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Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people (Review)

Crotty M, Unroe K, Cameron ID, Miller M, Ramirez G, Couzner L

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[Intervention Review]

Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

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ABSTRACT

Background

Social and psychological factors such as fear of falling, self-efficacy and coping strategies are thought to be important in the recovery from hip fracture in older people.

Objectives

To evaluate the effects of interventions aimed at improving physical and psychosocial functioning after hip fracture.

Search methods

We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register (September 2009), the Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2008, Issue 4), MEDLINE and EMBASE (to December 2008), other databases and reference lists of related articles.

Selection criteria

Randomised and quasi-randomised trials of rehabilitation interventions applied in inpatient or ambulatory settings to improve physical or psychosocial functioning in older adults with hip fracture. Primary outcomes were physical and psychosocial function and 'poor outcome' (composite of mortality, failure to return to independent living and/or readmission).

Data collection and analysis

Two authors independently selected trials based on pre-defined inclusion criteria, extracted data and assessed risk of bias. Disagreements were moderated by a third author.

Main results

Nine small heterogeneous trials (involving 1400 participants) were included. The trials had differing interventions, including 'usual care' comparators, providers, settings and outcome assessment. Although most trials appeared well conducted, poor reporting hindered assessment of their risk of bias.

Three trials testing interventions (reorientation measures, intensive occupational therapy, cognitive behavioural therapy) delivered in inpatient settings found no significant differences in outcomes. Two trials tested specialist-nurse led care, which was predominantly post-discharge but included discharge planning in one trial: this trial found some benefits at three months but the other trial found no differences at 12 months. Coaching (educational and motivational interventions) was examined in two very different trials: one trial found no effect on function at six months; and the other showed coaching improved self-efficacy expectations at six months, although not when combined with exercise. Two trials testing interventions (home rehabilitation; group learning program) started several weeks after hip fracture found no significant differences in outcomes at 12 months.

Authors' conclusions

Some outcomes may be amenable to psychosocial treatments; however, there is insufficient evidence to recommend practice changes. Further research on interventions described in this review is required, including attention to timing, duration, setting and administering discipline(s), as well as treatment across care settings. To facilitate future evaluations, a core outcome set, including patient-reported outcomes such as quality of life and compliance, should be established for hip fracture trials.

PLAIN LANGUAGE SUMMARY

Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Following hip fracture and subsequent surgery, many older people suffer a decline in mobility, independence and quality of life. Social and psychological factors such as fear of falling, self-efficacy, perceived control and coping strategies are now thought to be important in the recovery from hip fracture. There is, however, limited information on how treatments impact on these factors. Furthermore, there is little information on who can best provide these interventions.

The authors of this review looked for evidence on the effectiveness of treatments which specifically focused on improving independence with daily activities (such as dressing, home chores, going shopping and interacting in the community) or had a focus on psychological and social issues in older people recovering from hip fracture. We were able to identify nine studies involving 1400 people who had sustained a hip fracture. Findings from three trials testing approaches taken while the patients were still in hospital using strategies such as reorientation, cognitive behavioural therapy and intensive occupational therapy did not show changed outcomes. Two trials tested specialist gerontological nurse-led care, which was delivered largely in the community. One of these, which included discharge planning, found some evidence of a reduction of poor outcome (defined as death, readmission or failure to return home) at three months from specialist-nurse led care, but the other trial found no differences in functional outcomes at 12 months compared with usual care. Trials testing other post-hospital interventions including group education programs after discharge and home rehabilitation (provided by a study physiotherapist and nursing staff) provided no evidence that these improved outcomes. This suggests that the transition between acute, rehabilitation and community care requires further attention. In all, the studies were too small and their quality too varied to recommend changes in practice.

BACKGROUND

Description of the condition

Hip fractures, most of which are treated with surgical repair, are amongst the most devastating consequences of osteoporosis and injurious falls. Australian figures show the mean length of stay in an acute setting following a hip fracture to be 11.2 days ([Krejsfeld 2006](#)). However this is often followed by admission to a reha-

bilitation facility, in which the mean length of stay is 23 days in Australia (Poulos 2008). Although the mortality rate appears to be decreasing, 25% to 35% of patients die in the first year post-fracture (Braithwaite 2003; Dzupa 2002), and only 40% return to pre-fracture level of mobility (Koval 1994). Liebson 2002 reported that by one year, 20% of patients living in the community before their hip fracture had moved to a nursing home, and another 15% had died. Type of fracture and surgical repair do not appear to influence in-hospital mortality or functional recovery at one year, rather outcomes seem dependent on a broad array of physical, psychological and social factors (Craik 1994).

Description of the intervention

Recovery can be difficult for frail older adults who sustain a hip fracture and they often require extensive health system resources (Ray 1997; Schneider 1990). Hip fractures have adverse effects on patients and their families and, in particular, they have a negative impact on health related quality of life measures (Adachi 2001). Effective rehabilitation strategies for hip fractures are still evolving, but evidence suggests that early multidisciplinary care improves clinical outcomes and reduces costs. A non-Cochrane systematic review of randomised controlled trials (RCTs) comparing multidisciplinary rehabilitation with usual orthopaedic care following hip fracture found that rehabilitation was associated with a modest but important reduction in poor outcome (Halbert 2007). Guidelines for the management of hip fracture from several countries promote the services of organised multidisciplinary health care teams (ASGM 2004; BOA 2007), prompt surgery, early mobilisation and a team-based rehabilitation approach to restoring function. However, while it is recognised that the process is dependent on the co-ordinated skills of multiple professionals, concerns exist around the contribution of various components of this resource-intensive approach. Cochrane reviews examining mobilisation strategies (Handoll 2007) and nutritional supplementation (Avenell 2006) are available, but it remains unclear what contribution is made by interventions specifically focused on improving independence with daily activities such as dressing, going shopping and interacting in the community. Social and psychological factors such as fear of falling, self-efficacy, perceived control and coping strategies are now thought to be important in the recovery from hip fracture but there is still limited information on how treatments impact on these factors (Mossey 1989; Oude Voshaar 2006; Proctor 2008). Furthermore, there is little information on who can best provide these interventions.

Why it is important to do this review

Rehabilitation can be defined as services provided by a multidisciplinary team with the goal of reducing disability by improving task-oriented behaviour (Cameron 2008). The benefits of in-

patient multi-disciplinary rehabilitation for older people after a hip fracture have been explored in a previous Cochrane review (Cameron 2001) and an update of this review, which has been extended to also include post-hospital-discharge rehabilitation, is now available (Handoll 2009). However, Handoll 2009 provides very limited information to guide policy and practice regarding the effects of single interventions. Our review, which complements the above review, evaluated any single rehabilitative therapy (e.g. occupational therapy) across any setting (e.g. inpatient, ambulatory or across care settings) which was specifically aimed at improving physical and psychosocial functioning after hip fracture. It specifically did not include mobilisation strategies (Handoll 2007).

Furthermore, previous research tends to focus on physical function as an outcome rather than psychosocial functioning. 'Positive affect' (e.g. having an optimistic outlook) is a significant independent predictor of recovery in activities of daily living in various clinical groups including hip fracture (Mossey 1989), and has been associated with significantly lowering the risk of frailty (Ostir 2004). Mastery or internal control has been demonstrated to be associated with better coping, adjustment and general mental health after hip fracture (Reich 1991). However, it is unclear whether therapy directed at these areas can achieve improvements in function and quality of life.

This review examined evaluations of single therapy programmes not covered elsewhere, that are specifically designed to improve physical and psychosocial functioning of older persons following a hip fracture. This approach is modelled on the work in the area of stroke where, following a stroke, a broad range of programmes addressing physical and psychosocial functioning, such as occupational therapy and nursing, have been identified as helpful (Stroke Unit Trialists' Collaboration 2007).

OBJECTIVES

To evaluate the short (four months or less) and longer term effects of interventions, including programmes, specifically aimed at improving and restoring physical and psychosocial functioning after a hip fracture in older people.

The primary comparison was between any relevant intervention versus no or placebo (sham) intervention, or conventional or usual care.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised or quasi-randomised (e.g. allocation by date of birth) studies that evaluated interventions designed to improve physical or psychosocial functioning compared with usual or conventional care as described by the trialists. Cluster randomised trials, where people were allocated to the different interventions in clusters (e.g. by hospital ward), were eligible but none was found.

Types of participants

The main study population was older people with any type of fracture of the proximal femur. Most participants were aged 65 years or over and had undergone surgery for their hip fracture. Trials that included younger participants were included if the mean age minus one standard deviation was greater than 65 years. Participants younger than 65 years were included as long as the number of these was relatively small and there was adequate randomisation of younger patients to intervention and control groups. Studies which focused on younger people with hip fracture were excluded, as were trials involving people with multiple trauma.

Types of interventions

We included studies evaluating interventions or programmes designed to improve and restore physical and psychosocial functioning after hip fracture surgery in older people. While the psychosocial component of the intervention varied from one study to the next, the interventions can simply be described as any one of occupational therapy, cognitive therapy or discharge planning. These interventions could be commenced at any stage after the injury (during acute or rehabilitation admission, post-discharge or across settings). To be included, the studies focusing on physical functioning needed to report on interventions such as patient assessment, home assessment and assisting/training patients to perform key functional activities (e.g. washing, dressing). Also included were studies that evaluated practical measures such as provision of assistive devices/equipment and training to use these. The included studies on psychosocial functioning examined interventions such as behavioural modification (e.g. to enhance motivation, increase confidence, counter fear of falling, and help orientation) or interventions relating to social support and inclusion (e.g. involvement, social care provision, arranging and enhancing support networks, training and support of carers, and encouraging social participation). Although many of these activities could be performed or initiated by an occupational therapist, it was the interventions rather than care providers that were the primary focus of this review. Nonetheless, trials testing the provision, extent of provision or timing of occupational therapy were eligible. We included trials evaluating referral for treatment such as part of functional and psychosocial assessment, for clinical conditions such as depression but not those testing the actual treatment of clinical conditions such as depression.

Only trials comparing the rehabilitation intervention with either no or placebo intervention, or with usual or conventional care

were included. Comparisons of different interventions would have been included but not those comparing unusual or unconventional treatments only.

Studies that reported on interventions that were pre-surgical or surgical only were excluded. We have not included trials specifically testing mobilisation strategies as these were already reviewed in [Handoll 2007](#). Where there was concern we approached the authors of other Cochrane reviews (e.g. those for multidisciplinary rehabilitation, nutritional supplementation or mobilisation strategies using physiotherapy) to discuss the inclusion of any potentially eligible studies that appeared to overlap with the scope of their reviews.

Types of outcome measures

Primary outcomes

The primary outcomes included independence in physical function (self care activities of living and home chores) and quality of life (overall and independent domains) for psychosocial function. Preference was given to validated, patient-reported outcome measures. Added at the review stage was 'poor outcome', which was defined as death, readmission to hospital (if data were available) or failure to return to independent living.

Secondary outcomes

Other measures of interest were mobility, falls and fear of falling, strength and balance for physical function, pain and self-efficacy, self-rated health and well being, anxiety and depression for psychosocial function. Adherence to education strategies were examined as well as health service outcomes such as services required, discharge destination, readmission to hospital and length of hospital stay (including acute and rehabilitation).

Search methods for identification of studies

Electronic searches

We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register (September 2009), the Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2008, Issue 4), MEDLINE (1950 to December 2008), EMBASE (1980 to December 2008), PsycINFO (1806 to June 2008), Allied and Complementary Medicine (AMED) (1985 to August 2008), Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1982 to September 2008) and the Physiotherapy Evidence Database ([PEDro](#)) (1929 to August 2008). We also searched [Current Controlled Trials](#) and the [WHO International Clinical](#)

[Trials Registry](#) for ongoing and recently completed trials. We applied no restrictions based on language or publication status. In MEDLINE, the subject-specific search was combined with the Cochrane Highly Sensitive Search Strategy for identifying randomised trials in MEDLINE: sensitivity- and precision- maximizing version (Lefebvre 2008), and was modified for use in the other databases. The search strategies that were used can be found in [Appendix 1](#).

Searching other resources

Results from a comprehensive search for trials (up to August 1998) for a non-Cochrane review on rehabilitation following fractures in older people (Cameron 2000) were screened. The results from a more recent non-Cochrane review (search for trials up to July 2005) on multidisciplinary rehabilitation (Halbert 2007) were also screened. The table of contents for Supplements of Acta Orthopaedica Scandinavica (1998 to 2004) and the Journal of Bone and Joint Surgery (British Volume) (1996 to 2008) were handsearched. The tables of contents for the proceedings of the British Orthopaedic Association Congress (1996 to 2003), SICOT (1996 to 1999) and the annual meetings of the American Orthopaedic Trauma Association (1996 to 2008) were also handsearched. Additionally, "Fracture" articles were downloaded weekly from new issues of 14 publications (Am J Orthop; Arch Orthop Trauma Surg; Clin J Sport Med; Clin Orthop; Foot Ankle Int; Injury; J Am Acad Orthop Surg; J Arthroplasty; J Bone Joint Surg Am; J Bone Joint Surg Br; J Foot Ankle Surg; J Orthop Trauma; J Trauma; Orthopedics) via [EBSCO Journal Alert](#).

Data collection and analysis

Selection of studies

Two review authors (KU and MC) independently screened papers identified from the database searches. These authors then assessed the trials based on the predefined inclusion criteria. The reasons for exclusion were documented. A third review author (MM) moderated any disagreements. Remaining issues about study inclusion were then discussed with a member of the Cochrane Bone, Joint and Muscle Trauma Group (Helen Handoll). From the full text, trials which met the selection criteria were selected for inclusion. Trials that aimed to improve physical and psychosocial function were included in either this review or in the review of multidisciplinary interventions for older people following hip fracture (Handoll 2009), but not both reviews. This was determined by discussions between the authors of the two reviews. We approached the authors of other Cochrane reviews to discuss the inclusion of any potentially eligible studies that appeared to overlap with the scope of their review.

Data extraction and management

A pre-designed data extraction form was used by two review authors to evaluate the selected studies. The data extraction form was piloted on two trials and relevant changes made in response to the findings of the pilot. The remaining studies were then evaluated. Data were collected on study design characteristics, the study population, interventions, outcome measures, and length of follow-up. Information was also gathered on the discipline administering the intervention (e.g. occupational therapy, nursing) and whether they directly delivered the intervention or had a facilitatory role only (e.g. referral to existing services). The review authors attempted to contact the authors of all included trials for unreported outcomes and additional data. The authors of two of the nine studies responded (Krichbaum 2007; Tinetti 1999).

Assessment of risk of bias in included studies

The Cochrane Collaboration's tool for assessing risk of bias was used by two review authors to assess the studies included in the review. This tool incorporates assessment of randomisation (sequence generation and allocation concealment), blinding (based on primary outcomes), completeness of outcome data (again for primary outcomes), selection of outcomes reported and other sources of bias. Other sources of bias included selection bias, where we assessed the risk of bias from imbalances in key baseline characteristics (e.g. cognitive impairment), and contamination of the control group.

Measures of treatment effect

Outcome measures were classified in terms of the domain assessed, e.g. psychosocial or physical. Clinically relevant cut-off points were identified. Results were analysed at both short term (four months or less) and longer term (one year or longer) intervals. Risk ratios with 95% confidence intervals were calculated for dichotomous outcomes. Mean differences or standardised mean differences with 95% confidence intervals were calculated for continuous outcomes as appropriate.

Unit of analysis issues

The unit of randomisation in these trials is the individual patient. We did not include any cluster randomised trials.

Dealing with missing data

Where possible we performed intention-to-treat analyses to include all people randomised. However, where drop-outs were identified, the actual denominator of participants contributing data at the relevant outcome assessment was used. We were alert to the potential mislabelling or non-identification of standard errors and standard deviations (SDs). Unless missing standard deviations

could be derived from confidence intervals or standard errors, we did not assume values in order to present these in the analyses. Where data were presented as median (inter-quartile range), we did not attempt to transform data to achieve normality or estimate mean and SD. We attempted communication with the relevant trialists to obtain means and SDs. If these were not available then no values were incorporated into the analyses.

Assessment of heterogeneity

Heterogeneity was assessed by visual inspection of the forest plot (analysis) along with consideration of the χ^2 test for heterogeneity and the I^2 statistic (Higgins 2003). Subgroup analyses were unable to be performed where heterogeneity was substantial (I^2 greater than 50%) as any statistically significant pooled analyses were performed with data contributed by two studies only. Data were therefore pooled for overall results even if heterogeneity were substantial.

Assessment of reporting biases

Our search of clinical trial registers assisted in decreasing publication bias. We also investigated selective outcome reporting by comparing the study outcomes with those routinely presented for similar studies, and also by comparing the methods section of papers with the results reported.

Data synthesis

When considered appropriate, results of comparable groups of trials were pooled. As planned, we used the fixed-effect model and 95% confidence intervals. We stipulated that we would consider using the random-effects model, especially where there is unexplained heterogeneity. Also, that outcomes identified as being measured using different instruments and/or with different scales across studies would be pooled using the standardised mean difference.

Subgroup analysis and investigation of heterogeneity

Subgroup analysis to determine the effects of intervention duration, cognitive status, pre-injury functional status, and pre-injury accommodation status on the outcomes of interest was not possible. This was due to the small number of trials, the diversity of intervention duration and the tendency of the majority of trialists to only include participants without cognitive impairment and with high levels of independence. The timing of the intervention (acute or rehabilitation admission, post-discharge, across settings) was also explored. However the interventions performed according to the selected timing were too diverse to pool.

Sensitivity analysis

Given the small number of eligible studies we did not perform sensitivity analyses to explore important sources of bias, such as whether allocation was concealed, in the included studies.

RESULTS

Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

Results of the search

From the 2719 abstracts retrieved from the search strategies described above, 143 articles for trials were obtained for further examination. We then removed articles that clearly did not meet the study eligibility criteria. These included articles reporting non-randomised trials and studies not involving hip fracture patients. Studies covering other interventions such as nutritional supplementation (Avenell 2006), and exercise regimens specifically aimed at mobilisation (Handoll 2007) were also not covered in this review. Additionally, we grouped reports belonging to the same trial. Of the 30 remaining trials, nine were included and 21 were excluded. Subsequently, from a search update of the Group's Specialised Register (18 September 2009), we received additional references for two included trials, one excluded trial and an additional trial, which was excluded.

