



January 2022

## Sleep in the Intensive Care Unit (ICU): An Overlooked Opportunity for Occupational Therapists to Fill a Gap in Health Care Service

McKenzie C. Bolin

Wingate University - USA, mc.bolin549@wingate.edu

Melissa M. Sweetman

Wingate University - USA, m.sweetman@wingate.edu

Follow this and additional works at: <https://scholarworks.wmich.edu/ojot>



Part of the Occupational Therapy Commons

### Recommended Citation

Bolin, M. C., & Sweetman, M. M. (2022). Sleep in the Intensive Care Unit (ICU): An Overlooked Opportunity for Occupational Therapists to Fill a Gap in Health Care Service. *The Open Journal of Occupational Therapy*, 10(1), 1-5. <https://doi.org/10.15453/2168-6408.1846>

This document has been accepted for inclusion in The Open Journal of Occupational Therapy by the editors. Free, open access is provided by ScholarWorks at WMU. For more information, please contact [wmu-scholarworks@wmich.edu](mailto:wmu-scholarworks@wmich.edu).

---

## Sleep in the Intensive Care Unit (ICU): An Overlooked Opportunity for Occupational Therapists to Fill a Gap in Health Care Service

### Abstract

Sleep hygiene is well-established in the scope of occupational therapy practice; however, this occupation is rarely addressed in the intensive care unit (ICU). The majority of health care practitioners believe patients experience reduced sleep quality in the ICU, which can negatively impact patient outcomes. Through a review of the literature, this paper identifies common factors that negatively influence sleep quality and duration and proposes evidence-based interventions to improve patients' sleep. Factors that influence sleep and fall in the domain of occupational therapy practice include the environment, psychosocial elements, and patient care. Occupational therapists can use interventions, such as orienting patients during the day, creating sleep-promoting routines, and educating patients on the use of adaptive equipment (earplugs, eye masks, or sound machines for relaxing music). Role confusion and a lack of prioritization of sleep have led to the occupation of rest and sleep not being addressed. This paper will suggest implications for the future of the profession that includes establishing leadership positions on a multidisciplinary team to improve patients' sleep.

### Comments

The authors declare that they have no competing financial, professional, or personal interest that might have influenced the performance or presentation of the work described in this manuscript.

### Keywords

critical care, interventions, occupational therapy, rest and sleep, sleep deprivation, sleep promotion

### Credentials Display

McKenzie C Bolin, OTDS

Melissa M Sweetman, PhD, OTD, OTR/L, CLA

Copyright transfer agreements are not obtained by The Open Journal of Occupational Therapy (OJOT). Reprint permission for this Opinions in the Profession should be obtained from the corresponding author(s). Click here to view our open access statement regarding user rights and distribution of this Opinions in the Profession.

DOI: 10.15453/2168-6408.1846

“Approximately 80% of ICU patients experience sleep deprivation during their hospital stay” (Grimm, 2020, p. e18). The implications of this staggering statistic are far-reaching and well-supported by the clinical experiences of health care practitioners. A recent multi-national survey regarding sleep in the intensive care unit (ICU) showed 88% of practitioners believe sleep deprivation negatively impacts the recovery process (Kamdar et al., 2016). Survey respondents also believed sleep deprivation can lead to ICU acquired delirium, longer length of stay, and poor participation in therapy. Although there was wide agreement that sleep is vital to recovery, only 32% of survey respondents had sleep hygiene protocols in place.

The physiological impact of sleep deprivation has not been studied extensively in an ICU setting, but the deleterious impacts are well-documented in the general population. In a clinical review, Pisani et al. (2015) explained that sleep deprivation is linked to decreased immune functions, decreased respiratory muscle endurance, decreased exercise performance, and negative impacts on neuroendocrine control systems. In addition, healthy individuals with sleep deprivation experience impaired cognition which resembles that of ICU acquired delirium. Although studies to date have been unable to identify a causal relationship between sleep deprivation and ICU delirium, the similarities in presentation may suggest the possibility of a relationship (Pisani et al., 2015).

