Authors' objectives
To analyse published hospital fall prevention programmes to determine whether there is any effect on fall rates; to review the methodological quality of such programmes and the range of interventions used; and to provide directions for further research.

Searching
MEDLINE and CINAHL were searched from 1974 to 1999 using combinations of the search words 'Accident', 'Accidental', 'Older', 'Falls', 'Hospital', 'Inpatients', 'Institution', 'Patients' and 'Prevention'. Secondary references from papers, review articles, and authoritative texts were also sought.

Study selection

Study designs of evaluations included in the review
The authors did not specify any inclusion or exclusion criteria relating to the study design.

Specific interventions included in the review
The authors specified only that included articles should describe an intervention to prevent falls in the hospital setting.

The included studies were classified according to whether seven interventions were involved: risk assessment, an education or awareness programme, equipment checks, labels or bracelets for high-risk patients, use of alarms, use of restraints, or a tailored nursing care plan.

Participants included in the review
The authors did not specify any inclusion or exclusion criteria relating to the study participants, and no details of the included participants were reported.

Outcomes assessed in the review
The authors stated that the included papers should describe a fall rate with and without the intervention.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
The authors do not state that they assessed validity.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction. Data were extracted from primary studies on study setting, intervention, study design, and results (fall rates).

Methods of synthesis
How were the studies combined?
A random-effects meta-analysis was used to summarise the overall effect size (see Other Publications of Related Interest no.1), with Begg's test used to check for publication bias (see Other Publications of Related Interest no.2). Separate meta-analyses were conducted of the 3 controlled trials (2 RCTs and 1 prospective study with parallel control) and 7 prospective studies with historical controls. In the remaining 11 prospective studies with historical controls, only
fall rates were described, and these studies could not be subjected to meta-analysis. All the studies for which standard errors could be calculated used risk assessment. The authors checked for differences in outcome between studies using and not using this intervention. Separate meta-analysis regressions were performed using restricted maximum likelihood for each of the other six interventions, in order to determine differences in outcome between studies using or not using that intervention (see Other Publications of Related Interest nos.3-4).

How were differences between studies investigated?
The authors do not state a method for assessing any differences between the studies.

Results of the review
A total of 21 studies were included in the review: 2 randomised controlled trials (RCTs), 1 prospective study with parallel control, and 18 prospective studies with historical control. The numbers of study participants were not reported.

Ten of the 21 included trials contained sufficient data to allow the calculation of confidence intervals (CIs). A rate ratio of less than one indicated a reduction in fall rate resulting from an intervention. The pooled rate ratio for the 2 RCTs and 1 prospective study with parallel control was 1.0 (95% CI: 0.60, 1.68). For the 7 prospective studies with historical controls, the pooled rate ratio was 0.76 (95% CI: 0.65, 0.88). The pooled effect ratio from all 10 studies was 0.79 (95% CI: 0.69, 0.89). The individual components of interventions showed no significant benefit.

Authors' conclusions
The pooled effect of an approximately 25% reduction in the fall rate may result from the intervention, but may also be biased by studies using historical controls that do not allow for historical trends in the fall rate before and during the intervention. The RCTs’ apparent lack of effect might be due to a change in practice when patients and controls were in the same unit at the same time during a study. Studies did not analyse compliance with the intervention or opportunity costs resulting from the intervention. Research and clinical programmes in hospital fall prevention should pay more attention to study design and the nature of the interventions.

CRD commentary
The objectives of the review were broad but clearly defined. All reports of fall prevention programmes in hospital inpatients were eligible for inclusion.

The search strategy reported was appropriate for the non-specific nature of the review question, and was likely to have resulted in near complete retrieval of the available published literature. There were no reported language restrictions, and there was no attempt to retrieve unpublished data. Begg’s analysis, however, did not suggest the presence of significant publication bias.

No method for assessing the validity of included trials was reported. The presence of methodological bias in some form is highly likely, given the wide range of study methodologies described and the lack of quality-related inclusion and exclusion criteria.

Details of the study design and results of included trials were presented in tabular form. There were some discrepancy between the abstract, results tables and the text of the results regarding the number of prospective studies with historical controls where only fall rates were described. In addition, details of the study participants were almost completely absent, thus raising concerns about the external validity and generalisability of the review’s findings.

The studies were appropriately combined and the data analysis was thorough. The authors’ conclusions are suitably cautious given the apparent heterogeneity of the primary studies.

Implications of the review for practice and research
Practice: The authors state that as there seemed to be no demonstrable benefit of restraint, and because there are concerns about the appropriateness of these interventions in these patients, this study does not support the use of restraints in patients at risk of falling.
Research: The authors state that in seeking to make the case for hospital fall prevention programmes, more thought needs to be given to study design. If it is only practicable to apply fall prevention programmes to entire wards or units, RCTs could be organised on a multicentre basis. One approach would be to pair up similar wards and decide randomly which will get and which will not get the intervention. If it is felt that all centres should receive the intervention, a 'stepped wedge' version of this design can be used in which only the order of randomisation is varied. In addition, end points other than fall prevention need to be included in the analysis to determine other consequences, e.g. adverse consequences, of these programmes on patient care.

Bibliographic details

PubMedID
11129762

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Accidental Falls /prevention & control /statistics & numerical data; Confidence Intervals; Health Services Research; Hospital Administration; Humans; Program Evaluation; Prospective Studies; Randomized Controlled Trials as Topic; Regression Analysis; Research Design; Risk Assessment; Risk Factors; Risk Management /organization & administration; Safety Management /organization & administration

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.