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Alternative Sleep Improvement Methods for Inpatient Care

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ABSTRACT

Sleep disturbances are highly prevalent among hospitalized patients, with up to 60% reporting poor sleep quality. Inadequate sleep can lead to detrimental effects like impaired cognitive function, weakened immunity, delayed wound healing, and increased risks of chronic diseases, ultimately compromising recovery and accounting for billions in higher healthcare costs annually. While sleep medications may help insomnia, they carry risks like addiction, cognitive impairment, and drug interactions. Evidence-based non-pharmacological interventions should be the first-line approach for promoting healthy hospital sleep. Effective strategies include limiting noise through quiet time protocols, establishing bedtime routines like avoiding caffeine and screen time before bed, creating a relaxed, dark environment conducive to melatonin production, practicing relaxation techniques, making dietary modifications like increasing tryptophan-rich foods, and clustering care to allow longer uninterrupted sleep periods. Successful implementation requires interdisciplinary collaboration, environmental adjustments, sleep monitoring, and staff education. By prioritizing sleep hygiene and optimizing conditions, health care providers can enhance patient sleep quality and quantity, facilitate restorative sleep benefits, improve outcomes, prevent complications like delirium, and potentially increase the length of their inpatient stay. Standardized programs incorporating these non-pharmacological interventions should be adopted to create sleep-conducive healing environments integral to high-quality hospital care.



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INTRODUCTION

Sleep is a fundamental physiological need for overall health and well-being. It plays a role in numerous biological processes, including immune function, metabolism, cognitive performance, emotional regulation, and healing. During sleep, the body works to repair cells, clear metabolic waste from the brain, regulate hormones, and process memories and emotions from the day. High-quality, restorative sleep is essential for mental, physical, and spiritual health. In the hospital setting, patients are dealing with various health conditions and undergoing medical treatments that are frequently prioritized instead of sleep. Getting enough good-quality sleep can help patients recover faster and cope better with their illness.

Hospitalization can also disrupt patients' sleep patterns due to various factors like noise, frequent disruptions for vital sign checks, rounding, and medications. Medical staff, noise, and light were all identified as the main sleep preventers, and almost 60% of patients reported poor sleep during their hospitalization [1]. Health care workers should create a conducive environment for patients to get adequate sleep in the hospital. This can include minimizing noise and light disturbances, avoiding unnecessary interruptions during the night, and addressing any underlying medical issues affecting sleep or at risk of affecting sleep. The purpose of this literature review is to find practical non-pharmacological interventions to promote sleep in the hospital.

2. Method

The literature for this review was retrieved from several sources, including Ovid Medical Research Platform, Medline/PubMed, National Institutes for Health, and Cumulative Index of Nursing and Allied Health Literature. An expansive body of scientific literature has unequivocally established the importance of sleep. There are many focuses of research related to sleep. This review will establish the importance of sleep within the hospital and daily life and explore non-pharmacological interventions promoting sleep.

3. Review of Literature

Sleep is not a mere indulgence but a biological necessity that impacts virtually every aspect of physical and mental functioning. The ramifications of sleep deprivation or compromised sleep quality are far-reaching and profound. Numerous studies have consistently demonstrated that

inadequate sleep can significantly impair cognitive processes, including memory encoding and retrieval, attentional focus, decision-making capabilities, and higher-order executive functions [2,3].

Beyond cognitive impairments, sleep deficiencies can wreak havoc on emotional and psychological well-being. The link between chronic sleep loss and an increased risk of developing mood disorders such as anxiety, depression, and irritability has been identified [4, 5]. This bidirectional relationship between sleep and mental health highlights the intricate balance between sleep patterns and well-being.

It is imperative to recognize the profound significance of sleep as a pillar of health, not just a luxury to indulge in when convenient. Prioritizing sufficient, high-quality sleep must be a daily commitment during inpatient hospitalization. Acknowledging and respecting the importance of sleep is crucial for optimizing physical, cognitive, and emotional capacities. Sleep needs to be a priority for patients and health care workers.