Included studies

Trial selection and sample characteristics

The included trials were conducted in four different countries: four in the US, three in Sweden, one in the UK and one in Taiwan. All trials had been published between 1999 and 2007, and written in English. These trials involved a total of 1400 participants, all of whom were recovering from a fracture of the proximal femur after surgery. The mean age of participants was over 75 years for all trials except in Elinge 2003 where the sample was not specifically older adults (mean age: 73 years (range 54 to 90 years)). The majority of trials stipulated that participants should not have a history of cognitive impairment prior to the injury and were residing independently in the community, or with only minimal assistance. For further details, please see the [Characteristics of included studies](#) table.

Interventions

A range of interventions were evaluated in the included trials. Interventions were provided to patients solely in an inpatient setting (before discharge from hospital) in three trials (Burns 2007a; Hagsten 2004; Stromberg 1999). Interventions were started whilst the patient was in hospital, but were predominantly provided after hospital discharge in two trials (Allegrante 2007; Huang 2005). Huang 2005 intervened in the home following discharge while Allegrante 2007 delivered a facility based outpatient program of physical therapy. Interventions were started at various times after discharge from acute care in the other four trials (Elinge 2003; Krichbaum 2007; Resnick 2007; Tinetti 1999). Tinetti 1999 and Allegrante 2007 were home-based interventions while Elinge 2003 provided a combined facility based (group learning) and home-based (exercise) intervention. Krichbaum 2007 followed participants across all discharge locations including sub-acute care, long term care, rehabilitation and home.

Inpatient rehabilitation

- Reorientation measures while still in hospital, provided by nurses (Stromberg 1999).
- Intensive occupational therapy program, provided by occupational therapists (Hagsten 2004).
- Cognitive behavioural therapy, provided by an assistant psychologist (Burns 2007a).

Post-discharge/ambulatory rehabilitation

- Specialist-nurse led care conducted mostly or fully after discharge from acute care. Care started in hospital was provided by a nurse with master's level gerontological training in Huang 2005. Care started after discharge from acute care was co-ordinated by a gerontological nurse practitioner in Krichbaum 2007.
- Interventions with educational and motivational components, either separately or together with physical therapy (primarily exercises), were provided in two trials (Allegrante 2007; Resnick 2007). In Allegrante 2007, a motivational video tape, patient information booklet and visit from a former hip-fracture patient were provided prior to discharge, followed by a hospital-based, eight week outpatient program of physical therapy. The interventions in Resnick 2007 started after discharge from rehabilitation, generally around 60 days post-fracture, and lasted for up to 12 months post-fracture. Participants were randomised to one of four groups: 'exercise plus', exercise only, 'plus' only or usual care. The theoretical basis for the 'plus' intervention was social cognitive theory. The treatment was provided by an exercise trainer or coach who addressed self efficacy and outcome expectations in the 'plus' intervention.
- Home rehabilitation (physical and functional therapy), provided by a study physiotherapist and rehabilitation nursing

staff (Tinetti 1999). Participants had returned home within 100 days of their fracture.

- A group learning program aimed at improving function, provided by various disciplines including an occupational therapist, physiotherapist, physician, dietician and social worker (Elinge 2003). The program started post discharge from rehabilitation (106 to 194 days post fracture).

Outcomes

Trials used differing outcomes, measured at different time intervals over different follow-up periods.

Excluded studies

The main reason for exclusion of trials was that the interventions under examination were not specifically tailored/aimed at improving physical and psychosocial functioning after hip fracture. Several excluded trials compared multidisciplinary interventions (*see Handoll 2009*), which tested an overall policy for rehabilitation rather than the specific interventions and aims of this review, or interventions for specific conditions such as urinary retention (Skelly 1992).

For further details, please see the [Characteristics of excluded studies](#) table.

Risk of bias in included studies

The risk of bias of the nine trials was challenging to assess due to the lack of reporting according to CONSORT recommendations (Moher 2001). The authors attempted to clarify with trialists through email correspondence but only two trialists responded to requests for clarification. The trials were therefore largely recorded as 'unknown' on most criteria, although eight of the nine trials were rigorous in their attention to adequate sequence generation and seven out of nine trials were rigorous in their attention to blinding of outcome assessment. Attention to complete information for outcome data varied across the trials. While most provided clear information on the progress of participants through the trial (i.e. numbers contributing to analyses at each outcome assessment), many lacked clarification on why participants withdrew and any relevant characteristics of those lost to follow-up. Selective reporting was difficult to assess across the included studies due to the inability to contact authors. For the majority of the included studies we therefore rated this criteria as unknown. Two authors responded to requests for additional information and were rated as having reported selectively as responses indicated relevant data not presented in the publications were in fact available. The most common source of other potential bias was in the level of attrition or difference in attrition rates between groups. The low consent rate or inability to approach every eligible participant and contamination were other common potential sources of bias across

the included studies. Full details of the risk of bias for the nine trials are provided in the [Characteristics of included studies](#) table, [Figure 1](#) and [Figure 2](#).

Figure 1. Methodological quality graph: review authors' judgements about each methodological quality item presented as percentages across all included studies.

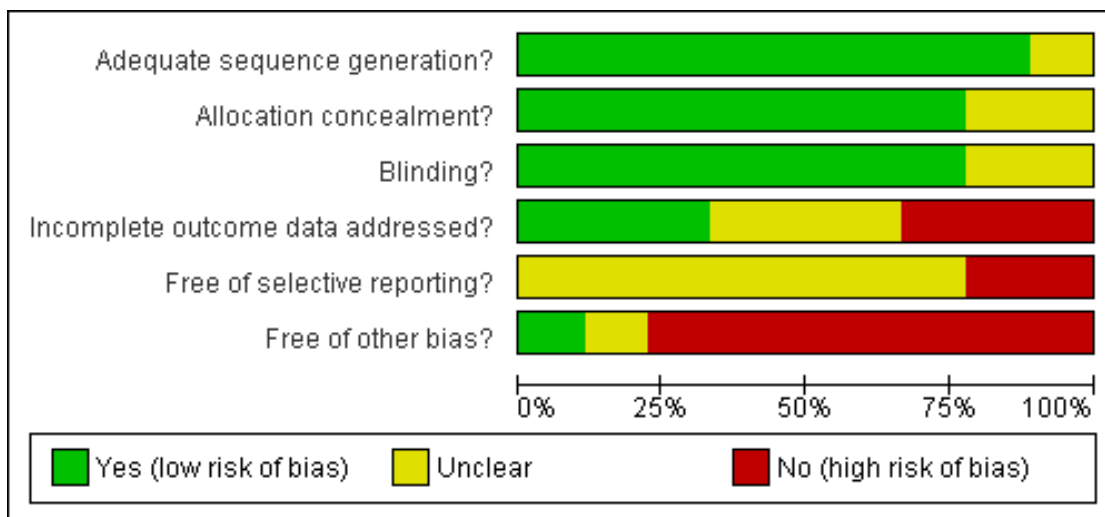


Figure 2. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.

| | Adequate sequence generation? | Allocation concealment? | Blinding? | Incomplete outcome data addressed? | Free of selective reporting? | Free of other bias? |
|-----------------|-------------------------------|-------------------------|-----------|------------------------------------|------------------------------|---------------------|
| Allegrante 2007 | + | + | + | - | ? | + |
| Burns 2007a | + | + | ? | ? | ? | - |
| Elinge 2003 | ? | ? | + | - | ? | - |
| Hagsten 2004 | + | + | + | ? | ? | - |
| Huang 2005 | + | ? | + | - | ? | - |
| Krichbaum 2007 | + | + | + | ? | - | - |
| Resnick 2007 | + | + | + | + | ? | - |
| Stromberg 1999 | + | + | ? | + | ? | - |
| Tinetti 1999 | + | + | + | + | - | ? |

Effects of interventions

Inpatient rehabilitation

Reorientation measures (provided by nurses)

Reorientation measures, including a nurse accompanying patients on home visits, were compared with a control group in 223 older people with hip fracture in [Stromberg 1999](#). Although 'poor outcome', defined here as non return to own home due to death or transfer to institutional care, was less in the intervention group at hospital discharge (RR 0.54, 95% confidence interval (CI) 0.26 to 1.13) and at long-term (one year) follow-up (RR 0.67, 95% CI 0.40 to 1.15), neither difference was statistically significant (*see Analysis 1.1*). Similarly, there were no statistically significant differences between the two groups in hospital and long-term mortality (*see Analysis 1.2*), in cognitive impairment at one week or at hospital discharge (*see Analysis 1.3*), and length of hospital stay (*see Analysis 1.4*).

Intensive occupational therapy program (provided by occupational therapists)

Intensive occupational therapy, including the occupational therapist accompanying patients on a home visit, was compared with a control group in 100 older people with hip fracture in [Hagsten 2004](#). There were no significant differences between the two groups in quality of life at two months as reported by 75 participants: the data for four domains (physical function, general health, physical health and emotional health) are presented in [Analysis 2.1](#). [Hagsten 2004](#) reported that at discharge, intervention group participants had better performance in activities of daily living (dressing, personal hygiene, bathing and toilet visits) but that all trial participants had regained these abilities at two months follow-up. Statistically significant differences at two months between the two groups were reported for self reported activities of living: moving around indoors (reported $P = 0.03$); light housework ($P = 0.05$); and getting in and out of a car ($P = 0.05$). There was no significant difference in 'poor outcome' at two months, defined here as death, remaining in hospital, readmission or referral to a nursing home (*see Analysis 2.2*).

Cognitive behavioural therapy (provided by an assistant psychologist)

Cognitive behavioural therapy was compared with a control group in 172 non-depressed people with hip fracture in [Burns 2007a](#). Without providing data, [Burns 2007a](#) reported there were no significant differences in functional measures or pain at follow-up, or

in length of hospital stay. Separate data for mortality and morbidity were not provided. For 113 participants available at 12 weeks, there were no significant differences between the two groups in attainment of independent mobility (*see Analysis 3.1*) nor in patients with depression (*see Analysis 3.2*). Nor was there a difference in depression found at six months (*see Analysis 3.2*).

Ambulatory or post-discharge rehabilitation

Specialist-nurse led care, conducted mostly or fully after discharge from acute care.

This was compared with usual care in two trials ([Huang 2005](#); [Krichbaum 2007](#)) respectively in 141 and 33 people with hip fracture. [Krichbaum 2007](#) looked specifically at an intervention using a gerontological nurse practitioner and [Huang 2005](#) similarly involved a nurse with master's level gerontological training. Discharge planning was started within 48 hours of hospital admission in [Huang 2005](#), whereas the intervention started within 48 hours after discharge from acute care in [Krichbaum 2007](#). Follow-up was only three months in [Huang 2005](#), that for [Krichbaum 2007](#) was at three, six and 12 months but exact denominators for measures of physical and social function and health were only available for 12 months. Only data for short-term (3 months) mortality and 'poor outcome' (dead or readmitted or failed to go home) could be pooled. There were no significant differences between the two groups in mortality (*see Analysis 4.1*). Notably, the four deaths (3 from heart disease and 1 from stroke) in [Huang 2005](#) all occurred in the control group. Short-term poor outcome, as defined above, was significantly reduced in the intervention group (*see Analysis 4.2*: 6/80 versus 20/79, RR 0.30, 95% CI 0.12 to 0.70) but this reflected the favourable findings in [Huang 2005](#) only for readmission (*see Analysis 4.3*: RR 0.29, 95% CI 0.10 to 0.83). [Huang 2005](#) found both statistically and clinically significantly better activities of daily living (*see Analysis 4.4*) and quality of life (total, physical function, physical health and emotional health: *see Analysis 4.5*) scores for the intervention group. In contrast, [Krichbaum 2007](#) found no statistically significant differences at 12 months for activities of daily living (*see Analysis 4.6*), quality of life (*see Analysis 4.7*), or depression (*see Analysis 4.8*). Perhaps reflecting active discharge planning in the intervention group of [Huang 2005](#), length of hospital stay was significantly shorter in the intervention group (*see Analysis 4.9*: MD -1.89 days, 95% CI -3.06 to -0.72 days). There was no statistically significant difference in the numbers of people reporting falls at three months in [Huang 2005](#): *see Analysis 4.10*).

Coaching (educational and motivational interventions) alone or with exercise

The interventions and staging of the two trials in this section are very different and hence they are presented in turn. In [Allegrente 2007](#), coaching was provided primarily while the patient was in hospital. This was followed by an eight-week outpatient physical therapy program. There was no significant difference in mortality at six months (*see Analysis 5.1*). Quality of life/functional outcome data, assessed using the SF-36, at six months were only available for 58 of 176 trial participants. There were no statistically significant differences found for any of the eight separate domains of the SF-36 (*see Analysis 5.2*).

In [Resnick 2007](#), the interventions were started after discharge from rehabilitation, generally around 60 days post-fracture. Participants (N = 208) were randomised to one of four groups: 'exercise plus', exercise only, 'plus' only or usual care. The treatment was provided by an exercise trainer or coach. Two comparisons testing coaching (the 'plus' intervention) were 'plus' alone versus usual care, and 'exercise plus' versus exercise alone. There were no statistically significant differences in mortality at six or 12 months (*see Analysis 6.1*). Coaching alone when compared with usual care gave significant improvement in self efficacy expectations at six months (*see Analysis 6.2*: mean difference (MD) 1.31; 95% CI 0.18 to 2.44), but not at 12 months (MD 0.79, 95% CI -0.54 to 2.12). There were no statistically significant differences in this outcome between coaching plus exercises versus exercises only (*see Analysis 6.2*). There were no statistically significant differences between the 'exercise plus' group versus usual care group for either mortality (*see Analysis 7.1*) or self efficacy expectations (*see Analysis 7.2*).

Home rehabilitation (provided by study physiotherapist and rehabilitation nursing staff)

Home rehabilitation (physical and functional therapy) was compared with usual home care in 304 patients who had returned home within 100 days of their fracture ([Tinetti 1999](#)). There were no statistically significant differences between the two groups in all outcomes presented in the analyses at either six or 12 months follow-up (*see Analysis 8.1*: 'poor outcome' (death or non-recovery of self-care ADL; [Analysis 8.2](#): mortality; [Analysis 8.3](#) and [Analysis 8.4](#) self-care ADL; [Analysis 8.5](#) and [Analysis 8.6](#): home management ADL; [Analysis 8.7](#): social activity; [Analysis 8.8](#): hospital readmission; [Analysis 8.9](#): mortality and readmission; [Analysis 8.10](#): depression; and [Analysis 8.11](#): falls).

Group learning program (provided by various disciplines)

A group learning program aimed at improving function, started after formal discharge from rehabilitation, was compared with no treatment in 43 former hip fracture patients in [Elinge 2003](#). However, eight control group patients were excluded from the analyses "for various reasons". Additionally, only limited outcome data

were available for this trial. [Elinge 2003](#) reported that there were no significant differences between the two groups in the ability to perform activities of daily living either directly after the 10-week intervention or 12 months later. Participant-rated ability to participate in social life was statistically significantly better in the intervention group post intervention, but not 12 months later (*see Analysis 9.1*). A sensitivity analysis where it is assumed that the eight excluded control group participants perceived no restrictions in their social life shows no statistical difference between the two groups post intervention (*see Analysis 9.1*).

DISCUSSION

In this review, we examined the impact of various interventions on the outcomes of hip fracture patients. Our goal was to examine single component interventions, in order to complement the review of multidisciplinary rehabilitation originally available as [Cameron 2001](#) (now [Handoll 2009](#)). It is difficult to separate out components in rehabilitation but our intention was to focus on interventions where one strategy dominated, rather than an interdisciplinary team approach. Further, as opposed to the [Handoll 2007](#) review of specific mobilisation strategies, we were interested in the disciplines involved in the post-operative rehabilitation but our focus was on the interventions and we grouped them accordingly. We focused on both physical function as well as psychosocial outcomes, including quality of life. After a comprehensive literature search, we were only able to find nine randomised controlled trials that met our selection criteria. These trials involved 1400 participants.

Unfortunately, there was a scarcity of trials that met our inclusion criteria. Several trials measured the effect of interventions on physical functional improvement; however, they did so at varying time intervals. In terms of psychosocial domains, outcomes were reported by [Huang 2005](#) and [Hagsten 2004](#) respectively using the SF-36 and Swed-QoL, which are validated instruments often used to assess patient perceptions of quality of life. When possible, we looked at adverse outcomes, including mortality, institutionalisation, and incomplete independence.

Few rehabilitation trials are designed to focus on psychosocial functioning, perhaps because achieving physical functioning benchmarks (such as walking independently) has traditionally been considered to be the goal of rehabilitation following orthopaedic surgery. In these trials there were few self reported measures. In particular, quality of life was not consistently measured in all trials and carer measures were reported in none. The interventions that dealt with these issues differed in conception and in delivery approach. In [Elinge 2003](#), there was a single intervention studied, a group learning programme delivered by multiple disciplines including an

occupational therapist, physiotherapist, physician, dietician and social worker. [Huang 2005](#), [Krichbaum 2007](#), [Stromberg 1999](#) and [Tinetti 1999](#) all investigated primarily nursing interventions but the strategies differed. In [Stromberg 1999](#), the nurses worked on a specialised orthopaedic hip fracture unit. [Krichbaum 2007](#) looked specifically at an intervention using a gerontological nurse practitioner and [Huang 2005](#) similarly involved a nurse with master's level gerontological training. [Tinetti 1999](#) differed from the others as it delivered a typical multidisciplinary rehabilitation program to older people with hip fractures; this provided physical therapy in conjunction with a rehabilitation nursing intervention. The nurses in [Tinetti 1999](#) co-ordinated with occupational therapists to deliver care to the patients. [Hagsten 2004](#) investigated an intensive occupational therapy program, [Burns 2007a](#) evaluated cognitive behavioural therapy; and [Resnick 2007](#) and [Allegrante 2007](#) tested coaching.

Finally the trials were comparatively recent (published between 1999 and 2007) suggesting that interest in interventions that could be considered to be addressing psychosocial outcomes is recent. Given the diversity of the studies, there were very limited opportunities for meta-analysis.

Summary of main results

Inpatient rehabilitation

There was no evidence that any of the three interventions provided during inpatient stay had any significant advantage over usual care.

- Reorientation measures while still in hospital, provided by nurses ([Stromberg 1999](#)).
- Intensive occupational therapy program, provided by occupational therapists ([Hagsten 2004](#)).
- Cognitive behavioural therapy, provided by an assistant psychologist ([Burns 2007a](#)).

