



Best Practice

Evidence Based Practice Information Sheets for Health Professionals

Strategies to manage sleep in residents of aged care facilities

Information source

This *Best Practice* Information Sheet has been derived from a systematic review of research entitled "Effectiveness of strategies to manage sleep in residents of aged care facilities"¹. The primary references on which this information sheet is based are available in this systematic review report available from The Joanna Briggs Institute and from the website www.joannabriggs.edu.au

Background

This sheet focuses exclusively on the effectiveness of strategies to assess sleep disturbances and manage sleep in residents of aged care facilities. Research indicates that there are substantial changes to an individual's sleeping cycles as they age. An age-related decrease in melatonin levels, a hormone implicated to control the body's sleep-wake cycle, has been described by some researchers. In addition, there are a number of age-related sleep disorders, such as sleep apnoea syndrome and periodic limb movement, which may be experienced.

For older people living in residential aged care facilities, the risk of sleep disturbances may be exacerbated due to a number of reasons. Environmental elements, such as increased light, noise and disruption to sleep by staff and other

This Information Sheet Covers the Following:

- Tools for diagnostic assessment and measurement of sleep disturbance
- Interventions for promoting sleep (behavioural/cognitive, pharmacological, biochemical, alternative therapies, environmental)

residents can substantially impact upon the quality and quantity of resident's sleep. The routines typically adhered to aged care facilities mean residents spend much time in bed during the day, which has been shown to interfere with circadian rhythms. In addition, residents are often given short-acting hypnotics or long-acting benzodiazepines to manage sleeping difficulties, despite research indicating that these medications may be counter-productive.

Objectives

The objective of this *Best Practice* Information Sheet is to present the best available evidence related to the

Grade of Recommendation

These Grades of Recommendation have been based upon the JBI developed Grades of *Effectiveness*:

Grade A: Effectiveness established to a degree that merits application

Grade B: Effectiveness established to a degree that suggests application

Grade C: Effectiveness established to a degree that warrants consideration of applying the findings

Grade D: Effectiveness established to a limited degree

Grade E: Effectiveness not established

effectiveness of strategies to assess and manage sleep in residents of aged care facilities. A number of tools are used in the assessment of sleep disturbance and a range of interventions have been suggested for the management of sleep in the population of interest. Following is a brief description of the diversity of these applications, followed by a synopsis of the systematic review results.

Tools for assessing and diagnosing sleep disturbance

A number of tools for assessing and diagnosing sleep disturbance were identified in the review.

Polysomnography

Polysomnography (PSG) is an objective technique to assess sleep, where patients are wired with electroencephalogram (EEG), electroculogram (EOG) and electromyogram (EMG) electrodes. The readings of brain and muscle activity that are recorded by the electrodes are interpreted by trained technologists, to ascertain a record of the patient's sleep-wake activity. Despite being described by some as the 'traditional gold standard' of sleep assessment, PSG appears limited in its use with older people and individuals with dementia. Reasons for this include difficulty reading EEG readings of individuals with dementia due to diffuse slowing of their brain activity and poor tolerance by some nursing home residents of being in a sleep laboratory, the environment where PSG's are typically conducted.

Wrist actigraphy

In a wrist actigraphy assessment, a monitoring device containing an accelerometer that measures intensity and frequency of body movement, is worn on the subject's non-dominant wrist. Activity is measured in 1-5 second intervals and data are analysed to determine sleep-wake cycles. Some wrist actigraphy devices have the added benefit of recording noise and light levels, enabling the opportunity to concurrently assess sleep patterns and the sleep environment objectively. Wrist actigraphy was found to offer the most accurate objective sleep assessment tool for use with residents of aged care facilities. Wrist actigraphy offers benefits over EEG in that it can be used in a resident's normal sleep environment (as opposed to a sleep laboratory), is non-invasive, more cost-effective and the data are not influenced by brain wave changes associated with dementia. The main issue appears to be compliance,

and regular staff checks to ensure the resident is still wearing the wrist device are highly recommended.

