

What Is Occupational Therapy's Role In Addressing Sleep Problems Among Older Adults?

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ABSTRACT

Sleep problems, prevalent among older adults, are associated with poor outcomes and high health care costs. In 2008, rest and sleep became its own area of occupation in the American Occupational Therapy Association's Occupational Therapy Practice Framework. The current scoping review examined a broad context of sleep research to highlight efficacious interventions for older adults that fall within the occupational therapy scope of practice and present an agenda for research and practice. Four sleep intervention areas clearly aligned with the practice framework, including cognitive behavioral therapy for insomnia, physical activity, multicomponent interventions, and other interventions. Occupational therapy is primed to address sleep problems by targeting the context and environment, performance patterns, and limited engagement in evening activities that may contribute to poor sleep. Occupational therapy researchers and clinicians need to work collaboratively to establish the evidence base for occupation-centered sleep interventions to improve the health and quality of life of older adults. [OTJR: Occupation, Participation and Health. 2014; 34(3):141-149.]

Older adults have significantly higher rates of sleep difficulty than younger age groups (Ohayon, Carskadon, Guilleminault, & Vitiello, 2004). It is estimated that 40% to 70% of older adults have problems sleeping (Foley, Ancoli-Israel, Britz, & Walsh, 2004; Jaussent et al., 2011),

which can result in social isolation, decline in function, increased risk of falling, impaired cognitive function, and increased morbidity and mortality (Dew et al., 2003; Nebes, Buysse, Halligan, Houck, & Monk, 2009; Stone et al., 2014). Accordingly, this public health issue has significant biological, physi-

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ological, and psychosocial implications for older adults' health and quality of life (Ancoli-Israel, 2009; Lam & Ip, 2010; Stranges, Tigbe, Gómez-Olivé, Thorogood, & Kandala, 2012). Moreover, poor sleep is associated with greater health care utilization, with annual health care costs being \$1,143 higher for older adults with insomnia compared to those without (Ozminkowski, Wang, & Walsh, 2007). Cumulatively, in the context of the aging population, these poor outcomes underscore the growing need for health professionals to address poor sleep among older adults.

In 2008, the American Occupational Therapy Association's (AOTA) Occupational Therapy Practice Framework (the Framework) reclassified rest and sleep as its own area of occupation, no longer categorizing it as an activity of daily living (AOTA, 2008, 2014). Qualitative studies by Green (2008) and O'Donoghue and McKay (2012) have illustrated the pervasive impact poor sleep has on quality of life and occupational engagement. For example, they found that individuals with poor sleep restricted engagement in social activities, limited driving, and experienced a loss of intimacy with significant others (Green, 2008; O'Donoghue & McKay, 2012). Although occupational therapy is primed to address the sleep needs of older adults and the Framework has clearly identified rest and sleep as a critical occupation, there is a paucity of evidence documenting the efficacy of occupational therapy sleep interventions. By addressing impairments in this essential occupation, occupational therapists can better promote health and quality of life for the aging population (Green, 2008). Therefore, the purpose of this study was to examine existing evidence on sleep interventions for older adults that fall within the scope of occupational therapy practice and provide suggestions for future directions in occupational therapy research and practice.

Method

We conducted a scoping review, which is a systematic summary of the literature related to a clearly defined question. This method identifies current evidence, distinguishes gaps in the literature, and outlines a future research agenda (Arksey & O'Malley, 2005). A scoping review, as opposed to a systematic review, is appropriate because the role occupational therapy has played in sleep intervention research with older adults is not clear due to the paucity of occupational therapy research in this area.

