
There is currently insufficient evidence either to support or refute the use of case management services to improve community integration of people with a traumatic brain injury

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Clinical Question: Does case management improve community integration of people with a traumatic brain injury?

Clinical Scenario

Case management services are frequently recommended for clients following a traumatic brain injury, specifically to assist in community integration. What is the effectiveness of this intervention in assisting clients with their community integration?

Clinical Bottom Line: There is insufficient evidence either to support or refute the provision of case management services, to improve the community integration of clients with a traumatic brain injury.

Summary of Key Findings

- 14 studies were reviewed that met the inclusion/exclusion criteria.
- One systematic review was located and appraised.
- The systematic review included three studies. According to the NHMRC, 2000 classification, there was one level III study (Greenwood et al., (1994) and two Level IV studies (Ashley et al., (1994); (Malec et al., (1995).
- Results from the three studies included in the systematic review could not be compared because of their dissimilar design, samples and outcome measures.
- This systematic review found no clear evidence of effectiveness of case management. Currently there is insufficient evidence to either support or refute the use of case management to improve community integration in this population.

Limitation of Summary of Evidence: This summary of evidence has not undergone a process of peer review.

Methodology

Search Strategy: Using the levels of evidence as defined by the NHMRC (2000), the search strategy aimed to locate the following study designs:

Level I	Systematic Reviews and Meta-analyses;
Level II	Randomised Controlled Trials;
Level III	Controlled trials, cohort or case-control analytic studies;
Level IV	Case series: Post – test only, Pre - test/Post – test;
Level V	Expert opinion including literature/narrative reviews, consensus statements, descriptive studies and individual case studies.

A search was also conducted for clinical practice guidelines based on these levels of evidence.

Search Terms

Patient/Client: Brain injury, acquired brain injury, brain injur*, traumatic brain inj*, head injury brain damage, neurological deficits, head trauma.

Intervention: Case management, care coordination, rehabilitation manager, care manager.

Comparison: Nil

Outcome: Community integration, life skills, living skills, functional skills, functional activities.

Sites/Resources Searched

Clinical Guidelines

- NHMRC
- New Zealand Guidelines Group
- Health Base
- National Guidelines Clearinghouse
- UK Guidelines:
- Scottish Intercollegiate Guidelines Network (SIGN)
- National Association of Neurological Occupational Therapists (NAN OT)
- Motor Accidents Authority of NSW
- Workcover NSW

Systematic Reviews

- Cochrane Library
- Cochrane Abstracts
- Database of Abstracts of Reviews of Effectiveness (DARE)
- PEDro – The Physiotherapy Evidence Database
- Effective Health Care Bulletins
- Centre for Clinical Effectiveness (Monash University)

General Databases

- PubMed
- PEDro – The Physiotherapy Evidence Database
- Ovid Full Text
- Medline – Pre Medline
- CINAHL
- Embase
- AMED
- ASSIA
- Psychlit
- Psych Info
- OTD Bas
- OT Bib Sys
- Eric International

Inclusion/Exclusion Criteria

Inclusion Criteria

- Studies that included case management following an acquired brain injury.
- Studies discussing the effect of case management on community integration.
- Studies published in English.

Exclusion Criteria

- Studies that did not include outcomes of case management on clients' function.

Results

Results of Search: 14 relevant studies were located and categorised as follows:

Table 1. Study design of articles retrieved by search

Methodology of Studies Retrieved	Number Located	Source of Evidence
Clinical Practice Guidelines (Evidence Based)	0	N/A
Systematic Reviews or Meta – analyses	1	From reference list of systematic review article.
Randomised Controlled Trials	2	PubMed and Medline
Controlled trials, cohort or case-control analytic studies	1	CINAHL
Case series: Post – test only, Pre - test/Post - test	1	PubMed
Expert opinion including literature/narrative reviews, consensus statements, descriptive studies and individual case studies	9	Various. See reference list for details.

Specific Results: The systematic review was the only study critically appraised for this summary, as it represented the highest level of evidence. The study and appraisal findings are summarised in Table 2.

Table 2. Description and Appraisal of Systematic Review by Patterson et al (1999)

<p>Objective of Study</p> <p>To identify evidence of case management effectiveness within the context of Traumatic Brain Injury (TBI) rehabilitation. The purpose was to systematically review the literature for controlled clinical studies of the influence of case management and/or care coordination on targeted outcomes amongst the TBI rehabilitation populations.</p> <p>Intervention Investigated</p> <p>A number of electronic databases were searched for case management evidence and then citations were excluded from further review in three phases of elimination. In phase III only three studies (Ashley et al., 1994, Greenwood et al., 1994 and Malec et al., 1995) met the final two study selection criteria: (1) case management with an independent variable in the study and (2) the article contained adequate evidence for review. The three studies were then critically analysed.</p> <p>Below is a brief outline of each study included in the review:</p>
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Study 1 Ashley et al. (1994)

Intervention investigated: Case management effectiveness particularly focused on independence following rehabilitation. There were 2 groups. Group 1 – approx 350 patients of 1 post-acute rehabilitation clinic in 1980-90; in vocational rehabilitation; Disability Rating Scale <10 (mod severe). Group 2 – males; 20 yrs + at injury; <1500 days post-injury; treated 1981 or 83-86; had Worker's Compensation insurance.

