

Sleep in residential aged care: A review of the literature

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KEY WORDS

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ABSTRACT

Objective

Sleep is necessary for good health at all stages of life. This literature review aims to identify evidence-based strategies to improve sleep in residential care, and offer recommendations for further research.

Design

A literature search was conducted for articles published between April 2003 and May 2010 and 34 papers were reviewed. These were classified according to the National Health and Medical Research Council's (NHMRC) 2005-2007 pilot program of additional levels of evidence.

Setting

Residential aged care

Primary argument

Strategies for improving sleep were described and evaluated in the 34 papers reviewed. These included pharmacological therapies, cognitive behavioural therapy, light therapy, various alternative therapies and multi-factorial interventions. There are no clear guidelines for effective and safe sleep promotion interventions in residential aged care.

Conclusions

Given the prevalence of sleep disorders amongst older people in residential care, there is a clear need for further research to enable guidelines to be developed.

INTRODUCTION

Sleep is necessary for good health at all stages of life. Generally, some changes in sleep can be considered part of normal ageing; however, normal changes should not cause personal dissatisfaction with quantity or quality of sleep (Tafaro et al 2007). In addition to their negative influence on perceived quality of life, sleep disturbances in older people can be problematic because of safety concerns, increased risk of falls and injury, and harm caused to bedroom partners and carers (Conn and Madan 2006). Sleep disruption is often a reason for residential care placement (Pollak and Perlick 1991), and in residential care, poor resident sleep is often associated with disruptive behaviours and psychological distress (Voyer 2006).

This literature review aims to identify evidence-based strategies to improve sleep in residential care, and offer recommendations for further research.

Sleep disturbances in older populations are common. Examples of primary sleep disorders common in older people include sleep apnoea, periodic limb movement disorder, circadian rhythm disorders, and primary insomnia. No large-scale epidemiologic studies of the prevalence of primary sleep disorders in residential care have been conducted (Martin 2008). Pain, depression, polypharmacy, environmental disturbances, chronic diseases, and nocturia are common causes of secondary sleep disorders in older adults (Garcia 2008).

For older adults living in residential care there are additional contributors to sleep disturbances. Environmental factors such as noise from staff and other residents, inappropriate lighting and temperature, and nighttime nursing care can disturb sleep (Ancoli-Israel et al 1989). Additionally, excessive time spent napping and in bed during the day, very early bedtimes, low levels of physical activity, low levels of bright light exposure during the day, pain and medications have all been cited as contributory to sleep disturbance (Conn and Madan 2006; St. George et al 2009).

Design

An initial review was undertaken by members of the authorship team in 2008 and reported to the Victorian Department of Human Services (Dowson et al 2008). This review extends the 2008 report and includes international research relating to sleep in residential care, published between April 2003 and May 2010. Haesler systematically reviewed literature published between 1993 and 2003 in 2004. This review sought to extend rather than replicate Haesler's work (2004).

Pubmed databases were searched for relevant English language articles limited to humans aged 65 years and over. The key words used included care home, nursing home, residential home, residential facilities, residential care, residential aged care, permanent care, long term care, resident(s), assisted living facilities, group homes, halfway houses, homes for the aged, intermediate care facilities, skilled nursing facilities and sleep, sleep medication, benzodiazepines; and sleep in combination with:

- acupuncture
- aromatherapy
- daytime napping
- diet
- environment
- exercise
- herbal
- light therapy
- music therapy
- naturopathy
- nighttime routine
- relaxation

Relevant articles were selected from the abstracts.

The literature was reviewed using the Australian National Health and Medical Research Council's (NHMRC) 2005-2007 pilot program of additional levels of evidence and grades for recommendations for developers of guidelines (National Health and Medical Research Council (NHMRC) 2005). In summary, 34 published papers were reviewed, of which none met the criteria for NHMRC Level I, 13 were Level II, two were Level III-2, five were Level III-3, and six were Level IV. In addition, eight literature reviews that could not be classified using this system were reviewed. This paper provides a summary of the evidence derived from these papers.

RESULTS

Strategies to Improve Sleep

Most medical literature on strategies to improve sleep for older people refers to conventional pharmacologic strategies, and cognitive behavioural therapy. Other management strategies found in the literature include acupuncture, aromatherapy, exercise, light therapy, music therapy, naturopathy, improved nighttime nursing care, and multifactorial interventions.

