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Review

Efficacy and Feasibility of Nonpharmacological Interventions for Neuropsychiatric Symptoms of Dementia in Long Term Care: A Systematic Review

Dallas P. Seitz MD^{a,*}, Sarah Brisbin MSc^a, Nathan Herrmann MD^{b,c}, Mark J. Rapoport MD^{b,c}, Kimberley Wilson MSW^d, Sudeep S. Gill MD^e, Jenna Rines^a, Ken Le Clair MD^a, David Conn MB^{c,f}

^aDepartment of Psychiatry, Queen's University, Kingston, Ontario, Canada

^bDepartment of Psychiatry, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada

^cDepartment of Psychiatry, University of Toronto, Toronto, Ontario, Canada

^dCanadian Coalition for Seniors' Mental Health, Toronto, Ontario, Canada

^eDivision of Geriatric Medicine, Queen's University, Kingston, Ontario, Canada

^fDepartment of Psychiatry, Baycrest Centre, Toronto, Ontario, Canada

A B S T R A C T

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Background: Nonpharmacological therapies are often recommended as a first-line treatment for neuropsychiatric symptoms (NPS) of dementia in long term care (LTC); however, little is known about which nonpharmacological interventions are most effective for NPS in LTC or the feasibility of interventions, given the availability of resources in typical LTC environments.

Methods: We searched the electronic databases MEDLINE, EMBASE, PsychINFO (1980–2010), the Cochrane Library, and Google Scholar using keywords and medical subject headings for randomized, controlled trials evaluating nonpharmacological interventions for NPS conducted in LTC settings. Change in severity of NPS symptoms was evaluated through the NPS outcomes measures reported in studies. We assessed study quality and described the feasibility of interventions based on various aspects of study design.

Results: A total of 40 studies met inclusion criteria. Sixteen (40%) of 40 included studies reported statistically significant results in favor of nonpharmacological interventions on at least one measure of NPS. These interventions included staff training in NPS management strategies, mental health consultation and treatment planning, exercise, recreational activities, and music therapy or other forms of sensory stimulation. Many of the studies had methodological limitations that placed them at potential risk of bias. Most interventions (n = 30, 75%) required significant resources from services outside of LTC or significant time commitments from LTC nursing staff for implementation.

Conclusions: There are several nonpharmacological interventions that may be effective for NPS in LTC, although there are a limited number of large-scale, high-quality studies in this area. The feasibility of some interventions will be limited in many LTC settings and further research into practical and sustainable interventions for NPS in LTC is required to improve usage of these important treatments.

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Neuropsychiatric symptoms (NPS) of dementia, also known as behavioral and psychological symptoms of dementia, are common among older adults with dementia in long term care (LTC).^{1,2} NPS can include symptoms such as agitation, psychotic symptoms, including delusions or hallucinations, or aggressive behavior directed toward staff or co-residents.^{3,4} Approximately 60% of individuals in LTC have underlying dementia,¹ and most individuals with dementia will

develop NPS at some point in their illness.^{1,5} NPS among community-dwelling older adults are a risk factor for LTC placement⁶ and NPS are associated with increased costs of care,⁷ and decreased quality of life for individuals with dementia⁸ and their caregivers.^{8,9}

Interventions to treat NPS of dementia can include both non-pharmacological and pharmacological interventions. Psychotropic use is common in LTC with a high prevalence of antipsychotics^{10–15} and benzodiazepines or other sedatives,^{10,13,16} which are all frequently used for NPS. Some classes of psychotropic medications, such as antipsychotics¹⁷ and antidepressants,¹⁸ have evidence to support their use in NPS; however, their effects are generally modest and serious adverse effects associated with antipsychotics, such as cerebrovascular accidents¹⁹ and an increased risk of mortality,^{20–22}

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* Address correspondence to Dallas P. Seitz, MD, Geriatric Psychiatry Services, Providence Care – Mental Health Services, Kingston, Ontario, Canada K7L 4X3.

E-mail address: seitzd@providencecare.ca (D.P. Seitz).

highlight the need for nonpharmacological alternatives for these symptoms.

Guidelines for NPS of dementia^{23,24} recommend nonpharmacological treatments for NPS as initial therapy or to be used as adjuncts to pharmacological treatments; however, there are a number of possible nonpharmacological treatments for NPS,²⁵ and the evidence that supports their use is often unclear. Previous reviews on nonpharmacological interventions for NPS of dementia have been conducted,^{25–37} although only a few reviews have applied rigorous methods for evaluating the quality of studies.^{26,27,29,35} In addition, many of these reviews have also included studies conducted in settings other than LTC, such as the community or hospital inpatients where the availability of resources differs from LTC. Finally, there have been no reviews that have systematically evaluated the potential feasibility of interventions in LTC. Therefore, the objective of our study was to systematically review the evidence for nonpharmacological interventions for NPS in LTC, and to assess both the quality of studies and the feasibility of interventions. A better understanding of the efficacy and feasibility of nonpharmacological interventions will help identify effective interventions for NPS and identify strategies to enhance implementation of these important treatments.

