
Evidence Based Complementary Intervention for Insomnia

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Abstract

Increasing scientific evidence point to a non-pharmacological complementary treatment for insomnia: white noise. Its presentation has been shown to induce sleep in human neonates and adults, probably by reducing the signal-to-noise ratio of ambient sound. White noise may be a simple, safe, cost-effective alternative to hypnotic medication in many psychiatric disorders, especially acute stress disorder and PTSD.

Sleep dysfunction is common among people with acute stress disorder, posttraumatic stress disorder (PTSD), as well as most other mood and anxiety spectrum disorders, both in the primary care setting and in specialty clinics. Patients report difficulty falling asleep, are easily awakened, and may suffer from disturbing, unpleasant nightmares.¹ Indeed, two of the major symptom criteria for PTSD, re-experiencing and hyperarousal, are negatively related to sleep regulation.² Re-experiencing phenomenon may include intrusive thoughts and images of the traumatic event that prevent individuals from falling asleep and distressing nightmares that wake them. Similarly, enhanced arousal may lead to difficulty in falling asleep (perhaps due to hypervigilance), as well as increase the probability of nighttime awakenings provoked by an exaggerated startle response to external stimuli that do not penetrate the consciousness of normal individuals.

Primary care clinicians often prescribe hypnotics such as benzodiazepines, in addition to the pharmaceutical regimen directed at the underlying disorder, to psychiatric patients who suffer from insomnia. The difficulties and harm that can ensue from benzodiazepine administration are well documented. As such, there is growing interest in adjunctive and integrative biological approaches in medicine, and there may be safer alternatives that deserve greater research and clinical attention.

One intriguing possibility is the controlled presentation of white noise, which may possess hypnotic properties. To date, only a few controlled experiments have tested the sleep utility of low-intensity, consistent auditory stimulation. White noise has been shown to effectively induce sleep in human neonates between the ages of two and seven days.³ Eighty percent of those neonates exposed to white noise fell asleep within five minutes, compared to a spontaneous rate of 25%. Simulated music composed of white noise also induces sleepiness and higher delta component power densities (measured via EEG) in adult subjects, suggesting that it has the capacity to alter overall level of arousal and state of consciousness.⁴ Another study tested the clinical effectiveness of white noise in a sample of postoperative coronary artery bypass graft (CABG) patients, following their transfer from an intensive care unit.⁵ Subjects exposed to ocean sounds (composed of white noise) for three nights reported experiencing significantly better sleep, in terms of sleep depth, number of awakenings, ease of return to sleep, quality of sleep, and total sleep, when compared to subjects not given white noise treatment.

Presumably, white noise functions to reduce signal-to-noise ratio, and thus promote decreased arousal and prevent sleep interruption. Very simply, invariable, low-intensity auditory stimulation could mask the perception of normally disrupting nighttime noises, such as wind, car-alarms or voices. This could be particularly useful for victims of acute stress disorder and PTSD, by serving as an effective startle-prevention tactic. Interestingly, it has been shown that the presentation of white noise reduces norepinephrine concentration in the auditory pathways of rats.⁶ Given this neurotransmitter's involvement in arousal, stress and the etiology of PTSD,⁷ it is possible that white noise may have a direct therapeutic effect on certain stress-mediated disorders. For several years now, many PTSD experts in the VA healthcare system have been advising their patients to sleep with a fan on to induce sleep, and unpublished anecdotal reports from patients in the VA regarding the effectiveness of this simple suggestion have been encouraging. A more precise strategy would be the use of standardized, wide-spectrum white noise, currently available in CD format (www.whitenoise.cd.com) as a complementary intervention for insomnia.⁸

Clearly, a prescription of white noise possesses strong advantages over benzodiazepines in terms of both safety and cost. We would like to suggest that more research be conducted on the effectiveness of white noise as a sleep-aid for psychiatric patients, as well as on the neurophysiological mechanism behind its potential function.

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