



AOTA Critically Appraised Topics and Papers Series Traumatic Brain Injury

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

CRITICALLY APPRAISED PAPER (CAP)

Focused Question

What is the evidence for the effect of interventions (published between 2000-2004) to enable persons with traumatic brain injury (TBI) to participate in areas of occupation (activities of daily living [ADL], instrumental activities of daily living [IADL], work, leisure, social participation, and education)?

Powell, J., Heslin, J., & Greenwood, R. (2002). Community based rehabilitation after severe traumatic brain injury: A randomised controlled trial. *Journal of Neurology, Neurosurgery, and Psychiatry*, 72, 193–202.

PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)

- There is a need for community-based programs which focus on enabling people with brain injuries to reengage with life as fully as possible.
- In view of this, the trend in North America has been to shorten inpatient care and increase community-based interventions.
- Until recently there has been no good evidence to confirm the effectiveness of this approach.
- In 1992, an exceptional opportunity arose to conduct randomized treatment trials of community rehabilitation programs for patients with traumatic brain injury.

State the problem the authors are investigating in this study.

It was hypothesized that participants randomized to outreach rehabilitation would make greater gains on measures of independence in activities of daily living, social participation, and psychological well-being than would those receiving only information about other existing sources of potential help.

RESEARCH OBJECTIVE(S)

List study objectives.

- To evaluate multidisciplinary community-based outreach rehabilitation after severe traumatic brain injury (TBI).
- To determine whether or not outreach treatment increased the relative probability and magnitude of improvements.

Describe how the research objectives address the focused question.

The hypothesis of this study directly addresses the focused question.

DESIGN TYPE:

Randomized controlled trial

Level of Evidence:

Level I

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *If no, explain.*

Yes

No

SAMPLE SELECTION

How were subjects selected to participate? Please describe.

All who met criteria were included

Inclusion Criteria

- Live within 1 hour's travel time of the hospital.
- Have long-term treatment goals agreed within the team as being amenable in principle to intervention.
- Have at least moderate brain injury prior to admission (PTA) > 24 hours or other neurological evidence).

Exclusion Criteria

Current neurological diagnosis

Sample Selection Biases: If yes, explain.

Volunteers/Referrals

Yes

No

Attention

Yes

No

Others (list and explain):

SAMPLE CHARACTERISTICS

N= 166 → 110 → 94

% Dropouts

#/ (%) Male

#/ (%) Female

Ethnicity

Disease/disability diagnosis

NR = Not reported.

Age 16–65 years; time since onset: 3 months to 20 years

Check appropriate group:

<20/study group	20–50/study group <input checked="" type="checkbox"/>	51–100/study group	101–149/study group	150–200/study group
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Sample Characteristics Bias: If no, explain.

If there is more than one study group, was there a similarity between the groups?

Yes Similar on demographics, severity, mean time since onset, and on Barthel Index and Brain Injury Community Rehabilitation Outcome–39 (BICRO-39). Randomized blindly.

No

Were the reasons for the dropouts reported?

Yes

✓ 166 → 110 due to decline or withdrawal before randomization.
 110 → 94 due to death, incarceration, failure to attend.
 94 → 75 due to lack of information at baseline for BICRO-39

No

INTERVENTION(S)—Included are only those interventions relevant to answering the evidence-based question

Add groups if necessary

Group 1 Outreach N= 54 → 48 → 35

Brief Description	Outreach treatment with contractually organized goal setting. Client worked toward long-term goals valued by the client and caregivers and considered amenable to intervention. Client used a series of written contracts which specified interim and short-term goals achieved over 6–12 weeks.
Setting	Community (patients' homes, day centers, workplace)
Who Delivered?	Team (2 occupational therapists, 1 physical therapist, 1 speech-language therapist, 1 part-time social worker, and 1 clinical psychologist. Directed by the clinical psychologist.)
Frequency?	Mean of 2 sessions/week; 2–6 hours/week
Duration?	28.1 (∇ 19.1) weeks

Group 2 Control N = 56 → 46 → 40

Brief Description	Written information detailing alternative resources; a specially collated booklet which listed a wide range of local and national resources and highlighted those of particular relevance to the patient's needs.
Setting	Community
Who Delivered?	"A team therapist"
Frequency?	1 visit from therapist
Duration?	N/A

Intervention Biases: *Explain, if needed.*

Contamination

Yes

✓ Control subjects received limited treatment and support from the outreach team over the 1 month immediately after discharge from inpatient rehabilitation.

No

Co-intervention

Yes

No

Timing

Yes

No

Site

Yes

No

Use of different therapists to provide intervention

Yes

No

NR

MEASURES AND OUTCOMES—Included are measures relevant to answering the focused question

Name of measure:

Barthel Index

Outcome(s) measured (what was measured?):

Functional ability; basic activities of daily living

Is the measure reliable (as reported in article)?