Methods

Search Strategy

We followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for conducting systematic reviews to guide the review process.³⁸ We searched the electronic databases Medline (1980–2010) and EMBASE (1980–2010), PsychINFO (1980–2010), and the Cochrane Library, using free text search terms and medical subject headings for potentially relevant articles. We combined terms for dementia, LTC, behavioral symptoms, and nonpharmacological interventions (Supplementary Table 1). Google Scholar was also searched for additional articles using keywords and citation lists of key articles. We hand-searched the reference lists of retrieved articles, previous reviews on NPS, and NPS guidelines for additional articles not identified by the initial search of electronic databases.

Study Selection

Preliminary lists of potentially relevant titles and abstracts were screened by 2 authors to identify studies meeting inclusion criteria. We included all randomized, parallel group, clinical trials comparing any nonpharmacological interventions with usual care, medications, or other nonpharmacological control group. We included all English-language publications that provided sufficient information for data extraction. We excluded studies that used only pre-post comparisons of participants without control groups and crossover studies, given the high placebo-response rate noted in some NPS studies.¹⁷ We only included studies conducted in LTC settings exclusively, or, if conducted in a mix of LTC and other populations (such as outpatients or hospitalized patients) when the proportion of individuals who were in LTC formed the majority (>50%) of study participants. All retrieved full-text articles were reviewed for meeting inclusion criteria by 2 study authors, and discrepancies were resolved through further discussion.

Data Extraction

Data were extracted in duplicate by 2 authors and reviewed for consistency. We extracted information from articles on the following characteristics where provided: descriptions of the intervention and

control group, mean age of participants, gender, study setting, severity of cognitive impairment (as measured by Mini-Mental Status Examination Score or other cognitive test), method for diagnosing dementia, and duration of study. We included the following information on change in NPS. For studies using continuous measures of NPS, we reported the baseline score, score at study end point, and change in NPS. For studies using binary outcomes, the proportion of participants satisfying the outcome measure of improvement was reported. In studies that did not specify a primary outcome or end point, we reported the change in total NPS scores if an NPS rating scale was used. Where multiple end points were reported without specification of a primary end point, we included the first end point following conclusion of the active treatment period as the primary end point.

Assessment of Study Quality

The Cochrane collaboration risk of bias assessment tool was used to describe the potential risk of bias associated with various aspects of study design.³⁹ The following aspects of study design were evaluated for potential risk of bias: method of random sequence generation; concealment of allocation; blinding; incomplete outcome data; selective outcome reporting; and other potential sources of bias, which included whether the funding source for the study may have had a financial conflict of interest. Each item was rated as being potentially at low risk of bias (“Yes”), high risk of bias (“No”), or unclear. All items were rated in duplicate.

Assessment of Feasibility of Interventions

Given that there are several barriers that have been identified to the provision of nonpharmacological interventions for NPS in LTC, including a lack of knowledge,⁴⁰ variation in the availability of services,^{41–44} and limited time available for nursing staff to implement interventions,^{45–48} we assessed the feasibility of interventions for NPS included in our review. To address some of the limitations in published literature on the potential feasibility of interventions, we also completed a survey of LTC facilities in our region (n = 25) and a qualitative study of LTC providers (unpublished data) to derive the categories and ratings for the assessment of feasibility. In selecting our criteria for feasibility, we aimed to have categories that would allow for meaningful discrimination between interventions with respect to feasibility. As there were no existing measures of the feasibility of interventions, we created the categories for the assessment of feasibility based on previous published research, our pilot studies, and our experience in working in LTC settings. We created 3 categories related to feasibility: time required to train staff or for staff to implement interventions; requirements for access to specialized mental health services to implement interventions; and direct monetary costs associated with purchase of equipment or supplies. Each study was rated on these 3 categories as having “High,” “Medium,” “Low,” or unclear feasibility based on the information provided in the studies. The details of the feasibility rating scheme are provided in Supplementary Table 2.

Data Synthesis

Information from study characteristics, assessment of study quality, and feasibility were summarized in tables. We classified interventions into the following categories: nursing staff training interventions, comprehensive mental health assessment or consultation, psychosocial activities, exercise, music therapy, and other forms of sensory stimulation. Meta-analyses were planned within subgroups of similar interventions, provided there were studies that were qualitatively similar in terms of study design, patient population, outcome measures, and duration of intervention.