The role confusion among health care practitioners and a lack of prioritization of addressing sleep have caused the issue of sleep deprivation to fall by the wayside, leaving an opportunity for occupational therapists to take the lead in confronting this multidisciplinary concern. Occupational therapists’ expertise in analyzing the demands of an occupation, the contexts in which the occupation occurs, performance patterns, performance skills, and client factors supporting or inhibiting occupational performance indicate that occupational therapists are ideally suited to address sleep in the ICU (American Occupational Therapy Association [AOTA], 2020). This paper will identify factors that influence sleep quality, explore potential interventions indicated to improve patients’ sleep, and present the argument for why occupational therapists play a critical role in addressing this major patient care concern.

### **Factors that Influence Sleep**

Given the prevalence of sleep deprivation in the ICU, researchers have continuously sought to understand factors that reduce sleep quality in this setting. In a meta-analysis of qualitative studies on sleep quality determinants as perceived by patients, Mattiussi et al. (2019) identified three themes shown to have a negative influence on sleep. In addition to environmental factors, their results found pain and psychosocial elements as significant themes. Complex interactions with the environment as both positive and negative factors were identified. One positive factor that promotes sleep was the rhythmic hum of the ventilator, whereas a negative factor that deterred sleep was the sound of people entering and leaving the unit. Psychosocial factors identified were feelings of fear, anxiety, and uncertainty of what the next day would bring medically (Mattiussi et al., 2019).

In addition, Grimm (2020) sought to distinguish factors influencing patients’ sleep in the ICU and categorized the results as modifiable and nonmodifiable. Grimm used a literature review to identify barriers to patients’ sleep and propose care guidelines to improve patient outcomes. According to Grimm, modifiable barriers to sleep include personal factors (fear and anxiety), environmental factors (noise, odors, and lighting), and medical factors (pain, medications, and constant interruptions for medical care). Nonmodifiable factors include a history of sleep disorders, acute illness, and the need for mechanical ventilation.

Interestingly, Grimm (2020) identified ventilation as a negative factor in sleep, whereas Mattiussi et al. (2019) found ventilation can be a positive factor as some patients find the constant noise to be relaxing. Additional research is needed to understand the impact of ventilation on sleep, as well as to discern the impact of various factors, such as distinguishing the impact of sound versus the impact of lighting. Other risk factors, such as the environment, pain, and negative emotions, have been demonstrated to negatively impact sleep across multiple studies (Grimm, 2020; Mattiussi et al., 2019; Younis et al., 2020) and have indicated sleep as a clear need to be addressed in clinical practice.

### **Interventions to Promote Sleep**

Research on interventions to promote sleep in the ICU is more prevalent than research identifying factors that lead to sleep deprivation. Although pharmaceutical interventions have been studied extensively, only nonpharmaceutical interventions fall within the scope of occupational therapy practice. Some researchers have studied the effects of individual interventions on sleep, such as music and eye masks, whereas others have studied the effects of bundled interventions, or the use of combining two or more interventions at once. Table 1 includes a categorized list of interventions compiled from various studies (Aitken et al., 2017; Arttawejkul et al., 2020; Ferrehi et al., 2016; Patel et al., 2014; Su et al., 2013).

**Table 1**

*Categorizing Common Interventions to Promote Sleep*

<b>Category</b>	<b>Examples</b>
Environmental	<ul style="list-style-type: none"> <li>• Closing doors and blinds</li> <li>• Ear plugs</li> <li>• Eye masks</li> <li>• Introducing a clock or calendar to the patient's room</li> <li>• Low level or relaxing music</li> <li>• Open blinds for natural lighting during the day</li> <li>• Reducing light</li> <li>• Reducing noise</li> </ul>
Educational	<ul style="list-style-type: none"> <li>• Educating patients on the appropriate use of sleep enhancing tools</li> </ul>
Patient Care	<ul style="list-style-type: none"> <li>• Cluster or group patient care when possible</li> <li>• Limit medical interruptions during sleep hours when possible</li> <li>• Orient patients regarding time, place, and date every 8 hr</li> <li>• Promote comfort through repositioning</li> <li>• Reduce pain levels</li> <li>• Wash/shower before bed</li> </ul>
Pharmacological	<ul style="list-style-type: none"> <li>• Antiemetics</li> <li>• Pain relief</li> <li>• Sleep inducing medications</li> </ul>
Psychosocial	<ul style="list-style-type: none"> <li>• Familiarity</li> <li>• Increased family visitation</li> <li>• Prayer</li> <li>• Reduce anxiety/fear</li> </ul>