Behavioural observation

Although commonly used to assess sleep, the validity of behavioural observation has been questioned. One of the main threats to validity is the frequency with which observations are conducted. It was noted that behavioural observations are likely to be inaccurate when conducted on a 1-2 hourly basis, however they may be effective as a sleep assessment method when conducted on a more frequent basis.

Subjective assessment tools

The validity of subjective sleep assessment tools, particularly when used on cognitively impaired older people, has been questioned. Two subjective sleep assessment tools identified were the Subjective Evaluation of Sleep Tool (SEST) and the Pittsburgh Sleep Quality Index (PSQI). However, neither tool have had their validity established in the population of interest.

Interventions for the promotion of sleep

Studies were identified which looked specifically at interventions for the promotion of sleep through modifying the nursing home environment, reduction in nocturnal nursing care, promoting exercise and daytime activity, light therapy, use of aromatherapy, use of valerian, light therapy, melatonin, pharmacological management or multidisciplinary approaches.

Nursing home environment – Light minimisation and noise abatement interventions

A number of elements in the nursing home environment can impact negatively on resident's sleep. These include light, noise and disruption from

room mates. A number of studies looked at the efficacy of light minimisation and noise abatement interventions on promoting sleep. One study found that reducing night lighting may assist in maintenance of resident's circadian rhythms and prompt staff to maintain a quiet night-time environment. The study researchers recommended that protocols be adopted which prescribe headphones for night-time television watching to minimise disturbance to other residents, decreasing noise level of alarms and telephones at night and refraining from using cleaning equipment at night.

Nocturnal continence and pressure area care

Night time nursing care may impact negatively on resident sleep in aged care facilities. Two studies investigated the effectiveness of individualised nocturnal care programs in reducing the number of resident awakenings due to care attendance. Individualised care regimes, based on assessment of resident's bed mobility and risk of skin breakdown, or conducting hourly checks and only providing care when a resident is awake, were both found, in separate studies, to significantly improve resident's sleep quantity.

Exercise

The benefit of exercise in promoting sleep has been shown to be effective in younger subjects. For the population of interest in this review however, evidence obtained from the two studies identified were contradictory. One RCT conducted was with 65 residents in seven nursing homes, all aged 65 years and older, who either had urinary incontinence or were regularly physically restrained. Following two nights of baseline recording, residents were randomised to either the intervention group (n=33) or the control group (n=32). Residents in the

intervention group undertook one of two physical activity programs – Functional Incidental Training (FIT) or Row Walk Wheel (RWW), whilst the control group received normal care. Despite strong adherence to the physical activity programs, data analysis failed to identify any significant changes in sleep characteristics as a result of participation in either of the programs. The second study was a smaller, non-randomised controlled trial with 22 older high-level care residents, all with a diagnosis of dementia. Residents in the intervention program (n=11) participated in a 40 minute exercise program, seven days per week, for the four week intervention period. The control group undertook social activities held at the same time. Significant improvements in the sleep of residents in the intervention group were noted, but not for residents in the control group. Based on the small number of studies identified and the contradictory results achieved, no recommendations are able to be made regarding the efficacy of physical exercise in promoting sleep in residents of residential aged care facilities.

Daily routine and activities

It has been suggested that daytime napping can contribute to night-time sleep disturbances. Therefore, maintaining physical activity during the day may have the effect of decreasing daytime napping, and hopefully promoting better sleep. One uncontrolled quasi-experiment investigated the effect of individualised activity intervention. Programs included activities to meet residents' specific interests and physical capabilities such as board games, ball games, music and simple crafts. All residents displayed improved nocturnal sleep, with an average increase of 6.7% (54.2% compared to 47.5%) of time spent sleeping at night ($P < 0.01$). Sixty percent

of residents also had decreased daytime napping (79.7 compared to 105.9 minutes). Whilst the results are encouraging, the fact that the effect of social interaction with staff was not controlled for, small study size, gender bias (all participants were male) and uncontrolled, non-randomised study design, all decrease confidence in the findings. Other studies identified reported an improvement in sleep when physical activity interventions were combined with other sleep promotion strategies, such as reducing environmental noise and individualising night-time nursing routines.