4. Importance of Sleep

Sleep is a fundamental pillar of a healthy lifestyle, acting as a restorative force that promotes recovery from illness and fortifies well-being. Its role extends beyond mere rest, as it plays a critical regulatory function in modulating mood, memory, and cognitive performance [6,7]. Ample evidence demonstrates that obtaining sufficient, high-quality sleep is associated with a myriad of health benefits, including a reduced risk of chronic conditions such as obesity, diabetes, cardiovascular disease, and depression [6,7]. Sleep is widely recognized as an essential physiological imperative for maintaining homeostasis and survival [8]. It is not merely a period of unconscious rest but a highly regulated and metabolically active state during which the body undergoes a coordinated symphony of reparative and restorative processes.

The profound importance of sleep, particularly in the context of healing and recovery, was astutely recognized by the pioneering nurse Florence Nightingale, who emphasized that patients should not be disturbed or awakened, whether intentionally or inadvertently, as part of providing quality nursing care [2]. Health care professionals can implement this principle by planning

patient care activities and scheduling interventions to minimize sleep pattern disruptions, fostering an environment conducive to rest.

Sleep plays an essential role in regulating the body's hormonal systems, including the production and regulation of cortisol, often called the "stress hormone." Cortisol follows a natural diurnal rhythm, typically peaking in the morning and gradually declining throughout the day [9]. This rhythm can be significantly disrupted by sleep disturbances or deprivation. Inadequate sleep has been shown to alter the typical cortisol pattern, leading to elevated levels throughout the day and night [9,10]. This chronic exposure to high cortisol levels can have wide-ranging negative impacts on various physiological processes.

From a health care standpoint, elevated cortisol from poor sleep can contribute to increased inflammation, impaired immune function, and slower wound healing [11]. Inadequate sleep can also exacerbate hypertension, insulin resistance, and cardiovascular disease risk [12,13]. High cortisol levels can negatively impact cognitive function, mood, and emotional regulation, potentially exacerbating symptoms of anxiety and depression [1,14]. Promoting quality sleep becomes paramount for hospitalized patients, not only for recovery but also for managing stress responses and preventing complications associated with dysregulated cortisol levels. Health care professionals must be vigilant in identifying and addressing sleep disturbances to maintain optimal hormonal balance and support healing processes.

5. Complications of Inadequate Sleep

Inadequate sleep quantity and quality can have severe and far-reaching consequences, resulting in numerous acute and chronic complications. In the short term, lack of sleep can manifest in difficulties with concentration, impaired decision-making abilities, mood disturbances such as irritability or anxiety, and decreased reaction times [15]. Acute sleep deprivation can lead to involuntary microsleep, a brief period of unintended sleep [16,17].

The long-term effects of chronic sleep deprivation can be even more detrimental and long-lasting. These include an increased susceptibility to developing chronic conditions such as obesity, diabetes, and cardiovascular disease [6,7]. Prolonged sleep deficits can also compromise immune function, leaving individuals more vulnerable to frequent illnesses and infections [18].

As a result, it can subsequently impact daily personal and professional routines and responsibilities. Chronic sleep loss has been linked to accelerated cognitive decline and heightened risks of developing neurological disorders such as Alzheimer's disease [19]. Prioritizing restorative sleep even while hospitalized is imperative to mitigate these potentially severe acute and chronic health complications associated with inadequate sleep.

6. Non-Pharmacological Sleep Interventions

In addition to medications, non-pharmacological or holistic interventions should be utilized to promote sleep in and out of the hospital setting. A diverse array of evidence-based, drug-free approaches effectively enhance sleep quality and optimize sleep duration. These interventions include practicing relaxation techniques, minimizing exposure to blue light and screen time before bed, establishing a consistent bedtime routine, implementing clustered nursing care to minimize nighttime disruptions, reducing environmental noise levels, and making specific dietary modifications.