Ambulatory or post-discharge rehabilitation

- Specialist-nurse led care started in hospital ([Huang 2005](#)), or started after discharge from acute care ([Krichbaum 2007](#)), was associated with reductions in short-term "poor outcomes" (RR 0.30, 95% CI 0.12 to 0.70) which was a composite of three outcomes: death, readmission to hospital and failure to return to independent living. The result reflects the favourable findings in [Huang 2005](#). This study was performed in Taiwan and hence some cultural issues affecting the care of older patients with hip fracture may make the effects of the intervention less generalisable.

- Interventions with educational and motivational components, either separately or together with physical therapy (primarily exercises), were provided in two trials ([Allegrante](#)

[2007](#); [Resnick 2007](#)). [Allegrante 2007](#), which was conducted primarily in hospital, found coaching had no effect on function or mortality at six months. [Resnick 2007](#), which started after discharge from rehabilitation, found coaching alone improved self-efficacy expectations at six months but not when combined with exercise.

There was no evidence that the two remaining approaches were associated with any significant advantage over usual care:

- Home rehabilitation (physical and functional therapy), provided by study physiotherapist and rehabilitation nursing staff ([Tinetti 1999](#))
- A group learning program aimed at improving function, provided by various disciplines including an occupational therapist, physiotherapist, physician, dietician and social worker ([Elinge 2003](#)). The program started post discharge from rehabilitation (106 to 194 days post fracture).

Overall completeness and applicability of evidence

Several features need consideration before drawing conclusions or generalising from these studies. The populations of the studies differed. For example, [Huang 2005](#), which was conducted in Taiwan, describes the custom of "rotation care" where an older adult is moved every few months to a different child's home and more than half of the group changed caregivers over the period of the study. This is described as a challenge for the study but it raises the issue of whether outcomes achieved in this study are generalisable to older adults in other societies. It is possible that this custom may be associated with differing risks of adverse effects as older people move from house to house.

The settings of these studies were heterogeneous and the timing of the interventions following fracture differed. Some interventions were offered only in an inpatient setting ([Burns 2007a](#); [Hagsten 2004](#); [Stromberg 1999](#)) while others were offered as outreach interventions extending across care settings by commencing while the older adult was an inpatient and continuing following discharge ([Allegrante 2007](#); [Huang 2005](#)). Other interventions were offered in an outpatient setting ([Elinge 2003](#); [Krichbaum 2007](#); [Resnick 2007](#); [Tinetti 1999](#)). It is also important to consider whether the results from single investigator / care-provider trials would apply more generally. Multicentre trials are valuable in this regard. Except [Krichbaum 2007](#), all studies specifically excluded patients with cognitive impairment. No studies reported carer outcomes, such as measures of carer burden, quality of life, or impact on carer health status.

Quality of the evidence

The review suggests that some outcomes, both physical and psychosocial, following hip fracture may be amenable to treatments

which focus on psychological and social issues. However, at this stage the trials are too few and small to inspire recommendations for broad practice change. For the most part, the trials are inconsistent in approach to the intervention and measurement of outcome, and hence meaningful pooling of data is challenging. It was difficult to determine the range of attrition rates for the reviewed studies, as one (Hagsten 2004) reported differing numbers of drop-outs. However the attrition rates for the remaining studies ranged between 4% (Stromberg 1999) and 66% (Allegante 2007). Huang 2005 used a financial payment to reduce attrition. A core set of outcomes for hip fracture trials including patient reported outcomes such as quality of life and measures of carer burden would improve the quality of trials.

Potential biases in the review process

It is possible that our review was unable to identify some important trials in this area. While the search strategy was comprehensive, it is possible that small single-investigator trials may not have been published in full and hence were not identified for inclusion in this review.

While we consider that we have included and excluded trials appropriately for this review, it was difficult to distinguish between trials evaluating psychosocial interventions or simply reporting psychosocial outcomes from other forms of rehabilitation. It was primarily this distinction that informed whether the trial belonged in this review or an alternative (e.g. Cameron 2008; Handoll 2007). It is possible that other rehabilitation interventions had small psychosocial components which contributed to intervention effects in trials excluded from this review. However, it was deemed inappropriate to include every rehabilitation intervention ever evaluated.

We approached the authors of all papers included in this review but only two authors responded with data (Krichbaum 2007; Tinetti 1999). Both authors were able to provide us with additional information. The other studies may have collected psychological and social outcomes, but these were not adequately reported in their papers.

Agreements and disagreements with other studies or reviews

To our knowledge no previous work has reviewed specific interventions aimed at improving psychological and social outcomes in hip fracture patients. There are reviews of rehabilitation in other contexts available (Avenell 2006; Halbert 2007; Handoll 2007; Handoll 2009). However, these reviews do not specifically explore psychosocial interventions and outcomes. The findings of this review complements those from existing rehabilitation reviews.

AUTHORS' CONCLUSIONS

Implications for practice

The review suggests that some outcomes, both physical and psychosocial, following hip fracture may be amenable to treatments which focus on psychological and social issues. However, at this stage the studies are too few and small to inspire full confidence in their results. The review provided some support (one study only) for clinical services to include a gerontological nurse and suggested that where they were involved there was a reduction in some adverse outcomes. While the authors are supportive of such rehabilitation services, it is important that these services continue to be rigorously evaluated whilst being implemented, and the findings of such investigations published. Rehabilitation interventions (e.g. occupational therapy) have been demonstrated to be important in improving other outcomes not investigated in this review and hence the findings of this review should not be used to support removal of such rehabilitation services for older adults following hip fracture.

Implications for research

This review included a small number of trials that varied in types of intervention, quality and outcomes assessed. While encouraging, the findings highlight the absence of evidence and suggest that larger studies with representative populations, clearly defined interventions (including time of commencement), over sufficient duration (perhaps across settings) and with attention to reporting on compliance are needed. A core set of outcomes should be established for hip fracture trials including patient reported outcomes such as quality of life, and trialists are encouraged to report their findings according to CONSORT recommendations as applied to nonpharmacological treatments (Boutron 2008) to allow for more robust analysis in future meta-analysis on this topic.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Allegrante 2007

| | | |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Methods | RCT with assessment at 4 or 5 days post-surgery, 3 months and 6 months | |
| Participants | Participants were patients aged 65+ who had received surgical repair for primary unilateral fracture of the hip that was non-pathologic in nature. Patients were excluded if they were unable to provide informed consent, were unable to give coherent responses to the Folstein Mini-Mental State Exam, were non-English speaking, did not have access to a telephone or did not reside in the catchment area. Patients were also excluded if exercise was contraindicated. (N = 176). Age: mean 79 years; gender: of 114 participants 80% females. | |
| Interventions | USA; July 1993 to June 2000 Intervention: Prior to discharge, participants received an in-hospital postoperative motivational videotape and patient information booklet on falls-prevention self-efficacy. An in-hospital support visit was also received by a recovered hip fracture patient who had been briefly trained in peer counselling and was of a similar age to the participant in order to provide social support and an example of successful recovery. Participants also received an 8-week out-patient tailored physical therapy program consisting of balance retraining, gait, exercise and progressive muscle-strength training. The interventions were provided in addition to usual care (N = 90) Control: Participants received the usual post-operative care provided to all patients seen at the fracture service of the participating hospitals. This included weight bearing on the leg of the fractured hip and routine range-of-motion and low-intensity strengthening exercises (N = 86) Following discharge, all participants regardless of allocation received weekly social support telephone calls for 4 to 5 weeks post-surgery | |
| Outcomes | SF-36: 36 item questionnaire measuring health status. Scored from 0 (poorest health) to 100 (best health) for each of the following 8 domains: Physical function; general health; bodily health; vitality; role-emotional; role-physical; social functioning; mental health. Mortality. Physical therapy functional milestones. Compliance with intervention Various measures of mobility (timed up and go; functional reach; 6 minute walk) were reported but for 1 or 2 centres only. Costs | |
| Notes | No results reported for 3 month assessment (6 month was primary outcome) The only baseline assessment that was reported was SF-36. Also the only baseline measure that was repeated at 3 and/or 6 month follow-up | |
| Risk of bias | | |
| Item | Authors' judgement | Description |

Allegrante 2007 (Continued)

| | | |
|----------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adequate sequence generation? | Yes | Randomisation schedules developed from tables of random numbers and were balanced at intervals with the exact balancing interval blinded to all study investigators except the study statistician |
| Allocation concealment? | Yes | As above. |
| Blinding? All outcomes | Yes | All study investigators were blinded to allocation. |
| Incomplete outcome data addressed? All outcomes | No | Flow of patients through the trial is reported. Participants that were lost to follow-up accounted for. Only 59 (34%) participants completed the 6 month assessment (32 intervention and 27 control) |
| Free of selective reporting? | Unclear | Selective reporting possible as depression (CES-D) and stress (Holes & Rahe) collected at baseline but outcomes not described |
| Free of other bias? | Yes | Appears to be. |

Burns 2007a

| | |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Methods | RCT with assessment within 2 weeks of surgery and at 6 weeks, 3 months and 6 months |
| Participants | UK; March 2002 to October 2003 Hip fracture patients aged 60+ years, residing within the catchment area, with a Geriatric Depression Scale score of ≤ 6 . Participants were required to have sufficient functional English and could not be cognitively impaired nor have significant hearing loss as this would make it difficult to conduct the interviews. Patients also needed to be medically stable (N = 172). Age: mean 80 years; gender: 78% females |
| Interventions | These participants were then randomised to either the intervention or control group Intervention: Maximum of 7 cognitive behavioural therapy sessions with an assistant psychologist. The aim of the sessions was to improve the ability of patients to adapt to the physical and psychological challenges often experienced during rehabilitation. Participants received instruction on challenging negative thoughts and ideas and the utilisation of positive coping strategies. Supervision was provided by a clinical psychologist to ensure treatment fidelity (N = 85) Control: Participants received treatment as usual (N = 85). |
| Outcomes | Anxiety and depression: Hospital Anxiety and Depression scale. This tool does not include symptoms that may have a physical cause, to avoid bias related to coexisting medical conditions. Scores range from 0 to 7 (no mood disorder), 8 to 10 (possible mood |

| | <p>disorder) to 11 to 21 (probable mood disorder). The 15 item Geriatric Depression Scale was also used to measure depression. A score of 5 to 9 indicates possible depression and a score of 10 or above indicates depression</p> <p>Fear of falling: Modified Falls Efficacy Scale, a 14 activity questionnaire suited for community-dwelling older adults (a higher score indicates a higher level of confidence in performing the specified tasks)</p> <p>Pain: Sensory and affective dimensions of pain, along with the location and intensity were measured using the McGill Pain Questionnaire (score ranges from 0 to 78, with a higher score indicating a higher level of pain). The Wong-Baker Pain Rating Scale was also used, in which participants select the face that corresponds with their level of pain. The choices range from “no hurt” to “hurts worst”</p> <p>Mobility: Measured using the timed up-and-go test (length of time taken to rise from a chair, walk 3 meters, return to the chair and sit back down: poor mobility = 20+ seconds) ; gait test (time and number of steps in the faster of 2 trials of walking 4 meters); also mobility categories ranging from totally immobile to able to walk without aids)</p> <p>Cognition: Measured using the Mini-Mental State Examination. A score of < 24 is indicative of cognitive impairment</p> <p>Functional status: A rating of physical illness was performed, categorized into those fit and well and living independently, those in residential care or receiving the equivalent degree of support at home, and those in between</p> <p>Hospital and community service use: Collected using a retrospective diary system</p> <p>Social networks: Collected using a retrospective diary system</p> | |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Notes | <p>Contacted authors for additional information but with no success</p> <p>121 patients meeting the inclusion criteria but with a Geriatric Depression Scale score of 7 or more were included in a treatment trial (<i>see Burns 2007b</i>). No extra data were available from two additional publications which included trial participants but also other patients (Oude Voshaar 2006; Oude Voshaar 2007).</p> | |
| Risk of bias | | |
| Item | Authors' judgement | Description |
| Adequate sequence generation? | Yes | A telephone randomization scheme organised by the medical statistics department independently from the researchers was used to allocate participants. Computer-generated randomisation stratified by hospital using a block size of 4 |
| Allocation concealment? | Yes | After recruitment, research assistants telephoned the statistician who contacted the assistant psychologist if the patient was allocated to receive the intervention |
| Blinding? All outcomes | Unclear | Not specified whether the outcome assessor was blind to participant allocation |

Burns 2007a (Continued)

| | | |
|----------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Incomplete outcome data addressed? All outcomes | Unclear | Participant flow is presented and all participants that failed to complete the study are accounted for although there is some incomplete information on drop-outs |
| Free of selective reporting? | Unclear | Few outcomes presented and authors contacted to determine if additional outcomes measured but no response |
| Free of other bias? | No | Baseline anti-depressant use differed between treatment and usual care: 18% versus 11%. Greater attrition in the treatment group |

Elinge 2003

| | | |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Methods | RCT with outcome assessment performed post-intervention (10 weeks) and 12 months post-intervention | |
| Participants | Sweden; October 1996 to February 1998 Hip fracture patients with no history of dementia and with independent mobility prior to injury (N = 43). Of 35 participants: Age: mean = 73 years; gender: 77% females | |
| Interventions | Intervention: Group learning program commenced between 106-194 days post hip fracture, administered weekly (2 hours) for 10 weeks (N = 21) Comparison: No intervention post rehabilitation (N = 22). | |
| Outcomes | ADL: Self report - Barthel (10 items, maximum score = 20: independent). Also asked about perceived difficulty (yes: difficulty; no difficulty) in performing each task on the Barthel Ability to participate in social life: Modified Branholms Interest Checklist (maximum score = 30). Asked if ability to participate in activities with family and friends had changed as a result of the hip fracture and number of activities that were not being performed with interest compared with before the hip fracture | |
| Notes | Email correspondence attempted but no response from trialists. All continuous data presented as medians and interquartile ranges. Means and SDs requested from trialists | |

Risk of bias

| Item | Authors' judgement | Description |
|-------------------------------|--------------------|--------------------------------------------------------|
| Adequate sequence generation? | Unclear | No description provided regarding sequence generation. |

Elinge 2003 (Continued)

| | | |
|----------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Allocation concealment? | Unclear | Describes the randomisation procedure as: participants were randomised by lot, either to the intervention group (N = 21) or the control group (N = 22) |
| Blinding? All outcomes | Yes | Single blind: the occupational therapist performing the outcome assessments did not participate in the group learning programme and the answers given on previous occasions were not discussed |
| Incomplete outcome data addressed? All outcomes | No | Missing data at 12 months not discussed. Baseline data not provided for 8 participants from the control group who “discontinued participation for various reasons” |
| Free of selective reporting? | Unclear | Attempted contact with authors however no response was provided |
| Free of other bias? | No | Imbalance in attrition in the two groups. |

Hagsten 2004

| | |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Methods | RCT with outcome assessment at 3 to 4 days post-surgery (pre-morbid assessment), on discharge and at 2 months |
| Participants | Sweden; 1996 to 1998 Hip fracture patients (65+ years) living independently prior to injury, with no cognitive impairment and no use of walking or technical aids (N=100: see notes). Age: mean 80 years; gender: 80% females |
| Interventions | Intervention: Early, individualised post-operative occupational therapy program, administered daily 5 times per week, 45-60 minutes duration, and home visit (N = 50) Comparison: Conventional care from nursing staff, no home visits (N = 50) All patients received instruction from a physiotherapist on use of mobility aids |
| Outcomes | Primary: ADL (measured according to the Klein-Bell ADL scale: 75 items scored from 0-3 and summed with a higher score indicating greater independence) and IADL (measured according to the Disability Rating Index: 14 items incorporating ADL and indoor and outdoor IADL and scored on a VAS of 1 indicating no difficulty to 100 indicating impossible) Secondary: Need for aids and home modification (? measured), fear of pain and pain when performing ADL and IADL (both measured alongside the items measured on the Disability Rating Index) and HRQoL (as measured by the Swedish Health Related Quality of Life Questionnaire: 68 items with 13 sub-scales and higher scores indicating greater quality of life) |

| | | |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Notes | Email correspondence attempted but no response from trialists Ten patients randomised into the trial (4 versus 6), of whom 6 changed their minds (3 versus 3) and 4 (1 versus 3) underwent total hip replacement, were excluded before the first assessment and another 10 patients were randomised to take their place. Thus, strictly speaking 110 patients were randomised into the trial | |
| Risk of bias | | |
| Item | Authors' judgement | Description |
| Adequate sequence generation? | Yes | 50 + 50 opaque envelopes with cards stating OT or C, were sealed, numbered from 1 to 100 and mixed by an external person. Ten patients were excluded before the first OT assessment and hence 10 corresponding assignment cards were put in new envelopes, sealed and inserted in a blind manner among the remaining ones |
| Allocation concealment? | Yes | The numbered, sealed, opaque envelopes were drawn consecutively |
| Blinding? All outcomes | Yes | Participant and nursing staff not blind but it appears that the outcome assessor was blinded |
| Incomplete outcome data addressed? All outcomes | Unclear | The original publication (2004) disclosed how participants progressed throughout the trial and how many participants were included in each of the analyses undertaken. The same was true for the follow-up report, however the numbers did not correspond with the original publication. Data for QoL domains available for 38 versus 37 participants |
| Free of selective reporting? | Unclear | Attempted contact with authors however no response was provided. Unable to locate primary author |
| Free of other bias? | No | Only 5/105 declined to participate in the trial and recruitment appeared consecutive hence reducing selection bias and increasing external validity Attrition: the control group lost a greater number of participants throughout the course of the study compared with the intervention group |

