Methodology for the Systematic Reviews on Occupational Therapy for Adults With Alzheimer’s Disease and Related Dementias

Marian Arbesman, Deborah Lieberman

KEY WORDS
- Alzheimer disease
- occupational therapy
- research design
- review
- treatment outcome

Systematic reviews of literature relevant to adults with Alzheimer’s disease and their families are important to the practice of occupational therapy. We describe the seven questions that served as the focus for systematic reviews of the effectiveness of occupational therapy interventions for adults with Alzheimer’s disease and their families. We include the background for the reviews; the process followed for each question, including search terms and search strategy; the databases searched; and the methods used to summarize and critically appraise the literature. The final number of articles included in each systematic review; a summary of the results; the strengths and limitations of the findings; and implications for practice, education, and research are presented for the six questions addressing interventions in the areas of occupation, perception, environment, activity demands, fall prevention, and caregiver strategies.


Occupational therapists and occupational therapy assistants, like many other health care professionals facing the demands of payers, regulators, and consumers, increasingly have to demonstrate clinical effectiveness. In addition, they are eager to provide services that are client centered, supported by evidence, and delivered in an efficient and cost-effective manner. Over the past 20 yr, evidence-based practice (EBP) has been widely advocated as one approach to effective health care delivery.

Since 1998, the American Occupational Therapy Association (AOTA) has instituted a series of EBP projects to assist members with meeting the challenge of finding and reviewing the literature to identify evidence and, in turn, using this evidence to inform practice (Lieberman & Scheer, 2002). Following the evidence-based philosophy of Sackett, Rosenberg, Muir Gray, Haynes, and Richardson (1996), AOTA’s projects are based on the principle that the EBP of occupational therapy relies on the integration of information from three sources: (1) clinical experience and reasoning, (2) preferences of clients and their families, and (3) findings from the best available research.

A major focus of AOTA’s EBP projects is an ongoing program of systematic review of multidisciplinary scientific literature, using focused questions and standardized procedures to identify practice-relevant evidence and discuss its implications for practice, education, and research. Systematic reviews of literature relevant to adults with Alzheimer’s disease (AD) and their families strengthen understanding of the foundations of this important area of practice.

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Background

AD and other dementias continue to have a large impact on the health and wellness of the population (Alzheimer’s Association, 2009). Data have indicated that 5.3 million Americans have AD, and in 2006 it was reported to be the sixth leading cause of death (Alzheimer’s Association, 2009). The disease occurs primarily at older ages, and an estimated 1 in 8 people age 65 or older has AD. Of those with AD, 50% are reported to be age 85 or older (Alzheimer’s Association, 2009).

The burden of AD is far reaching. It primarily affects the person with AD and his or her caregivers. An estimated 10 million Americans provide unpaid care for a person with AD (Alzheimer’s Association, 2009). In addition, AD has a large effect on the health care system. In 2004, total per-patient payments from all sources for health and long-term care were estimated to be 3 times higher for Medicare beneficiaries ≥ age 65 with AD and related dementias than for other beneficiaries in the same age group (Alzheimer’s Association, 2009). Given this enormous burden of disease, it is imperative that occupational therapy practitioners, researchers, and educators have access to information that is up to date and of the highest quality.

According to Law and Baum (1998), evidence-based occupational therapy practice “uses research evidence together with clinical knowledge and reasoning to make decisions about interventions that are effective for a specific client” (p. 131). An evidence-based perspective is founded on the assumption that scientific evidence of the effectiveness of occupational therapy intervention can be judged to be more or less strong and valid according to a hierarchy of research designs, an assessment of the quality of the research, or both. AOTA uses standards of evidence modeled on those developed in evidence-based medicine. This model standardizes and ranks the value of scientific evidence for biomedical practice using the grading system presented in Table I. In this system, the highest levels of evidence include systematic reviews of the literature, meta-analyses, and randomized controlled trials (RCTs). In RCTs, the outcomes of an intervention are compared with the outcomes of a control group, and participation in either group is allocated randomly. The evidence-based literature reviews presented in this issue of the American Journal of Occupational Therapy (AJOT) include Level I RCTs; Level II studies, in which assignment to a treatment or a control group is not randomized (cohort study); Level III studies, which do not have a control group; Level IV studies, which use a single-case experimental design, sometimes reported over several participants; and Level V studies, which are case reports and expert opinion that include narrative literature reviews and consensus statements. In addition, two of the focused question reviews included qualitative studies. The inclusion of the qualitative literature provides additional information in areas of limited research.

