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THE EFFECT OF NATURE SOUND MUSIC THERAPY ON SLEEP QUALITY AMONG PATIENTS IN THE INPATIENT WARDS OF MANADO ADVENTIST HOSPITAL

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ABSTRACT

Objective: Sleep disturbances are commonly experienced by hospitalized patients due to environmental factors, underlying medical conditions, and anxiety, which may negatively affect the recovery process. Nature sound music therapy is a non-pharmacological intervention that may improve sleep quality. This study aimed to determine the effect of nature sound music therapy on the sleep quality of patients admitted to the inpatient wards of Manado Adventist Hospital. **Methods:** This quantitative study employed a pre-experimental, one-group pre-test and post-test design. A total of 34 participants were recruited using purposive sampling. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). The intervention was administered before bedtime for three consecutive days. Data were analyzed using the Wilcoxon signed-rank test. **Results:** Before the intervention, most participants had poor sleep quality (76.5%), while only 23.5% had good sleep quality. After the intervention, sleep quality improved, with 76.5% of participants reporting good sleep quality and 23.5% remaining poor sleepers. Nature sound music therapy had a statistically significant effect on the sleep quality of hospitalized patients ($p < 0.001$). **Conclusion:** Nature sound music therapy has the potential to serve as a simple, safe, and cost-effective non-pharmacological nursing intervention for improving patients' sleep quality. Further studies should employ a control group, a larger sample size, and a longer intervention period to strengthen the evidence regarding its effectiveness.
Keywords: Inpatients; music therapy; sleep quality.

INTRODUCTION

Sleep quality is a fundamental human need that plays an essential role in maintaining physical and mental health. Good sleep quality encompasses an individual's satisfaction with sleep, adequate sleep duration, and sleep efficiency that supports optimal bodily functioning (Yin et al., 2025). Conversely, poor sleep quality may cause various adverse physiological and psychological effects. Sleep deprivation may trigger an increase in cortisol levels, which can elevate blood glucose levels, blood pressure, and appetite, thereby increasing the risk of diabetes, hypertension, and obesity. Moreover, sleep disturbances are associated with sleep apnea, vascular diseases, stroke, myocardial infarction, anxiety, depression, and other psychological disorders (Meddis, 2017).

Sleep disturbance is a common problem experienced by patients during hospitalization. Hospitalization is often an unpleasant experience because patients must adapt to a new environment, changes in daily routines, their medical conditions, treatment procedures, environmental noise, lighting, and anxiety regarding their health status. These circumstances may interfere with the fulfillment of patients' biological needs, including the need for sleep and rest (Maharani et al., 2020).

Poor sleep quality among hospitalized patients is an important concern in nursing because sleep is a fundamental need that must be adequately addressed during the care process. Poor sleep quality may increase pain, fatigue, respiratory dysfunction, and the risk of complications such as delirium. These conditions may delay recovery, prolong the length of hospitalization, and reduce patients' overall quality of life (Mendonça et al., 2025). Therefore, nurses play an important role in identifying sleep disturbances and providing safe, simple, and effective nursing interventions to help patients achieve better sleep quality.

Globally, sleep disturbances among hospitalized patients remain highly prevalent. A study conducted in Thailand reported that 91% of hospitalized patients experienced poor sleep quality (Kulpatcharapong et al., 2020). A similar problem has also been identified among hospitalized patients in Indonesia. A study conducted at a general hospital in Denpasar found that 74 out of 118 hospitalized patients had poor sleep quality (Pradhani et al., 2025). Another study conducted in Yogyakarta reported that most hospitalized patients experienced poor sleep quality, with the majority of patients classified as having poor sleep quality (Damayanti et al., 2024). These findings indicate that sleep disturbance is a significant problem commonly experienced by patients during hospitalization.

One non-pharmacological intervention that can be used to improve patients' sleep quality is nature sound

music therapy. This therapy uses recordings of natural sounds, such as rainfall, ocean waves, wind, flowing rivers, trickling water, birdsong, or forest sounds, which may produce a relaxing effect on listeners. Several studies have demonstrated that music therapy may positively influence sleep quality. Jespersen et al. (2023), in a study involving 10 randomized controlled trials with a total of 726 participants, found that listening to music at night was significantly more effective in improving sleep quality than conventional care. Similar findings were reported by Li et al. (2025), who concluded that music therapy was associated with improved sleep quality, particularly among older adults. In addition, exposure to natural sounds has been reported to produce calming effects, reduce anxiety, and help patients achieve a relaxed state before sleep (Hikaru et al., 2022). Other literature has also demonstrated that nature sound music therapy may enhance comfort and facilitate better-quality sleep, making it a potentially effective and easily implemented non-pharmacological intervention in clinical settings, including inpatient wards (Laloan, 2025).

