

There is evidence to suggest that inpatient rehabilitation helps improve functional outcomes for elderly patients with hip fractures.

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CLINICAL SCENARIO: Hip fractures are very common in the elderly and are usually associated with a fall or a complication of osteoporosis. They are treated with surgical fixation with a pin and plate, dynamic hip screw or total hip arthroplasty. They are a major cause of mortality, impaired function and admission to institutions. The geriatric population has specific needs due to multiple co morbidities, cognitive problems, polypharmacy, functional and balance decline with age.

FOCUSED CLINICAL QUESTION:

In elderly patients with hip fractures, is inpatient geriatric rehabilitation more effective than conventional care to help improve functional outcomes?

SUMMARY of Search, 'Best' Evidence' Appraised, and Key Findings:

- Five studies met the inclusion criteria: 2 systematic reviews and 3 recent randomised controlled trials (RCT's)
- The 2 systematic reviews (Bachmann et al., 2010) (Halbert et al., 2007) and 2 of the RCT's (Stenvall et al., 2007) (Shyu et al., 2008) concluded that a multidisciplinary inpatient rehabilitation program specifically designed for elderly patients helps improve functional outcomes related to activities of daily living (ADL), performance and mobility, both from a short-term (at 4 months) and long-term (at 1 year) perspective.
- There is one RCT (Naglie et al., 2002) that found no significant difference in outcomes at 3 or 6-months for elderly patients with hip fracture receiving postoperative inpatient interdisciplinary care.

CLINICAL BOTTOM LINE:

There is evidence that inpatient geriatric rehabilitation is more effective than conventional care in improving functional outcomes after hip fractures.

Limitation of this CAT: This critically appraised paper (or topic) was prepared for a graduate course assignment and has /has not been peer-reviewed by one other independent person/an instructor.

SEARCH STRATEGY:

Terms used to guide Search Strategy:

- **P**atient/Client Group: Elderly patients with hip fracture
- **I**ntervention (or Assessment): Inpatient geriatric rehabilitation
- **C**omparison: Conventional care
- **O**utcome(s): Functional outcomes based on ADL performance as measured by the Barthel index.

Databases and Sites Searched	Search Terms	Limits Used
Medline CINAHL Embase PubMed PEDro EMB reviews	Hip Fracture AND Rehab*; Inpatient Rehab* AND Hip Fracture; Hip fracture AND multi-disciplinary Rehab*; Hip fracture AND activities of daily living	English language Humans only Age 65+ Published in the last 10 years

INCLUSION and EXCLUSION CRITERIA

- Inclusion: Hip Fracture, Elderly > 65 years, male or female, studies published in the last 10 years, RCT's, systematic reviews, ADL performance as a outcome measure.
- Exclusion: Hip fractures due to traumatic injury, hip fracture in patients with severe dementia, studies published before 10 years, studies with lower level of rigor like cohort studies, community or outpatient rehabilitation after hip fracture.

RESULTS OF SEARCH

Five relevant studies were located and categorised as shown in Table 1

Table 1: Summary of Study Designs of Articles Retrieved

Study Design/ Methodology of Articles Retrieved	Level*	Number Located	Author (Year)
Systematic Review	1++	1	Bachmann, S., Finger, C., Huss, A., Egger, M., Stuck, A.E., Clough-Gorr, K.M. (2010)
Systematic Review	1+	1	Halbert, J., Crotty, M., Cameron, I., Kurrle, S., Graham, S., Handoll, H., Finnegan, T., Jones, T., Foley, A., Shanahan, M. (2007)
Randomised Controlled Trial	1	3	Shyu, Y.L., Liang, J., Wu, C.C., Su, J. Y., Cheng, H. S., Chou, S.W., Chen, M.C., Yang, C.T. (2008)
			Stenvall, M., Oloffson, B., Nyberg, L., Lundstrom, L., Gustafson, Y. (2007)
			Naglie, G., Tansey, C., Kirkland, J. L., Ogilvie-Harris, D.J., Detsky, A.S., Etchells, E., Tomlinson, G., O'Rourke, K., Goldlist, B. (2002)

*Based on National Health Service (NHS) in the United Kingdom, 2004

BEST EVIDENCE

The following study/paper {{113 Bachmann,S. 2010;}} was identified as the 'best' evidence and selected for critical appraisal. Reasons for selecting this study were:

- Highest level of evidence.
- Most recent publication.
- Uses standardized measures of functional outcomes.
- Includes 2 of the RCT's as part of the review.

SUMMARY OF BEST EVIDENCE

Table 2: Description and appraisal of systematic review by

Bachmann, S., Finger, C., Huss, A., Egger, M., Stuck, A. E., & Cloug-Gorr, K. M. (2010). Inpatient rehabilitation specifically designed for geriatric patients: Systematic review and meta-analysis of randomised controlled trials. *BMJ (Clinical Research Ed.)*, *340*, c1718. doi:10.1136/bmj.c1718

Aim/Objective of the Study/Systematic Review: To assess the effects of inpatient rehabilitation specifically designed for geriatric patients compared with usual care on functional status, admissions to nursing homes, and mortality.