Huang 2005

| | |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Methods | RCT with outcome assessment on discharge, 2 weeks after discharge and at 3 months |
| Participants | Taiwan; January to December 2002. Medically stable hip fracture patients (65+ years) living independently prior to injury, with no cognitive impairment (N = 141). Age (of 126): mean 77 years; gender: 53% females |
| Interventions | Intervention: Masters prepared gerontological nurse met with patients within 48 hours of hospital admission and at least every 48 hours during the admission. A home visit occurred within 3 to 7 days of discharge and initiated a telephone call weekly thereafter for a total intervention duration of 3 months. Participants were able to contact the gerontological nurse 7 days per week between the hours of 8am and 8pm. The nurse was responsible for designing an individualised discharge plan. As part of the plan the nurse provided direct care, education and confirmation of learning as well as advice on appropriate assistive devices. Two brochures were provided, one detailing self care following hip fracture and the second detailing falls prevention strategies (N = 70) Comparison: Conventional care from generalist nursing staff, no home visit, telephone contact, brochures or discharge summaries (N = 71) |
| Outcomes | Health related quality of life (measured according to the SF-36 - 36 items with 8 subscales each scoring from 0 to 100 and higher scores indicating greater quality of life). ADL (measured according to the Barthel Index: 10 items summed with a higher score indicating greater independence) Length of hospital stay (in days), rate of readmission to hospital, rate of repeat falls (subjects kept a diary), and mortality |
| Notes | Data for falls, readmission and survival were available also as mean (SD) time to event in this paper Authors collected data from caregivers. However, because the caregivers altered during recovery as participants moved from family member to family member data on caregivers were deemed unreliable and therefore not presented Email correspondence attempted but no response from trialists |

Risk of bias

| Item | Authors' judgement | Description |
|-------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Adequate sequence generation? | Yes | According to a computer generated table, the researcher then randomly assigned patients to either the control group or the intervention group |
| Allocation concealment? | Unclear | As above but no description of how the researcher obtained the allocation |
| Blinding? All outcomes | Yes | Single blind: A research assistant blinded to assignment of subjects to study groups completed the baseline and outcome assessments |

Huang 2005 (Continued)

| | | |
|----------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Incomplete outcome data addressed? All outcomes | No | The authors disclosed how participants progressed throughout the trial and how many participants were included in each of the analyses undertaken. However, 15 participants were excluded and no baseline data were provided for these or subsequent drop-outs |
| Free of selective reporting? | Unclear | Attempted contact with authors. However, no response was provided. Unable to locate primary author |
| Free of other bias? | No | Participants from both groups withdrew from the study prior to discharge from hospital but this was after randomisation. Baseline characteristics of remaining participants however were not significantly different between the intervention and control groups and hence bias appears to have been minimised. There is however no indication of whether those withdrawing from the study were different from those remaining in the study and hence there is potential for selection bias and impact on external validity |

Krichbaum 2007

| | |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Methods | RCT with outcome assessment at 1, 3, 6 and 12 months. |
| Participants | USA; May 1998 to June 1999 Hip fracture patients (65+ years) admitted to one of two acute care facilities from home or assisted living facility prior to injury. Participants were required to be ambulatory prior to the fracture and only one participant was assessed as being cognitively impaired (MMSE < 24/30) (N = 33). Age: mean 79 years; gender: 73% females |
| Interventions | Intervention: Post-acute care coordination by a gerontological advanced practice nurse for 6 months. Care coordination involved regular interaction with participants (within 48 hours of discharge, weekly for the first month and then fortnightly to 6 months), physical and psychological assessments, education regarding postacute care, communication with family and staff across various facilities and physicians, documenting and evaluating progress (N = 17) Control: Received care after hip fracture according to the hospital and individual surgeons' protocols and had no assigned continuous care coordinator or care manager for the postacute period (N = 16) |

| | |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outcomes | <p>Global Health (self rated): one question with responses ranging from 1 (poor health) to 5 (excellent health). Higher score indicates better outcome</p> <p>Functional Status: According to the functional status index, average performance across 18 ADL and IADL tasks over the past 7 days. Ratings include three domains: Difficulty in performing task (scale of 1 to 4 with 4 being the greatest difficulty), pain in performing task (scale of 1 to 4 with 4 being the most pain), and amount of assistance required in performing task (scale 1 to 5 with 5 being the most assistance required). Higher scores indicate worse outcome</p> <p>Depression: According to the 15 item short form geriatric depression scale with responses of yes/no with a score > 3 indicating mild depression, > 7 indicating moderate depression and > 10 indicating severe depression. Higher scores indicate worse outcome</p> <p>Mortality, living situation (authors did not report how this was assessed)</p> |
| Notes | <p>Nurse played consultant role only as she could not prescribe direct care because of externally-imposed limitations</p> <p>Functional status index was reduced to 17 items as no participants reported using public transportation prior to injury</p> <p>Email correspondence with trialists provided additional information to assess risk of bias and additional data. Further email correspondence provided data on mortality across time points</p> |

Risk of bias

| Item | Authors' judgement | Description |
|----------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adequate sequence generation? | Yes | The principal investigator used a table of random numbers to assign participants to the treatment or control group |
| Allocation concealment? | Yes | The statistician in the School of Nursing placed slips of paper into envelopes on which a number and group designation was written. Envelopes were opened in order of admission |
| Blinding? All outcomes | Yes | Single blind: All participants were assessed at baseline, 1, 3, 6 and 12 months by the research assistant who was blinded to group assignment |
| Incomplete outcome data addressed? All outcomes | Unclear | It is unclear what denominator should be used at any point other than baseline and 12 months |
| Free of selective reporting? | No | Contact with trialists (30.05.2009) indicated additional data collected including cognition and depression |

Krichbaum 2007 (Continued)

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|---------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Free of other bias? | No | External validity compromised with only 43% of potentially eligible participants agreeing to speak with investigators, and only 76% of these agreeing to participate in the trial. In addition, there was 30% attrition due to withdrawals or deaths |
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Resnick 2007

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| Methods | RCT using a repeated measure design with participants randomised to one of four groups: 'exercise plus', exercise only, 'plus' only or usual care. Outcome assessments were conducted within 22 days of fracture, and at 2, 6 and 12 months post-fracture |
| Participants | USA; July 2000 to September 2004 Females aged 65 or over with a nonpathologic fracture which had been surgically repaired. Participants were required to be community dwelling at the time of the fracture and be free of medical problems that may pose a risk for falls when exercising along at home. Participants needed to be able to mobilise independently prior to their fracture and score 20 or higher on the Folstein Mini Mental State Examination (N = 208). Age: mean 81 years; gender: all females |
| Interventions | In the 3 intervention groups, visits from an exercise trainer were initially twice a week and then decreased to once a month in the final 4 months of the program. The first visit from the trainer ranged from 28 to 200 days, generally after 60 days post fracture. The program ended 12 months post-fracture. Plus intervention: The exercise trainer provided participants with a booklet on the benefits of exercise post-hip fracture, verbal encouragement via goal setting and positive reinforcement, posters describing the exercises, a goal form, calendar of daily exercise activities. Participants were also informed of methods for reducing the unpleasant sensations associated with exercise such as relieving or decreasing pain using prescribed medications, heat or ice treatments (N = 54) Exercise intervention: Participants participated in a session with an exercise trainer incorporating aerobic exercise, a strengthening program and stretching exercises. Participants were asked to perform aerobic activity at least 3 days per week and strength training 2 days per week for 30 minutes (N = 51) Exercise Plus intervention: This included the exercise and the plus interventions described above (N = 52) Usual care: Participants received rehabilitation according to the Medicare guidelines including inpatient physical and occupational therapy determined by the needs of the individual. This often included a single home therapy evaluation for safety (N = 51) |
| Outcomes | Mortality. Efficacy expectations: Measured using the Self-efficacy for Walking/Exercise scale, a 9 item measure (range from 0 to 10) that assesses self-efficacy expectations regarding ability to continue to exercise despite barriers to doing so. A higher score indicates a higher level of confidence Outcome Expectations: Measured using the Outcome Expectations for Exercise Scale. |

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| | <p>This measure consists of 9 statements about the benefits of exercise. In which participants whether they agree with agree or disagree with each statement. The choices range from 1 (strongly disagree) to 5 (strongly agree)</p> <p>Exercise behaviours: Measured using the exercise sub-scale of the Yale Physical Activity Survey, a questionnaire administered by an interviewer that includes 5 categories of activities such as work, exercise and recreational activities. The Step Activity Monitor (SAM): this records the number of steps taken at specified intervals and was utilised for a 48 hour period at each of the follow-up periods</p> | |
| Notes | <p>Adherence: Plus only group received 63% of total possible visits, Exercise only group received 45% of the total possible visits, Exercise Plus group received 55% of the total possible visits</p> <p>Treatment fidelity of the interventionists revealed that the intervention was delivered in the intended manner in 90.8% of cases</p> <p>One patient was excluded post-randomisation as she had not had surgery</p> | |
| Risk of bias | | |
| Item | Authors' judgement | Description |
| Adequate sequence generation? | Yes | A freeware computer program was used to undertake randomisation. Allocation was blocked by hospital to assure equal probabilities within each hospital of being assigned to each of the study groups |
| Allocation concealment? | Yes | Participants were assigned to groups randomly with forced balancing of treatment groups within each hospital. The randomisation scheme was provided to the project coordinator. Patients were then assigned as they became available at the indicated hospital |
| Blinding? All outcomes | Yes | The study nurses involved with participant recruitment and data collection were blind to randomisation. Participants were not informed of which specific arm of the intervention they were randomised to |
| Incomplete outcome data addressed? All outcomes | Yes | All outcome measures are reported and all participants that were lost to follow-up accounted for |
| Free of selective reporting? | Unclear | Insufficient information. |
| Free of other bias? | No | Variability existed for when the intervention was initiated (28 to 200 days). This was due to participants being allowed to in- |

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| | | dicate when they felt willing for the interventionist to visit them in their own home |
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Stromberg 1999

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| Methods | RCT with outcome assessment performed day 2 and day 7 post-surgery, on discharge and again at 4 and 12 months |
| Participants | Sweden; January 1991 to December 1992 Hip fracture patients (> 64 years) living independently prior to injury, with no history of cognitive impairment (N = 223). Age: mean 81 years; gender: 76% females |
| Interventions | Intervention: Reorientation activities, provided as nursing care, including pre-surgical admission to the orthopaedic ward, home visits during the admission, access to reorientation devices and wearing of own clothes (N = 116) Comparison: Conventional nursing care (N = 107). |
| Outcomes | Primary: Cognition as measured by the Short Portable Mental Status Questionnaire, maximum score = 10, higher score indicating greater cognitive function Secondary: Discharge destination, mortality, change in accommodation and length of stay |
| Notes | Note: authors also make comparison to a historical control. Email correspondence attempted but no response from trialists |

Risk of bias

| Item | Authors' judgement | Description |
|----------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adequate sequence generation? | Yes | A random table was used for group allocation. |
| Allocation concealment? | Yes | Sealed, numbered envelopes with group allocation were used. |
| Blinding? All outcomes | Unclear | No response to request of trial authors to provide further information |
| Incomplete outcome data addressed? All outcomes | Yes | Appears so, although only patients discharged alive are included in analyses and only those residing in own home at 4-month follow-up were included in analyses at this time point |
| Free of selective reporting? | Unclear | Insufficient information. |

Stromberg 1999 (Continued)

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|---------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Free of other bias? | No | Possible contamination as all patients were treated in a densely staffed, specialised 12-bed hip fracture unit Selection bias and hence external validity likely compromised by the number of patients excluded due to insufficient availability of beds, lack of resources for weekend and out of hours recruitment |
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Tinetti 1999

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|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Methods | RCT with outcome assessment performed at baseline and again at 3, 6 and 12 months |
| Participants | USA; May 1993 to September 1995 Hip fracture patients (65+ years) living independently in the community prior to injury, with no history of cognitive impairment. Return home within 100 days of injury. Patients with established terminal illness with life expectancy < 1 year or residing > 25 miles from the recruitment site were excluded. (N = 304). Age: mean 80 years; gender: 82% females |
| Interventions | Intervention: 6 months of physical and functional therapy from a study physiotherapist and rehabilitation nursing staff. Other home care services, including home care nursing and home health aides, were provided by the home care agencies. Physical therapy involved instruction in safer, more effective techniques, procurement of and training in use of assistive devices and environmental modifications, daily progressive, competency based exercises for balance, upper and lower body conditioning. Rehabilitation nursing staff (in consultation with an OT) delivered the functional therapy component of the intervention which involved a program to address task performance on identified impediments (N = 148) Comparison: Physiotherapy through staff employed by home care agencies. Duration and frequency of the therapy was left to the discretion of the individual therapists. No usual care patients received functional therapy. Other home care services, including home care nursing and home health aides, were provided by the home care agencies (N = 156) |
| Outcomes | Primary: Self reported function in seven self-care ADL and in seven home management ADL. Each ADL was scored 0 (does not do), 1 (does with human help) or 2 (does without human help). Scores were aggregated into a composite self-care ADL score (0 to 14) and home management ADL score (0 to 14). Also summarised as: proportion that performed all ADL activities without human help (complete independence) and proportion who achieved at least as good as before the injury (recovered independence) Secondary: Social activity as measured from the EPESE interview: frequency of 10 groups of social activities summed into a scale based on the frequency for each activity. Categories included < 1/12 (0), 1-4/12 (1), > 4/12 (2). Social activity score was the aggregate of frequency ratings for each of these 10 activities (possible range 0 to 20) Also measured range of performance-based measures including mobility (as measured by the time required to stand from a chair three times, to walk 10 feet, turn and walk back, and to climb a flight of stairs), balance (as measured by the Berg Balance Scale, possible range 0 to 52, higher score indicating better performance), assessment of gait (as |

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| | <p>measured by 5 items from the Performance-Oriented Mobility Assessment, namely step continuity and symmetry, path deviation and turning, and missed steps with possible scores ranging from 0 to 8), upper limb strength (as measured by 1RM of the non-dominant triceps), lower limb strength (as measured by 1RM of the uninjured knee extensors)</p> <p>Also measured adverse events, including falls, musculoskeletal pain or injuries, and hospitalisation at 3 months (via telephone) and again at 6 months</p> |
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| Notes | <p>Social activities and the performance based measures were all presented as mean (SE) adjusted for discharge location and pre-fracture score on the item of interest. Exception is chair stand and stair climb where no baseline data were available</p> <p>Email correspondence with trialists (04.05.2009) provided clarification for assessment of risk of bias and additional data</p> |
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Risk of bias

| Item | Authors' judgement | Description |
|----------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adequate sequence generation? | Yes | A statistician external to the intervention team generated the randomisation sequence, which was stored in a secure database. When a new eligible patient was recruited into the study, the statistician informed the intervention team what the treatment assignment was |
| Allocation concealment? | Yes | The intervention team did not have access to the overall sequence and so would have no foreknowledge of upcoming assignments |
| Blinding? All outcomes | Yes | Single blind - A nurse researcher, not involved in treatment and blinded to participants' treatment group, performed the baseline and follow-up assessments |
| Incomplete outcome data addressed? All outcomes | Yes | Missing data accounted for throughout. Analysis undertaken using intention-to-treat principles |
| Free of selective reporting? | No | All measures described in the methods are presented in the results and appear reasonable. Unclear why primary outcome was not looked at as a continuous variable. Correspondence with authors uncovered additional outcomes including ADL efficacy and depression |

Tinetti 1999 (Continued)

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|---------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Free of other bias? | Unclear | Potential contamination arising from increased availability and use of home services by the usual care group during trial period. Participants therefore had more than usual physical therapy although it is reported that none of the control participants received any functional therapy |
|---------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

ADL: Activities of Daily Living
 HRQoL: Health Related Quality of Life
 IADL: Instrumental Activities of Daily Living
 MMSE: Mini-Mental Status Examination
 OT: occupational therapist
 QoL: Quality of Life
 RM: repetition maximum
 SD: standard deviation
 SE: standard error

Characteristics of excluded studies [ordered by study ID]

| Study | Reason for exclusion |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bai 2003 | Trial tested a complete care package and thus not in scope of review |
| Burns 2007b | A randomised controlled trial of 121 older depressed hip fracture patients (Geriatric Depression Scale score of ≥ 7) randomised to cognitive behaviour therapy versus control. The study was excluded because the primary focus was on the treatment of depression. A linked trial on 172 hip fracture patients who were screened as not depressed is included in this review (Burns 2007a). |
| Cameron 1993 | Trial evaluated accelerated rehabilitation, which included a greater emphasis on retraining for physical independence. Multidisciplinary rehabilitation: not in scope of review |
| Crotty 2002 | Trial evaluated accelerated discharge and home-based interdisciplinary rehabilitation, which included occupational therapy and other interventions aimed at improving functioning. Multidisciplinary rehabilitation with additional interventions: not in scope of review |
| Di Monaco 2008 | Intervention focused on fall prevention: not in scope of review |
| Galvard 1995 | Trial compared geriatric rehabilitation versus usual orthopaedic care: not in scope of review |
| Gilchrist 1988 | Trial compared combined geriatric-orthopaedic care in special designated unit, which included additional input from an occupational therapist, versus usual orthopaedic care. Multidisciplinary rehabilitation: not in scope of review. Additionally, no relevant outcomes |

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|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hagsten 1994 | Not a randomised controlled trial. |
| Houldin 1995 | Small flawed “exploratory” trial testing a psychiatric nursing intervention. Trial was excluded because separate data were not provided for the eight hip fracture patients; the remaining 14 patients had had elective total hip replacement |
| Husko 2002 | Trial compared intensive geriatric rehabilitation within hospital by a multidisciplinary geriatric team, including an occupational therapist, versus discharge to local community hospitals under general practitioner. Multidisciplinary rehabilitation: not in scope of review |
| Kennie 1988 | Trial compared combined geriatric-orthopaedic care in special designated unit versus orthopaedic care. Multidisciplinary rehabilitation: not in scope of review |
| Kuisma 2002 | This trial compared discharge from an acute ward to home with visits by a physiotherapist versus usual care in a rehabilitation centre in 81 hip fracture patients. The trial is primarily a home versus hospital comparison and thus was excluded |
| Mendelsohn 2008 | This trial involved 20 older people randomised to receive additional upper body aerobic training in the form of a crank exercise training program versus standard inpatient rehabilitation. There were no psychosocial outcomes and the focus was on cardiovascular fitness. Thus, not in scope of review |
| Naglie 2002 | Trial compared interdisciplinary care consisting of routine postoperative surgical care plus daily medical care by internist-geriatrician, and regular care by physiotherapist, occupational therapist, social worker and clinical nurse specialist versus usual care on orthopaedic units. Multidisciplinary care with additional components: not in scope of review |
| Parkinson 2007 | Trial focused on incontinence. No outcomes relevant to this review |
| Shyu 2005 | Trial compared interdisciplinary programme of geriatric consultation, continuous rehabilitation and discharge planning versus usual care on trauma or orthopaedic ward. Multidisciplinary rehabilitation: not in scope of review |
| Skelly 1992 | Trial focused on management of urinary retention. Intervention not in scope of review and no relevant outcomes |
| Stenvall 2007 | Trial compared multidisciplinary rehabilitation based in a geriatric unit specialising in geriatric orthopaedic care (additional occupational and physical therapy) versus usual orthopaedic care. Multidisciplinary rehabilitation with additional components: not in scope of review |
| Swanson 1998 | Trial compared accelerated rehabilitation programme involving a multidisciplinary team, including occupational therapist and social worker, versus standard orthopaedic management. Multidisciplinary rehabilitation: not in scope of review |
| Tsauo 2005 | This trial, which is included in the mobilisation strategies review (Handoll 2007), compared eight sessions of a home-based individualised physical therapy programme versus unsupervised home exercises in 54 people recently discharged from an acute ward. Although there were some home modifications, the primary focus was on mobilisation and thus this trial is excluded here |