Pharmacological therapy

The National Institute of Health State-of-the-Science Conference on Insomnia concluded that there is no systematic evidence supporting the effectiveness of antihistamines, antidepressants, antipsychotics, or anticonvulsants in the treatment of insomnia (Cooke and Ancoli-Israel 2006).

In a double-blind RCT a sample of 30 older residents with dementia taking antipsychotic medications for non-psychotic symptoms were randomly assigned to withdrawal or control groups (Ruths et al 2004). Actigraphy showed significantly lower average sleep efficiency after withdrawal and increased nighttime activity that did not reach significance. Importantly, the withdrawal in this study was not gradual. In 2008, Ruths et al conducted a randomised placebo controlled trial on the impact of stopping long-term antipsychotic drug treatment on behavioural and psychological symptoms of dementia in nursing home patients (Ruths 2008). At three months post-study 33% of intervention participants and 22% of delayed intervention participants had not resumed antipsychotic treatment. Furthermore, they found ceasing antipsychotics did not significantly impact sleep.

Greco et al (2004) published a study on sleep and the use of psychoactive medications in residential care with residents who were unable to get into and out of bed without assistance. The study used wrist actigraphy and confirmed the disrupted nature of sleep in residential care previously reported. They reported that 65% of residents were routinely taking one or more psychoactive medications, similar to other reported studies (Holmquist 2005). The most commonly prescribed psychoactive medications were antidepressants. There were no differences between those taking psychoactive medications and those not in number of minutes asleep, percent of time in bed asleep, and number of awakenings. Antidepressants or the use of psychoactive medications reported to cause sedation were not associated with significantly better sleep quality.

As the recent literature shows, there are limited benefits in pharmacological treatments for sleep disturbance and some worrying side effects (Fonad et al 2009; Wagner et al 2004), confirming Haesler's (2004) recommendation to use sleep medications with caution in long-term residential care recipients.

The literature supports not initiating use of pharmacological treatments for sleep disturbances in residential care where possible, and attempting slow withdrawal in long-term users. Any use of pharmacological treatments for sleep disturbances should be short-term and intermittent and the effects closely monitored and documented (Locca et al 2008).

Cognitive Behavioural Therapy

Cognitive behavioural therapy (CBT) is an umbrella term that refers to non-pharmacological strategies that aim to challenge and change dysfunctional thoughts, emotions and behaviours. There have been several successful RCTs demonstrating that CBT and the various strategies it entails are effective in improving several sleep parameters in the short and long-term (Joshi 2008).

No studies in residential care have been published, perhaps due to the clear limitations of this approach with residents with deteriorating cognition. Some residents however would have the ability to understand and follow CBT strategies, and caregivers could potentially guide some behaviours of others.

Light Therapy

Light therapy appears promising because it is well established that circadian rhythms are influenced by light exposure (Brawley 2009). Bright light may contribute to better sleep via an increased homeostatic factor brought about by relative sleep restriction during the day (Fetveit 2005). There is, however, no consensus on the optimum treatment protocol. Most studies administer light via an artificial light box instead of natural exposure, but intensity, time of day, and duration of treatment vary between studies making it difficult to compare results.

Recent studies suggest some potential benefits from light therapy, but results have still not been sufficiently robust to conclusively demonstrate benefits. A Cochrane review with stringent inclusion criteria (Forbes et al 2004) excluded most studies, and concluded that none provided adequate evidence of the effectiveness of light therapy in managing sleep, behaviour or mood.

Nonetheless, Dowling et al (2005) reported a placebo RCT in two large long-term care skilled nursing facilities. Forty-six residents with Alzheimer's disease were exposed to one hour of bright light (more than 2500 lux) Monday to Friday for ten weeks. The results indicated significant improvements in residents with aberrant rest-activity rhythm, but no overall improvement in measures of sleep or rest-activity rhythms in the intervention group as a whole. The authors recommended studies to assess whether daily (including weekends) and longer duration of light exposure could produce more robust effects.

Ouslander et al (2006) applied a number of intervention measures to keep residents out of bed in the daytime, along with evening bright light exposure, but the results were not significant. In another large RCT, bright light ceiling fixtures were mounted in common living areas in six residential care facilities and found a significant 2% increase in total sleep duration (Riemersma-van der Lek et al 2008).

