical background


Outcomes at 3 months or less post-discharge


Outcomes at 6 months post-discharge


**Outcomes at 12 months or longer post-discharge**


APPENDIX (Article Critique)

Title: A randomized controlled trial of domiciliary and hospital-based rehabilitation for stroke patients after discharge from hospital


Purpose of the study:
- To determine whether home-based rehabilitative treatment after a CVA would increase client improvements in activities of daily living and reduce caregiver stress in comparison to traditional treatment requiring the client to travel to a hospital.

Study Design:
- Level I, a randomized control trial
- Clinical trial of patients admitted with acute CVA who were randomized into the control or the treatment group just prior to discharge from inpatient medical treatment. Baseline measurements were taken prior to randomization.
- Patients from the three different types of acute care facilities ("healthcare of the elderly", "general medical" or "stroke unit") were randomized separately on the grounds that patient characteristics varied between the three facilities as did typical post-discharge services

Setting:
- Clients in the intervention group received physical therapy, occupational therapy and "other relevant help" as coordinated by either the physical therapist or the occupational therapist in their homes while those in the control group received similar treatment in a hospital setting.

Participants:
- There were 162 participants in the intervention group and 165 in the control group for a total of 327 participants at the beginning of the study. At the 6 month follow-up, 15 patients from the intervention group and 6 patients from the control group had died, one participant refused to complete questionnaires associated with data collection and two participants could not be contacted, giving a final number of 303 participants.
- All participants were diagnosed with acute CVA upon admission to the hospital. The median length of hospital stay was 19.5 days
- Inclusion criteria included a diagnosis of CVA. Presence of vascular disease, incontinence, mental disability or lack of ability to ambulate independently was noted but not used to exclude individuals from the study.
Exclusion criteria included being discharged to residential or nursing services, need for respite or terminal care, participation in outpatient treatment prior to current hospitalization, lack of significant disability from current CVA, or fewer than seven days of inpatient treatment needed for current CVA.

Blinding of participants was not feasible in this study due to the fact that the home-based treatment was a program initiated specifically for this study and this type of treatment had not previously been available in this geographic area.

All patients who were admitted to city and university hospitals with acute CVA during a 15 month period were considered for inclusion and recruited if they met criteria. Of the 1119 individuals, 790 were eliminated due to exclusion criteria and two declined to participate in the study, leaving 327 individuals who were provided with informed consent papers and enrolled.

The overall mean age of participants was 70 years and the group was 47% female. Participants’ history of CVA or immobility as well as whether they lived alone or with a spouse or other family member was also noted, along with alertness upon admission and presence of sensory deficit at that time. At time of entry into the study, participants were evaluated for aphasia and incontinence and assessed with the Abbreviated Mental Test and the Barthel Index of ADL performance. The number of days spent in inpatient care was recorded for all participants as well. It should be noted that there was a statistically significant difference between ADL performance at discharge from acute care, with the hospital-based group scoring higher.

Participants who were treated in different acute care settings did differ on some variables as expected, with those who were treated in the “healthcare of the elderly” ward having a mean age of 77, those treated in the “general medical” ward having a mean age of 66 and those treated in the “stroke unit” ward having a mean age of 60. Participants who were treated in the “healthcare of the elderly” ward also were more likely to live alone, have suffered a previous CVA, or have previous mobility impairments. Participants who were treated in the “stroke unit” ward had a longer mean hospital stay and were more likely to have aphasia.

**Intervention Investigated**

Potential participants were identified by checking a register of City and University Hospital admittances for patients with acute CVA. Patients who were being discharged to nursing or residential care, required terminal care, had been receiving outpatient rehab prior to their CVA, exhibited no significant disability due to their CVA or required less than seven days of inpatient care were excluded. All others were contacted for informed consent. Those who gave informed consent were asked for relevant medical history and assessed with the Barthel ADL index and the Abbreviated Mental Test before random allocation into either the treatment or the control group. Patients from the three different types of wards were randomized separately as described above.
Treatment was provided by two half-time physical therapists and one full-time occupational therapist. Therapists received no additional treatment specific training beyond their professional preparation. However, the three therapists involved in providing treatment piloted the home-based rehabilitation program utilized as the treatment intervention for four months before the study began. Therapy sessions occurred in the individual participants’ homes and continued for up to 6 months. Participants who achieved all of their treatment goals were discharged from the program when appropriate while those who required additional therapy beyond the 6 months covered in this study were referred to routine services. The total hours of treatment which each participant received were not provided but the total number of sessions for all participants in each group as well as the median number of sessions per participant was provided. The hospital-based group (n = 165) received 1626 sessions total while the home-based group (n = 163) received 1615. The median number of sessions per hospital-based group participant was 16 while home-based group participants received a median of 7 sessions. The number of sessions provided to individual participants was based on need for therapy. It should be noted that the home-based group had statistically significantly less sessions per person but statistically significantly more people receiving therapy than the hospital-based group. Blinding of interventionalists was not feasible in this study due to difference in treatment settings.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Outcome measure</th>
<th>Data type</th>
<th>Scoring</th>
<th>ICF level</th>
<th>OT Framework terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADL performance</td>
<td>Barthel index</td>
<td>ordinal</td>
<td>Higher scores indicate greater independence</td>
<td>Activities and participation restriction</td>
<td>Occupational performance of activities of daily living</td>
</tr>
<tr>
<td>Perceived health</td>
<td>Nottingham health profile</td>
<td>ordinal</td>
<td>Higher scores indicate poorer perceived health (0-100)</td>
<td>Impairment</td>
<td>Client factors of body functions and beliefs</td>
</tr>
<tr>
<td>Caregiver effects</td>
<td>Brief assessment of social engagement</td>
<td>ordinal</td>
<td>Higher scores indicate greater social engagement (0-20)</td>
<td>Activities and participation restriction</td>
<td>Occupational performance in social participation</td>
</tr>
</tbody>
</table>
Main Findings