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|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Uy 2008 | Trial compared an inpatient multidisciplinary rehabilitation programme involving accelerated rehabilitation versus usual care involving discharge back to nursing home after surgery: not in scope of review |
| Vidan 2005 | Trial compared multidisciplinary care versus usual orthopaedic care: not in scope of review |

DATA AND ANALYSES

Comparison 1. Reorientation measures versus usual care: inpatient care

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|--------------------------------------------------------------------|----------------|---------------------|-------------------------------------|---------------------|
| 1 'Poor outcome': non-return to own home (dead or not in own home) | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 1.1 Non return at hospital discharge | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.2 Non return at 1 year (dead or in institution) | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 2 Mortality | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 2.1 In hospital mortality | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 2.2 1 year mortality | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 3 Cognitive impairment of survivors (score < 8 of 10 SPSMQ) | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 3.1 at 1 week | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 3.2 on discharge from hospital | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 4 Length of hospital stay | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |

Comparison 2. Occupational therapy versus usual care: inpatient care

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---------------------------------------------------------------------------------|----------------|---------------------|-------------------------------------|---------------------|
| 1 Self-reported quality of life (SWED-QUAL scores: 0 to 100 (best)) at 2 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 1.1 Physical function domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 1.2 Quality of life general/self-rated health domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 1.3 Quality of life physical health domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 1.4 Quality of life emotional health domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2 'Poor outcome': dead or readmitted or failed to return home (at 2 months) | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |

Comparison 3. Psychology intervention versus usual care: inpatient care

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|----------------------------------------|----------------|---------------------|---------------------------------|---------------------|
| 1 Independence in mobility at 12 weeks | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 2 Depression | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 2.1 At 12 weeks | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 2.2 At 6 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |

Comparison 4. Specialist nurse led care versus usual care: discharge planning and post discharge

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|----------------------------------------------------------------------------|----------------|---------------------|-------------------------------------|---------------------|
| 1 Mortality | 2 | | Risk Ratio (M-H, Fixed, 95% CI) | Subtotals only |
| 1.1 At 3 months | 2 | 159 | Risk Ratio (M-H, Fixed, 95% CI) | 0.32 [0.08, 1.28] |
| 1.2 At 6 months | 1 | 33 | Risk Ratio (M-H, Fixed, 95% CI) | 0.71 [0.19, 2.67] |
| 1.3 At 12 months | 1 | 33 | Risk Ratio (M-H, Fixed, 95% CI) | 0.71 [0.19, 2.67] |
| 2 Poor outcome: dead or readmitted or failed to return home | 2 | 159 | Risk Ratio (M-H, Fixed, 95% CI) | 0.30 [0.12, 0.70] |
| 3 Readmission at 3 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 4 ADL at 3 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 5 Quality of life (SF-36 total and subscales: 0 to 100 = best) at 3 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 5.1 Overall quality of life | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 5.2 Physical function domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 5.3 Social function domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 5.4 Quality of life physical health domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 5.5 Quality of life emotional health domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 5.6 General health domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 6 Functional Status Index domains (higher scores are worse) at 12 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 6.1 Personal care ADL (score 1 to 3) | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 6.2 Home chores (1 to 4) | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 6.3 Mobility (1 to 5) | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 6.4 Social (1 to 6) | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 7 Self-rated health (1: poor to 5: excellent) at 12 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |

| | | | | |
|---------------------------------------------------------------------------------|---|--|-------------------------------------|---------------------|
| 8 Depression (Geriatric Depression Scale: 0 to 15: most depressed) at 12 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 9 Length of hospital stay | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 10 Falls at 3 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |

Comparison 5. Coaching (inpatient) + physical therapy (post-discharge) versus usual care: mainly post discharge

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|----------------------------------------------|----------------|---------------------|-------------------------------------|---------------------|
| 1 Mortality at 6 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 2 Quality of life: SF-36 domains at 6 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 2.1 Physical functioning domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.2 Role physical domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.3 Social functioning | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.4 General health | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.5 Role emotional | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.6 Mental health domain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.7 Bodily pain | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.8 Vitality | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |

Comparison 6. Coaching versus usual care: post discharge

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|-------------------------------------------------------------|----------------|---------------------|-------------------------------------|---------------------|
| 1 Mortality | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 1.1 At 6 months: coaching alone | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.2 At 6 months: coaching + exercise versus exercise alone | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.3 At 12 months: coaching alone | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.4 At 12 months: coaching + exercise versus exercise alone | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 2 Self efficacy expectations | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 2.1 At 6 months: coaching alone | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.2 At 6 months: coaching + exercise versus exercise alone | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.3 At 12 months: coaching alone | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |

2.4 At 12 months: coaching + exercise versus exercise alone

1

Mean Difference (IV, Fixed, 95% CI)

Not estimable

Comparison 7. Coaching + exercises versus usual care: post discharge

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|------------------------------|----------------|---------------------|-------------------------------------|---------------------|
| 1 Mortality | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 1.1 At 6 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.2 At 12 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 2 Self-efficacy expectations | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 2.1 At 6 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 2.2 At 12 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |

Comparison 8. Home based rehabilitation versus usual care: post discharge

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|----------------------------------------------------------------|----------------|---------------------|-------------------------------------|---------------------|
| 1 'Poor outcome': dead or incomplete recovery of self-care ADL | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 1.1 At 6 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.2 At 12 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 2 Mortality | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 2.1 at 6 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 2.2 at 12 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 3 Incomplete recovery of self-care ADL | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 3.1 At 6 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 3.2 At 12 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 4 Personal/self-care ADL (0 to 14: best) | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 4.1 At 6 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 4.2 At 12 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 5 Incomplete recovery of home management ADL | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 5.1 At 6 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 5.2 At 12 months | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 6 Home chores/management ADL (0 to 14: best) | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 6.1 At 6 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 6.2 At 12 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 7 Social activity (0 to 20: best) | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 7.1 At 6 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 7.2 At 12 months | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |

| | | | |
|---------------------------------------------|---|-------------------------------------|---------------------|
| 8 Readmission by 6 months | 1 | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 9 Mortality and readmission at 6 months | 1 | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 10 Depressive symptoms (depression scale) | 1 | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 10.1 At 6 months | 1 | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 10.2 At 12 months | 1 | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 11 Participants reporting falls by 6 months | 1 | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |

Comparison 9. Group learning program versus usual care: post discharge from rehabilitation

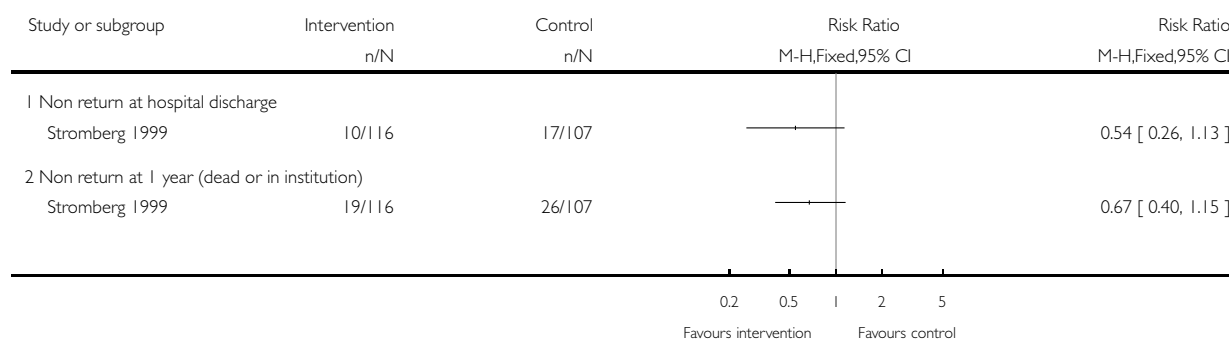
| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|--------------------------------------------------------------------------------------------|----------------|---------------------|---------------------------------|---------------------|
| 1 Patient perceived reduced ability to participate in social life | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 1.1 Post intervention | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.2 12 months post intervention | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.3 Post intervention (excluded control group patients assumed to have no reduced ability) | 1 | | Risk Ratio (M-H, Fixed, 95% CI) | Not estimable |

Analysis 1.1. Comparison 1 Reorientation measures versus usual care: inpatient care, Outcome 1 'Poor outcome': non-return to own home (dead or not in own home).

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 1 Reorientation measures versus usual care: inpatient care

Outcome: 1 'Poor outcome': non-return to own home (dead or not in own home)

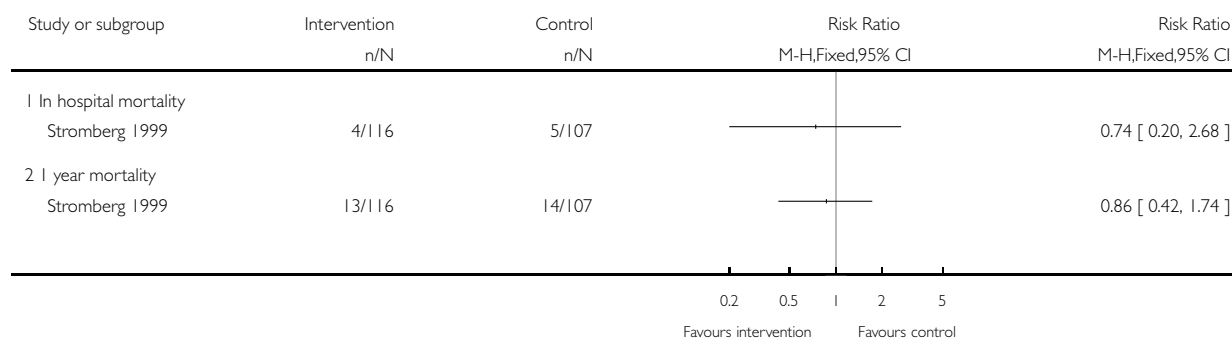


Analysis 1.2. Comparison 1 Reorientation measures versus usual care: inpatient care, Outcome 2 Mortality.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 1 Reorientation measures versus usual care: inpatient care

Outcome: 2 Mortality

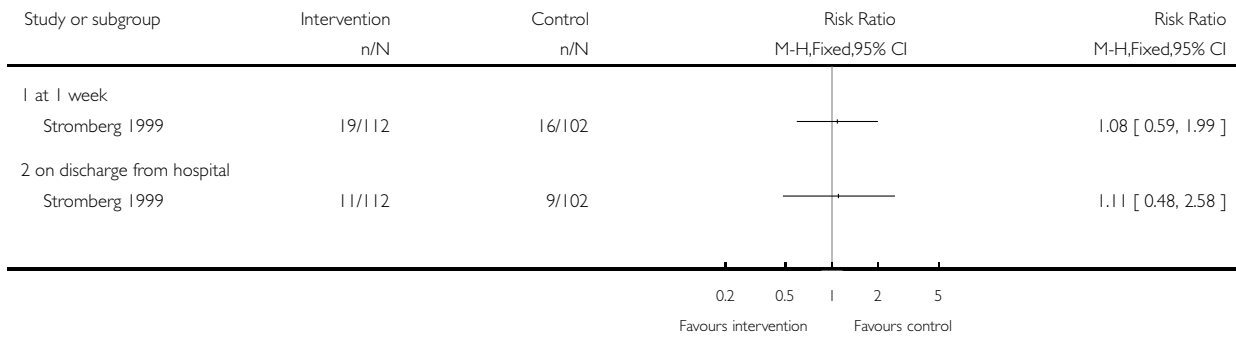


Analysis 1.3. Comparison 1 Reorientation measures versus usual care: inpatient care, Outcome 3 Cognitive impairment of survivors (score < 8 of 10 SPSMQ).

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 1 Reorientation measures versus usual care: inpatient care

Outcome: 3 Cognitive impairment of survivors (score < 8 of 10 SPSMQ)

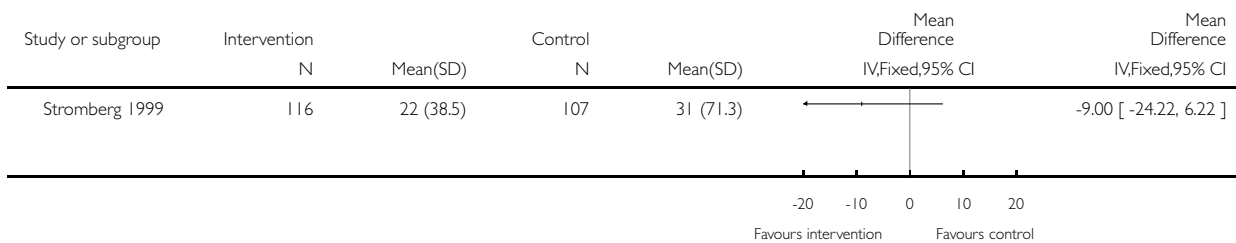


Analysis 1.4. Comparison 1 Reorientation measures versus usual care: inpatient care, Outcome 4 Length of hospital stay.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 1 Reorientation measures versus usual care: inpatient care

Outcome: 4 Length of hospital stay

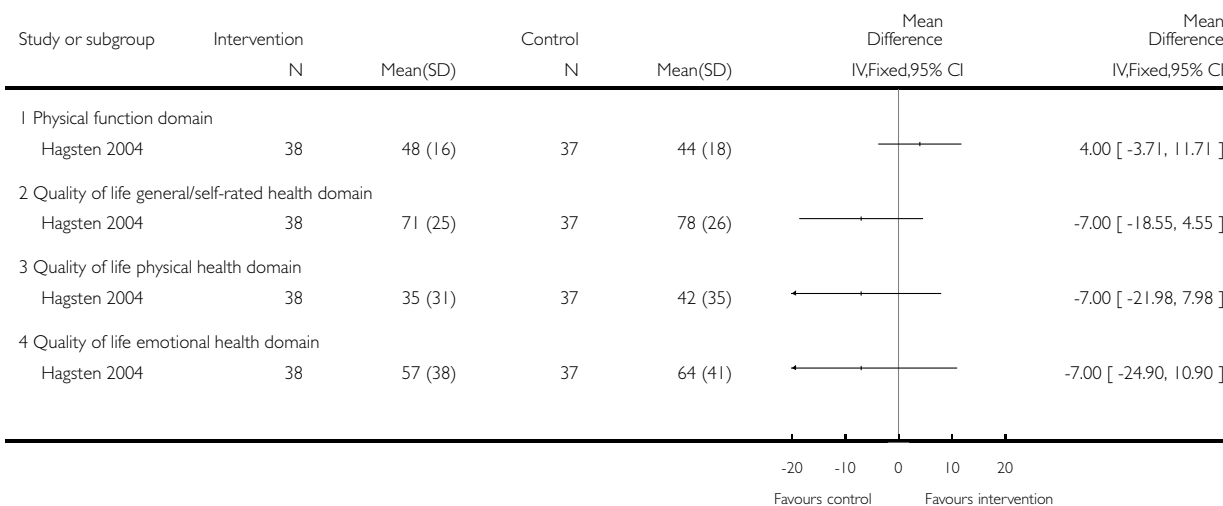


Analysis 2.1. Comparison 2 Occupational therapy versus usual care: inpatient care, Outcome 1 Self-reported quality of life (SWED-QUAL scores: 0 to 100 (best)) at 2 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 2 Occupational therapy versus usual care: inpatient care

Outcome: 1 Self-reported quality of life (SWED-QUAL scores: 0 to 100 (best)) at 2 months

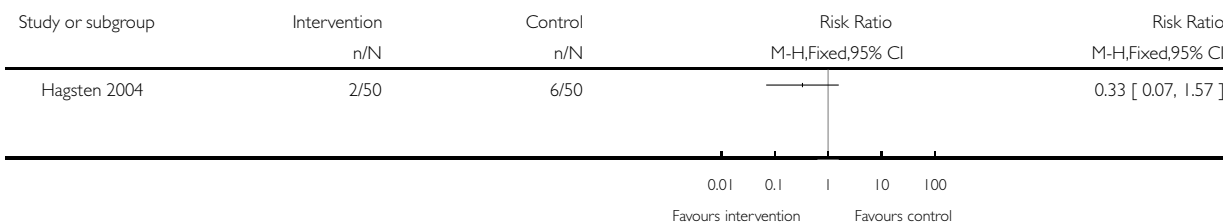


Analysis 2.2. Comparison 2 Occupational therapy versus usual care: inpatient care, Outcome 2 'Poor outcome': dead or readmitted or failed to return home (at 2 months).