By incorporating these drug-free interventions into comprehensive sleep promotion plans, health care providers can empower patients to improve their sleep through natural, low-risk methods. This multifaceted approach addresses immediate sleep concerns and promotes well-being by harnessing the body's innate restorative capabilities. Integrating these interventions into patient care plans can be an effective adjunct or alternative to pharmacological sleep aids, reducing reliance on medication and mitigating potential side effects or risks associated with their long-term use.

Limit Noise

"Noise" is a word derived from the Latin word "nausea," referring to seasickness [20]. Unwanted sound is an underrated pollutant that negatively affects health and well-being [20]. This negative impact results from how the body processes noise, similar to how stress is processed. Noise-induced responses cause a release of adrenocorticotrophic hormone activation and release of cortisol by the adrenal cortex [21,20].

Noise exposure can cause short and long-term complications such as annoyance, negative mood states, hearing loss, cardiovascular disturbances, sleep disturbances, and impaired wound healing

[21,20]. In the hospital, excess noise can come from many areas, such as other patients, bed alarms, pumps, heart monitors, call alarms, intercoms, phones, staff, visitors, and foot traffic. Noise pollution is not limited to health care environments.

Sleep Hygiene and Diet

Sleep hygiene encompasses a set of healthy habits, environmental conditions, and lifestyle interventions during the day and at bedtime that promote high-quality, restorative sleep [22]. These habits can be challenging in the inpatient setting but must be a priority. Key elements include establishing a consistent sleep schedule by going to bed and waking up around the same time each day, even on weekends and days off. It is also crucial to avoid stimulants like caffeine and nicotine, as these can interfere with the ability to fall and stay asleep [22]. If avoidance of the stimulant caffeine is not possible, it should not be consumed for several hours before bed, or it can interfere with sleep.

Creating a comfortable sleep environment by keeping the bedroom calm, dark, and quiet supports healthy sleep. Blackout curtains, white noise machines, and comfortable bedding can optimize the sleep space and help get the recommended seven to nine hours of sleep each night [22]. Another critical aspect of sleep hygiene is limiting exposure to blue light from electronic devices and screens near bedtime [22]. The blue wavelengths emitted by televisions, computers, smartphones, and tablets can suppress melatonin production and disrupt circadian rhythms, making it harder to fall asleep [23]. A best practice is to engage in relaxing activities like reading, taking a warm shower or bed bath, or light stretching to help transition the body into sleep mode instead of electronics. Blue light exposure during this time can halt the natural melatonin secretion and alter the natural sleep-wake cycle [24]. Melatonin is a hormone that controls the body's sleep-wake cycle [25]. Peak melatonin secretion is between midnight and four in the morning [24]. During peak melatonin secretion, avoiding electronic use and being asleep is crucial.

Bedtime procrastination, the deliberate delay of sleeping without a valid external reason, can be a significant obstacle to maintaining good sleep hygiene [26]. This behavior involves putting off one's planned bedtime despite having no obligations or commitments during that time. Individuals may procrastinate on sleep for various reasons, such as a fear of missing out, thrill-

seeking tendencies, or a desire to catch up on tasks or entertainment. Negative consequences and chronic sleep deprivation can result from bedtime procrastination.

Dark Environment

As stated with sleep hygiene, creating a dark environment can help promote sleep by mimicking the natural light-dark cycle that regulates circadian rhythms. A dark sleeping environment can stimulate the release of melatonin, making it easier to fall asleep and stay asleep [24]. A dark environment reduces visual distractions, and these can interfere with sleep. By minimizing these external stimuli, the body can relax more easily and enter a deeper state of sleep, which is essential for restorative rest. Interventions for creating a dark environment can be as simple as using blackout curtains or shades to block external light sources, removing electronic devices from the bedroom, avoiding night lights, and using a sleep mask to cover the eyes. Hospitals should have eye masks available for patients.