Guided by Arksey and O'Malley's (2005) methodology, we searched PubMed, Cochrane Library,

and AgeLine databases for articles published in the past 15 years. Search terms included *sleep*, *sleep intervention*, *older adults*, *physical activity*, *exercise*, *occupation*, *occupational therapy*, and *activity*. Articles were included if they were written in English, examined sleep interventions for older adults (i.e., samples with an average age of 60 or older), and used sleep as the primary outcome. Systematic reviews and meta-analyses were included. We manually inspected citation lists of extracted articles. Studies that did not evaluate intervention efficacy (e.g., cost-effectiveness studies), interventions outside the scope of occupational therapy (e.g., pharmaceutical trials), and research that focused solely on patients with neurodegenerative diseases (e.g., dementia) were excluded. This patient exclusion was selected based on the rationale that the approaches and integration of sleep interventions into existing care models may differ for these groups, even if the broad principles of the intervention may apply. Articles were categorized by type of sleep intervention. Discrepancies regarding inclusion were deliberated among the researchers until consensus was achieved.

Results

Our search resulted in an initial sample of 994 articles. In reviewing their titles and abstracts, 70 studies met our initial selection criteria. After reviewing these articles in full, 36 were excluded for the following reasons: did not evaluate an intervention ($n = 19$), already included in a systematic review in our sample ($n = 9$), used interventions outside the scope of occupational therapy ($n = 5$), or exclusively assessed either medication efficacy ($n = 2$) or cost effectiveness ($n = 1$). The final sample of 34 articles represented four intervention areas within the scope of occupational therapy: cognitive behavioral therapy for insomnia (CBT-I; $n = 12$), physical activity ($n = 11$), multicomponent interventions ($n = 7$), and other intervention strategies ($n = 3$).

Cognitive Behavioral Therapy for Insomnia

CBT-I targets insomnia, one of most common sleep problems (Montgomery & Dennis, 2009), by modifying dysfunctional perceptions of sleep and unsuitable sleep behaviors (Morgan, Gregory, Tomeny, David, & Gascoigne, 2012). Stimulus control (i.e., restricting activities in bed to sleep and sexual activity, adapting nightly routines to decrease stimuli) and sleep restriction/compression (i.e., complying with a predetermined, limited sleep schedule) are core components of CBT-I (Montgomery & Dennis, 2009). Other complementary techniques are commonly in-

Table 1

Cognitive Behavioral Therapy for Insomnia Used With Older Adults ($n = 12$)

| Article | Setting & Sample | Design | Intervention | Results |
|--|------------------|-------------------|--|---|
| El Kady, Ibrahim, & Mohamed (2012) | I; $n = 210$ | Pretest-posttest | SH, STM, behavioral and routine modification | Significant change in subjective sleep |
| Epstein, Sidani, Bootzin, & Belyea (2012) | C; $n = 179$ | Four-arm RCT | IG1: STM IG2: SR/C IG3: STM and SR/C CG: wait list control | Compared with the CG, all IGs had significant and equal benefit on sleep |
| Fiorentino & Martin (2010) | C; $n = 1$ | Case study | SR/C, SH, STM, LT, RT | Sleep outcomes improved. |
| Germain et al. (2006) | C; $n = 35$ | Two-arm RCT | IG: SR/C, SH, STM CG: information only | IG sleep outcomes significantly improved compared with the CG at 1 month. |
| Harvey, Inglis, & Espie (2002) | C; $n = 90$ | Two-arm RCT | IG: SR/C, STM, SH, imagery, and RT CG: delayed treatment | IG sleep outcomes significantly improved compared with the CG at 12 months |
| Hoch et al. (2001) | C; $n = 21$ | Three-arm RCT | IG1: SR/C and SH IG2: SH CG: no treatment | IGs showed significant benefit at 8 weeks; only IG1 outcomes were sustained at 52 weeks |
| McCrae, McGovern, Lukefahr, & Stripling (2007) | C; $n = 20$ | Two-arm RCT | IG: SR/C, STM, SH CG: SH | Sleep outcomes improved significantly in IG group over the CG at 8 weeks post treatment |
| McCurry, Logsdon, Teri, & Vitiello (2007) | $n = 20$ | Systematic review | SR/C alone, CBT-I, and STM alone | SR/C alone and CBT-I were efficacious; STM alone needs more evidence |
| Montgomery, & Dennis (2009) | $n = 6$ | Systematic review | CBT-I, SH, SR/C, STM, and RT | Meta-analysis concluded CBT-I is effective |
| Morgan, Gregory, Tomeny, David, & Gascoigne (2012) | C; $n = 202$ | Two-arm RCT | IG: mailed six self-help booklets (SR/C, STM, SH) and access to self-help phone line CG: usual care | IG sleep outcomes significantly improved compared with CG at 3 months and persisted at 6 months. |
| Sivertsen et al. (2006) | C; $n = 46$ | Three-arm RCT | IG1: SR/C, SH, STM, and RT IG2: sleep medication CG: placebo | IG1 demonstrated significantly greater improvement in sleep outcomes than did IG2 or CG at 6 months |
| Vitiello, Rybarczyk, Von Korff, & Stepanski (2009) | C; $n = 51$ | Two-arm RCT | IG: SR/C, STM, RT, SH, and LT CG: stress management and wellness education | IG showed significant improvement in sleep outcomes compared with CG after 1 year. |