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 2 Occupational therapy versus usual care: inpatient care

Outcome: 2 'Poor outcome': dead or readmitted or failed to return home (at 2 months)

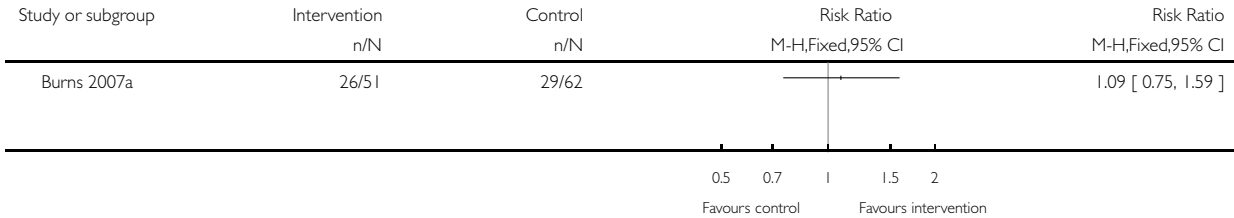


Analysis 3.1. Comparison 3 Psychology intervention versus usual care: inpatient care, Outcome 1 Independence in mobility at 12 weeks.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 3 Psychology intervention versus usual care: inpatient care

Outcome: 1 Independence in mobility at 12 weeks

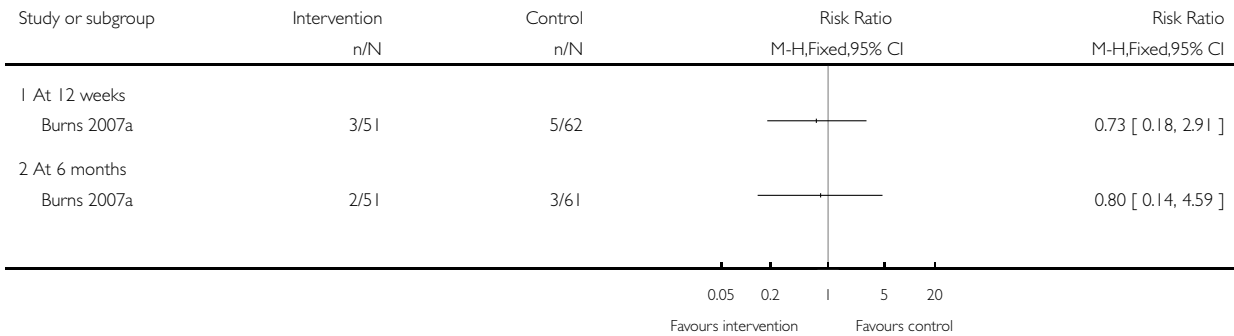


Analysis 3.2. Comparison 3 Psychology intervention versus usual care: inpatient care, Outcome 2 Depression.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 3 Psychology intervention versus usual care: inpatient care

Outcome: 2 Depression

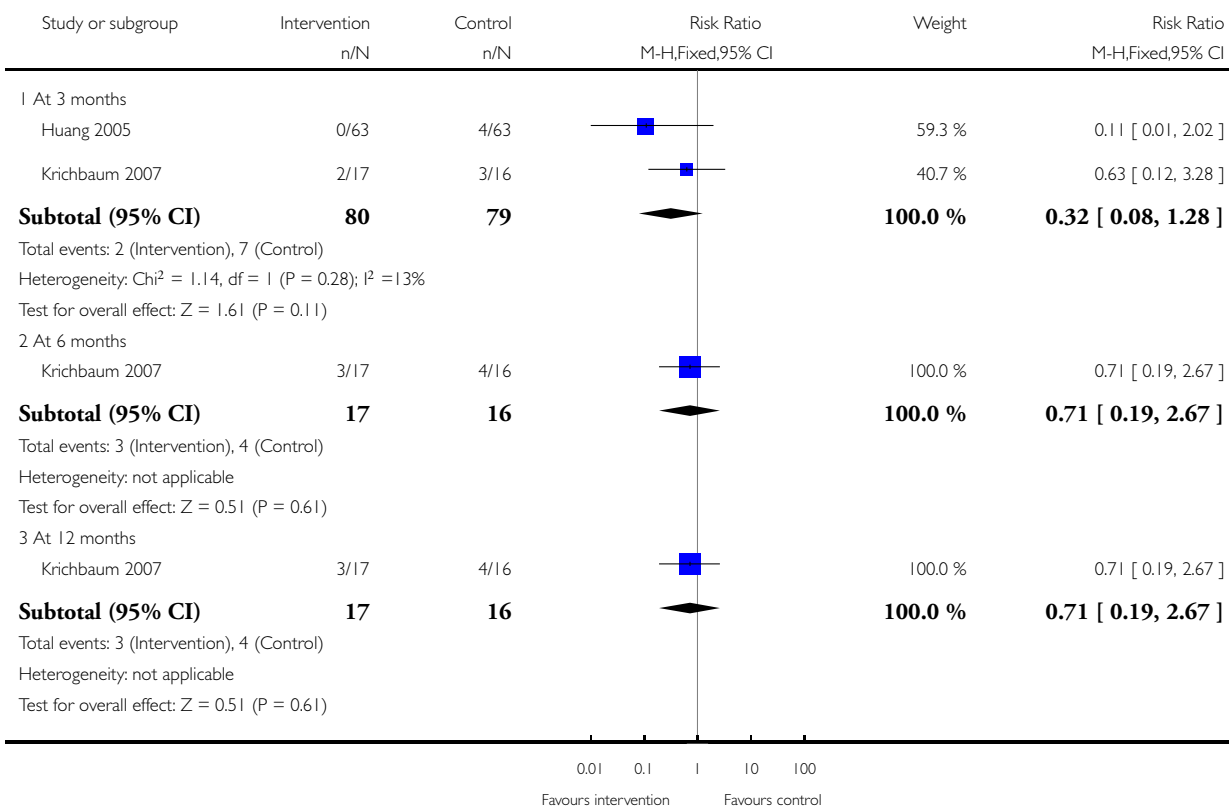


Analysis 4.1. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 1 Mortality.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 1 Mortality

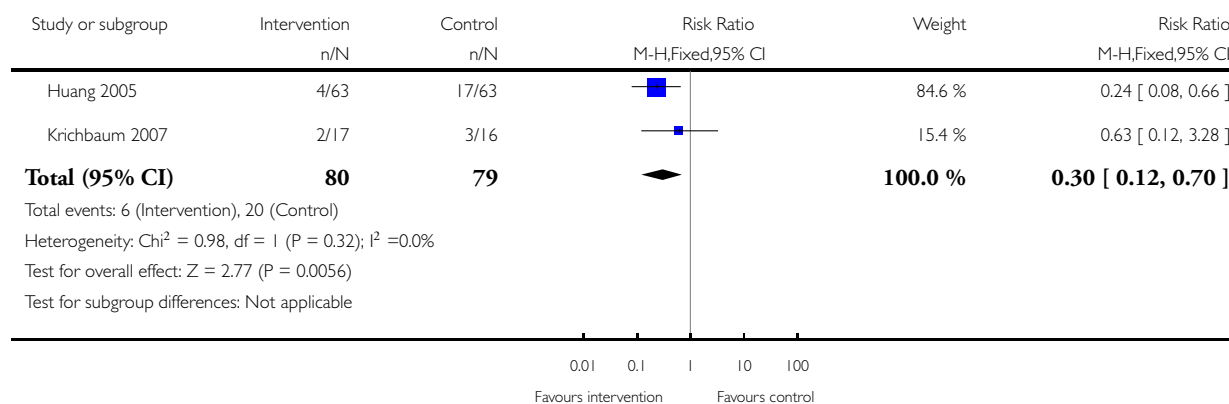


Analysis 4.2. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 2 Poor outcome: dead or readmitted or failed to return home.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 2 Poor outcome: dead or readmitted or failed to return home

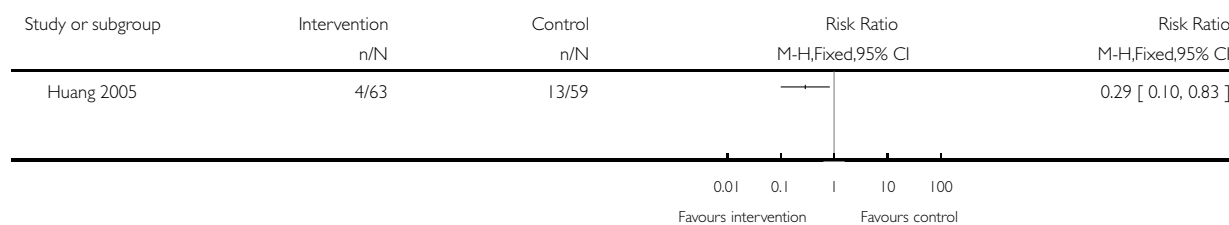


Analysis 4.3. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 3 Readmission at 3 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 3 Readmission at 3 months

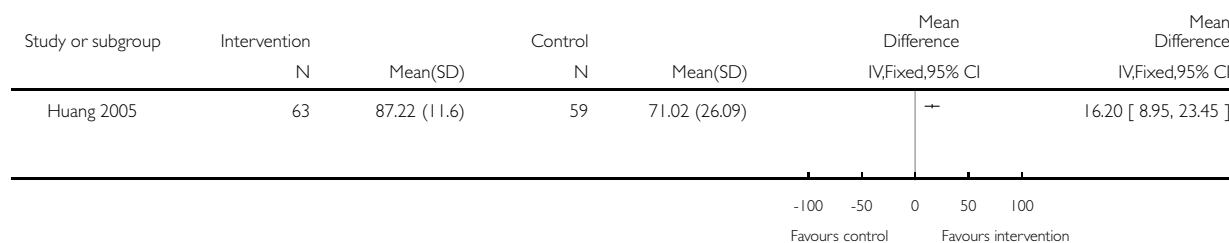


Analysis 4.4. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 4 ADL at 3 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 4 ADL at 3 months

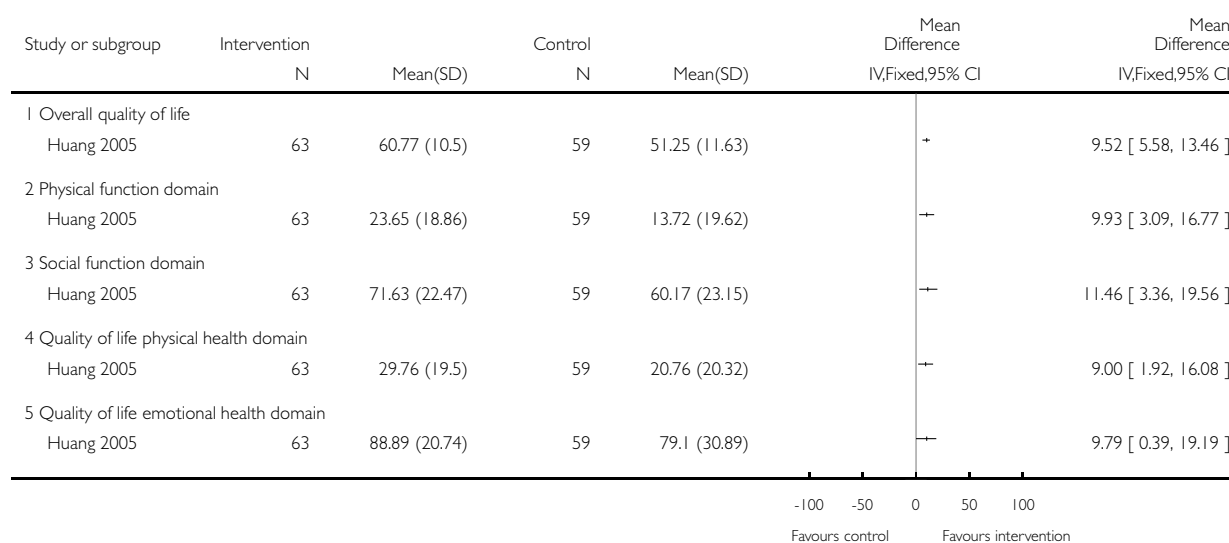


Analysis 4.5. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 5 Quality of life (SF-36 total and subscales: 0 to 100 = best) at 3 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

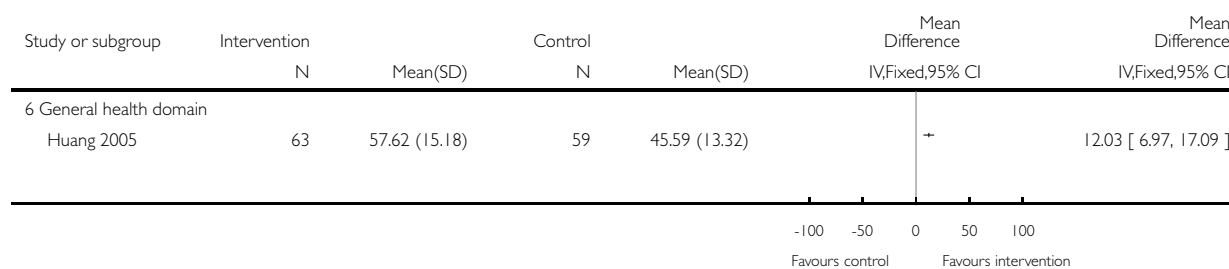
Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 5 Quality of life (SF-36 total and subscales: 0 to 100 = best) at 3 months



(Continued ...)

(... Continued)

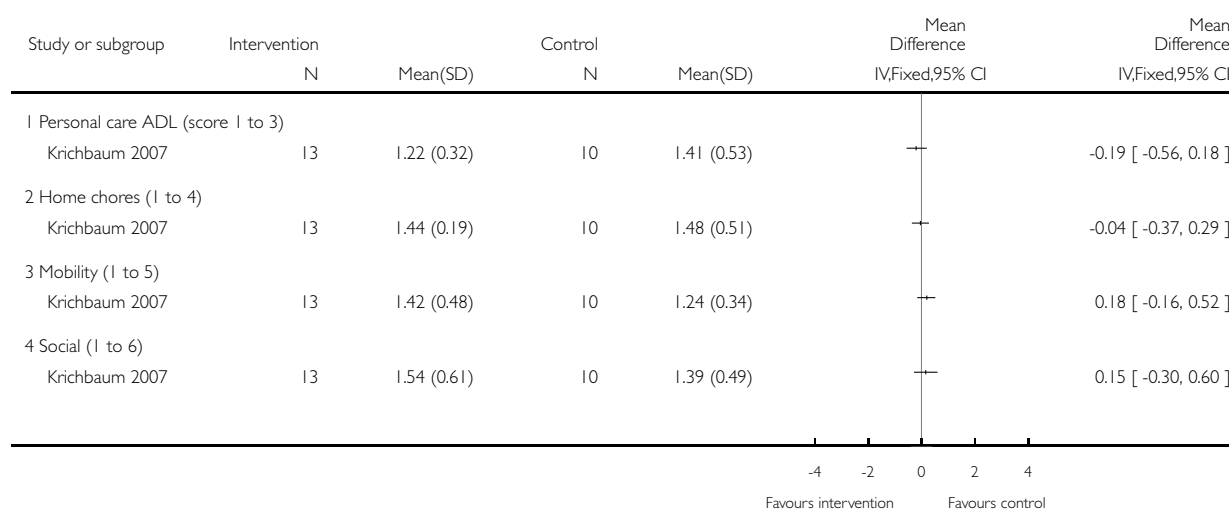


Analysis 4.6. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 6 Functional Status Index domains (higher scores are worse) at 12 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 6 Functional Status Index domains (higher scores are worse) at 12 months

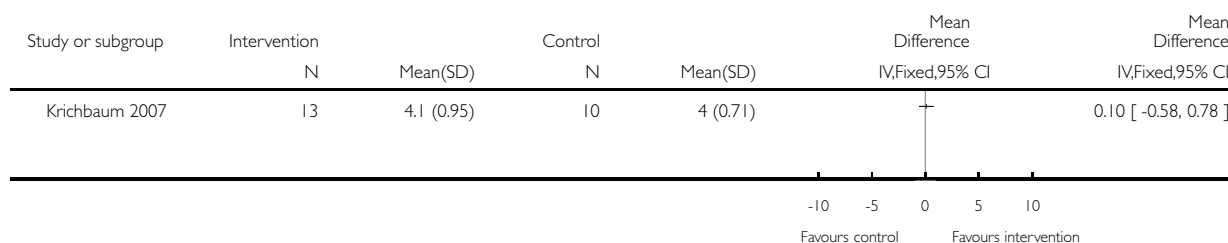


Analysis 4.7. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 7 Self-rated health (1: poor to 5: excellent) at 12 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 7 Self-rated health (1: poor to 5: excellent) at 12 months

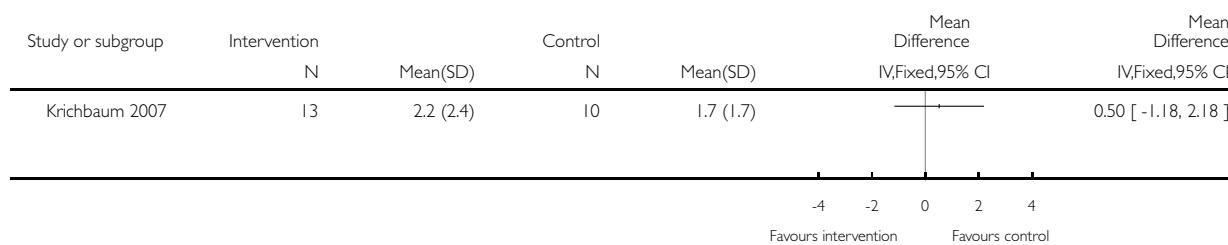


Analysis 4.8. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 8 Depression (Geriatric Depression Scale: 0 to 15: most depressed) at 12 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 8 Depression (Geriatric Depression Scale: 0 to 15: most depressed) at 12 months

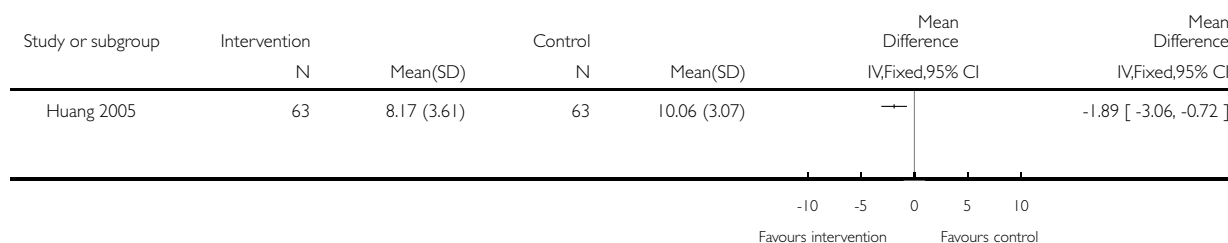


Analysis 4.9. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 9 Length of hospital stay.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 9 Length of hospital stay

