

SYSTEM-WIDE NON-PHARMACOLOGICAL INTERVENTIONS TO PROMOTE SLEEP IN NON-CRITICALLY ILL HOSPITAL PATIENTS*



System-wide Environmental Strategies: Apply at a ward level

Appoint clinician champions

Appoint clinician champion(s) at the ward level to:

- Prioritise sleep for patients.
- Promote, implement, monitor and report non-pharmacological interventions.
- Develop local ward-based sleep protocols (specific to ward's characteristics).
- Monitor and report use of medicines for night sedation and adverse effects such as falls, delirium.
- Promote resourcing of non-pharmacological sleep aids e.g. ear plugs, eye masks.
- Identify clinician champion position in hospital's strategic plan of quality improvement activities ensuring succession & ongoing support.

Reduce noise at night

Multiple sources of noise in hospital. WHO recommends sound pressure level should not exceed 30 decibels (dB) at night.¹

Methods to reduce noise and/or its effects include use of:

- Silent staff footwear e.g. soft-soled shoes.
- Sound-reducing rubber on the wheels of hospital beds and trolleys
- Sound masking for white noise, music may create appropriate ambience and act as 'white noise'. App examples include <https://www.tmssoft.com/white-noise/>; <https://mynoise.net/>; White noise playlists from music apps e.g. in Spotify® or Apple Music®.
- Ear muffs/plugs for patients.
- Silent mode on mobile phones at night.
- A lower ring volume on telephones and pagers at night.
- Noise metres, or a "sound ear" to help minimise noise. The "sound ear" machine features the silhouette of an ear, which turns green, yellow or red depending on noise levels and is a visual warning cue to staff, patients and family in the area when it is getting too noisy. Mobile phone apps which measure noise level include Decibel-Noise and Sound Meter, NIOSH Sound Level Meter, Noise Meter 32 db.
- Ward-based behavioural modifications e.g. "quiet time" protocols.
- Remote alarms in staff rooms and potential use of visualisation strategies e.g. switchable glass, webcams for nocturnal checks (check local policy).
- Soft close doors. (Fix any squeaky doors).
- Sound proofing acoustic materials e.g. lightweight materials with porous surfaces, such as textiles and fabrics, absorb sound better than concrete or glass. Check with relevant departments e.g. Facilities Management Department and Infection Prevention Control Department

In addition:

- Limit patient television viewing at night during normal sleeping hours in shared rooms.
- Ensure staff conversations are away from ward areas during the night.
- Avoid room changes, and other noisy procedures e.g. use of pill crushers, floor waxing during normal sleeping times.
- Reduce alarms, which are especially disruptive noises, and paging.¹

System-wide Environmental Strategies: Apply at a ward level

<p>Reduce disturbances <i>One-third of patients reported nocturnal monitoring as a major sleep disrupter.² Sedative use halved (32% to 16%) in inpatients when vital sign monitoring and medication administration was confined to 6am to 10pm.³</i></p>	<p>Consider re-arrangement of workflow:</p> <ul style="list-style-type: none"> • Limit interactions during typical sleep hours to those that are truly required for patient care. • Review and modify all treatments, procedures, and morning rounds to minimise awakenings (especially in the early morning). Liaise with medical team(s) as necessary. • Do not wake patient to administer night sedation medicine. • Investigate/consider use of wireless or wearable monitoring technologies.
<p>Expose patients to appropriate levels of day and night light <i>Many hospital patient care areas have lighting that impairs sleep and disrupts circadian rhythm such as constant bright light conditions and low 24 hour light amplitudes.⁴</i></p>	<p>Promote adherence to normal circadian rhythm (and appropriate melatonin release) by establishing a clear day/night light exposure protocol consistent with environmental norms.</p> <ul style="list-style-type: none"> • Use dimmed lights in corridors and patient rooms at night as excessive evening light stimulates alertness. Adjustable LED systems allowing for blue-depleted lighting in the evening and overnight reduces disruptive effects of conventional artificial light on circadian rhythm and sleep.⁵ • Large windows in patients' rooms exposing patients to natural light and smart light bulb systems that mimic natural light variations are helpful. • Provide eye masks at night as appropriate (consider providing for admitted patients or ask them to bring from home).
<p>Reduce wakefulness stimuli at night</p>	<ul style="list-style-type: none"> • Discourage activities such as eating, using computers or devices and watching TV during normal sleeping hours. • Discourage intake of caffeine-containing beverages towards end of day (within 4-6 hours of bedtime).
<p>Other</p>	<ul style="list-style-type: none"> • If appropriate, pre-sleep shower may be helpful. • When appropriate, avoid visual access to clock when in bed to reduce patient anxiety about how much sleep they have 'lost'. • Create a sleep conducive environment e.g. free of clutter, appropriate temperature and a comfortable bed and pillow. • There are harmful effects associated with unnecessary bed rest^{6,7}, which may occur with the use of night sedation medicines. When appropriate, encourage patients to not lie in bed during the day-get dressed, sit in chair if possible and return to bed to sleep at night. Consider movements such as 'endPJparalysis'.^{8,9} • Encourage onsite retail outlets to stock ear muffs/plugs, eye masks, headphones and ensure staff are aware that patients can obtain them from these outlets. • Consider having ear muffs/plugs and eye masks available from the hospital newspaper/magazine trolley run.