Note. I = institution-based population; SH = sleep hygiene; STM = stimulus control; C = community-based population; IG = intervention group; CG = control group; SR/C = sleep restriction/compression; LT = light therapy; RT = relaxation therapy; RCT = randomized controlled trial.

tegrated into CBT-I interventions, including sleep education, light therapy, and relaxation techniques (e.g., diaphragmatic breathing).

Eight of the 12 CBT-I articles were randomized controlled trials (RCTs); the remaining four included a case study, pretest-posttest study, and two systematic reviews (Table 1). Ten studies used both sleep restriction/compression and stimulus control as the core interventions, and the remaining two studies

used either sleep restriction/compression or stimulus control. For clients struggling to comply with the sleep restriction schedule, Fiorentino and Martin (2010) recommended clients engage in activities to properly fill new out-of-bed time (e.g., reading, chores). Other supporting techniques used in conjunction with core components of CBT-I included sleep hygiene education ($n = 10$), relaxation strategies ($n = 5$), and light therapy ($n = 2$). Sleep hygiene

Table 2

Physical Activity to Address Sleep Problems Among Older Adults ($n = 11$)

| Article | Setting & Sample | Design | Intervention | Results |
|--|------------------|-------------------------------------|--|--|
| Benloucif et al. (2004) | C; $n = 12$ | Repeated measure crossover | Physical/social activities (e.g., stretching, walking, dancing) in either morning or afternoon | Both morning and evening combined social/physical activity sessions improved subjective sleep |
| K.M. Chen et al. (2009) | C; $n = 128$ | Two-arm RCT | IG: yoga CG: existing senior center activity schedule | Significant difference in subjective sleep between IG and CG at 3 and 6 months, favoring IG |
| M.C. Chen, Liu, Huang, & Chiou (2012) | C; $n = 55$ | Two-arm RCT | IG: Qigong exercise CG: no treatment | Qigong significantly improved subjective sleep, compared with CG at 12 weeks |
| Freburger, Callahan, Shreffler, & Mielenz (2010) | C; $n = 346$ | Two-arm RCT | IG: exercise program (e.g., strength, endurance) CG: delayed treatment | Exercise significantly improved subjective sleep at 8 weeks, compared with CG, but not sustained at 3 and 6 months |
| Khalsa (2004) | C; $n = 20$ | Pretest-posttest | Yoga | Statistically significant improvements in subjective sleep after 8-week intervention |
| Li et al. (2004) | C; $n = 118$ | Two-arm RCT | IG: tai chi CG: seated exercise | Significant improvements on subjective sleep in IG compared with CG at 6 months |
| Lira et al. (2011) | C; $n = 14$ | Pretest-posttest | Running | Sleep outcomes improved significantly after 6 months |
| Manjunath & Telles (2005) | C; $n = 69$ | Three-arm RCT | IG1: yoga IG2: An herbal supplement CG: wait list control | IG1 had significant improvement in sleep outcomes, compared with IG2 and CG |
| Patel, Newstead, & Ferrer (2012) | C; $n = 649$ | Systematic review and meta-analysis | Yoga compared with other exercise interventions | Relationship between sleep measures and yoga is mixed |
| Tanaka et al. (2002) | C; $n = 11$ | Pretest-posttest | Nap and moderate evening exercise | There were significant changes in objective sleep measures post intervention |
| Viana et al. (2012) | C; $n = 40$ | Two-arm RCT | IG: resistance training session CG: no exercise | Mixed results for sleep outcomes |