It has been suggested that the routines experienced by residents in aged care facilities may also impact on night-time sleep. One study investigated the effect on sleep of allowing residents to select their own daily routines, with respect to getting up and retiring to bed, timing of hygiene, and activity and meal times. However, no significant changes were noted in night-time sleep ratings. Limitations of this study were the small sample size, non-validated data collection method, brief study time frame and difficulties with staff cooperation.

Aromatherapy

Essential oils have been used for their claimed relaxing and sedative properties. However, only three studies were identified that investigated the use of aromatherapy in residents of aged care facilities. One cohort study investigated the effectiveness of aromatherapy oils in promoting sleep and decreasing use of sedation. Large improvements in night-time sleep and a concurrent reduction in sedative use were reported by the researchers. Another small cohort study reported a small (2%) improvement in total night sleep, using lavender essential oil administered by a vaporiser. A case study also provided support for the use

of aromatherapy (specifically lavender and chamomile) as promoting sleep. Whilst the results of the three studies were promising, the evidence obtained from them is limited by their poor study designs. Poor confidence in the results means no recommendations are able to be made regarding the use of aromatherapy in promoting sleep in the population of interest, other than the area seems worthy of further research.

Valerian

Valerian extract originates from the plant *Radix Valerianae officinalis* L. and is purported to have sedative effects. Only one study, an RCT, was identified which investigated the use of valerian in promoting sleep in residents of aged care facilities. Eight older residents were randomised to the intervention group, and received a valerian extract preparation of 405mg, three times a day. The control group (n=6) received a placebo. A number of changes to the sleep characteristics of the intervention group were noted by the researchers. These included an increase in mean total nightly sleep time and an overall increase in slow wave sleep. There was a corresponding decrease in stage 1 sleep. No changes in slow wave sleep time or total sleep time were observed in the control group. Interestingly however, whilst the intervention group experienced increased total sleep time, they did not report a concurrent increase in satisfaction with sleep.

Light therapy

Exposure to bright light has been shown to be effective in altering the timing and strength of circadian rhythms in studies with younger adults and community-dwelling older adults. For older people with dementia living in residential aged care facilities however, a similar effect has not been consistently demonstrated. Four RCTs and three lower level studies

investigating the effects of various light therapy regimes on sleep-wake cycles of residents with dementia were identified. No studies were identified that were conducted with residents with normal cognitive function. The largest study identified, an RCT conducted on 77 residents, noted some effects of bright light therapy on circadian rhythms; however there was no concurrent improvement in sleep. Findings of other RCT's were mixed; one reported improvement in night-time sleep variables in residents with vascular dementia, but not in those with Alzheimer's disease and another RCT found significant improvement only in the fourth study week. Case studies also reported improvement in sleep when light therapy had been applied for periods of 1 month or longer.

Administering light therapy to the population of interest can be problematic as residents may wander, demonstrate increased agitation or fall asleep during therapy. As such, constant supervision is necessary. Other variables which may also impact on the effectiveness of light therapy are the type of light therapy and duration of sessions, the illumination levels used, the timing of light administration, the duration of therapy and the type and level of dementia which the resident has.

Melatonin

Sleep disturbances and disruption to the sleep-wake cycle may be caused by alterations in melatonin levels in older adults. However, only two studies were identified that researched this aspect in residents of aged care facilities, neither of which provided significant evidence in support of oral melatonin therapy.

