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Review Article

Interventions for the Treatment of Pain in Nursing Home Residents: A Systematic Review and Meta-Analysis

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A B S T R A C T

Background: More than one-half of nursing home residents experience a complex mix of pain. Despite this, assessment and treatment of pain remain inadequate.
Methods: Using techniques of the Cochrane Collaboration and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, we assessed efficacy of interventions aimed at reducing chronic pain in nursing home residents >65 years of age. We searched for controlled trials comparing and measuring pain interventions using standardized pain scales. Two reviewers independently selected included studies, abstracted data, and assessed risk of bias. We performed meta-analyses calculating standardized mean differences (SMDs) using random effect models.
Results: Fourteen trials (n = 2293) were included in the meta-analysis: 7 reported nonanalgesic treatments, 4 reported analgesic treatments, 5 reported system modifications, and 2 reported educational interventions. A variety of pain scales were used, reporting outcome measures from 1 week to 1 year. Pooled results at trial completion revealed a statistically significant small treatment effect [SMD −0.33, 95% confidence interval (CI) −0.51, −0.14]. Further subgroup analysis revealed that residents receiving analgesic interventions benefited most (SMD −0.65, 95% CI −1.07, −0.23), followed by those receiving educational interventions (SMD −0.40, 95% CI −0.59, −0.21), and those receiving system modification interventions (SMD −0.26, 95% CI −0.51, −0.02).
Conclusions: Nonanalgesic treatment and control groups showed no statistical differences. Our findings suggest that analgesics are the most effective pain intervention and should be considered first-line therapy. Caution should be used in interpreting findings as few trials were included, risk of bias was variable, sample sizes were small, and pooled treatment effects were small to moderate.

With a growth rate 50% higher than average, the population of older adults is rapidly increasing. By 2030, older adults will comprise 20% of the population.[1] Pain is common in older adults, with at least 60% to 75% of individuals experiencing chronic pain that is most often attributable to musculoskeletal conditions.[2] Although older adults are more likely to define their pain as moderate (60%) rather than severe (25%), pain prevalence rises steadily with age.[2,3] Many community-dwelling older adults experience pain, but the highest rates occur among nursing home residents, with 45% to 80% of residents affected.[4] Not only is this condition common, it is also costly. In 2010, in the US alone, costs to the healthcare system were reportedly between $560 to $635 billion, exceeding the individual cost of cancer, heart disease, and diabetes.[5]

Description of the Condition

Nursing home residents experience a complex mix of chronic disorders (such as musculoskeletal or neurologic disorders) and acute conditions (such as fractures or falls), many associated with pain.[6–8] The consequences of untreated pain include unnecessary suffering, disruptive behavioral responses, decreased socialization, impaired quality of life, sleep disturbances, functional loss, and further cognitive decline leading to increased care demands and cost.[2,9–11] Despite this, assessment and treatment of pain remain inadequate.[3,12] Unfortunately, barriers to effective pain management for nursing home

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residents are numerous, including high rates of concurrent illness, underassessment and underreporting of pain, complex clinical manifestations of pain, and higher chance of medication-related side effects.[7] In addition, residents with cognitive or communication barriers are often unable to report pain, thus, healthcare staff fail to recognize the behaviors that suggest the presence of pain.[13]

Description of the Intervention

Despite the fact that pain is often undertreated in nursing home residents, there are interventions with varying levels of effectiveness including both pharmacologic and nonpharmacologic approaches. The treatment of choice depends on both the type of pain and individual resident factors, including comorbidity, cognitive impairment, concurrent medications, and resident preference. Polypharmacy and decreased drug absorption, metabolism, and excretion in older adults reinforce the need for complementary nonpharmacologic and alternative interventions as adjunct approaches.[2,4,14] Nonpharmacologic interventions include osteopathic manipulative treatment, physical therapy, acupuncture, cognitive behavior therapy, spirituality, and resident and caregiver education.[4]

Relevance of Systematic Review and Meta-Analysis

This review aims to widen the scope of previous systematic reviews, which focused on sole interventions, single painful conditions, or exclusively on the population with dementia, did not measure pain using a standardized tool, and did not include meta-analyses.[3,6,15–17] We provide the first systematic review and meta-analysis following Cochrane guidelines to assess the efficacy of pharmacologic, nonpharmacologic, and alternative therapies for reducing pain in nursing home residents who are older adults (>65 years).[18] This systematic review offers healthcare providers the opportunity to implement evidence based practices while also offering researchers, policy makers, and other stakeholders a concise report of current research in this field.