Note. C = community-based population; RCT = randomized controlled trial; IG = intervention group; CG = control group.

education informed clients about habits and routines that are conducive to sleep, such as minimizing fluid consumption after dinner and limiting television use in the bedroom (Morgan et al., 2012; Morgenthaler et al., 2006). A variety of relaxation techniques were used, such as guided imagery and diaphragmatic breathing, to address anxiety associated with sleep problems. Light therapy included exposure to sunlight or artificial light using light boxes.

CBT-I treatment lengths varied from one session to eight weekly sessions, with durations of 30 to 60 minutes. Ten studies concluded there was a positive treatment effect for CBT-I based on the hours

of continuous sleep or self-reported quality of sleep, which were quantified using standardized sleep assessments, including actigraphy, sleep diaries, and the Pittsburgh Sleep Quality Index (PSQI). Both systematic reviews concluded CBT-I was effective (McCurry, Logsdon, Teri, & Vitiello, 2007; Montgomery & Dennis, 2009). Furthermore, McCurry et al. (2007) concluded that stimulus control alone without sleep restriction/compression was not efficacious.

Physical Activity Interventions

Eleven studies (six RCTs, three pretest-posttest studies, one systematic review, and one crossover

Table 3

Multicomponent Interventions Used to Address Sleep Problems in Older Adults ($n = 7$)

| Article | Setting & Sample | Design | Intervention | Results |
|---|------------------|-------------------|--|---|
| Alessi et al. (2005) | I; $n = 118$ | Two-arm RCT | IG: SR/C, sun exposure, PA, STM, modify environment CG: usual care | IG significantly decreased daytime sleep compared with CG |
| LaReau, Benson, Watcharotone, & Manguba (2008) | I; $n = 59$ | Two-arm pilot RCT | IG: SH, RT, altered nighttime interruptions (e.g., weights, baths) CG: usual nighttime care | IG group reported significantly higher subjective sleep than CG |
| Martin, Marler, Harker, Josephson, & Alessi (2007) | I; $n = 100$ | Two-arm RCT | IG: SR/C, SH, BL, PA, STM, altered nighttime care routine CG: usual care | IG showed a benefit to objective measure of sleep |
| Morin et al. (2006) | $n = 37$ | Systematic review | STM, SR/C, SH, RT, muscle relaxation, anxiety and stress management | STM, RT, SR/C are efficacious |
| Ouslander et al. (2006) | I; $n = 107$ | Two-arm RCT | IG: PA, SR/C, SH, BL, altered nighttime care routine CG: delayed intervention | No significant differences in objective sleep measures |
| Rybarczyk, DeMarco, DeLaCruz, Lapidus, & Fortner (2001) | C; $n = 243$ | Two-arm RCT | IG: RT, PA, and nutrition, meditation, and cognitive strategies CG: wait list control | IG showed significant change in subjective sleep compared with CG |
| Tamrat, Huynh-Le, & Goyal (2014) | $n = 13$ | Systematic review | RT, SH, and BL | RT and BL improved sleep quantity |

Note. I = institution-based population; RCT = randomized controlled trial; IG = intervention group; SR/C = sleep restriction/ compression; PA = physical activity; STM = stimulus control; CG = control group; SH = sleep hygiene; RT = relaxation therapy; BL = bright light therapy; C = community-based population.

design) examined the relationship between physical activity and sleep (Table 2). Wide ranges of physical activities, such as resistance training and dancing, were prescribed. Physical activity intervention dosage varied from a single session to six sessions per week, with durations of 30 to 90 minutes per session. Intervention intensity ranged from low intensity (e.g., stretching) to high intensity (e.g., running). Among the eight studies examining outcomes immediately after intervention, seven found favorable results for enhancing sleep, whereas the systematic review of yoga reported mixed results. Three of the four studies examining long-term outcomes found a sustained treatment effect up to 6 months. The two most common standardized outcome measures for sleep were the PSQI, a standardized self-reported sleep quality assessment, and actigraphy, which objectively quantified continuous hours of sleep and awakenings.