System-wide Patient-related Strategies: Consider with each patient

<p>Ensure a patient-centred approach <i>Apply individualised, flexible and informed strategies rather than a task-focused approach.</i></p>	<ul style="list-style-type: none"> Assess risk of disturbed sleep during hospitalisation and identify effective home-based strategies (if previously used) for hospital implementation. Tailor sleep hygiene education as appropriate. Counsel patients to manage patient expectations regarding sleep and its management during hospital stay, ideally before admission e.g. in pre-admission clinic. Counsel patients that treatment of the underlying medical or surgical condition e.g. pain, dyspnoea, coughing etc. should improve sleep quality and quantity.
<p>Routinely provide sleep hygiene education <i>A recent randomised controlled trial demonstrated improvement of sleep and fatigue in non-critically ill patients with the provision of patient education and empowerment about the use of various sleep-enhancing tools e.g. ear plugs.¹⁰</i></p>	<ul style="list-style-type: none"> Counsel and educate patients complaining of sleep disturbance on how to adopt and/or maintain good sleep practices prior to and during hospitalisation and on discharge. Educate patients about excessive napping. Naps should be purposeful. Although some napping may compensate for a previous night's sleep disturbance and assist recovery from acute illness, it may interfere with the next night's sleep. Excessive napping may also indicate Obstructive Sleep Apnoea. Provide patient-friendly supplemental written and/or electronic resources for relevant information.^{11,12}
<p>Identify the patient's chronotype <i>Are they early chronotypes, 'larks', and more alert and active in the morning or late chronotypes, 'night-owls', and more alert and active at night?</i></p>	<ul style="list-style-type: none"> Hospitals usually operate an early sleep-wake schedule. Hence hospitalised night-owls may experience more sleep disruption. A mixture of 'larks' and 'night-owls' in the one hospital room can be problematic. Cluster similar chronotypes and adjust hospital care routines to match chronotype if possible. Single room allocations for poor sleepers is preferable but may not be possible.
<p>Recognise & manage anxiety & stress & promote relaxation <i>Anxiety symptoms reported in 33% ICU survivors and 20% of general ward patients identified as a cause of insomnia.^{2,13}</i></p>	<p>Apply strategies to reduce anxiety and stress:</p> <ul style="list-style-type: none"> Ensure good communication between clinicians and patients/carers and responsiveness to patient needs. Allay/normalise patient's anxiety given that unfamiliar surroundings, lack of control, uncertainty and worry regarding illness and possible disease progression can be expected to increase anxiety in hospitalised patients. Promote shared decision making. Encourage patients to use relaxation techniques, especially if they have previously used them. Consider strategies such as deep breathing, music, visual imagery, mindfulness and progressive muscle relaxation for patients who have trouble relaxing or winding down.
<p>Medication, fluid and food adjustments <i>A variety of medications can impair sleep and include CNS and respiratory stimulants, antidepressants, some beta blockers and glucocorticoids.</i></p>	<p>Carefully consider presence of adverse effects from medications and diet.</p> <ul style="list-style-type: none"> When possible, administer medications with activating properties in the morning, and sedating medications in the evening. Consult a clinical pharmacist for advice. Avoid caffeine-containing drinks such as coffee, tea or soft drinks at least 4-6 hours before bed.
<p>Exercise or physiotherapy</p>	<ul style="list-style-type: none"> Increase mobilisation during the earlier part of the day and avoid exercise close to bedtime.
<p>Screen for Obstructive Sleep Apnoea (OSA) in high risk patient groups</p>	<ul style="list-style-type: none"> Referral for definitive diagnosis and treatment of OSA can be facilitated during hospitalisation.

*Many strategies are also useful in long stay and non-hospital settings and may be recommended to patients for post-discharge management.