In a randomized controlled trial, Su et al. (2013) assessed the effects of listening to relaxing music on sleep quality for patients in an ICU setting. Although the sample size was small ( $N = 28$ ), the

results validated the claim that music can improve sleep. Su et al. found that patients who listened to music had a statistically significant shorter stage N2 sleep ( $p = 0.014$ ), longer stage N3 sleep ( $p = 0.008$ ), and lower heart rate ( $p < 0.003$ ). These findings indicate patients spent more time in deeper, restorative stages of sleep when listening to relaxing music.

Although relaxing music is known to improve sleep, many patients report the constant barrage of background noise and lighting leads to reduced sleep. To better understand the impact of two simple, low-cost interventions on improving sleep by blocking out unnecessary sensations, Arttawejkul et al. (2020) studied the effects of ear plugs and eye masks. In a small ( $N = 17$ ) prospective randomized controlled trial, Arttawejkul et al. found the use of ear plugs and eye masks lowered participants' arousal index. Results were not statistically significant ( $p = 0.086$ ), but this could be because of the small sample size, indicating the need for further research to better understand the relationship between these tools and sleep quality.

In a high-quality cohort study, Patel et al. (2014) analyzed the impact of a bundle of 17 nonpharmaceutical interventions on sleep for patients in the ICU. The interventions used in this study aimed to reduce noise, light, and patient care during sleeping hours. The bundled intervention approach significantly reduced night-time noise ( $p = 0.002$ ), light ( $p = 0.003$ ), staff-patient interactions ( $p = 0.045$ ), and the number of times that staff interactions awoke patients ( $p = 0.003$ ). The reduction of environmental and patient care disruptions led to significantly improved sleep efficiency ( $p < 0.001$ ), sleep quality ( $p < 0.001$ ), sleep duration ( $p < 0.001$ ), and reduced daytime sleepiness ( $p = 0.042$ ).

When identifying potential occupational therapy interventions, it is important to discuss not only those that are most commonly recommended by health care practitioners, but also those that are proposed by patients. In an exploratory descriptive study by Aitken et al. (2016), patients identified solutions that improved their sleep quality or duration. Many of their results supported those of other studies (e.g., music, ear plugs, or eye masks), but some findings were novel, such as promoting comfort through repositioning and prayer. Although this study was not conducted by occupational therapists, it highlights an area in which the profession of occupational therapy excels: the use of a holistic, patient-centered approach. Through the occupational therapy process, therapists are able to determine patient values and concerns, and could then gain a better understanding of which interventions may best suit one patient's needs. If a patient identifies religion as a strong value, for example, the use of prayer could be a great intervention to address their anxiety and sleep deprivation.

The importance of patient education on intervention compliance rates has not been studied extensively in the context of sleep hygiene promotion, yet this is a promising area for intervention. Ferrehi et al. (2016) compared the effectiveness of sleep intervention with and without patient education in a high-quality randomized controlled trial. All of the participants received eye masks, ear plugs, and a white noise machine; the control group received generalized education on the benefits of these sleep-enhancing tools, whereas the intervention group received specific education on how to use each of the tools. The results showed that a significant portion of participants who received specific education on sleep enhancing tools used at least one of the tools ( $p = 0.01$ ), and post hoc analyses found that adherence to sleep-improving interventions resulted in significantly improved outcomes for sleep disturbance, wake disturbance, and fatigue ( $p < 0.01$ ) (Ferrehi et al., 2016). This is promising, as previous studies that have attempted to assess the impact of interventions have shown low compliance rates to intervention (Jones & Dawson, 2012).