This study was initiated and supported by AOTA as part of the Evidence-Based Literature Review Project. Seven focused questions were developed for the evidence-based literature review of occupational therapy interventions for adults with AD. The questions were generated in conjunction with a group of content experts in AD and EBP. They were developed and reviewed to provide needed information to update the previously published guidelines for the practice of occupational therapy for adults with AD (Corcoran, 1999).

The following focused questions from the review are included in this issue of AJOT:

1. Areas of occupation: What is the evidence for the effect of interventions designed to establish, modify, and maintain activities of daily living (ADLs), instrumental activities of daily living (IADLs), leisure, and social participation on quality of life, health and wellness, and client and caregiver satisfaction for people with Alzheimer’s disease and related dementias?

2. Perception: What is the evidence for the effect of interventions designed to modify and maintain perceptual abilities on the occupational performance of people with Alzheimer’s disease and related dementias?

3. Environment: What is the evidence for the effect of environment-based interventions on performance,

Table 1. Levels of Evidence for Occupational Therapy Outcomes Research

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<thead>
<tr>
<th>Evidence Level</th>
<th>Definition</th>
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<tr>
<td>I</td>
<td>Systematic reviews, meta-analyses, randomized controlled trials</td>
</tr>
<tr>
<td>II</td>
<td>Two groups, nonrandomized studies (e.g., cohort, case control)</td>
</tr>
<tr>
<td>III</td>
<td>One group, nonrandomized studies (e.g., before and after, pretest and posttest)</td>
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<tr>
<td>IV</td>
<td>Descriptive studies that include analysis of outcomes (e.g., single-subject design, case series)</td>
</tr>
<tr>
<td>V</td>
<td>Case reports and expert opinion that include narrative literature reviews and consensus statements</td>
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affect, and behavior in both the home and institutions for people with AD?

4. **Activity demands:** What is the evidence for the effect of interventions designed to modify the activity demands of the occupations of self-care, work, leisure, and social participation for people with AD?

5. **Fall prevention:** What is the evidence for the effect of interventions to prevent falls in people with dementia?

6. **Caregiver strategies:** What is the evidence for the effect of educational and supportive strategies for caregivers of people with dementia on the ability to maintain participation in that role?

In addition, the systematic reviews included a seventh focused question on interventions related to routines. The methodology for this question is incorporated in this article; the results for this question are included in the *Occupational Therapy Practice Guidelines for Adults With Alzheimer’s Disease and Related Disorders* (Schaber, 2010), and a summary of the evidence is available as a Critically Appraised Topic (CAT) in the Evidence-Based Practice and Research section of the AOTA Web site (AOTA, 2007; www.aota.org/CCL/Alz/Alz-Routines.aspx).

Inclusion and exclusion criteria are critical to the systematic review process because they provide the structure for the quality, type, and years of publication of the literature incorporated into a review. The reviews for all seven questions were limited to peer-reviewed scientific literature published in English. The reviews also included consolidated information sources such as the Cochrane Collaboration. Except as described next, the literature included in the reviews had been published since 1987, and the study populations were participants with dementia or their caregivers. The reviews excluded data from presentations, conference proceedings, non–peer-reviewed research literature, research reports, dissertations, and theses.

One team, headed by Lori Letts at McMaster University (Hamilton, ON), reviewed intervention questions focusing on areas of occupation, perception, and routines. These reviews included literature published between 1994 and 2010. The areas of occupation review included interventions that focused on at least one of the following: ADLs, IADLs, leisure, or social participation. Studies were considered for the review if they included at least one of the following outcome measures: quality of life, health, wellness, and client or caregiver satisfaction. Articles with study samples of people with AIDS-related dementia were excluded from the review. The perception review included studies that described and evaluated interventions that targeted perception, either improving or maintaining perception or using remaining perceptual abilities. In addition, studies included in the perception review reported functional or occupational performance outcomes. The routines review included studies that described an intervention based on the use of routine, responses to the use of routines in the course of daily care, or interactions during routines. Studies were excluded from the review if they did not report data on or systematic observations of the outcomes of the use of routines.