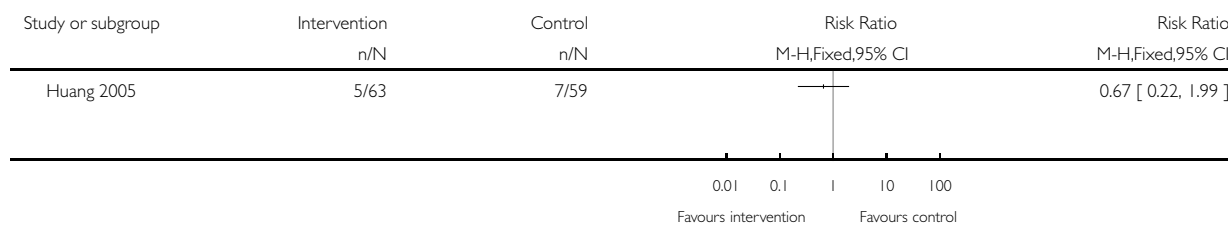


Analysis 4.10. Comparison 4 Specialist nurse led care versus usual care: discharge planning and post discharge, Outcome 10 Falls at 3 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 4 Specialist nurse led care versus usual care: discharge planning and post discharge

Outcome: 10 Falls at 3 months



Analysis 5.1. Comparison 5 Coaching (inpatient) + physical therapy (post-discharge) versus usual care: mainly post discharge, Outcome 1 Mortality at 6 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 5 Coaching (inpatient) + physical therapy (post-discharge) versus usual care: mainly post discharge

Outcome: 1 Mortality at 6 months

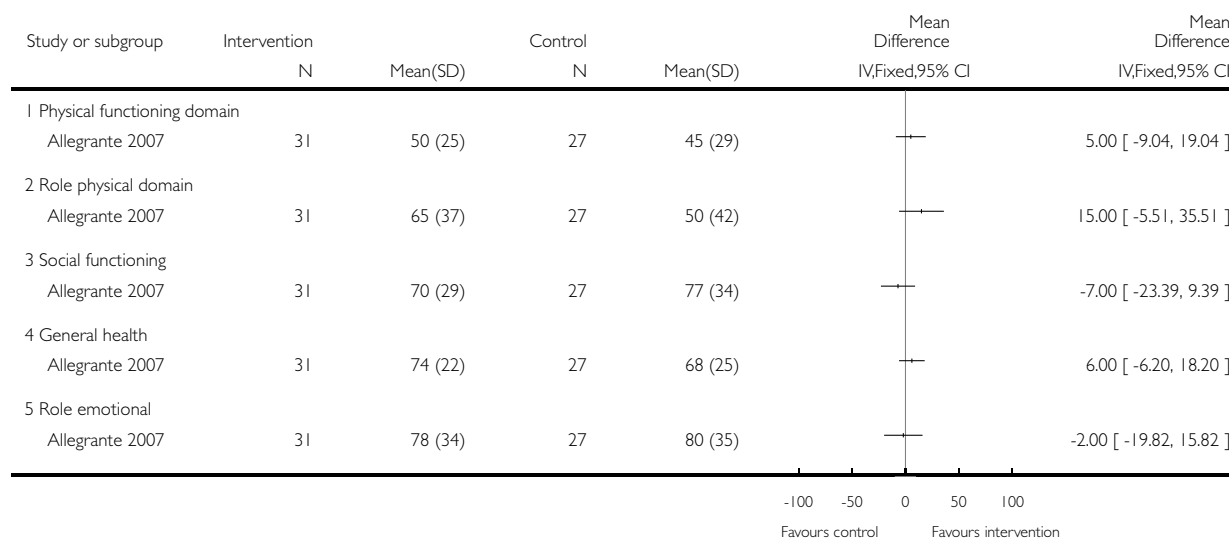


Analysis 5.2. Comparison 5 Coaching (inpatient) + physical therapy (post-discharge) versus usual care: mainly post discharge, Outcome 2 Quality of life: SF-36 domains at 6 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

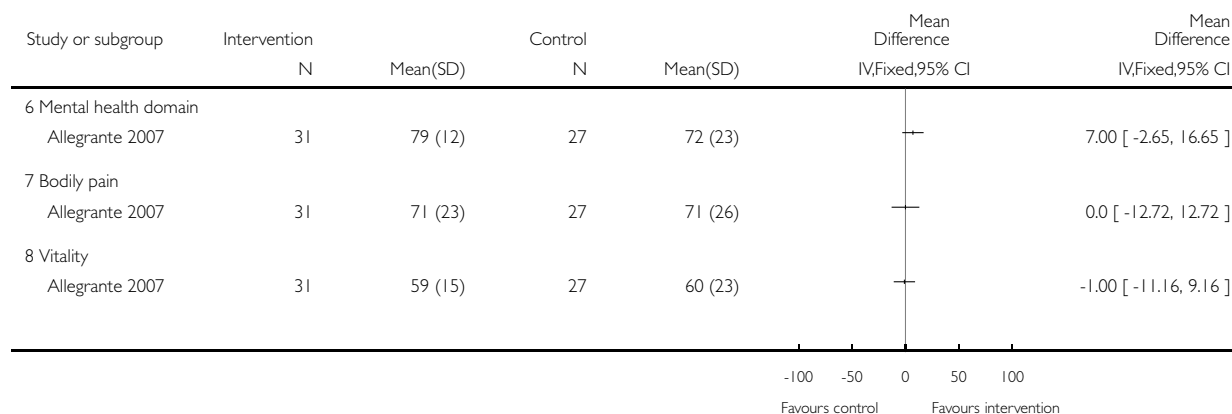
Comparison: 5 Coaching (inpatient) + physical therapy (post-discharge) versus usual care: mainly post discharge

Outcome: 2 Quality of life: SF-36 domains at 6 months



(Continued ...)

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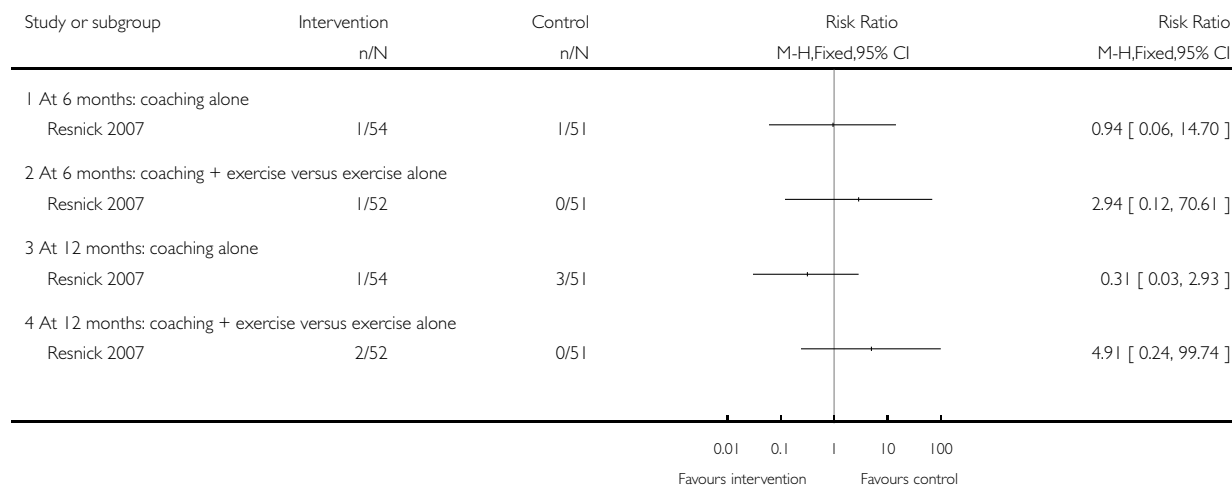


Analysis 6.1. Comparison 6 Coaching versus usual care: post discharge, Outcome 1 Mortality.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 6 Coaching versus usual care: post discharge

Outcome: 1 Mortality

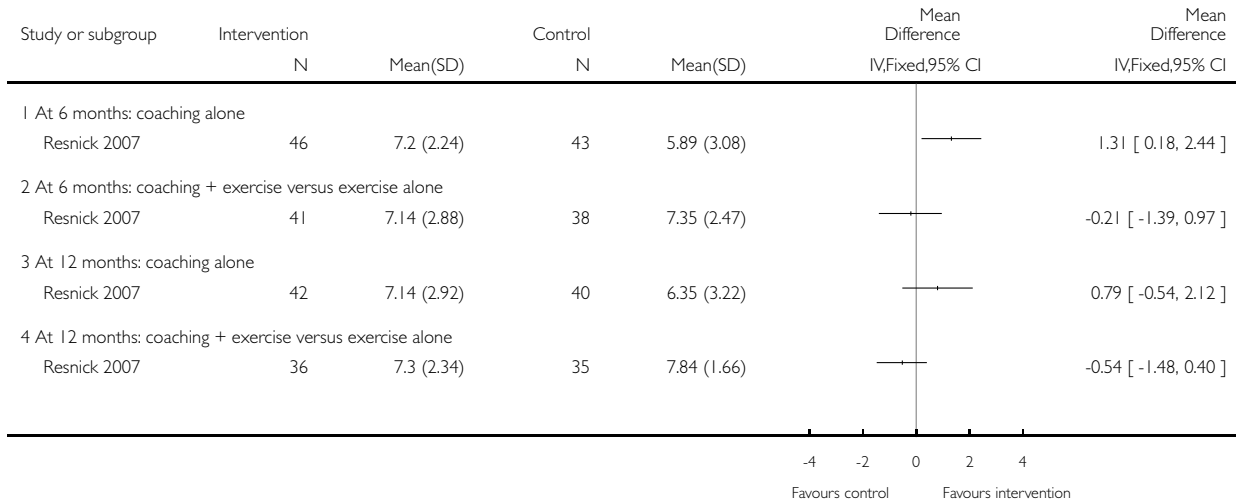


Analysis 6.2. Comparison 6 Coaching versus usual care: post discharge, Outcome 2 Self efficacy expectations.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 6 Coaching versus usual care: post discharge

Outcome: 2 Self efficacy expectations

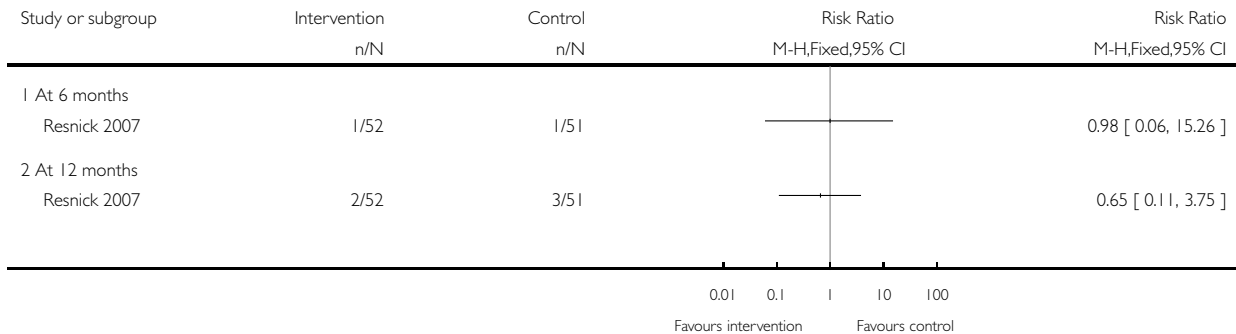


Analysis 7.1. Comparison 7 Coaching + exercises versus usual care: post discharge, Outcome 1 Mortality.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 7 Coaching + exercises versus usual care: post discharge

Outcome: 1 Mortality

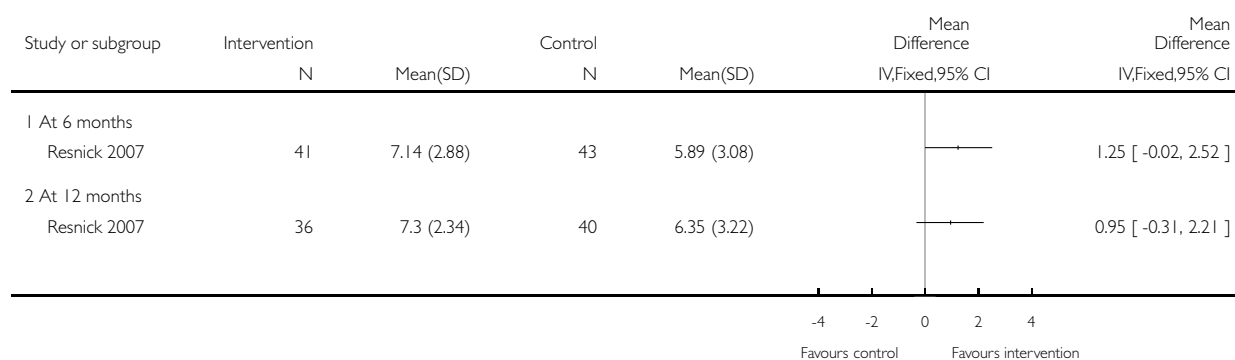


Analysis 7.2. Comparison 7 Coaching + exercises versus usual care: post discharge, Outcome 2 Self-efficacy expectations.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 7 Coaching + exercises versus usual care: post discharge

Outcome: 2 Self-efficacy expectations

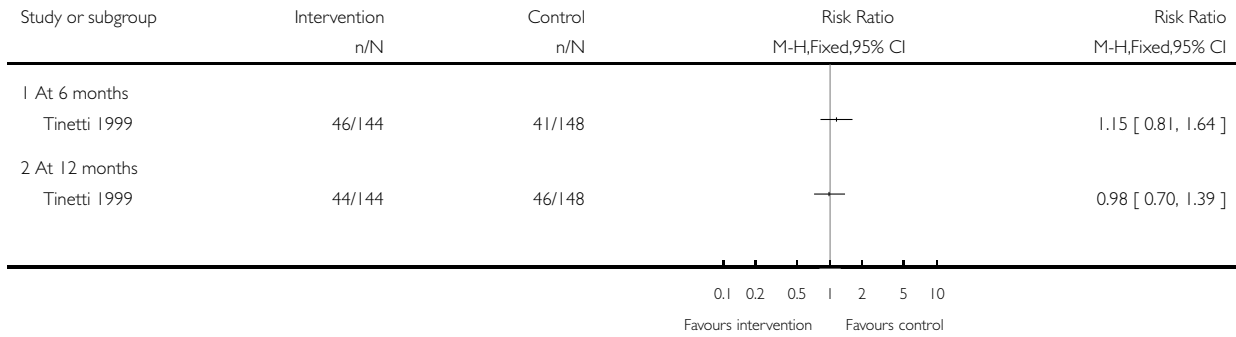


Analysis 8.1. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 1 'Poor outcome': dead or incomplete recovery of self-care ADL.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 1 'Poor outcome': dead or incomplete recovery of self-care ADL

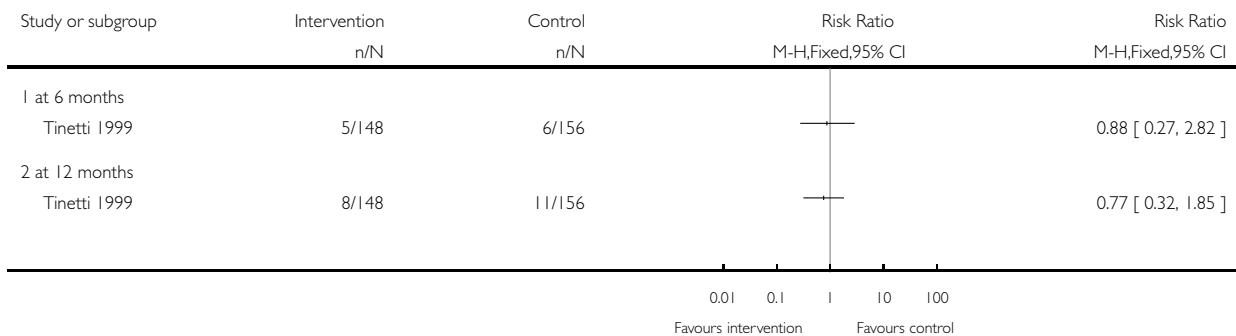


Analysis 8.2. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 2 Mortality.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 2 Mortality

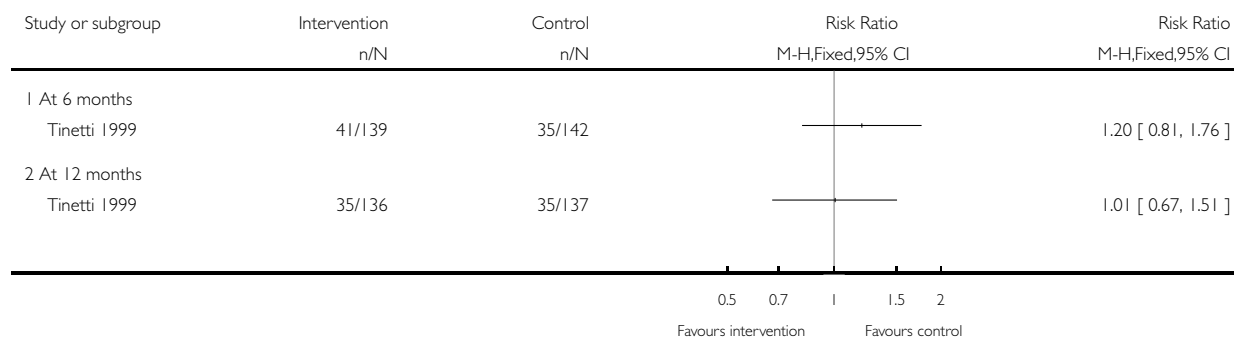


Analysis 8.3. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 3 Incomplete recovery of self-care ADL.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 3 Incomplete recovery of self-care ADL

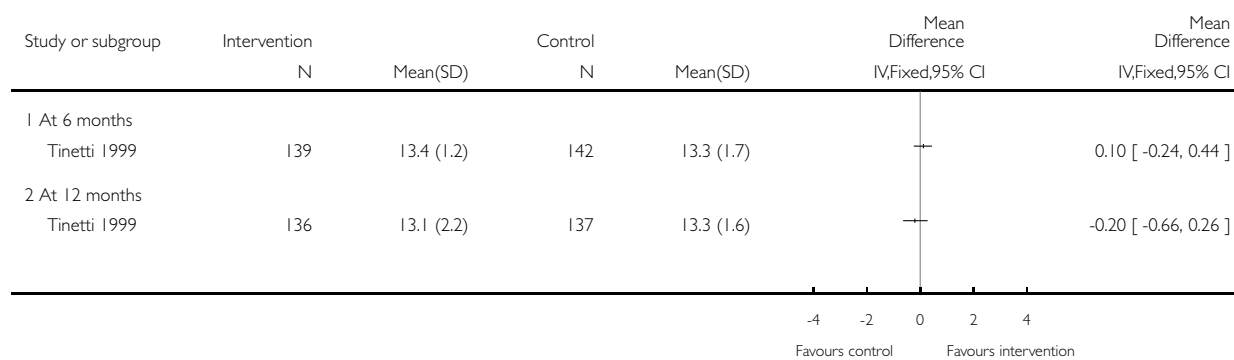


Analysis 8.4. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 4 Personal/self-care ADL (0 to 14: best).