Relaxation Techniques

Relaxation techniques can significantly support healthy sleep as part of sleep hygiene. These techniques help to calm the mind and body, making it easier for individuals to fall asleep and stay asleep [27]. Relaxation techniques can also help to reduce stress and anxiety, which are common contributors to sleep disorders or poor sleep [27]. Numerous relaxation modalities can be used to aid sleep promotion.

Deep breathing is a relaxation technique that can be particularly helpful for promoting healthy sleep. Deep breathing involves taking slow, deep breaths through the nose, holding the breath for a few seconds, and then exhaling slowly through the mouth. This technique can help to slow down the heart rate and relax the muscles, making it easier to fall asleep.

Progressive muscle relaxation is another effective relaxation technique for promoting healthy sleep. This technique involves tensing and then relaxing each muscle group in the body, starting with the feet and working up to the head [27]. This technique can help reduce muscle tension and promote relaxation throughout the body.

Other relaxation techniques for promoting healthy sleep include visualization, mindfulness meditation, and yoga. Visualization involves picturing a relaxing scene in the mind, such as a beach or a peaceful forest. In contrast, mindfulness meditation involves focusing on the present moment and letting go of distracting thoughts. Yoga is a physical practice that combines movement with deep breathing and meditation, making it an excellent way to promote relaxation and reduce stress. By calming the mind and body, reducing stress and anxiety, and promoting relaxation, these techniques can help individuals fall asleep more easily, stay asleep longer, and wake up refreshed and energized [27].

Dietary Changes

Eating foods rich in tryptophan is a dietary adjustment that may improve sleep quality. Tryptophan is an amino acid that helps produce the neurotransmitter serotonin, which regulates sleep [28]. Examples of foods high in tryptophan include turkey, chicken, fish, eggs, nuts, seeds, and dairy products [29]. Consuming these foods before bed can help to promote relaxation and improve sleep quality. Additional foods promoting sleep include complex carbohydrates, such as whole grains, fruits, and vegetables, and foods high in magnesium, such as leafy green vegetables, nuts, seeds, and whole grains [279]. These foods can help regulate blood sugar levels and promote relaxation, making it easier to fall asleep and stay asleep throughout the night [29]. Avoiding or limiting foods that can interfere with sleep, such as spicy foods, heavy or greasy meals, and high-sugar or high-fat foods, is essential. These foods can cause indigestion, making it difficult to fall asleep or stay asleep throughout the night [30].

Clustering Care

In health care, providing quality and thoughtful care is paramount. [31] Defined the concept of clustering care as an approach that involves providing interventions in quantities of six or more to ensure that interactions are given together instead of several separate patient interactions. Health care providers can deliver a more efficient and effective care experience by clustering care and improving patient outcomes and satisfaction. It is common for hospitalized patients to get less than 90 minutes of uninterrupted sleep time, meaning they cannot complete an entire sleep cycle [32]. Clustering care can help change this and help achieve complete at least one sleep cycle.

Hospital staff and nurses can implement several strategies to cluster care and promote better patient sleep, refer to figure no. 1 for additional details. Interdisciplinary collaboration can ensure that care activities are coordinated effectively and disruptions are minimized. For example, nurses can communicate with physicians and other health care workers to ensure that medications, tests, and procedures are scheduled during the day whenever possible. Nursing assistants and other support staff can also be involved in clustering care activities to minimize disruptions during the night.