For all three reviews, Letts’s team searched the following databases: AgeLine, CINAHL, Medline, PsycInfo, EMBASE, and HealthSTAR. In addition, they searched the Cochrane Library, OT Seeker, and Allied and Complementary Medicine for studies related to the perception and routines questions. Bibliographies of selected studies in all three reviews were hand searched to locate additional potential articles. Team members developed the search strategies, and a research librarian with a specialization in rehabilitation science was consulted to finalize the search strategy. Table 2 presents the search strategies for all three reviews. A team member conducted the searches, and review members discussed the search results to ensure that key articles or areas of research had not been overlooked and that articles met the inclusion criteria. Group consensus was used to resolve any uncertainties.

### Table 2. Search Strategy for Systematic Reviews on Areas of Occupation, Perception, and Routines

<table>
<thead>
<tr>
<th>Category</th>
<th>Key Search Terms</th>
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<tbody>
<tr>
<td>Patient–client population</td>
<td>dementia (exploded) key word and text word</td>
</tr>
<tr>
<td>Intervention: Areas of occupation</td>
<td>(activities of daily living or (instrumental activities of daily living or household or household management) or (social interaction or social participation or social behavior or interpersonal interaction or interpersonal interactions or participation or social behavior or religion or religious practice or worship) or (recreation or leisure or leisure participation) or (sexual behavior or sexual intimacy or intimacy)</td>
</tr>
<tr>
<td>Intervention: Perception</td>
<td>perception, perceptual abilities, or perceptual impairment (including searching for the terms perceptual discrimination, apraxia, agnosia, stereognosis, spatial discrimination, spatial relations, depth perception, color perception, visuospatial impairment, hemianopia, hemianopia, way finding, body awareness, body image, body scheme, auditory priming, auditory perception, left/right discrimination, speech perception, visual perception, sensory integration)</td>
</tr>
<tr>
<td>Intervention: Routines</td>
<td>activity patterns or schedules or routine or habit or habits</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Not included in search strategy</td>
</tr>
<tr>
<td>Comparison</td>
<td>Not included in search strategy</td>
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For the review focusing on areas of occupation, 6,621 titles and abstracts were reviewed, and 291 articles were reviewed in full. Twenty-six articles fulfilled the inclusion and exclusion criteria for the review. For perception, 3,766 titles and abstracts were reviewed, and 111 of those articles were retrieved. Thirty-one articles were included in the final review. For the review focusing on routines, 823 titles and abstracts were reviewed, and 24 articles were retrieved. Fourteen articles were included in the routines review.

The second team, led by René Padilla with doctoral students in the occupational therapy program at Creighton University (Omaha, NE), conducted the reviews on the environment, activity demands, fall prevention, and caregiver strategies. All reviews were initially completed in 2007, except for the review on caregiver strategies, which was completed in 2008. The reviews were updated in 2010. Participants in the included studies were people with dementia, except for studies in the reviews on fall prevention and caregiver strategies, which also focused on caregivers. Interventions included in all reviews were specific to the question (e.g., interventions for activity demands related to self-care and other ADLs, IADLs, work, leisure, or social participation) and fit within the scope of practice of occupational therapy. This set of reviews included Level I, II, and III studies, except for the environment and fall prevention reviews, which also included one Level IV study each.

