**Authors' objectives**
To contribute to a new conceptual understanding of delirium by reviewing evidence relating to its prevention, treatment, and outcome (aspects relating to prevention and treatment only will be reported in this abstract).

**Searching**
For prevention studies, MEDLINE (January 1966 - March 1998) and CINAHL (January 1982 - March 1998) were searched using the keywords 'delirium or acute confusion or postoperative psychosis' and 'prevention or treatment or intervention'. Additionally, bibliographies of relevant articles were examined. Only papers published in English and French were sought.

For treatment studies, MEDLINE (January 1987 - December 1997) was searched using the keyword 'delirium' (prevention and control, drug therapy, rehabilitation, therapy). In addition, bibliographies of relevant chapters in major texts, review articles, and other retrieved studies were examined. Only papers published in English were sought.

**Study selection**

**Study designs of evaluations included in the review**
For prevention studies, randomised or non-randomised controlled trials were eligible. For treatment studies, randomised or non-randomised controlled trials and cohort studies (prospective and retrospective) were eligible.

**Specific interventions included in the review**
Interventions designed to prevent delirium included: psychiatric assessment alone; psychiatric assessment, support and reorientation; psychiatric interview; education of patient; education of spouse; special medical and surgical care; special nursing care; and patient controlled analgesia. Interventions were delivered by doctors and/or nurses. In surgical patients, the timing of the intervention could be pre-operative and/or post-operative.

Interventions designed to treat delirium included: pharmacotherapy (narcotics, haloperidol, mianserin, chlorpromazine, and lorazepam) and non-pharmacotherapy (screening for post-operative confusion, then reorientation; post-operative monitoring and intervention; screening for hypoxia and administration of supplementary oxygen for hypoxic patients; geriatric psychiatry consultation; special nursing care; screening, geriatric consultation and follow-up by liaison nurse; and education of house staff to diagnose and manage delirium).

**Participants included in the review**
For prevention, studies of hospitalised elderly patients deemed to be at risk of suffering from delirium were included in the review. Medical and surgical patients were included. Surgical patients were from cardiac, elderly orthopaedic, and elderly surgical wards. The cardiac surgery patients were described as 'middle-aged'. Medical patients were from elderly medical wards. For treatment studies, accepted criteria for delirium had to be used (not explained in the paper). Surgical patients were from cardiac, chest, elderly orthopaedic, and elderly surgical wards. One study recruited older patients with intra-aortic balloon pump for cardiac surgery or cardiac failure. Three studies recruited patients from medical-surgical units for older people. Medical patients were from elderly medical wards and psychogeriatric wards. One study recruited younger people with acquired immunodeficiency syndrome (AIDS).

**Outcomes assessed in the review**
For prevention studies, the outcome was incidence of delirium. For treatment studies, outcomes included the following: incidence of delirium symptoms; post-operative complications; delirium mortality; all-cause mortality; residual symptoms in survivors; length of stay; cognition; anxiety; depression; disposition; function; and side effects of pharmacotherapy.

**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 authors performed the selection.

Assessment of study quality
For both prevention and treatment studies, the methods and design of each trial were assessed according to the six criteria for intervention studies described by the Evidence-Based Medicine Working Group (see Other Publications of Related Interest). The criteria were: randomisation; baseline comparability; equally treated groups; blinded outcome assessment; completeness of follow-up; and use of the intention-to-treat protocol. The above criteria were applied to controlled trials only; the validity of the cohort studies was not assessed. Details such as the number of reviewers involved, and methods used for resolving disagreements, were not provided.

Data extraction
For prevention studies, details of study design, patient population, diagnostic criteria, sample size, interventions, and results were abstracted systematically from each report and tabulated. To compare the effect of the interventions, the incidence rate of delirium as measured in each study in treatment and control groups was determined, and the absolute risk reduction (ARR) was calculated.

For treatment studies, details of study design, patient population, sample size, type of interventions, length of follow-up, outcome measures, and results, were abstracted systematically from each report and tabulated.

Methods of synthesis
How were the studies combined?
For both prevention and treatment studies, results were combined by narrative summary.

How were differences between studies investigated?
There were no systematic assessments of heterogeneity for either prevention or treatment studies. However, for prevention, the incidence of delirium across different studies was examined.

Results of the review
For prevention studies, ten trials were included overall, including eight of surgical patients, and two of medical patients. Four were randomised controlled trials (RCTs) and six were non-randomised trials. The overall number of participants was 1,051 (489 in treatment groups, and 562 controls).

For treatment studies, 13 studies were included overall, including six pharmacotherapy and seven non-pharmacotherapy evaluations. Three were RCTs, six were non-randomised trials, three were prospective cohort studies, and one was a retrospective cohort. The overall number of participants was 1,395.

Prevention studies (10 trials overall; 8 surgical and 2 medical): The incidence rate of delirium among treatment groups ranged from 2% to 59%, and among control groups the range was 0% to 78%. The ARRs for delirium among surgical patients (included middle-aged and elderly patients) ranged from -13% to 19% (median 13%), and -3% to 3% among elderly medical patients. ARRs were similar for younger and older surgical patients. In surgical patients, five interventions involving psychiatric or medical assessment, support, education, or reorientation appeared to be equally beneficial, irrespective of the personnel involved (doctor versus nurse versus both), the timing of the intervention (pre-operative versus post-operative), or sample size. The intervention of patient-controlled analgesia appeared to virtually eliminate the occurrence of delirium in a frail, elderly surgical population.

