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COMMENTARY

How can we address poor sleep in nursing homes?

Sleep disturbances are common among residents of nursing homes, affecting over 69% of residents (Martin *et al.*, 2006; Alessi *et al.*, 2005). Poor sleep is associated with a host of negative outcomes, including worsening depression (Chau *et al.*, 2019), anxiety (Johnson *et al.*, 2006), pain (Finan *et al.*, 2013), and increased falls (Jiang *et al.*, 2019). Historically, sedative-hypnotic medications have been commonly used to address sleep disturbances in nursing home residents (Svarstad and Mount, 2002); however, these medications can have significant adverse effects for older patients including impaired cognition, increased risk of falls, and worse sleep quality over the long-term despite their intended effect (Bourgeois *et al.*, 2014). These adverse effects have led to systematic efforts to reduce use of these medications in older adults (American Geriatrics Society, 2019) and to identify other non-pharmacological treatments to address poor sleep in nursing homes and other long-term care settings. Initial intervention studies focused mostly on timed bright-light exposure during the daytime, in an effort to strengthen circadian rhythms and consolidate sleep (Ancoli-Israel *et al.*, 2002; Fukuda *et al.*, 2001). These single-component interventions have demonstrated some promise; however, benefits have not been sustained after treatment ends.

As a result of these limitations and the multifactorial determinants of sleep quality, especially for residents of nursing homes, investigators have sought to develop and test multi-component treatments that address multiple factors simultaneously. Residents of nursing homes typically suffer from poor sleep due to complex interactions among resident-level factors and environmental factors. Residents in nursing homes often suffer from cognitive impairment and multiple chronic conditions for which treatments also contribute to poor sleep (e.g. conditions that cause pain or discomfort or treatments such as medications that increase urination). Residents often take multiple medications some of which may cause daytime sedation (making it hard for residents to be alert) or nighttime sleep fragmentation (making it hard to obtain adequate sleep at night). In a recent qualitative study, Webster *et al.* found that nursing staff do not think medications adequately address sleep disruption in residents and can have negative effects on residents during the daytime hours (Webster *et al.*, 2020). On top of the many issues faced by residents individually, the nursing home nighttime environment is not conducive to solid, restful sleep. The environment is typically noisy, and lights are often left on throughout the night (Janus *et al.*, 2020; Schnelle *et al.*, 1993). Moreover, during the daytime, residents often remain in bed past morning hours, lighting levels are often low, and there is insufficient stimulation for residents to sustain wakefulness. (Martin *et al.*, 2006) This combination of factors creates a vicious cycle of daytime sleeping and nighttime wakefulness.

Wifling and colleagues (2020) conducted a systematic review of multi-component interventions to improve sleep in nursing homes, seeking to describe the common elements of effective approaches, with the goal of elucidating those components that are most impactful. They extracted information about a total of seven interventions, and identified four key elements of the interventions: (1) daytime activities including exercise and socialization, (2) nighttime activities to reduce environmental noise and light, (3) staff education and training, and (4) daytime light exposure. Importantly, they note that many studies did not provide sufficient details regarding interventions to facilitate direction comparison across studies and sleep-related outcome measures varied. Overall, the studies showed improvements in sleep, compared to control conditions; however, there was limited information about how these multi-component interventions can be sustainably implemented over time.

Wifling *et al.* (2020) comment that a systematic evaluation of the individual components within these interventions is warranted; however, it may be impossible to tease apart the impact of each individual component. Factors impacting sleep in nursing home residents interact with one another and may further amplify the individual potency of one factor or another. Thus, as with many complex interactive factors, addressing all of them simultaneously may be necessary to achieve clinically meaningful benefits. If a patient is sleeping better at night, is it because the environment is less noisy, because of increased daytime activity, or because of improved circadian rhythmicity? It may be impossible to know. Sleep regulation is a delicate balance involving all of these factors simultaneously (Borbely and Achermann, 1999). For example, a noisy environment may

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awaken a patient, and for the patient who suffers from dementia, she may interpret the noisy environment as an indication that it's time to get up and get dressed. Once dressed and ready to begin the day, staff may find it impossible to coax her back into her room so she can return to sleep. Sleep problems must be conceptualized as a 24-hour sleep/wake issue. Increased wakefulness is essential to improving nighttime sleep quality and *vice versa*.

Conceptualizing sleep health as a 24-hour sleep/wake issue is inherently complex. Complex interventions require complex designs and sophisticated analytic approaches if identifying intervention programs worthy of adoption is to be realized. Study complexity may be addressed not only through randomized trial designs, but also through the conduct of grounded pragmatic designs, which provide content and protocol guidance but also rely on local conditions and staff for implementation and iterative problem identification and resolution through an adaptive design. However, such efforts require staff buy-in and participation. The challenges of staffing to resident ratios, the injection of more and more medical care into nursing home facilities, and the growing complexity of nursing care as a result must be integrated into any programmatic considerations. Multiple stakeholder (residents, their families, nursing home staff, and their leaders) engagements are needed for any program to succeed and be sustained. Programmatic education is an essential component of a successful intervention. Although necessary but not sufficient, educational content as well as its mode of delivery requires careful consideration.

In this review, only three studies involved education of facility staff related to sleep, and no studies involved working directly with front-line caregiving or clinical staff in addressing sleep disruption. This is a significant limitation as studies have failed to address the ability of multi-component interventions to be implemented within real-world nursing home care. Education of staff on how to handle sleep-related challenges will enhance the ability of interventions to be sustainably implemented. Studies are needed that consider the ability of intervention programs to be used in a sustainable way – by nursing home staff – accounting for the many challenges they already face in providing care to these residents with complex health issues. Staff recognize the impact of poor sleep on other residents, staff and family members as they perceive poor sleep as contributing to daytime sleeping, irritability, and agitation (Webster *et al.*, 2020).

It is also important to note that the COVID-19 pandemic has disproportionately impacted older adults in institutional settings and the staff who provide their care, with more than 40,000 COVID-related deaths among US nursing home residents (Centers for Medicare Services, 2020). In an effort to reduce transmission of COVID-19 among these vulnerable individuals, the Centers for Medicaid Services (CMS) and Centers for Disease Control and Prevention (CDC) released guidance to restrict visitors and non-essential personnel in nursing homes and to cancel communal dining and group activities (Levitt and Ling, 2020). An absence of daytime activities has been certain to increase boredom, reduce mobility, and elevate the risk for confusion and agitation among residents. Loss of family connections and other familiar faces (now behind masks) has likely created new anxieties and exacerbated old ones. Furthermore, staff concerns and anxieties about their own health have likely led to a transference of these emotions and further fueled residents' concerns.

These unintended consequences as a result of necessary policy changes have likely worsened the ability of residents to get a good night's sleep, while creating new challenges for staff trying to provide care to these medically complex residents under extraordinary circumstances. In developing and testing future interventions to reduce sleep disruption, it will be essential to consider infection control and the safety of residents and staff in programs designed to improve sleep and avoid the health-related issues associated with chronic sleep disruption in nursing homes.

The systematic review of multi-component interventions by Wifling *et al.* (2020) highlights the need for detailed reporting of intervention structure and content to facilitate dissemination and real-world adoption of research findings. They are to be commended on their thorough analysis of the available trials of multi-component non-pharmacological sleep interventions in nursing home residents as these approaches show the greatest promise in achieving improved sleep for this vulnerable group of older adults.

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