Study population: TBI patients of 1 post-acute rehabilitation clinic in vocational rehabilitation

Primary outcome measure: Changes in Disability Rating Score (DRS), living and occupational status; treatment costs.

Results: Both groups showed improved disability, living and working status. A single case management approach was associated with greater improvement.

Study 2: Greenwood et al. (1994)

Intervention investigated: Case management effect on employment, quality of life, family burden and the rehabilitation process. N=126 at entry reducing to N=60 at 24 months. Numbers divided into two groups CM=56 at start, Non CM n=70 at entry. The intervention was allocated to all sequentially admitted patients in randomized sites.

Study population: TBI treatment in 3/88-11/90. 16-60 yr, < 7 days post injury > 6 hours in coma or > 48 hours amnesia. Family consent, local resident.

Primary outcome measure: Number of referrals to care service, time in rehabilitation, physical and cognitive impairment, (including DSR) hours of care for home supports and supervision, satisfaction with services, information and case management, changes in affect, behaviour, social functioning, personality, global impairment, patient and family housing, financial, vocational leisure and medical needs.

Results: Non CM approach favoured probably due to less severe injuries, CM increased the chance and range of referrals to other health professionals but not contact duration.

Study 3 Malec et al. (1995)

Intervention investigated: Case management with measurement of employment outcomes. N=147, 25 mild injured patients reportedly lost to follow-up, so N=122.

Study population: 509 TBI patients of 1 emergency department from 10/94-10/95. Inclusions: 18-55 yrs; primary diagnosis TBI; secondary diagnosis psychiatric or substance abuse, if receiving appropriate treatment.

Primary outcome measure: Change in disability (Mayo-Portland Adaptability Inventory, by self report and staff rating), employment function (Vocational Outcome Scale) job type, job setting, pay rate, type and cost of vocational supports, independent living, patient/family satisfaction

Results: Study reported year 1 of a 2 year study with half of the outcome goals met for CM patients

Results

Although all the studies addressed case management effectiveness, their designs differed. Two compared case management with no case management and one compared two different case management approaches (Ashley et al., 1994). Two were group comparisons, while one compared outcome rates with previously established baseline rates (Malec et al., 1995).

The purposes of all the studies differed with Malec and associates measuring employment outcomes. Ashley and associates focused on independence following rehabilitation and Greenwood and associates addressed patient employment, quality of life, family burden and the rehabilitation process.

Sampling and group assignment differed. In two studies the sample size was moderately high (>100) and in one it was small (n = 39; Ashley et al.). Subject withdrawals and exclusions were reported in two papers. In the third Ashley et al (1994), the subjects were all patients who met the inclusion criteria and could be matched to the control group.

Each study focused on a different subpopulation though comparison groups in two studies were similar.

The studies also tested different models of case management intervention. One was a medical model and the other a medical-plus-vocational model. Although these two models had similarities, too few details were available to determine whether different modes of vocational coordination were provided.

Additionally, case manager role behaviours and expectations were poorly reported. Only one study identified the case manager's disciplines and training levels (Malec et al). It is also unclear whether all subjects in a group had the same case manager, or whether subjects in a group had the same case manager for the whole post TBI period.

The results showed evidence of case management effectiveness was mixed. Two of the three studies showed that case management improved vocational status with the "single case manager and insurance" approach (Ashley et al., 1994) and with the "combined nurse and vocational case manager" model (Malec et al., 1995).

There were conflicting results regarding the effects of case management on functional status, living status, family impact and other recovery aspects. When two forms of case management were compared, both the single and multiple case manager/insurance approaches showed significant functional improvements (Ashley et al., 1994). Greater independence in subjects' living arrangements was demonstrated with the single manager and insurance model (Ashley et al., 1994) while greater dependence was found with the general case manager model (Greenwood et al., 1994).

Other single-study findings included lower rehabilitation costs and higher disability payments for the single case manager model (Ashley et al., 1994).

Systematic Review Authors' Conclusions

The studies used in this systematic review were Level III and IV according to NHMRC, 2000 classification. Therefore the results of this systematic review need to be considered in light of this. No Level I or Level II studies were included in this systematic review therefore affecting the validity of the clinical bottom-line. Thus further research is warranted to resolve the question of case management effectiveness amongst TBI survivors and their families, as there is no clear evidence of effectiveness, but neither is there clear evidence of ineffectiveness.