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 4 Personal/self-care ADL (0 to 14: best)

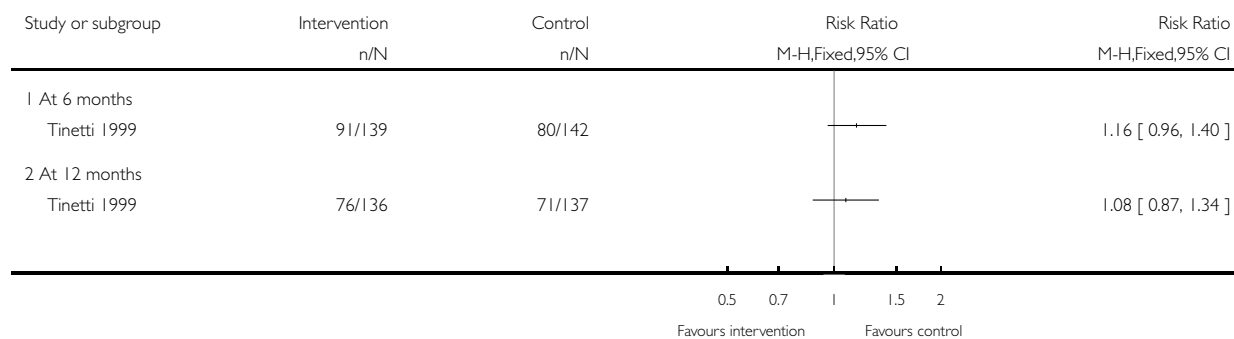


Analysis 8.5. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 5 Incomplete recovery of home management ADL.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 5 Incomplete recovery of home management ADL

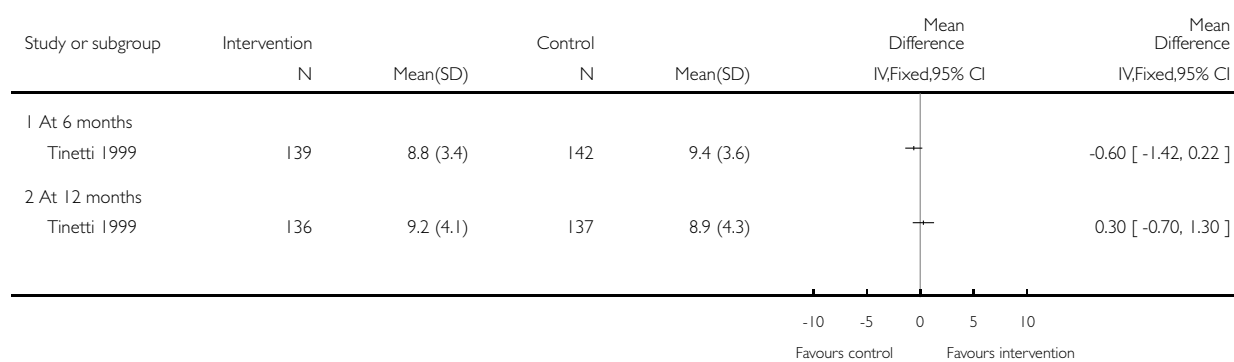


Analysis 8.6. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 6 Home chores/management ADL (0 to 14: best).

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 6 Home chores/management ADL (0 to 14: best)

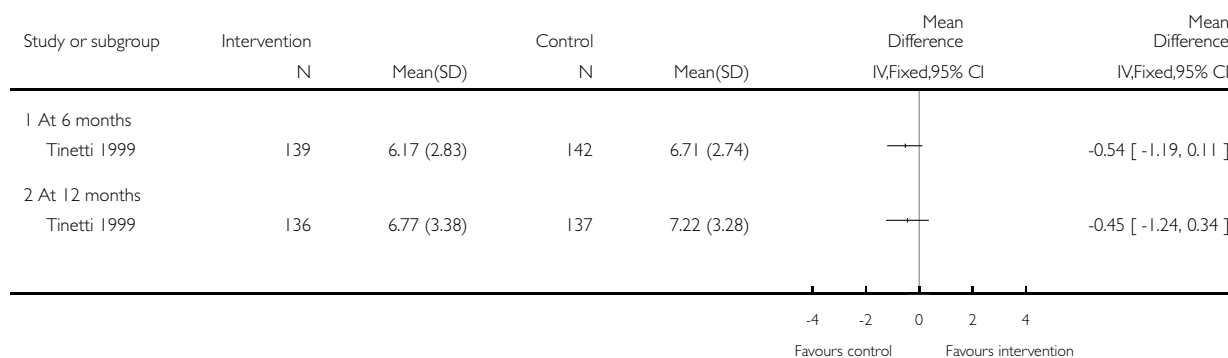


Analysis 8.7. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 7 Social activity (0 to 20: best).

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 7 Social activity (0 to 20: best)

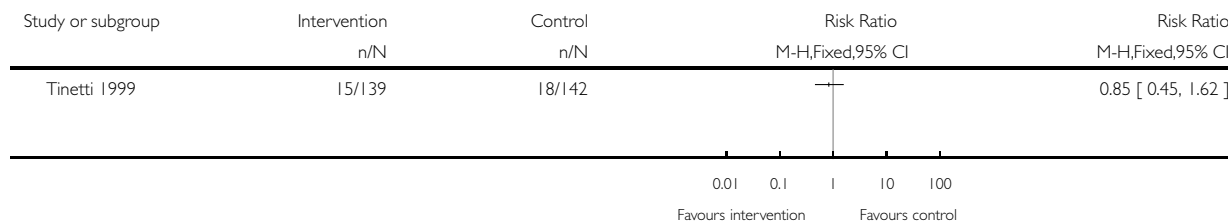


Analysis 8.8. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 8 Readmission by 6 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 8 Readmission by 6 months

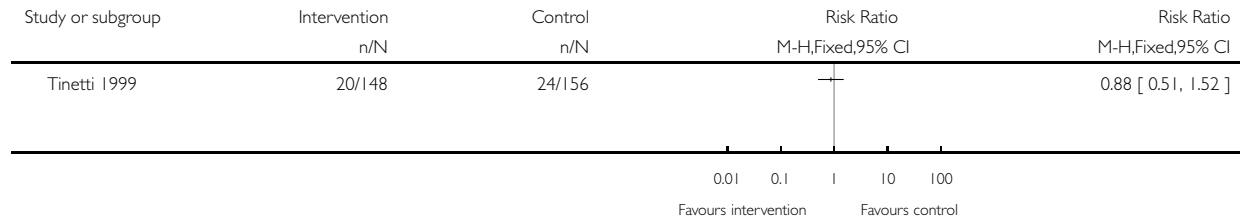


Analysis 8.9. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 9 Mortality and readmission at 6 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 9 Mortality and readmission at 6 months

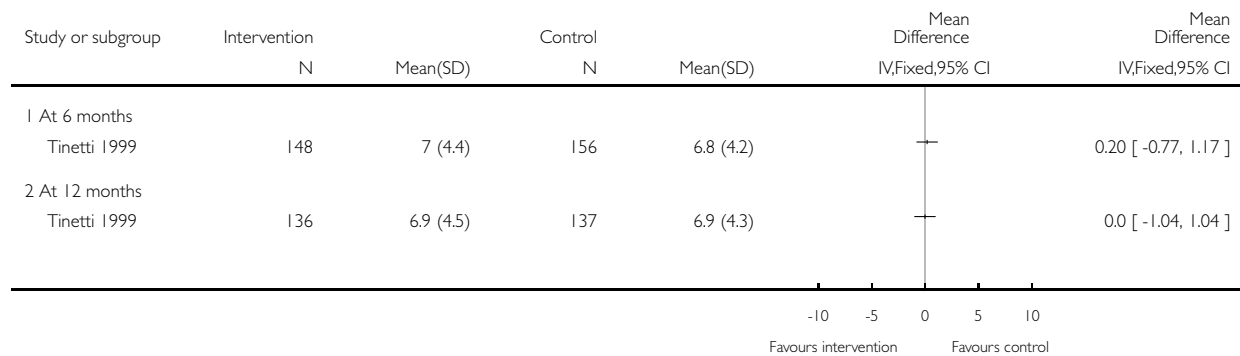


Analysis 8.10. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 10 Depressive symptoms (depression scale).

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 10 Depressive symptoms (depression scale)



Analysis 8.11. Comparison 8 Home based rehabilitation versus usual care: post discharge, Outcome 11 Participants reporting falls by 6 months.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 8 Home based rehabilitation versus usual care: post discharge

Outcome: 11 Participants reporting falls by 6 months

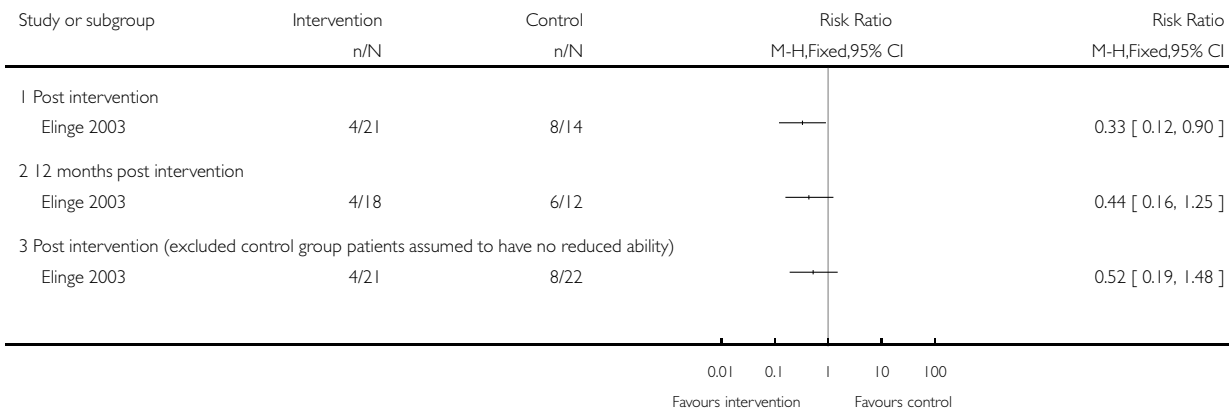


Analysis 9.1. Comparison 9 Group learning program versus usual care: post discharge from rehabilitation, Outcome 1 Patient perceived reduced ability to participate in social life.

Review: Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people

Comparison: 9 Group learning program versus usual care: post discharge from rehabilitation

Outcome: 1 Patient perceived reduced ability to participate in social life



APPENDICES

Appendix I. Search strategies

MEDLINE and EMBASE (Ovid interface)

1. exp Femur/
2. Fractures, Bone/ or exp Fracture Fixation/ or Fracture Healing/
3. and/1-2
4. ((hip* or pertrochant* or intertrochant* or trochanteric or subtrochanteric or extracapsular* or ((femur* or femoral*) adj3 (neck or proximal))) adj4 fracture*).tw.
5. exp Human Activities/
6. Quality of Life/
7. Social Support/
8. exp "Outcome and Process Assessment (Health Care)"/
9. Health Facilities/or Ambulatory Care Facilities/ or Community Health Centres/ or Outpatient Clinics, Hospital/ or Rehabilitation Centres
10. Hospitals, Convalescent/ or Hospitals, Osteopathic/
11. Community Health Services/ or Community Health Nursing/ or Counselling/ or Home Care Services, Hospital-Based/ or Health Services For The Aged/ or Social Work/ or Exp Nursing Care/ or Home Care Services/ or Home Nursing/
12. Hospitals, Community/ or Hospitals/
13. exp Comprehensive Health Care/ or Continuity of Patient Care/ or Patient Care Team/
14. (functional status or functional outcome* or ambulation).tw.
15. exp Health Status/ or Recovery of Function/
16. Rehabilitation Nursing/
17. ((geriatric or inter?disciplinary or multi?disciplinary or early or post?operative or post?surgical or home* or intensive or accelerated or intervention or functional) adj2 (intervention or care or rehabilitation or program* or approach or group or recovery)).tw
18. Rehabilitation/ or Early Ambulation/ or Exp Exercise Therapy/ or Occupational Therapy/ or Rehabilitation, Vocational/
19. Health Education/ or Patient Education as Topic/
20. Patient Care/ or Aftercare/ or Ambulatory Care/ or Day Care/ or Postoperative Care/
21. Postoperative Period/
22. Outpatients/
23. Social Adjustment/ or Adaptation, Psychological/
24. Mental Health/
25. Self Efficacy/
26. psychosocial.tw
27. or/5-26
28. exp Aged/ or Middle Aged/
29. older people.mp.
30. geriatr*.mp.
31. or/28-30
32. Randomized Controlled Trial.pt.
33. Controlled Clinical Trial.pt
34. randomized.ab.
35. placebo.ab.
36. Clinical Trials as Topic/
37. randomly.ab.
38. trial.ti.
39. or/32-38
40. Humans/
41. and/39-40
42. (3 or 4) and 27 and 31 and 41

PsycINFO (Ovid interface)

1. Hips/
2. fracture*.tw.
3. ((hip* or pertrochant* or intertrochant* or trochanteric or subtrochanteric or extracapsular* or ((femur* or femoral*) adj3 (neck or proximal))) adj4 (fracture* or injur*)).tw.
4. (1 and 2) or 3
5. randomly.ab.
6. randomized.ab.
7. placebo.ab.
8. trial.ti.
9. (clinic* adj25 trial*).tw.
10. ((singl* or doubl* or trebl* or tripl*) adj (mask* or blind*)).tw.
11. Placebo/
12. placebo*.tw.
13. exp Clinical Trials/
14. or/5-13
15. limit 14 to human
16. 4 and 15

AMED (Ovid interface)

1. exp Femoral fractures/ or (exp Femur/ and exp Surgery operative/)
2. (hip* or intertrochant* or trochant* or intracapsular or extracapsular).mp. [mp=abstract, heading words, title]
3. ((femur* or femoral*) adj3 (neck or proximal) adj4 fracture*).mp. [mp=abstract, heading words, title]
4. 1 or 3 or 2
5. ((geriatric or inter?disciplinary or multi?disciplinary or early or post?operative or post?surgical or home* or intensive or intervention or functional) adj2 (intervention or care or rehabilitation or program* or approach or group or recovery)).mp. [mp=abstract, heading words, title]
6. exp Health Administration/ or "delivery of health care"/
7. exp Health/
8. "Quality of life"/
9. Patient assessment/ or "Activities of daily living"/ or Clinical assessment scales/ or Disability evaluation/ or Geriatric assessment/ or Pain measurement/ or exp Physical examination/
10. Treatment outcome/
11. ((recovery adj2 function) or (functional adj2 status) or (functional adj2 outcome*)).mp. [mp=abstract, heading words, title]
12. 8 or 6 or 11 or 7 or 10 or 9 or 5
13. 4 and 12
14. Clinical trials/ or Randomized controlled trials/
15. trial.m` titl.
16. (random or randomi?ed or rct*).mp. or placebo.ab. [mp=abstract, heading words, title]
17. 16 or 15 or 14
18. 13 and 17

CINAHL (EBSCOhost interface)

- 1 ((MH "Femoral Fractures+") or (MH "Femur/SU")) or (femur* or femoral* N3 neck or proximal N4 fracture*) or (hip* or pertrochant* or intertrochant* or trochanteric or subtrochanteric or extracapsular*)
- 2 geriatric or inter* or multi* or early or post* or home* or intensive or intervention or functional N2 intervention or care or rehabilitation or program* or approach or group or recovery
- 3 (MH "Rehabilitation+") or (MH "Geriatric Assessment+") or (MH "Health Status+") or (MH "Quality of Life+")
- 4 (MH "Quality of Health Care+") or (MH "recovery") or recovery N2 function or (functional N2 status or outcome*)
- 5 S1 and (S2 or S3 or S4)
- 6 (MH "Clinical Trials+") or TI trial or AB (random* or rct* or placebo)

PEDro (available at pedro.org.au)

Abstract & title: fracture*

Body part: thigh or hip

Method: clinical trial

HISTORY

Protocol first published: Issue 1, 2009

Review first published: Issue 1, 2010

| Date | Event | Description |
|------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 17 February 2009 | New citation required and minor changes | Addition of psycINFO search strategy to protocol. Further details of the risk of bias assessment added. New author added |
| 12 November 2008 | New citation required and major changes | First protocol version published |

CONTRIBUTIONS OF AUTHORS

MC and KU planned the review protocol with input from IC and MM. LC co-ordinated the search with support from the Trial Search Co-ordinator of the Cochrane Bone, Joint and Muscle Trauma Group. MC and KU led the selection of trials while MM led the evaluation of trials.

MC and KU independently screened the article abstracts and agreed on the short list of trials for inclusion. Where opinion differed MM arbitrated.

MC, KU, MM and LC extracted data independently, MM was responsible for entering into RevMan and reporting on data analysis.

MC, KU, MM and LC performed independent quality assessment and then agreed on the final risk of bias scores for articles included in the analysis. GR reviewed the methodology.

All authors contributed to the final write-up and discussion.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- Flinders University, Australia.

Infrastructure to support the review authors affiliated with this institution.

- Duke University, USA.

Infrastructure to support the review author affiliated with this institution.

- University of Sydney, Australia.

Infrastructure to support the review author affiliated with this institution.

- Charles R Drew University, USA.

Infrastructure to support the review author affiliated with this institution.

External sources

- The Cochrane Collaboration Prioritisation Project Fund, UK.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We introduced a new primary outcome: 'poor' outcome, which is defined as death, hospital readmission or failure to return to independent living.

In assessing risk of bias for blinding and incomplete outcome data, we just considered that relating to primary outcomes only rather than, as stated in the protocol, by primary outcomes, other subjectively-assessed outcomes, clinically-assessed outcomes, and 'hard' outcomes such as mortality.

INDEX TERMS

Medical Subject Headings (MeSH)

Hip Fractures [*psychology; *rehabilitation]; Randomized Controlled Trials as Topic

MeSH check words

Aged; Humans