For all reviews, Padilla’s team searched the following databases: Medline, OT Search, AgeLine, CINAHL, PsycInfo, Google Scholar, Academic Search Premiere, Science Direct, and Web of Science. In addition, the Cochrane Library was searched for all reviews. The team developed the search strategies, and a medical librarian, AOTA staff, and a consultant to the AOTA Evidence-Based Practice Project reviewed them. Table 3 presents the search strategies for the four questions reviewed by Padilla’s team. After the doctoral students graduated, Padilla performed additional searches to update the reviews, first in 2008 and then in 2010. For the four-question search (environment, activity demands, fall prevention, and caregiver strategies), 8,111 abstracts were reviewed, and 95 articles met the inclusion and exclusion criteria. Of these, 70 were Level I studies, 10 were Level II studies, 13 were Level III studies, and 2 were Level IV studies.

Table 4 presents the number of articles in each review at each level of evidence. The two teams working on each focused question reviewed the articles according to their quality (scientific rigor and lack of bias) and level of evidence. Each article included in the review was then abstracted using an evidence table that provides a summary of the method for and findings of the article, an appraisal of the study’s strengths and weaknesses on the basis of design and methodology, and implications for occupational therapy. For each question, review authors also completed a CAT, a summary and appraisal of the

**Table 3. Search Strategy for Systematic Reviews on Environmental Interventions, Activity Demands, Fall Prevention, and Caregiver Interventions**

<table>
<thead>
<tr>
<th>Review Topic and Category</th>
<th>Key Search Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental interventions</td>
<td>Alzheimer’s, dementia strategy, technique, treatment, intervention, environment, Montessori, Snoezelen, ESP, progressively lowered stress threshold, multi-sensory, aromatherapy, bright light therapy</td>
</tr>
<tr>
<td>Activity demands</td>
<td>Alzheimer’s, dementia strategy, technique, treatment, intervention, adapt, modify, adjust, change, alter</td>
</tr>
<tr>
<td>Fall prevention</td>
<td>Alzheimer’s, dementia, cognitive impairment, elderly fall prevention, intervention, safety</td>
</tr>
<tr>
<td>Caregiver interventions</td>
<td>caregivers, carers, helpers, family, Alzheimer’s, dementia education, psychoeducation, intervention, support, strategy depression, mental health, burden, longevity, knowledge</td>
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Note: ESP = environmental skill-building program.
The evidence for the use of reminiscence activities for adults with AD is inconclusive.

In the area of perception, the evidence is good that music, body awareness, and mobility and functional training are helpful, as is the use of an attention-focusing group to improve visual matching and activities. The evidence is limited for the use of live or recorded music and for the use of multisensory environments. The evidence for the use of sensory integration and Snoezelen® is inconclusive.

Many research studies have addressed the use of a wide range of environmental interventions to improve behavior in people with AD. Strong evidence exists for occupational therapy practitioners’ use of interventions that emphasize compensatory and environmental strategies, including cueing and step-by-step instructions. Evidence for changes to the physical environment, such as the use of music, natural environment simulations, and activity therapy, is good, as is the evidence for the use of Montessori materials that incorporate aesthetically pleasing materials from the environment and for the use of a schedule to balance high-arousal and low-arousal states. Evidence for the use of increased lighting at mealtime and changes to doors and exits, such as concealing knobs, using visual barriers, and leaving doors unlocked, is limited. The evidence for assessment and training in the use of cognitive and physical assistive technology at the early stages of AD is also limited. The evidence for the following interventions is inconclusive: Snoezelen; aromatherapy; bright light therapy; the use of signs and photographs outside residents’ rooms to assist with way-finding; enhancement of corridors and other changes in environmental design in residential facilities; and units that emphasize the control of sensory stimulation, use music, and control traffic in the unit.

Modifying the demands of an activity can be effective in improving the performance of people with AD. The evidence is strong for the effectiveness of interventions during feeding that include consistent verbal prompts across caregivers, reinforcement for eating, the use of music during dining, and changes in meal presentation. The evidence is also strong for occupational therapy practitioners’ use of compensatory and environmental strategies. Limited evidence has been found for the use of cognitive stimulation therapy with adapted daily tasks matched to ability level. In addition, the evidence is limited for skill elicitation and individualized behavioral interventions for habit training during ADL performance.