Results

Study Selection

The flow of studies through the review process is outlined in [Supplementary Figure 1](#). A total of 4589 citations were identified through searches of electronic databases and 55 references from hand-searches of reference lists for a total of 3922 unique citations. After screening of titles and abstracts, 419 full-text articles were retrieved and reviewed for inclusion criteria with 40 studies meeting inclusion criteria.^{49–88}

Characteristics of Included Studies

Of the 40 studies meeting inclusion criteria, 11 examined training LTC staff in strategies to manage NPS,^{49–59} and 3 studies evaluated the effects of individualized geriatric mental health assessment or consultation.^{60–62} Several studies evaluated the effects of providing programming or activities, including 10 studies that examined effects of various individual or group-based psychosocial activities,^{63–72} 5 studies that examined exercise,^{73–77} 3 studies that evaluated the effects of music,^{78–80} and 8 studies that evaluated other forms of sensory stimulation^{81–88} ([Supplementary Table 3](#)).

A total of 3519 individuals were included in all the studies; the sample size of studies varied from 20 to 306 participants, with a median study sample size of 80 participants. The median mean age of participants was 84 years and most participants were women (78%) in studies reporting the gender distribution. Most studies included individuals with relatively advanced dementia according to cognitive scores as reported on the Mini-Mental State Examination (MMSE) or other measures of cognition with average MMSE scores of between 5 and 10. The duration of studies varied between 1 and 52 weeks, with a median study duration of 12 weeks.

Effects of Interventions on Neuropsychiatric Symptoms of Dementia

A variety of outcome measures were used in the included studies ([Supplementary Table 4](#)). Most of the studies included participants with relatively mild to moderate severity of NPS according to baseline measures of NPS as reported on NPS symptom rating scales. Of the 40 included studies, 16 (40%) reported a statistically significant difference between nonpharmacological intervention and control conditions on at least one NPS outcome measure^{49,57,59,60,62,64,69,73,75,77,78,80,82,84,85,87} ([Supplementary Table 4](#)). The magnitude of the effects of interventions on NPSs appeared to be modest in most studies reporting a statistically significant difference, with only 2 studies reporting outcomes that reflected clinically significant reductions in NPS.^{60,82} The remaining 24 studies did not report any significant difference between the intervention and control conditions. Given the heterogeneity of patient populations, interventions, duration of treatment, and outcomes, meta-analysis was not performed.

Assessment of Study Quality

The potential risks of bias associated with aspects of study design are summarized in [Supplementary Table 5](#). Only 1 study was rated as being at low risk of bias on all items related to study quality.⁷² Most studies did not report study methodology in sufficient detail to make a definitive assessment of the potential risk of bias on some items and therefore were rated as being at unclear risk of bias.

Feasibility of Interventions for Neuropsychiatric Symptoms of Dementia

The potential feasibility of interventions varied according to the category of intervention that was used. For studies evaluating the

effects of staff training programs, most studies used specialized staff to either train LTC staff or were directly involved in providing feedback to LTC staff, with all studies in this category receiving a rating of either “Low” or “Medium” feasibility in the specialized staff category ([Supplementary Table 6](#)). Likewise, the requirements for LTC in terms of time commitments in either participating in the training programs or implementation, resulted in scores of either “Low” or “Medium” feasibility for this group. Similarly, most of the remaining categories of nonpharmacological interventions also were rated as “Low” to “Medium” feasibility on the items for specialized staff, as LTC staff were not involved in the implementation of interventions as described in the studies. Conversely, the direct costs to LTC facilities to purchase equipment were minimal for most of the staff education interventions; however, only 1 study provided economic evaluations as part of the study publication.⁵⁷

Discussion

This review identified that there are several interventions that have been investigated for treatment of NPS in LTC settings, although there are only a few large, high-quality studies in this area. There is some support in the literature for interventions involving training of LTC staff, geriatric mental health consultation, provision of psychosocial activities, or activities involving exercise, music, or other forms of sensory stimulation. The observed benefits of many interventions appeared to be modest, and only a few studies reported outcomes that could be defined as clinically important changes in NPS. It should be noted that although some studies supported these types of interventions, there were both positive and negative trials within each of the categories of interventions. Unfortunately, given the heterogeneity of study design and outcome measures, meta-analysis was not possible and therefore the overall effects of categories of interventions could not be summarized quantitatively. Our review also found that most interventions were carried out by specialized staff external to the LTC home and, as such, many of these interventions should be conceptualized as efficacy trials; the effectiveness of these interventions in real-world LTC settings as implemented by LTC staff during routine care practices require further evaluation. Another important finding of our review was that there were no comparison trials of nonpharmacological and pharmacological interventions in the LTC settings, which is a common decision faced by clinicians in LTC.