Objectives

The objectives of this systematic review were (1) to assess the analgesic efficacy of interventions, including nonanalgesic treatments, analgesic treatments, system modifications, and educational programs, aimed at reducing pain in nursing home residents (>65 years of age) with chronic pain; and (2) to provide the first systematic review and meta-analysis on the topic.

Methods

We followed the procedures for systematic reviews and meta-analysis as described in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement[19] and the Cochrane Handbook for Systematic Reviews and Interventions.[18]

Criteria for Considering Studies for This Review

Types of studies

We planned to include all controlled trials: randomized controlled trails, controlled trials, and controlled before-and-after studies. As few true experimental studies exist, we planned to include prospective observational studies if they included a comparison group. Studies needed to evaluate the analgesic effectiveness of interventions that were treatment-based (pharmacologic, nonpharmacologic, or alternative therapies), systems modifications, or educational, with pain measured as a primary or secondary outcome. We defined systems modification as any quality improvement or feedback intervention aimed at improving the process of care delivery, such as implementing care maps.[20] We excluded studies if they lacked a comparison group that received placebo, no intervention, or standard care. Literature published in any language was included but retrospective studies were excluded.

Types of participants

To be eligible for inclusion, participants needed to be >65 years of age or referred to as elderly or aged, be any sex, suffer from chronic pain, and reside permanently in any type of institutional facility including a nursing home or long-term care or residential care facility.

Types of outcome measures

To understand and compare the analgesic efficacy of included interventions, studies needed to assess and measure pain using a quantitative standardized tool, such as a visual analog scale (VAS). A priori we planned subgroup analysis based on timing of outcome reports (eg, baseline, week 2, etc), type of intervention, and dementia status (yes or no). Interventions were classified as (1) nonanalgesic therapies, (2) analgesic therapies, (3) system modifications, or (4) educational interventions.

Search Methods to Identify Studies

We searched for controlled trials in the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (1946–present), EMBASE (1974–present), CINAHL (1937–present), and PsycINFO (1806–present) databases. We assessed gray literature, reference lists of screened papers, and articles of forward citations, and contacted experts in the field for additional sources. All databases were last accessed in January 2016. Our search strategy for MEDLINE can be found in Appendix 1–Supplemental Information File.

Study Selection, Data Extraction, and Analysis

One reviewer (P.P.) independently screened title and abstract of all articles from the initial search. Full-text articles of those passing initial screening were retrieved and reviewed independently by 2 reviewers (P.P., J.S.). If disagreements in opinion occurred, the 2 reviewers resolved them through discussion.

Reviewers (P.P., J.S.) used Cochrane's data extraction checklist to assemble data into an electronic data extraction form.[21] When raw data were not provided, we extracted data from tables or figures. We obtained the following information from each study, where possible: source, eligibility, methods, participants, interventions, outcomes, and results.

Assessment of Risk of Bias in Included Studies

After identifying studies meeting our inclusion criteria, we assessed methodological quality (internal validity) of individual studies using the risk of bias approach of the Cochrane Collaboration.[22] One reviewer (P.P.) constructed a risk of bias table (reviewed by J.S.) that noted random sequence generation (selection bias), allocation concealment (selection bias), blinding of participants and personnel (performance bias), blinding of outcome assessment (detection bias), incomplete outcome data (attrition bias), selective reporting, and other biases. Each criterion was assessed as low risk of bias (answered "yes"), high risk of bias (answered "no"), or unclear or *unknown risk of bias* (answered "unclear").[22] We considered studies to be of high quality if they met all criteria or all but 1 criterion.

Measurement of Treatment Effect

We reported outcomes on continuous scales and expressed them as standardized mean differences (SMDs) with 95% confidence