Multicomponent Interventions

Multicomponent interventions used multiple sleep intervention strategies to target the various

factors impacting sleep; five RCTs and two systematic reviews were included (Table 3). CBT-I strategies were integrated with physical activity and environmental modifications in four of the seven intervention studies. Institution-based sleep interventions, such as the work by Alessi et al. (2005), included adjustments to nighttime staff work activities to promote an environment of sleep (e.g., reduced noise). Actigraphy and the PQSI were the most common outcome measures used. Four of the five RCTs found a positive treatment effect for sleep.

Other Intervention Strategies

Three articles that did not fit the other categories were placed in a miscellaneous group (Table 4). These articles examined bright light therapy and strategies to enhance the sleep environment (i.e., earplugs, eye masks, sleep-inducing music). Two of the studies were RCTs, and one was a posttest quasi experiment. Ryu, Park, and Park (2012) found the combined use of a sleep mask and sleep-inducing music was effective in improving self-reported sleep quality using the Verran and Snyder-Halpern Sleep Scale. In contrast,

Table 4

Other Intervention Strategies to Address Sleep Problems Among Older Adults ($n = 3$)

| Article | Setting & Sample | Design | Intervention | Results |
|---|------------------|---------------------------------------|---|--|
| Richardson, Allsop, Coghill, & Turnock (2007) | I; $n = 64$ | Two-group posttest quasi-experimental | IG: Earplugs and eye mask CG: no earplugs or eye mask | No significant differences in sleep outcome |
| Royer et al. (2012) | I; $n = 28$ | Two-arm RCT | IG: Light exposure CG: Placebo | No significant differences in sleep outcome |
| Ryu, Park, & Park (2012) | I; $n = 58$ | Two-arm RCT | IG: Sleep-inducing music and sleep mask CG: Headphones with no music or sleep mask | Subjective sleep measures significantly, favoring IG over CG |

Note. I = institution-based population; IG = intervention group; CG = control group; RCT = randomized controlled trial.

Richardson, Allsop, Coghill, and Turnock (2007) and Royer et al. (2012) found no treatment effect when using a sleep mask and earplugs with no music and bright light therapy alone, respectively.

Discussion

This scoping review identified four sleep intervention areas (i.e., CBT-I, physical activity, multi-component interventions, other intervention strategies) that improved sleep—all of which fall within occupational therapy's scope of practice. Across these categories, there was a consistent emphasis on modifying existing habits and routines to support sleep quality, participating in physical activity, and initiating engagement in activities that comply with sleep restriction/compression recommendations (e.g., Fiorentino & Martin, 2010; Freburger, Callahan, Shreffler, & Mielenz, 2010; Germain et al., 2006; McCrae, McGovern, Lukefahr, & Stripling, 2007). To directly show how the four intervention areas fit within the scope of occupational therapy, we discuss the foci of the interventions using the Framework language and outline an agenda for future sleep research and practice in each area (AOTA, 2014).

Performance Patterns

Performance patterns, including habits, roles, and routines, are the avenues by which clients engage in desired occupations. Occupational therapists work with clients to modify these performance patterns to maximize engagement (AOTA, 2014). Based on the findings of this scoping review, occupational therapists could use CBT-I interventions to help individuals modify their sleep performance patterns by adhering to fixed sleep schedules, minimizing

nighttime stimuli, and reserving the bedroom for sleep and sexual activity (Friedman et al., 2000; Morin et al., 2006).

The sleep restriction/compression component of CBT-I programs were, at times, problematic, as older adults faced challenges in complying with the programs due to boredom and an absence of evening activities in which to engage (Fiorentino & Martin, 2010). However, this obstacle to compliance can be overcome with a client-centered, occupation-based approach. Occupational therapy researchers and clinicians can work together to evaluate interventions that facilitate habits, roles, and routines that use meaningful evening occupations to promote desirable sleep behaviors and compliance with a sleep restriction/compression program. Occupational therapy can serve a pivotal role in CBT-I sleep interventions by targeting performance patterns, thereby addressing the challenges older adults encountered in complying with the CBT-I program.