While patients receiving care in the ICU may have complex medical and occupational needs, it is vitally important that occupational therapists include the occupation of sleep as a priority. Although research has yet to distinguish which interventions may have the strongest influence, research shows that interventions can improve sleep quality (Aitken et al., 2017; Arttawejkul et al., 2020; Ferrehi et al., 2016; Patel et al., 2014; Su et al., 2013). Common interventions that address environmental factors have shown to be effective alone or bundled. Many of these interventions can be implemented universally and at little or no cost (such as dimming the lights, reducing bedside monitor volume, and reducing hallway discussions) and can easily be billable under the Self-Care (97535) or Therapeutic Activities (97530) current procedural terminology (CPT®) codes, depending on the specific nature of the intervention.

### **Implications for Occupational Therapy Practice**

The American Occupational Therapy Association (AOTA) has established occupational therapy's role in addressing sleep in practice. In the first edition of the *Occupational Therapy Practice Framework: Domain and Process* (AOTA, 2002), the scope of practice included rest and sleep as activities of daily living. The second edition of the framework prioritized sleep by removing it from the list of activities of daily living and instead categorized rest/sleep as a separate occupation, one of only eight areas of occupation (AOTA, 2008). Since then, rest/sleep has remained a priority occupation for occupational therapy practice in subsequent editions of the *Occupational Therapy Practice Framework: Domain and Process* (AOTA, 2014, 2020).

AOTA (2017) has supported their position that sleep is pertinent to occupational therapy assessment and intervention through the publication of a fact sheet regarding occupational therapy's role with sleep. According to AOTA, "sleep provides the foundation for optimal occupational performance, participation, and engagement in daily life" (para. 1). Recommended interventions relevant to the ICU include addressing secondary conditions that may reduce sleep quality, establishing predictable routines, modifying the environment, and advocating for sleep promotion (AOTA, 2017).

To integrate sleep into clinical practice, Ho and Siu (2018) recommended the use of the Person-Environment-Occupational Performance model. According to Ho and Siu, the use of this model can create occupation-based sleep management on three levels: person, environment, and occupational performance. Evidence supports the use of addressing the person by reducing pain and negative emotions, addressing the environment by reducing noise and lighting, and addressing occupational performance by implementing daytime activities that can promote sleep.

Occupational therapy is integral to improving patient outcomes in hospital settings. In order to maintain our position on the multidisciplinary care teams and ensure the best outcomes for patients, we must not allow ourselves to become complacent. With a large array of potential interventions shown to improve sleep, literature to support occupational therapy's role in sleep hygiene, and a theoretical framework to guide practice, occupational therapists can no longer ignore this occupation. There is strong evidence to support the use of free or low-cost interventions to improve patients' sleep, and occupational therapists in the ICU have an obligation to incorporate this research into their daily practice. Although these interventions overlap with other roles on multidisciplinary care teams, occupational therapists cannot leave this task to other practitioners. Occupational therapists can work with their multidisciplinary teams to determine which interventions are best suited for their environment and patient population. We must set the standard for all occupational therapists to address sleep hygiene in practice, taking the lead in hospitals that have yet to implement sleep-promoting intervention bundles.

By asserting the role as leaders in sleep hygiene, occupational therapists can highlight our distinct value of improving patient care through the use of evidence-based practice and patient-centered care.