Pharmacological management

Sedatives and hypnotics are widely used to manage sleep disturbances

experienced by residents in aged care facilities. However, few studies have been published which investigate the effectiveness of these medications in this population. Moreover, the studies identified in this review were generally not supportive of these medications as promoting sleep. Two cohort studies addressed the effectiveness of benzodiazepines, neuroleptics and antidepressants in promoting sleep. One cohort study (n=176) was conducted with incontinent high level care residents to determine the relationship between psychotropic medication use and both sleep quantity and night-time bed mobility. Objective sleep measures were compared between those residents taking these classifications of medications and those who were not. No significant differences in daytime or nocturnal sleep characteristics were noted between those residents receiving psychotropics (n=62) and those who did not (n=114). A second cohort study conducted with residents aged 65 years and older found residents who decreased their medication did not report an increase in sleep disturbance, compared to residents who had no change to their medication (P=0.13). Furthermore, an increase in psychoactive medication use was not associated with a decrease in sleep disturbances (P=0.24). There was some evidence in support of a specific non-benzodiazepine preparation (zolpidem titrate) for promoting sleep, however this was only anecdotal evidence derived from two case studies.

Multidisciplinary strategies

Using multiple interventions to promote sleep in residents of aged care facilities was the focus of two trials. One study was an RCT, which investigated the effectiveness of combining both physical exercise and night-time environment and

care modification, in promoting sleep. Residents were all incontinent, and the 15 randomised to the intervention group were exposed to both exercise and night-time environment modifications. The control group (n=14) was exposed to night-time environment modification alone. Bedside monitors were used to record wrist actigraphy, noise and light in 2-minute intervals to collect night-time data, and 15-minute behavioural observation was conducted to measure daytime sleep characteristics. The environmental manipulation interventions were reported to significantly decrease loud noise and exposure to light changes. Despite this, the researchers failed to demonstrate a corresponding improvement in sleep in residents in the control group, whereas the intervention group experienced a significant increase in time spent asleep at night. There was also a non-significant trend towards decreased daytime napping in the intervention group. The results suggest that environmental modification alone is not effective in promoting sleep, whereas multiple interventions may be. Findings of a non-randomised controlled trial, which investigated the effectiveness of a combination of a low intensity exercise program, evening bright light therapy, night-time noise abatement and a non-disruptive night-time care routine, suggested that implementation of a multidisciplinary program has the effect of decreasing daytime sleep. Confidence in these findings is limited, as the study was only briefly reported, however informed opinion is also supportive of using a range of strategies concurrently to promote sleep.

Recommendations

It should be noted that the recommendations are based on a small number of studies, many of which had limitations pertaining to small sample size, poor design and/or lack of validated data collection techniques. No studies were identified that addressed the diagnosis of specific sleep disorders in residents of aged care facilities. Further research is needed to fully evaluate strategies to assess and manage sleep in residents of aged care facilities.

Grade of recommendations

- Wrist actigraphy currently represents the most accurate objective sleep assessment tool for use in the population of interest. Regular supervision of residents wearing wrist actigraph devices is highly recommended. **(Grade B)**
- Behavioural observations may be effective when conducted on a frequent basis (more frequently than once/hour) **(Grade B)**
- Daytime physical and recreational activity programs are unlikely to have a significant impact on sleep when used in isolation, however their use as a part of a multidisciplinary sleep promotion plan may contribute to improvements in night-time sleep **(Grade B)**
- Benzodiazepines, neuroleptics and antidepressants do not appear to have a substantial effect in improving sleep of residents in high-level care. **(Grade B)**

No recommendations were able to be made regarding the following

- Physical exercise • Valerian • Subjective sleep assessment tools • Melatonin • Light therapy

References

1. Haesler, EJ. 2004. Effectiveness of strategies to manage sleep in residents of aged care facilities. JBI Reports, Blackwell Publishing Asia 2, 115-183.

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In addition this *Best Practice* Information Sheet has been peer reviewed by experts nominated by JBI collaborating centres.



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