Fetveit et al (2003) reported a two-week treatment period of 11 residents with dementia. Study participants were exposed to two hours of morning light (6000 – 8000 lux). This resulted in a significant reduction in daytime nap duration (but not frequency) as recorded in nursing staff diaries. The other positive result was a 23-minute delay in resident bedtime during the treatment period. The small sample size and absence of a placebo group limit the interpretation of this data. However, monitoring of sleep patterns at 4, 8, 12 and 16 weeks after treatment termination indicated that all variables gradually returned to pre-treatment levels. Given there were reported positive effects remaining after 12 weeks, there is a basis for extending the washout period in future crossover-designed studies (Fetveit 2004).

Exposure to natural outdoor light is another potential intervention to improve sleep. Gammack and Burke (2009) conducted a small controlled trial of morning outdoor light exposure and reported modest improvements in sleep latency, sleep disturbance and sleep indices scores.

Exercise and activity

Volicer et al (2006) implemented a continuous activity program with 90 residents in long-term care dementia units. Improvements in sleep were reported only when additional staff were available to run the program.

Manjunath and Telles (2005) published a RCT looking at the effects of yoga sessions on self-reported sleep of 69 adults in a residential home in India. The yoga group undertook 60 minute yoga sessions six days a week. The yoga group reported a significant decrease in time taken to fall asleep at three and six months, an increase in total number of hours of sleep at six months and an increase in feeling rested in the morning after six months. No significant changes were reported in the wait-list group or in an intervention group given a herbal preparation.

Using a quasi-experimental protocol a simplified tai chi exercise program was introduced to cognitively alert and mobile residents of a long-term residential care facility (Chen et al 2007). The residents reported improvements in sleep at six months, which were maintained at twelve months.

Haesler (2004) concluded that daytime physical and recreational activity programs in isolation are unlikely to significantly improve sleep. As there has been very little research conducted with older adults in residential care since Haesler's review, her findings cannot yet be challenged.

Melatonin

Melatonin is a naturally occurring hormone involved in regulating circadian rhythms and promoting sleep. In a literature review completed by Pandi-Perumal et al (2005), they concluded melatonin can improve sleep with minimal side effects in people who have diminished production of endogenous melatonin. Diminished production of endogenous melatonin is common in people with Alzheimer's disease and melatonin treatment has been found to improve early evening agitation and cognitive impairment (Pandi-Perumal et al 2005; Asayama et al 2003).

Two other studies, however, failed to demonstrate significant objective benefits for people with probable Alzheimer's disease taking melatonin supplements compared to placebo control groups (Gehrman 2009; Singer et al 2003). Singer did, however, report finding subjective improvements according to carer reports (Singer et al 2003).

A large RCT conducted in 12 residential care facilities found that melatonin led to significant improvements in sleep onset latency, sleep duration and uninterrupted periods of sleep, but was also associated with adverse effects on mood and level of withdrawn behaviour (Riemersma-van der Lek et al 2008). Combining melatonin with bright light therapy, however, ameliorated the negative effects on mood. Furthermore, a different RCT with residents with probable Alzheimer's disease discovered combining melatonin and bright light treatment produced significant improvements in reducing daytime sleep, increasing daytime activity and improving the day-to-night sleep ratio. The combined treatment, however, did not produce significant improvements in nighttime sleep variables (Dowling 2008).

Ramelteon

Melatonin receptor agonists may be more effective than melatonin due to longer half-lives. One of these melatonin receptor agonists, ramelteon, may be useful for chronic insomnia (Pandi-Perumal et al 2005), although application for marketing authorisation in Europe was refused in 2008 because the manufacturer failed to demonstrate the benefits of ramelteon outweighed the risks. Currently it is the only substance approved for the treatment of insomnia in the USA that is not classified as a controlled substance (Mini et al 2007).

It has been recommended that rigorous research amongst older people in residential care is required to determine whether ramelteon is safe and effective amongst this population (Shimazaka and Martin 2007).