Treatment studies (13 studies overall; 6 pharmacotherapy, 7 non-pharmacotherapy):

Non-pharmacotherapy interventions appeared to have a beneficial effect on the cognitive and functional status of younger and older delirious surgical patients and a modest beneficial effect on elderly delirious medical patients. For pharmacotherapy, results from one RCT suggested that haloperidol and chlorpromazine were more useful than lorazepam in improving delirium in younger AIDS patients, one cohort study reported that haloperidol was more...
useful than narcotics in controlling delirium in older cardiac patients, and two non-randomised trials reported that mianserin was as effective as haloperidol in controlling symptoms in older medical-surgical and psychiatric patients. 

For both prevention and treatment studies, there were frequent flaws in study design, including non-randomised designs, differences between treatment and control groups at baseline, and outcomes not rated blind.

Findings from a third literature review of outcome (prognostic) studies suggested that better premorbid function (i.e. admission from home or to a surgical unit) was the most important predictor of better outcomes.

Authors’ conclusions

It is difficult to draw firm conclusions due to three methodological problems in the primary literature, namely: the search strategies yielded a relatively small number of studies; many studies had limitations in design and methods; and limited interpretation of results due to heterogeneity of patient populations and interventions.

Despite the limitations, there are four major findings in this review. 1. A broad spectrum of interventions appear to be modestly effective in preventing delirium in young and old surgical patients but not elderly medical patients; the study of patient-controlled analgesia is noteworthy.

2. Systematic detection and treatment programmes and special nursing care appear to add large benefits to traditional medical care in young and old surgical patients and modest benefits in elderly medical patients; the more precise the target of the programme, the greater the benefit.

3. Pharmacological interventions may be useful in surgical and medical patients.

4. Delirium in the elderly has a poor prognosis but good levels of premorbid function seem to be related to better outcomes in all patient populations.

CRD commentary

Although one review question is presented, the paper is presented as three different literature reviews: prevention, treatment, and outcome (prognosis).

For each review, useful study details are presented in tables, including those relating to validity for RCTs and non-randomised trials. However, the authors did not assess the validity of cohort studies, eligible for the treatment review. Given the heterogeneous nature of the included studies, the authors’ decision to combine the data by narrative summary was appropriate. However, the results of tests of statistical significance from individual evaluations are not relayed as part of the review.

Different search strategies are used for each review; in each case the sources accessed and search terms used are provided. However, language restrictions (different for each review), failure to access other relevant sources (e.g. PsycLIT), and lack of a strategy to locate unpublished data, may mean that relevant material was omitted. This is particularly of concern in the treatment review, which did not access MEDLINE from inception.

Different study selection criteria are used for each review. For prevention studies, the criteria stipulated elderly hospitalised patients, however, four out of ten included trials recruited middle-aged patients. One trial included patients with a diagnosis of delirium at baseline, and therefore the condition could not be prevented by hospital intervention. Although non-randomised studies were eligible according to the review’s inclusion criteria, non-randomisation was later identified as a serious methodological flaw for both prevention and treatment studies.

No details are provided of the review process (i.e. how many reviewers involved in study selection, validity assessment, and data extraction, whether assessment was independent, and how disagreements were resolved).

The authors emphasise one particular study (involving patient-controlled analgesia), however, this study was small and had a low incidence of delirium in both treatment and control groups relative to many other studies, so it is possible that the study sample was drawn from a low risk population.
Overall, the authors conclusions appear to follow on from the evidence presented, and the authors rightly highlight the high level of heterogeneity between studies.

**Implications of the review for practice and research**

Practice: The authors did not state any implications for practice.

Research: The authors stated that controlled trials should replicate the effectiveness of patient controlled analgesia and education interventions.

Controlled trials of systematic detection and intervention programmes and special nursing care should target populations specified by age, premorbid level of cognition and function, surgical or medical illness, and expected complications. These trials should attempt to determine the impact of early detection alone on outcomes.

Controlled trials should replicate the efficacy of haloperidol, chlorpromazine, and mianserin in managing the symptoms of delirium.

New pharmacological treatments should be developed by exploring the usefulness of drugs that influence cholinergic, GABAergic, or serotonergic transmission.

**Bibliographic details**


**PubMedID**

9894731

**Other publications of related interest**


**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Age Factors; Aged; Aged, 80 and over; Clinical Trials as Topic /statistics & numerical data; Delirium /mortality /prevention & control /therapy; Female; Humans; Inpatients /statistics & numerical data; Institutionalization; Length of Stay; MEDLINE; Male; Middle Aged; Outcome and Process Assessment (Health Care) /methods; Risk Factors; Survival Rate; Treatment Outcome

**AccessionNumber**

11999000205

**Date bibliographic record published**

30/06/2000

**Date abstract record published**

30/06/2000

**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.