### References

- Aitken, L. M., Elliott, R., Mitchell, M., Davis, C., Macfarlane, B., Ullman, A., Wetzig, K., Datt, A., & McKinley, S. (2017). Sleep assessment by patients and nurses in the intensive care: An exploratory descriptive study. *Australian Critical Care, 30*(2), 59–66. <https://doi.org/10.1016/j.aucc.2016.04.001>
- American Occupational Therapy Association. (2002). Occupational therapy practice framework: Domain and process. *American Journal of Occupational Therapy, 56*(6), 609–639. <https://doi.org/10.5014/ajot.56.6.609>
- American Occupational Therapy Association. (2008). Occupational therapy practice framework: Domain and process (2nd ed.). *American Journal of Occupational Therapy, 62*(6), 625–683. <https://doi.org/10.5014/ajot.62.6.625>
- American Occupational Therapy Association. (2014). Occupational therapy practice framework: Domain and process (3rd ed.). *American Journal of Occupational Therapy, 68*(Suppl. 1), S1–S48. <https://doi.org/10.5014/ajot.2014.682006>
- American Occupational Therapy Association. (2017). *Occupational therapy's role with sleep* [Fact sheet]. <https://www.aota.org/-/media/Corporate/Files/AboutOT/Professionals/WhatsOT/HW/Facts/Sleep-fact-sheet.pdf>
- American Occupational Therapy Association. (2020). Occupational therapy practice framework: Domain and process (4th ed.). *American Journal of Occupational Therapy, 74*(Suppl. 2), 7412410010. <https://doi.org/10.5014/ajot.2020.74S2001>
- Arttawejkul, P., Reutrakul, S., Muntham, D., & Chirakalwasan, N. (2020). Effect of nighttime earplugs and eye masks on sleep quality in intensive care unit patients. *Indian Journal of Critical Care Medicine, 24*(1), 6–10. <https://doi.org/10.5005/ip-journals-10071-23321>
- Ferrehi, P. M., Clore, K. R., Scott, J. R., Vanini, G., & Clauw, D. J. (2016). Efficacy of sleep tool education during hospitalization: A randomized controlled trial. *American Journal of Medicine, 129*(12), 9–17. <https://doi.org/10.1016/j.amjmed.2016.08.001>
- Grimm, J. (2020). Sleep deprivation in the intensive care patient. *Critical Care Nurse, 40*(2), 16–24. <https://doi.org/10.4037/ccn2020939>
- Ho, E. C. M., & Siu, A. M. H. (2018). Occupational therapy practice in sleep management: A review of conceptual models and research evidence. *Occupational Therapy International, 1*–12. <https://doi.org/10.1155/2018/8637498>
- Jones, C., & Dawson, D. (2012). Eye masks and earplugs improve patient's perception of sleep. *Nursing in Critical Care, 17*(5), 247–254. <https://doi.org/10.1111/j.1478-5153.2012.00501.x>
- Kamdar, B. B., Knauert, M. P., Jones, S. F., Parsons, E. C., Parthasarathy, S., & Pisani, M. A. (2016). Perceptions and practices regarding sleep in the intensive care unit: A survey of 1,223 critical care providers. *Annals of the American Thoracic Society, 13*(8), 1370–1377. <https://doi.org/10.1513/AnnalsATS.201601-087OC>
- Mattiussi, E., Danielis, M., Venuti, L., Vidoni, M., & Palese, A. (2019). Sleep deprivation determinants as perceived by intensive care unit patients: Findings from a systematic review, meta-summary and meta-synthesis. *Intensive & Critical Care Nursing, 53*, 43–53. <https://doi.org/10.1016/j.iccn.2019.03.006>
- Patel, J., Baldwin, J., Bunting, P., & Laha, S. (2014). The effect of a multicomponent multidisciplinary bundle of interventions on sleep and delirium in medical and surgical intensive care patients. *Anaesthesia, 69*(6), 540–549. <https://doi.org/10.1111/anae.12638>
- Pisani, M. A., Friese, R. S., Gehlbach, B. K., Schwab, R. J., Weinhouse, G. L., & Jones, S. F. (2015). Sleep in the intensive care unit. *American Journal of Respiratory and Critical Care Medicine, 191*(7), 731–738. <https://doi.org/10.1164/rccm.201411-2099CI>
- Su, C., Lai, H., Chang, E., Yiin, L., Perng, S., & Chen, P. (2013). A randomized controlled trial of the effects of listening to non-commercial music on quality of nocturnal sleep and relaxation indices in patients in medical intensive care unit. *Journal of Advanced Nursing, 69*(6), 1377–1389. <https://doi.org/10.1111/j.1365-2648.2012.06130.x>
- Younis, M. B., Hayajneh, F., & Rubbai, Y. (2020). Factors influencing sleep quality among Jordanian intensive care patients. *British Journal of Nursing, 29*(5), 298–302. <https://doi.org/10.12968/bjon.2020.29.5.298>