Strategies applicable to longer stay hospital areas (e.g. rehabilitation and dementia units) and for patients following discharge include:

- a) Associating BED with only SLEEP - Condition the patient to expect that bed is for sleeping only and no stimulating activities in order to promote a positive association between bedroom environment and sleepiness. Promote getting up at the same time each day, no matter the quantity of sleep in the previous night. Ensure adequate exposure to sunlight during the day. Ensure a quiet, dark and comfortable temperature environment for sleep.
- b) Encouraging daytime exercise and relaxing evening activities, where feasible.
- c) Using relaxation therapies described above. Relaxation techniques are most effective if practised during the day, before going to bed and also in the middle of the night if the person is unable to go back to sleep. Usually several weeks of practise of these methods are required to improve sleep.
- d) Utilising Cognitive Behavioural Therapy (CBT) – CBT targets the anxiety-producing maladaptive beliefs and attitudes about sleep and sleep loss that can drive insomnia. Identifies and targets beliefs that may be interfering with adherence to stimulus control and sleep restriction. Uses mindfulness to alter approach to sleep.¹⁴

These interventions are effective and do produce more durable, safer benefits than drug treatment, although they may have limitations such as the need for skilled practitioners (e.g. CBT) or a change in culture and belief systems, the potential expense and time-consuming nature of the interventions, and the delay in improving sleep disturbances.^{15,16}

References:

1. Joseph A, Ulrich R. Sound Control for Improved Outcomes in Healthcare Settings. . 2007. <https://www.healthdesign.org/sites/default/files/Sound%20Control.pdf>.
2. Grossman MN, Anderson SL, Worku A, et al. Awakenings? Patient and Hospital Staff Perceptions of Nighttime Disruptions and Their Effect on Patient Sleep. *Journal of Clinical Sleep Medicine*. 2017;13(2):301-306.
3. Bartick MC, Thai X, Schmidt T, Altaye A, Solet JM. Decrease in as-needed sedative use by limiting nighttime sleep disruptions from hospital staff. *Journal of Hospital Medicine*. 2010;5(3):E20-24.
4. Tan X, van Egmond L, Partinen M, Lange T, Benedict C. A narrative review of interventions for improving sleep and reducing circadian disruption in medical inpatients. *Sleep Medicine*. 2018.
5. Vethe D, Scott J, Engström M, et al. The evening light environment in hospitals can be designed to produce less disruptive effects on the circadian system and improve sleep. *Sleep*. 2020.
6. Jasper U, Yadav L, Dollard J, Jadcak AD, Yu S, Visvanathan R. Sedentary Behaviour in Hospitalised Older People: A Scoping Review. *International journal of environmental research and public health*. 2020;17(24).
7. Alberta Health Services. Health Benefits End PJ Paralysis. . <https://www.albertahealthservices.ca/info/Page16913.aspx>. Published 2021. Accessed 2021.
8. McKendry S. #End PJ Paralysis Presentation. . Calvary Mater Newcastle Hospital. <https://www.health.nsw.gov.au/wohp/Documents/cd3-mckendry.pdf>. Published 2018. Accessed 24 February, 2021.
9. Dolan B. EndPJParalysis. Health Service 360. <https://endpiparalysis.org/>. Published 2020. Accessed 2021.
10. Farrehi PM, Nallamothu BK, Navvab M. Reducing hospital noise with sound acoustic panels and diffusion: a controlled study. *BMJ Quality & Safety*. 2016;25(8):644-646.
11. Patient information sheet: Advice on good sleep practices In. *eTG complete [digital]*. December 2020 ed. Melbourne: Therapeutic Guidelines Limited; 2013.
12. NPS MedicineWise. How to sleep right. NPS Medicine Wise Pty Ltd. <https://www.nps.org.au/consumers/how-to-sleep-right>. Published 2017. Accessed.
13. Nikayin S, Rabiee A, Hashem MD, et al. Anxiety symptoms in survivors of critical illness: a systematic review and meta-analysis. *General Hospital Psychiatry*. 2016;43:23-29.
14. Trauer JM, Qian MY, Doyle JS, Rajaratnam SM, Cunnington D. Cognitive Behavioral Therapy for Chronic Insomnia: A Systematic Review and Meta-analysis. *Annals of Internal Medicine*. 2015;163(3):191-204.
15. Insomnia In. *Australian Medicines Handbook*. July 2020 ed. Adelaide: Australian Medicines Handbook Pty Ltd.
16. Tamrat R H-LM, Goyal M. Non-pharmacologic interventions to improve the sleep of hospitalized patients: a systematic review. *J Gen Intern Med*. 2014;29(5):788-795.