- Will CVA patients who receive therapy at home improve more than those who receive therapy in a hospital?
  - There was a trend towards higher death rates for the treatment group but this was only reflected in the “healthcare of the elderly” stratum when participants from the three different types of wards were examined separately. The death rate for the “healthcare of the elderly” stratum for the treatment group was 13% while that of the same stratum for the control group was 4%.
  - The mean total Barthel index score for the treatment group was 8.0 while that of the control group was 8.5. The median difference between participants was zero, the 95% confidence interval for the difference between the two groups was -1.0 to 1.0 with a Mann-Whitney p<.05. Effect size could not be calculated because the standard deviation was not provided.
  - Although there was no difference in improvements by the 6 month assessment for the overall treatment and control groups, the “stroke unit” stratum of the treatment group had a greater increase in Barthel index score than its counterpart in the control group. The median difference was 1.0, the 95% confidence interval for the difference between the two groups was 0 to 3 with a Mann-Whitney p<0.01. Effect size could not be calculated because the standard deviation was not provided.
  - Median scores and interquartile ranges (IQR) were provided for each group for the individual scales of the Nottingham Health Profile. No summary scores or comparisons were provided. The differences in median scores of the scales ranged from 0-5 points on a 100-point scale and none were significant.

- Will caregivers of CVA patients who receive therapy at home have less stress than caregivers of patients receiving therapy in a hospital?
  - Only median scores and interquartile ranges (IQR) were provided for the two measures administered to caregivers of participants. The difference in median score on each measure was one point and was not significant.

Original Authors’ Conclusions

- Overall outcomes for both groups were similar concerning both ADL performance and perceived health.
- Caregiver stress associated with both groups was similar.
Older patients may have a smaller chance of a decline in health status when treatment is provided in a hospital setting.

Younger patients may have greater improvements in ADL performance when treatment is provided at home.

Home-based treatment is a viable and possibly more cost-effective option than hospital-based treatment for most CVA patients.

Validity

Participants were selected from a large group (1,119) of patients admitted for CVA to several different hospitals in the same geographic area and thus are probably representative of the general population with this diagnosis. Baseline measures were obtained prior to randomization into groups and therefore the baseline assessor was blind to group membership of the person being assessed. Participants received widely varying amounts of treatment with 25% of the treatment group and 46% of the control group receiving no rehabilitative treatment at all. Neither total hours of treatment per participant nor length of treatment sessions were reported; only the total number of sessions for each group and the median number of sessions per participant were provided. Six month outcome measures were obtained by an assessor who was blind to group membership but it is unclear if this was also the case for the three month outcome measures. Chi-square and Mann-Whitney significance tests were used since the measurement tools chosen provide ordinal level data.

PEDro (5/10)

- Participants were randomly allocated to groups (1 point)
- Allocation to groups was concealed from baseline assessors but it is unclear who actually performed the allocation (1 point)
- The treatment and control group were similar on all measures at baseline or adjusted appropriately during statistical analysis (1 point)
- The participants could not be blinded due to differences in setting (1 point)
- The participants could not be blinded due to differences in setting (1 point)
- All assessors were blind – all participants regardless of group membership were assessed in their own homes (1 point)
- All outcome measures were obtained from more than 85% of participants (1 point)
- All participants received the treatment or control as allocated, however the amount of therapy given to members of either was based solely on need (1 point)
- The results of between-group statistical comparisons were reported as median differences (1 point)
- No effect size was provided, nor were standard deviations which could be used to calculate effect size.

Interpretation of Results
Both types of treatment delivery yielded similar affects concerning participants’ functional abilities and perceived health as well as their caregivers’ social engagement and life satisfaction. There were trends which may indicate that treatment at home is better for younger patients while treatment in a hospital setting is better for more elderly patients. Since these trends were obtained with smaller subsets of participants – 127 in “healthcare for the elderly” and 46 in “stroke unit” – they should be interpreted with less confidence than the main results of the study.

The difference in amount of treatment provided to the two groups is hard to evaluate with the information provided by the authors. A larger proportion of the treatment group received treatment but the median number of sessions per participant was lower than that of the control group. It is possible that the difference in amount of treatment could have skewed some or all of the results but this is impossible to know with the information provided.

Summary/Conclusion (Take Away Message)

1. Overall, providing rehabilitative treatment at home after a CVA seems to have effects that are quite similar to providing treatment in a hospital-setting.
2. This article provides weak evidence that a CVA patient’s age may affect which treatment setting is best for him or her.
3. Future studies on this intervention could benefit from providing a standardized amount of treatment to all participants because this would increase the amount of effect that could be attributed to a difference in setting. In addition, studies which further investigate the possible interaction between setting and age may be warranted.