Evidence has been found for the effectiveness of interventions to prevent falls in people with AD. Strong evidence has been found for the effectiveness of multifaceted interventions, such as removing mechanical restraints,
using a fall alarm, encouraging exercise, and modifying the environment in hospital and geriatric hospital settings. The evidence for the use of multifaceted interventions to prevent falls in nursing home and community settings is limited. Good evidence has been found that physical training that includes gait training, strengthening, balance, and flexibility prevents falls in older adults with cognitive impairments.

In the area of caregiver interventions, the evidence is strong for the effectiveness of occupational therapy sessions that provide caregivers with education regarding AD, problem solving, task simplification, communication, and simple home modifications. The evidence is also strong for caregiver interventions that combine counseling and support groups, as well as for interventions that combine education, case management, patient involvement, stress management, and training. The evidence for participating in a caregiver support group and for having a technology-mediated support group is good. In addition, the evidence is good for customizing activity-based interventions in conjunction with instructions to the caregiver and for structuring caregiver interventions in the home. Evidence is limited for the effectiveness of day care for people with AD to maintain caregivers’ health and wellness and inconclusive for the use of respite care. The evidence has indicated that those caregiver interventions focusing only on the behavior of the person with dementia or on knowledge of dementia are ineffective.

Strengths and Limitations of the Reviews and Implications for Practice, Research, and Education

The systematic reviews cover many aspects of occupational therapy practice with people with AD and their families and have several strengths. Seven focused questions were included in the reviews, covering information on a variety of aspects of the Occupational Therapy Practice Framework (2nd ed.; AOTA, 2008). The reviews included 166 articles, and two-thirds of the articles were Level I and II evidence. The reviews involved systematic methodologies and incorporated quality control measures.

Limitations of the studies incorporated in the reviews include small sample size, lack of power analysis, and limited detail regarding recruitment of participants. In several cases, the study group was heterogeneous and may not have been representative of the population with dementia. Depending on the level of evidence, a lack of randomization, lack of control group, and limited statistical reporting may have occurred. In many cases, the studies included a limited description of both the outcome measure and the measure’s psychometric properties. In some cases, the outcome measures were subjective, and the follow-up on the intervention was limited. Separating the effects of a single intervention that is part of a multimodal intervention is difficult. In addition, adverse effects of an intervention may not have been included, and some studies did not control for confounders in the analysis. Several of the qualitative studies were limited by the amount of information provided about the data collection and analytic procedures. Because several studies were published before 2001, this lack of literature may reflect the more limited requirements for trustworthiness and credibility seen in older qualitative research.

The systematic reviews presented in this issue provide summaries of the best scientific literature to answer the focused questions. The results described here can be directly integrated into clinical practice by merging the scientific evidence with clinical expertise and client preferences. In addition, this information may be used when advocating for occupational therapy services to a payer or providing information and support to a client and family member at any point during the intervention process.

In the future, researchers should build on the existing studies discussed in the systematic reviews included in this issue. Whenever one is engaging in clinical research, one needs to be familiar with the most recent work to incorporate it into future research plans. Clearly, more work is needed to definitively answer the seven questions included in this evidence-based review. Although some future research can be conducted in isolation, research questions in the area of AD are often complex and may be best answered through collaborative research with other disciplines, such as nursing; psychology; and medical specialties such as neurology, psychiatry, and geriatric and internal medicine. This collaboration should begin in the planning stages to ensure the design of well-controlled research projects that incorporate the role of occupational therapy from a client-centered and occupation-based perspective.

The future of occupational therapy is based on all occupational therapy practitioners developing a firm grasp of the best available evidence. This agenda is also clear for academic programs training the next generation of occupational therapy practitioners. Educators need to be aware of the results of the systematic reviews and present this multifaceted information to students rather than focus on a favored type of intervention. In addition, the evidence should not be presented in a one-size-fits-all approach but should be discussed from a client-centered and occupational-based perspective as described in the Framework (AOTA, 2008).

The Centennial Vision for AOTA (2007) looks to a future in which occupational therapy meets society's
needs by being a powerful, science-driven, and evidence-based profession. Although the results of these systematic reviews have wide-ranging implications for occupational therapy, the Centennial Vision also indicates that the most important target audiences for these reviews are people with AD and their families. ▲

Acknowledgment

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References