| Clustering Care Examples | |
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| 6 or more of the following examples at once: | |
| <ul style="list-style-type: none"> ● Assessments ○ Head-to-toe ○ Focused body systems ○ Lines, tubes, drains ○ Pain ● Vital sign checks ○ Blood pressure ○ Heart rate ○ Pulse oximetry ○ Respiratory rate ○ Pulse oximetry ○ Other machines ■ IV pump ■ PCA pump ■ Hemodynamic monitoring ■ Ventilator ● Testing and procedures ○ X-ray ○ CT scan ○ MRI ● Laboratory samples ○ Routine blood samples ○ Blood cultures ○ Other body fluid collections ■ Urine ■ Sputum ■ Stool ■ Wound exudate ● Rounding ○ Routine ○ Medical necessity ○ Call light response ○ Interdisciplinary teams | <ul style="list-style-type: none"> ● Medication administration ○ Oral ○ Intramuscular ○ Intravenous ○ Topical ○ Intraocular ○ Otic ○ Nasal ○ Suppositories ■ Vaginal ■ Rectal ● Activities of daily living ○ Oral care ○ Oral fluid intake ○ Eating ■ Meals ■ Snacks ○ Bathing/showering ○ Shaving ○ Perineal/catheter care ○ Ambulation ○ Toileting ● Planning ○ Discharge needs ■ Social work ■ Case management ■ Prescriptions ■ Medical equipment ■ In-home care ■ Placements ○ Medication reconciliation ○ Consults ○ Therapy ■ Speech ■ Physical ■ Occupational ■ Respiratory |

Figure No. 1 Clustering Care Examples

Data adapted from [31] effect of clustered nursing interventions on physiological responses in critically ill patients. *Research and Opinion in Anesthesia & Intensive Care*, 7(3), 299-307.

7. Sleep Medication

About 70 million adults in the United States have a chronic sleep or wakefulness disorder, and the majority of these have taken a medication or supplement at some point to aid their sleep [32]. Sleep medications can help treat short-term sleep disturbances or insomnia, but they can also have several risks and side effects. Before initiating sleep medications, non-pharmacological interventions should be tried first, as there are many natural and healthy ways to improve sleep quality [32].

Complications and side effects from sleep medications need to be considered before their use. Many sleep medications can be habit-forming and lead to dependence, which can happen quickly [32]. Dependence can make it harder to fall asleep without the sleep medication, which can lead to tolerance so that an increasingly higher dose requirement for the same effect. If a physical dependence develops, it can result in making a person unable to stop the medication on their own without symptoms. Abruptly stopping sleep medications can lead to withdrawal symptoms such as anxiety, irritability, shivering, dizziness, and insomnia [34]. These vary based on the specific medication but are potential generalities.

Side effects may include drowsiness, impaired cognitive function, and challenging daily tasks or concentration [34]. If a patient has impaired cognitive function, it increases the risk of falls, injury, and could lead to longer hospital stays. Rebound insomnia is possible, meaning the insomnia returns and can worsen after medication is discontinued. As with any medication, an allergic reaction is possible, which can cause breathing difficulties, swelling, and hives.

Before starting any medication, the risks and benefits of sleep medications should be discussed with a healthcare provider. They can guide the appropriate use of sleep medications and recommend lifestyle changes or other non-drug treatments to improve sleep quality. The best practice is to use sleep medications only as a short-term solution and under the supervision of a health care prescriber.

8. Summary

Sleep is vital for health and essential for patients in the hospital setting. In addition to promoting faster recovery and better coping, adequate sleep has been shown to boost the immune system, improve mental health, and increase overall well-being. Sleep disturbances are common in hospitals due to noise, frequent interruptions, light, and uncomfortable or unfamiliar environments. Health care providers need to take action to minimize these factors and create an environment conducive to restful sleep. This can include minimizing noise levels, adjusting lighting, clustering care, and scheduling medical procedures and vital sign checks around patients' sleep schedules whenever possible. By prioritizing sleep hygiene and clustering care whenever possible, health care providers can play a critical role in promoting overall health and well-being for their patients.

Clinical Care Points (Practice Recommendations)

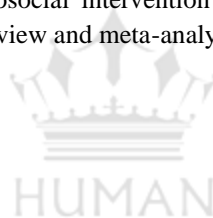
- Sleep in the hospital is a priority.
- Optimize sleep environments with limited noise or light.
- Cluster care to allow longer uninterrupted sleep periods.
- Encourage relaxation practices like deep breathing and meditation.
- Make dietary adjustments to promote sleepiness (tryptophan, avoid stimulants).
- Educate staff on multi-modal evidence-based strategies to aid sleep without medications.

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