The influence of drug use on fall incidents among nursing home residents: a systematic review
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CRD summary
The review found that multiple psychotropic drugs, antidepressants and anti-anxiety drugs increased fall risk in nursing home populations with residents with dementia. Deficiencies in the strategy for identification of studies, heterogeneity in the categorisation of psychoactive drugs and potential misclassification of both falls and drug use mean the authors' conclusions should be treated with caution.

Authors' objectives
To assess the influence of psychoactive drugs on gait and risk of falling in nursing home residents with dementia.

Searching
MEDLINE, CINAHL, PsycLIT and The Cochrane Library were searched from 1980 to October 2007 for relevant studies written in English, French, German or Dutch; search terms were reported. Reference lists of retrieved studies were searched.

Study selection
Published studies were eligible if they were randomised controlled trials (RCTs) or prospective cohort studies that included residents with dementia in the study population of nursing home residents where psychoactive medication use was studied and falls and gait parameters were measured. Studies that excluded residents with advanced dementia from participation in the study were excluded.

In the included studies, the proportion of nursing home residents with cognitive impairment or dementia ranged from 22% to 82% (where reported). In two studies it was unclear which patients were from nursing homes and which were in intermediate care facilities. Most residents were female. Mean age was over 80 years. Most studies ascertained falls from medical records or nursing home charts and from incidence reports. Falls were categorised as recurrent, injurious, occurring in day time, occurring at night time or falls not otherwise specified. None of the studies provided data on the association of gait and psychoactive drug use. The Minimum Data Set was used by most studies to ascertain psychoactive drug use. Psychoactive drugs included hypnotics, sedatives, anti-anxiety drugs, benzodiazepines, anti-psychotics and antidepressants.

Two reviewers independently performed selection of studies in a two-stage process (reviewing of titles and abstracts and screening of full text papers). Differences were resolved by discussion.

Assessment of study quality
Two reviewers independently assessed study quality using a nine-item cohort study checklist from the Dutch Cochrane Centre; questions were included on selection and information bias, loss to follow-up/sufficiently long follow-up and confounding. Questions were scored as positive, negative or insufficient information provided. Studies were considered high quality if six or more of the first eight questions were scored as positive; otherwise, studies were considered low quality.

Differences in scoring between the two reviewers were resolved by discussion or, if necessary, consultation with a third reviewer. Inter-observer agreement on quality scoring was measured by kappa statistics.

Data extraction
Data on incidence of falls, gait parameters and psychoactive drug use were extracted from the included studies and results (crude and adjusted estimates) from individual studies provided in tables. Outcome estimates included odds ratios (OR), relative risks (RR), hazard ratios (HR), incidence rate ratios (IRR) and incidence density ratios (IDR), and
their 95% confidence intervals (CIs).

Two reviewers extracted data using a standardised form from the Dutch Cochrane Centre. Disagreements were resolved by consensus.

Methods of synthesis
Studies were synthesized in narrative format with details for individual studies included in tables. Syntheses included the proportion of studies that reported positive and negative results. Subgroup analysis was undertaken according to type of psychoactive drug.

Results of the review
Seventeen prospective cohort studies (total n not calculated as sample size of one study not reported, range from 78 to 34,163 participants) were included in the review. No RCTs were identified. Three of the included studies represented multiple publications of one study. Sixteen studies were high quality and one study was low quality. No studies reported blinding. Follow-up ranged from one month to two years.

Use of multiple psychotropic drug regimens (effect sizes ranging from 1.3 to 10.3; three of three studies), antidepressants (effect sizes ranged from 1.1 to 7.6; 10 of 12 studies) and anti-anxiety drugs (effect sizes ranged from 1.2 to 1.3; two of two studies) were associated with increased risk of fall. There was no evidence of an association between other psychoactive drug classes with fall risk (28 studies).

Authors' conclusions
Multiple psychotropic drugs, antidepressants and anti-anxiety drugs increased fall risk in nursing home populations with residents with dementia.

CRD commentary
The review addressed a clear research question. Inclusion criteria appeared appropriate, although the studies of nursing home populations did not provide separate analyses of their residents with dementia. This suggests that the review question was able to be addressed specifically and results were relevant only to nursing home populations where some residents had dementia. A number of relevant databases were searched, but language restrictions meant that language bias could not be excluded. No attempts were made to find unpublished studies, so publication bias could not be excluded. Methods used for study selection, validity assessment and data extraction were appropriate. The tool used for validity assessment was appropriate. Most studies were scored as high quality, although none were blinded and some studies did not adjust for confounding. Variation in categorisation and dose of duration of psychoactive drugs meant that the decision to synthesize in narrative format was appropriate. Ascertainment of falls and potential misclassification of drug use from medical records suggested that bias from these data could not be excluded.

Deficiencies in the strategy for identification of studies, heterogeneity in the categorisation of psychoactive drugs and potential misclassification of both falls and drug use mean the authors' conclusions should be treated with caution.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that large prospective studies focused on the contribution of each drug class and dose and duration were needed to assess the relationship between psychoactive drugs and gait or fall risk in nursing home residents with dementia.

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