Physical restraint in acute and residential care: a systematic review

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Authors’ objectives
To investigate the effectiveness of physical-restraint minimisation (defined as any coordinated effort to minimise the use of physical restraint) in acute and residential care settings, and to investigate physical restraint-related injuries.

Searching
The following databases were searched: CINAHL, MEDLINE, Current Contents, the Cochrane Library, PsycINFO, EMBASE, HealthSTAR and Expanded Academic ASAP. In addition, Dissertation Abstracts International was searched for unpublished studies, and the reference lists of all identified articles and reports were checked. The search terms were reported.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for restraint minimisation. In the absence of RCTs, controlled trials, before-and-after studies, observational studies, and case studies were eligible. RCTs and observational studies were eligible for physical restraint. To determine the type and severity of injuries that occurred, any study or case report that reported injury associated with physical restraint devices was eligible.

Specific interventions included in the review
Studies of restraint minimisation and physical restraint were eligible.

Participants included in the review
Studies of adults in acute or residential care settings were eligible.

Outcomes assessed in the review
The outcomes of interest for restraint minimisation included restraint use, falls, injury or psychoactive drug use. The outcomes of interest for physical restraint included outcomes related to direct or indirect injury. Direct injury referred to physical injury resulting directly from the external pressure of the restraint, e.g. lacerations, strangulation and bruising, whereas indirect injury referred to adverse outcomes, e.g. mortality rate and duration of hospitalisation.

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

Assessment of study quality
For restraint minimisation, RCTs were assessed for risk of bias relating to allocation, treatment, detection and follow-up. The authors did not state who performed this assessment.

The validity of studies relating to physical restraint was not formally assessed.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
For restraint minimisation, the studies were combined in a narrative according to whether they were acute or residential...
care, and the synthesis was supported by tabular summaries. For physical restraint, odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. The studies were pooled using a fixed-effect model. When statistical pooling was not appropriate, the findings were synthesised narratively.

How were differences between studies investigated?
For restraint minimisation, the results were presented according to type of care setting (residential or acute). The authors stated that it was not possible to pool the findings of the studies due to differences in study design. For physical restraint, heterogeneity between combined studies was investigated using the chi-squared test.

Results of the review
There were 16 studies relating to restraint minimisation: 13 residential care (1 RCT, 1 controlled trial and 11 before-and-after studies) and 3 acute care (all before-and-after studies). There were 31 studies relating to physical restraint: 14 observational, 6 descriptive, 9 case and 2 before-and-after studies. The total number of participants was not stated.

Restraint minimisation in acute care (3 before-and-after studies): the findings of 2 before-and-after studies (one using a programme of policy change and the development of strategies for managing geriatric medical patients, and another using a programme of policy change and education) suggested that it was possible to reduce the use of physical restraint. However, a third study (using education programme and case conferences) showed that at 12 months, restraint was increased to higher than the pre-intervention level.

Restraint minimisation in residential care (1 RCT, 1 controlled trial and 11 before-and-after studies): restraint education and education supported by expert consultation safely reduced the use of physical restraint in the single RCT. The controlled trial and before-and-after studies supported the effectiveness of restraint education. There was no evidence of an increase in falls or serious injury. There was some evidence to suggest an increase in minor injuries following restraint.

Physical restraint in acute care, indirect injury (pooled results of observational studies).

Restrained patients were less likely to survive and be discharged home (2 studies; OR 12.42, 95% CI: 7.16, 21.52, P=0.19). Restrained patients were more likely to die during hospitalisation (3 studies; OR 11.24, 95% CI: 6.07, 20.83, P=0.93).

Restrained patients were more likely to acquire a nosocomial infection (2 studies; OR 3.46, 95% CI: 1.93, 6.22, P=0.34).

Restrained patients were more likely to fall (2 studies; OR 6.76, 95% CI: 3.44, 13.39, P=0.19).

In the acute care setting, restrained patients were also more likely to have an increased length of stay in hospital than patients who were not restrained.

Physical restraint in residential care, indirect injury (pooled results of observational studies). Restrained patients were just as or more likely to fall (2 studies; OR 1.72, 95% CI: 1.26, 2.35, P=0.00).

Restrained patients were more likely to have a serious fall-related injury (1 study; OR 3.60, 95% CI: 1.79, 7.27, P=0.00).

Restrained patients were more likely to suffer a falls-related fracture (1 study; OR 4.89, 95% CI: 1.79, 13.36, P=0.00).

In the residential care setting, restraint was also associated with a decline in social behaviour, and cognition and mobility; and an increase in disorientation, development of pressure sores, and bladder or bowel incontinence.

Authors’ conclusions
For restraint minimisation, the available evidence indicated that, through a combination of expert clinical consultation and education, physical restraint can be safely reduced in residential care settings. There was little evidence relating to
restraint minimisation in acute care settings. There is a need for further investigation into all aspects of restraint minimisation.

For physical restraint, there is a need for further investigation into the use of physical restraint in health care facilities. Further research should investigate the magnitude of the problem and specific restraint devices associated with injury. However, given the limited nature of the evidence, the association should be evaluated using rigorous research methods.

**CRD commentary**
The review question was clearly stated and supported by pre-specified inclusion criteria. The literature search was thorough with attempts to identify unpublished studies, although it was unclear whether studies in languages other than English were sought and included. In addition, publication bias did not appear to have been assessed. No details of the review process, such as how decisions on the relevance of primary studies were made or how the data were extracted, were reported. It is therefore unclear whether steps were taken to minimise bias in this process. Only the validity of RCTs was assessed; however, the review contained only one RCT. It is therefore unclear whether the results of the included studies, and hence the synthesis of them, is reliable.

Details of the studies were clearly presented in tabular format and in an appendix. Some studies of physical restraint were statistically pooled, even though the results of the chi-squared test indicated statistical heterogeneity. These pooled results should, therefore, be treated with caution. The authors appropriately conclude that further research is warranted.

**Implications of the review for practice and research**
Practice: For restraint minimisation, the authors stated that restraint education supported by clinical consultation is effective for the safe reduction of physical restraint in residential care settings. Combining staff education and a programme of multiple restraint-minimisation activities reduces the use of physical restraint without an increase in falls or serious injury in residential care settings.

For physical restraint, the authors stated that the most important implication is that the use of physical restraints brings a risk of adverse outcomes, which may be direct or indirect injuries. Further details were reported.

Research: For restraint minimisation, the authors stated that there is a need for investigations into many aspects of restraint minimisation, particularly in acute care settings. Further details were reported.

For physical restraint, the authors stated that there is an urgent need for research into the use of physical restraints in health care facilities. The magnitude of the problem needs further examination, as do issues associated with short versus long and intermittent versus continuous restraint. Restraint minimisation, and methods by which this can be safely achieved, should be investigated as a priority.

**Bibliographic details**

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by CRD

**MeSH**
Accidental Falls /prevention & control; Acute Disease; Aged; Critical Care /methods; Education, Nursing, Continuing; Geriatric Nursing /methods; Program Evaluation; Residential Facilities /organization & administration /standards; Restraint, Physical /utilization

AccessionNumber
12003008007

Date bibliographic record published
30/09/2004

Date abstract record published
30/09/2004

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.