Valerian

Valerian is a herb that comes in two forms – alcohol and aqueous (sesquiterpenes). It is commonly used as a herbal remedy for alleviating sleep problems. In particular, the aqueous type is considered to have a sedative effect (Shimazaka and Martin 2007). There are few studies on the efficacy of valerian in older adults and none in long-term care settings (Shimazaka and Martin 2007).

Other alternative therapies

There has been one small quasi-experimental study reporting benefits of the herb yi-gan san on sleep in residents with dementia (Shinno et al 2008). Other alternative therapies that may have some benefit are music therapy (Skingley and Vella-Burrows 2010), aromatherapy (Soden et al 2004) and acupuncture (Suen et al 2002). These therapies need to be rigorously tested with older adults living in residential care before recommendations can be made. Given the ease of implementation and potential benefits of these therapies, further research is warranted.

Multifactorial Interventions

Haesler (2004) concluded that using a variety of sleep promotion interventions is more likely to be effective than using one isolated intervention in residential care. Other experts also suggest simultaneous multifactorial interventions are more likely to achieve significant improvements in sleep in residential care (Martin 2008; Dowling 2008).

Alessi et al (2005) conducted a RCT in four care facilities with 108 participants. The trial included efforts to reduce daytime time in bed, 30 minutes or more of sunlight exposure per day, increased physical activity, structured bedtime routine, and efforts to decrease nighttime light and noise. The intervention was conducted over five days and nights, and the follow-up measures collected on the final three days and nights. The results indicated a modest decrease in mean duration of nighttime awakenings in the intervention participants. No significant effect on percentage of nighttime sleep, and number of nighttime awakenings was found. There was a significant decrease in daytime sleep in the intervention group, and an increase in participation in social and physical activities and social conversation.

A second multifactorial study was conducted in four pairs of residential care facilities (Ouslander et al 2006). The facilities were randomised such that one facility in each pair undertook the intervention while the other served as a control; subsequently, the control facilities undertook the intervention. One hundred and sixty participants undertook the intervention, 77 in the immediate intervention and 83 in the delayed intervention. The intervention undertaken included daytime physical activity, attempts to keep participants out of bed in the daytime, evening bright light exposure, structured bedtime routine, nighttime care routines to minimise sleep disruptions, and nighttime noise reduction strategies. The intervention took place for 17 days and nights, with the follow up data collected for the last seven days and nights. There were no significant differences in primary wrist actigraph sleep measures between the intervention and control groups or pre and post intervention.

Both studies of multifactorial interventions failed to demonstrate significant improvements in nighttime sleep. There are a number of proposed reasons why significant improvements were not observed. Treating specific sleep disorders and medical factors known to influence sleep, such as depression, were not part of either intervention. The interventions occurred over five and seventeen days and nights, and longer interventions may be required in residential care. More intensive activity interventions may be required to affect sleep. In both studies the strategies used to reduce nighttime noise and disruption were not sufficient and remained at disruptive levels. It was also suggested that interventions must do more than reduce daytime sleep to have a positive influence on nighttime sleep (Ouslander et al 2006).

CONCLUSIONS

In the years 2003-2010 there were 34 published English language articles regarding sleep in residential aged care, but further work is required to identify effective and safe sleep promotion interventions.

Interventions demonstrating promise in residential care settings include light therapy, exercise, melatonin treatment and multifactorial interventions; however, outcomes and protocols have been inconsistent. Further research is required to identify optimal treatments, and rigorous testing to verify beneficial outcomes is required.

Research in residential care into the safety and efficacy of cognitive behavioural therapy, ramelteon, valerian, yi-gan san, music therapy, aromatherapy and acupuncture is missing. As these interventions have demonstrated promise in community settings, further research should be undertaken.

The latest literature suggests medications for sleep should not be used as a substitute for addressing underlying causes of sleep disturbance and should be used with extreme caution. Long-acting benzodiazepines should be avoided because of their potential to harm. More research on the effects of tapered withdrawals from long-term benzodiazepine use in residential care, and the efficacy and risks of using non-benzodiazepine hypnotics in residential care, is required.

It is more likely that multifactorial interventions will improve sleep in residential care more than any single intervention in isolation. Effective durations, mixes and intensities of interventions are yet to be determined, and will likely vary for each individual, given the diversity of sleep disturbance causes. After a proper individual assessment and treatment for underlying causes, a targeted multifactorial approach is likely to be most effective.

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