Study Design: Systematic review with meta-analysis

Search Strategy: Searches in Medline, Embase (January 1970 to 31 July 2008), and the COCHRANE Central Register of Controlled Trials (CENTRAL) database. Screening reference lists identified additional trials.

Selection Criteria: Only randomised controlled trials were included. Trials had to report on inpatient rehabilitation and report at least one of functional improvement, admission to nursing homes, or mortality. Rehabilitation was defined as inpatient multidisciplinary programmes with active physiotherapy or occupational therapy, or both, according to WHO (World Health Organization) ICF (International Classification of functioning, disability and health) framework.

Exclusion Criteria: Studies that were not peer reviewed randomised controlled trials, studies offered to patients of all ages (studies with an age threshold of less than 55 years), interventions that were not an inpatient program, trials of non-multi disciplinary rehabilitation, trials of outpatient or consultation services, and trials without a control receiving usual care were excluded.

Data collection and Analyses: Two reviewers independently screened titles, abstracts, and full texts. They independently assessed all included trials for quality of the intervention programme and trial methods. Discrepancies were resolved through discussion with a third reviewer. Data were extracted on the mean age of the study population, location of the intervention, mean length of stay in hospital under acute care before randomisation, length of hospital stay after randomisation, length of follow-up for outcome evaluation, whether or not patients in the intervention program attended an outpatient follow-up therapy programme after their stay in hospital. Based on the search results, the studies were classified as orthopaedic geriatric rehabilitation after hip fracture or general geriatric rehabilitation. Data were double extracted. Odds ratios and relative risks with 95% Confidence Intervals (CI) were calculated. Computer software program was used to conduct random effects meta-analyses. Heterogeneity between trials was calculated statistically.

Results: 17 trials with 4780 people comparing the effects of general or orthopaedic geriatric rehabilitation programmes with usual care were included. An overall benefit of outcomes at discharge was indicated by meta-analyses of the effects. The weighted mean length of stay after randomisation, compared with those in control groups, was longer in patients allocated to general geriatric rehabilitation (24.5 versus 15.1 days) and shorter in patients allocated to orthopaedic rehabilitation (24.6 versus 28.9 days).

Effects of inpatient rehabilitation specifically designed for geriatric patients		
Outcomes	At hospital discharge	Effects at 3-12 month follow-up
Functional improvement (Barthel or Katz index)	1.75 (1.31 to 2.35) Odds ratio (95% CI)	1.36 (1.07 to 1.71) Odds ratio (95% CI)
Admission to nursing homes	0.64 (0.51 to 0.81) Relative risk (95% CI)	0.84 (0.72 to 0.99) Relative risk (95% CI)
Mortality	0.72 (0.55 to 0.95) Relative risk (95% CI)	0.87(0.77 to 0.97) Relative risk (95% CI)
<p>Original Authors' Conclusions: Inpatient rehabilitation specifically designed for geriatric patients has the potential to improve outcomes related to admission to nursing homes, function, and, mortality. However, insufficient data is available for defining characteristics and cost effectiveness of successful programmes.</p>		
<p>Critical Appraisal:</p> <p>Validity: Highest level of rigor. Randomised controlled trials PEDro scores: Naglie (7/10), Shyu (7/10), Stenvall (7/10). The criteria for selecting the studies were well described and only peer reviewed RCT's were included in the review. The outcome measures chosen were reliable and well validated with appropriate references.</p> <p>Interpretation of Results:</p>		

Transferability is limited as this is a preliminary investigation and more studies will be required to validate this review.

Limited number of studies comparing orthopaedic geriatric rehabilitation after hip fractures.

Less pronounced long-term effects for all outcomes as compared to short-term effects.

All of the articles, except one, (Naglie) found statistical benefit to advocate multidisciplinary inpatient rehabilitation versus usual care in elderly patients with hip fracture.

Summary/Conclusion:

There is evidence that inpatient rehabilitation for geriatric patients with hip fractures is more effective than usual care on functional outcomes at discharge. There is limited information on the long term effects and the cost effectiveness of this intervention.

IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

- An ageing population is causing increased demands on health care dollars. Future studies should analyse the cost effectiveness of inpatient rehab with respect to both short and long term outcomes.
- Geriatric rehabilitation is an emerging trend and has the potential to make changes in clinical practice in all areas of rehabilitation (stroke, cardiac, orthopaedic, etc).
- Geriatric rehabilitation will play an important role to help elderly patients maintain their quality of life, limit functional decline and nursing home admissions.
- More studies are required to understand the duration and frequency of multidisciplinary interventions in inpatient rehabilitation.

- There are different sub-groups of geriatric patients (e.g mild to moderate dementia), who may benefit from geriatric inpatient rehab.
- Additional studies need to be done regarding outpatient follow-up and therapy post discharge from inpatient rehab and their effect on outcomes in the long-term.

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