Yes “Good agreement between therapists and research assistants has been established”

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

Baseline by therapists; 18 to 40 month after randomization (follow-up) by researcher

Name of measure:

Brain Injury Community Rehabilitation Outcome-39 (BICRO-39)

Outcome(s) measured (what was measured?):

Self-report of levels of activity and participation and psychological aspects of functioning in the community. Caregivers also completed these assessments . A “maximum gain index” –a change score computed for each participant by identifying the subscale on which he or she showed the greatest improvement from intake to follow-up).

Is the measure reliable (as reported in article)?

Yes

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

Baseline (for 75 persons) and at follow-up as above.

Measurement Biases

Were the evaluators blinded to treatment status? *If no, explain.*

Yes

No Blinding was attempted, but imperfect because some patients told the assessor.

Recall or memory bias? *If yes, explain.*

Yes

This is possible since BICRO-39 is a self-report instrument

No

Others (list and explain):

Both primary measures, the Barthel Index (BI) and the BICRO-39, failed to measure the full extent of the participants' abilities, and therefore the effects of the intervention, because of severe ceiling and floor effects.

Limitations (appropriateness of outcomes and measures) *If no, explain.*

Did the measures adequately measure the outcome(s)?

Yes

No

60 % of participants scored at ceiling on the BI at intake with another 14% scoring near ceiling. "A sizable proportion of participants scored at ceiling on the BICRO-39 at intake, with the consequences that their change scores were close to zero" (p. 195). Therefore the maximum gain index was used.

RESULTS

List results of outcomes relevant to answering the focused question

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

Include effect size if reported

Outreach participants were significantly more likely to show gains on the BI and on the total score and self-organization and psychological well-being subscales of the BICRO-39.

Barthel Index: Because 74% of the participants scored at or near ceiling at intake, the change score (post – pretest) was 0 for both groups; 35% of the outreach group showed improvement vs 20% of the information group. Mann Whitney $U = 831$, $p < 0.05$.

BICRO-39: At intake, 70 % of the participants scored within 0.5 points of floor (0 = total independence) in personal care; 75% within 0.5% of ceiling (5 = no activity) on employment. The total BICRO-39 score was significantly better for the outreach group than the information group (Mann Whitney $U = 517$, $p = 0.05$). There was no significant difference on the socializing or productive employment subscales between groups. The outreach group scored significantly better than the information group on the subscales: self-organization (M-W $U = 474$, $p < 0.05$); psychological well-being (M-W $U = 469$, $p < 0.05$); mobility (M-W $U = 529$, $p = .10$); and personal care (M-W $U = 536$, $p = 0.08$). The maximum gain index (MGI) also was significantly better for the outreach group than the information group (M-W $U = 481$, $p < 0.05$).

Was this study adequately powered (large enough to show a difference)? *If no, explain.*

Yes

✓ Originally it was. 40 participants per group were required to detect the difference expected. However, because data were lost, one group (outreach) was reduced to 35.

No

Were appropriate analytic methods used? *If no, explain.*

Yes

✓ Non-parametric statistics because the distribution was not normal

No

Were statistics appropriately reported (in written or table format)? *If no, explain.*

Yes

No

CONCLUSIONS

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

Community rehabilitation after severe TBI can yield benefits which outlive the active treatment period, even if offered years postinjury.

Were the conclusions appropriate for the study design (level of evidence)? *If no, explain.*

Yes

No

Were the conclusions appropriate for the statistical results? *If no, explain.*

Yes

No

Were the conclusions appropriate given the study limitation and biases? *If no, explain.*

Yes

No

IMPLICATIONS FOR OCCUPATIONAL THERAPY

This section provides guidance about clinical practice, program development, and other implications of the study findings as they relate to the focused question.

This community-based therapy program was carried out by a team of rehabilitation professionals. There were two occupational therapists involved. Their roles and responsibilities were not described. However, since the goal of the intervention is congruent to usual goals of occupational therapy (independence in activities of daily living and improved social participation), it can be extrapolated that community-based occupational therapy aimed at these goals will produce a significant improvement in self-care and self-organization for persons with moderate to severe TBI over that expected for an informational home program alone. Further, targeted research is needed to determine the specific effectiveness of occupational therapy community-based treatment for patients with severe TBI.

This work is based on the evidence-based literature review completed by Catherine Trombly, ScD, OTR/L, FAOTA.

CAP Worksheet adapted from: Critical Review Form – Quantitative Studies ©Law, M., Stewart, D., Pollack, N., Letts, L., Bosch, J., & Westmorland, M., 1998, McMaster University. Used with permission.

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.



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