Context and Environment

This scoping review also highlighted the importance of a sleep-conducive environment. Sleep occurs in a physically and socially constructed context (AOTA, 2014). Efficacious interventions that modified the context and environment were reflected in stimulus control as part of the CBT-I and the multi-component interventions. Environmental modifications were simple changes, such as moderating bedroom temperature, (e.g., Friedman et al., 2000), or more complex modifications, as reflected in the institution-based interventions that altered nightly nursing routines and limited interruptions in order to promote a supportive sleep environment (e.g., Alessi et al., 2005).

Occupational therapy clinicians and researchers can advance this area of sleep research by evaluating individuals' occupational abilities and limitations within the physically and socially constructed context and environment to facilitate quality sleep. This is particularly salient in health care institutions, where research has focused on the organizational environment and made systematic changes (e.g., staff routines). Furthermore, sleep research has begun to examine individuals within the context of the health care setting by addressing environmental stimuli with the use of eye masks, music, and headphones; yet, the results have been mixed (Richardson et al., 2007; Royer et al., 2012; Ryu et al., 2012). To effectively address the sleep needs of clients in a health care setting, it is essential to examine the interplay between the individual's context and environment and his or her engagement in this pivotal occupation. Occupational therapy is uniquely situated to address this gap in knowledge by executing research interventions that integrate the client's abilities and sleep needs within the context and environment in order to facilitate improved sleep.

Supporting Occupations

Occupational therapists have the expertise to facilitate social participation and engagement in activities of daily living and instrumental activities of daily living (AOTA, 2014). Furthermore, researchers have demonstrated the efficacy of occupational therapy interventions that facilitate engagement in clients' desired occupations and the benefit on health outcomes (e.g., Clark et al., 1997; Hwang, 2012). Current occupational therapy research has not yet focused on its benefits for sleep. Relatedly, this scoping review showed that physical activity engagement is associated with improved sleep; however, occupation-based activities were not addressed. Physical activities used in the intervention studies dictated which activities participants engaged in and therefore were not necessarily meaningful to the participant. This gap indicates a need to evaluate whether participation in personally valued, occupation-based activities has a similar positive effect on sleep outcomes.

Limitations

Studies in this review were limited to sleep interventions targeting older adults and within the scope of occupational therapy practice. Further, we limited our search to articles published in the past 15 years and eliminated older studies that may warrant further discussion. We identified evidence through bibliographic searches; alternate search terms may have

resulted in additional articles. Moreover, articles may have been omitted inadvertently. The purpose of a scoping review is to summarize existing literature, identify gaps in knowledge, and inform future research (Arksey & O'Malley, 2005). Therefore, this study did not evaluate the quality of the studies, and readers should be cautious when interpreting the findings of individual studies.

Conclusion

In light of the aging population and prevalence of sleep problems in late adulthood, it is essential for occupational therapists to address sleep problems in older adults. This scoping review highlights efficacious sleep intervention areas that align with the Framework (i.e., CBT-I, physical activity, multicomponent interventions, other intervention strategies) and supports the integration of sleep interventions throughout the care continuum (AOTA, 2014). Regrettably, none of the reviewed interventions were led by occupational therapists. Important gaps such as a lack of occupation-based activity interventions and client-centered environmental modifications were apparent. This lack of evidence documenting occupational therapy's role in rest and sleep emphasizes an imperative to address this important occupation through collaboration between occupational therapy researchers and clinicians. There is a need to evaluate the effectiveness of occupational therapy interventions targeting sleep in older adult populations. Considering the interventions reviewed in this study, clinicians can help older adults with their sleep problems by ensuring a sleep-conducive environment, addressing evening routines that incorporate desired sleep behaviors, and modifying daily routines to include appropriate activity participation. Occupational therapy practitioners are uniquely positioned to address sleep problems among older adults in a holistic manner to promote health and quality of life.

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