The findings of our review are in keeping with previous reviews,^{25–37} guidelines,²³ and consensus statements^{24,89} published on the evidence for management of NPS; however, previous reviews did not distinguish between studies conducted in community or hospital settings, whereas this review was restricted to studies conducted in LTC where the availability of resources, comorbidity of patients, and severity of cognitive impairment may differ when compared with community or hospital-based samples. Also, many previous reviews did not limit studies to those using randomized controlled designs or failed to assess the quality of studies using standard criteria, which is important in understanding potential sources of bias and the internal validity of the primary studies.

Although the present review identified some nonpharmacological interventions for NPS with evidence to support their use, one potential limitation of these interventions surrounds the resource requirements required for implementation in typical LTC settings. There are relatively few studies describing access to services that might be used for managing NPS of dementia in LTC. For example, a study of provision of psychiatric consultations to a sample of US LTC facilities found that most homes had access to psychiatric consultation at a frequency of monthly or less, whereas more than a quarter of rural LTC facilities had no access to psychiatric consultation at all.⁴³ A

survey of access to psychiatric services in Ontario, Canada, also found that less than half of all facilities reported having any access to psychiatrists, with rural LTC homes having less access to psychiatrists than urban centers and most LTC facilities reported that more services were required.⁴¹ Although two-thirds of LTC residents have a mental disorder, only 2.3% received any mental health treatment by psychiatrists in a 1-month period.⁴² Therefore, interventions for NPSs that rely on availability of geriatric psychiatrists or other specialized services may have limited real-world feasibility in many LTC settings.

Our review identified that certain interventions, such as staff training and education, generally evaluate patient outcomes over a prolonged period of time, which is appropriate given the time required for staff to receive training and for changes in practitioner behavior to have an impact on resident NPS. Interventions, such as geriatric mental health consultation with individualized treatment planning, may be more appropriate for individuals with more acute presentations of NPS, although the evidence in favor of these interventions is limited to a few studies.^{60,62} Other interventions, such as music, sensory stimulation, and psychosocial activities, have generally been studied over shorter periods of time and are probably most effective in reducing NPS while participants are actively engaged in the intervention and may require ongoing implementation for sustained benefit.^{90,91} Interestingly, we did not identify any studies evaluating the effects of increasing the number of nursing staff in LTC. Given the demands on LTC staff to provide patient care,^{45,92} administer medications,^{45,46} and complete documentation and other administrative activities,^{45,92} increasing the number of nursing staff and thereby the amount of time available for psychosocial interactions may be one method of increasing staff engagement in activities that may reduce NPSs. Qualitative studies of LTC nursing staff have identified that having training in management strategies for NPS, as well as adequate time to implement such strategies, could help increase the use of nonpharmacological interventions.⁴⁸

Commonly used conceptual frameworks for understanding NPS suggest that some symptoms may be expressions related to unmet needs (eg, pain or other uncomfortable sensations), learned behaviors, or a reduced threshold to stress.^{32,93,94} Approaches to management of NPSs that explicitly incorporated an assessment for these potential contributors to NPSs, along with targeted interventions to address these unmet needs, were found to be beneficial in reducing NPSs^{57, 60, 62} and it is likely that any intervention for NPSs must incorporate these critical components to achieve optimal outcomes.⁹⁵ Given that there were no direct comparison trials of pharmacological

and nonpharmacological interventions, there is limited information available on the relative efficacy and safety of these approaches to managing NPSs.

There are some limitations to our review. One of the major limitations of this review is the limited quality of the studies. Similar to reviews of pharmacological treatments for NPS, authors of studies included in our review often failed to identify primary outcomes or reported multiple outcomes, which make interpretation of the results challenging.⁹⁶ Given the small sample sizes of many studies, the reported findings may have been underpowered to detect significant benefit or harms associated with many therapies. Unfortunately, owing to the heterogeneity of studies, we were not able to undertake meta-analyses to evaluate the pooled effects of interventions because of the heterogeneity in study designs and reported outcomes. Strengths of our review include our rigorous search strategy, detailed description of studies, assessment of study quality, and examination of the feasibility of studies. Our review focused entirely on studies conducted within the LTC setting, so the results of our review will apply to LTC, whereas previous reviews have included interventions conducted in community- or hospital-based settings, and those results may not always generalize to LTC.

Conclusion

Currently there are only a small number of high-quality clinical trials for nonpharmacological interventions for NPSs of dementia in LTC. A variety of different types of interventions have some evidence to support their use. One potential limitation of many nonpharmacological interventions is their potential limited feasibility in many LTC settings. Additional research is also required to determine the effectiveness of nonpharmacological interventions when implemented in routine clinical care outside of research settings and pragmatic approaches to managing NPSs in LTC.

Supplementary Data

Supplementary data related to this article can be found online at doi:10.1016/j.jamda.2011.12.059

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