Despite methodological weaknesses in the three studies and incompatible findings, there are some positive observations that can be made from this review. First, two studies found significant functional status improvements associated with case management (Ashley et al., 1994; Malec et al., 1995). This suggests that perhaps the case management model employed in the third study (Greenwood et al., 1994) was simply the wrong model. Also in the third study the subject drop-out rate was lower for those with a case manager, which suggest that patients and families may have found the service useful. This scant but encouraging evidence from three controlled studies implies that additional research is warranted.

Reviewers' Appraisal Comments

Validity (methodology, rigour, selection, biases) and Results

- The systematic review addressed a clearly defined question of whether case management is effective during recovery from traumatic brain injury in adults.
- The research is deemed thorough as a number of electronic databases were searched with a rigorous elimination process being employed over three phases.
- The studies that were included met strict inclusion criteria.
- The systematic review assessed the three included studies according to the research levels outlined by High, Boake, and Lehmkuhl (1995). There was one Class II study which was defined as prospective, controlled experiment with systematic assignment of cases to conditions; well defined, appropriate samples for the research question, two class III studies were included which were defined as retrospective data collection; systematic case histories; evaluation of treatment outcomes, including analyses of preliminary findings. None met Class I which was controlled experiments with random assignment of cases to comparison groups; samples drawn from a well-defined population.
- The authors of the systematic review were unable to statistically pool the results of the three studies due to differing outcome measures used in each study. Therefore they could only make a general comparison of the results of the three studies to draw their conclusions.
- A shortcoming of the systematic review was that the authors did state that in two of the studies there were improvements in functional status improvements but they failed to include whether these were statistically significant or clinically significant.

References

1. National Health and Medical Research Council. (2000). How to use the evidence: Assessment and application of scientific evidence. Handbook series on preparing clinical practice guidelines. Canberra: Commonwealth of Australia.

Article critically appraised for this summary of evidence

Level I Evidence

1. Patterson, P.K., Maynard, H., Chesnut, R. M., Carney, N., Clay Mann, N., & Helfand, M. (1999). Evidence of case management effect on traumatic-brain-injured adults in rehabilitation. Care Management Journal, 1(2), 87 – 97.

Related articles not included in the appraisal

Level II Evidence

1. Chesnut, R. M., Carney, N., Maynard, H., Patterson, P., Clay Mann, N., & Helfand, M. (1999). Evidence report/technology assessment number 2: Rehabilitation for traumatic brain injury, February 1999 [No. 99-E006]. Portland: Oregon Health Sciences University.

Level III Evidence

1. Greenwood, R. J., McMillan, T.M., Brooks, D.N., Dunn, G., Brock, D., Dinsdale, S., Murphy, L. D., & Price, J.R. (1994). Effects of case management after severe head injury. British Medical Journal, 308, 1199 – 1205.

Level IV Evidence

1. Evans, R., & Watke, M. (July/Aug/Sept 1995). Catastrophic neurological injury: Improving outcomes through case management. The Case Manager, 83 – 88.
2. Chesnut, R.M., Carney, N., Maynard, H., Mann, C., Patterson, P., & Helfand, M. (1999). Summary report: Evidence of rehabilitation for persons with traumatic brain injury. Journal of Head Trauma Rehabilitation, 14(2), 176 - 188.

Level V Evidence

1. Dernfield, G. (September/October 1990). Traumatic brain injury and case management. Cognitive Rehabilitation, 20 – 24.
2. Malkmus, D., & Johnson, P. (1992). Dedicated management of outcome, quality and value: Internal case management. Journal of Head Trauma Rehabilitation, 7(4), 57 – 67.
3. Veach, R. (September/October 1988). Case management of minor head injured survivors. Cognitive Rehabilitation, 22 – 24.
4. Hosack, K. (January/February 1999). Suggestions for case managers who work with patients with severe traumatic brain injury. Nursing Care Management, 4(1), 14 – 18.
5. Hosack, K. (June 1998). The value of case management in catastrophic injury rehabilitation and long-term management. The Journal of Care Management, 4(3), 58 - 67.
6. Roughan, J. Case management: Definition, process and perspective. Case Manager, 40 – 46.
7. Bush, G. (1989). Catastrophic case management: Thoughts from a teacher/consumer/advocate. Brain Injury, 3(1), 91 – 100.
8. Dernfield, G. (March/April 1995). Quagmire of receiving private rehabilitation services: Concerns and solutions. Cognitive Rehabilitation, 12 – 13.
9. Dernfield, G. (March/April 1991). Traumatic brain injury getting to the underbelly and getting through it. Cognitive Rehabilitation, 20 – 22.