Within the nursing context, this study is related to Virginia Henderson's theory of fundamental human needs. One of the essential components of this theory is the need for sleep and rest. When patients experience poor sleep quality, one of their fundamental human needs has not been adequately fulfilled. Therefore, nurses have a responsibility to assist patients in meeting their sleep and rest needs through appropriate nursing interventions, including complementary interventions such as nature sound music therapy (Elon et al., 2021).

Although various studies have demonstrated the benefits of music therapy for improving sleep quality, most previous studies have focused on music therapy in general or have been conducted among specific populations, such as older adults, patients undergoing hemodialysis, or patients with particular medical conditions. Studies specifically examining the effect of nature sound music therapy on the sleep quality of hospitalized patients remain limited, particularly within the Indonesian hospital context. Furthermore, few local studies have evaluated the use of natural sounds as a non-pharmacological nursing intervention in inpatient wards. Therefore, this study offers novelty by providing preliminary evidence regarding hospitalized patients' responses to nature sound music therapy. The findings are expected to strengthen the scientific basis for nurses to implement a simple, safe, and practical complementary intervention to improve patients' sleep quality during hospitalization. Accordingly, this study aimed to determine the effect of nature sound music therapy on the sleep quality of patients admitted to the inpatient wards of Manado Adventist Hospital.

METHODS

Research Design

This study employed a quantitative pre-experimental design using a one-group pre-test and post-test approach. This design involved a single group of participants whose sleep quality was measured before the intervention (pre-test) and after the intervention (post-test), without a control group or randomization.

Setting and Time

This study was conducted at Manado Adventist Hospital, North Sulawesi, Indonesia, in the Jasmine, Aster, and Seruni inpatient wards. Data collection was carried out from January to April 2026.

Population and Sample

The study population consisted of all patients admitted to Manado Adventist Hospital. Participants were recruited using a purposive sampling technique. The inclusion criteria were hospitalized patients aged 18-59 years, fully conscious, patients with an anticipated hospital stay of at least four days from enrollment, and willing to participate in nature sound music therapy throughout the study. The exclusion criteria included patients with hearing impairment, those taking medications or substances that could affect consciousness or sleep, such as sedatives, hypnotics, sedating antidepressants, sleeping medications, or caffeine, patients diagnosed with severe mental disorders, patients receiving care in isolation rooms, and patients admitted to maternity wards. Patients experiencing pain, dyspnea, anxiety, separation from family members, difficulty adapting to a new environment (new place syndrome), insomnia, trauma associated with natural sounds, nocturia, or polyuria were also excluded.

The required sample size was calculated using G*Power version 3.1.9.7 (Faul et al., 2009). Assuming a medium effect size of 0.5, a significance level of 5%, and a statistical power of 80%, the minimum required sample size was 34 participants. In accordance with the one-group pre-test and post-test design employed in this study, all 34 participants received nature sound music therapy, without the inclusion of a control group.

Research Instruments

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), developed by Buysse et al. (1989). The PSQI is a self-administered questionnaire comprising 19 items categorized into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each component is scored on a scale from 0 to 3, resulting in a global score ranging

from 0 to 21. Higher global scores indicate poorer sleep quality. A global PSQI score of ≤5 was classified as good sleep quality, whereas a score of >5 was classified as poor sleep quality. The Indonesian version of the PSQI has been widely used to assess sleep quality across various populations. Among hospitalized patients, the instrument demonstrated good internal consistency, with a Cronbach's alpha coefficient of 0.85 (Damayanti et al., 2024).

Nature sound music therapy was delivered using Galactic GH-01 wireless headphones connected to an Apple iPhone 13. The audio recordings were downloaded prior to the intervention to ensure uninterrupted playback. The headphones enabled the intervention to be delivered directly to each participant while minimizing environmental noise and preventing disturbance to other patients in the inpatient wards.

Research Procedures

Eligible patients were identified in coordination with the nurses at the inpatient wards. The researcher approached each potential respondent, introduced the study, explained its objectives, procedures, potential benefits, and the three-day intervention schedule, and confirmed the participant's usual bedtime. Written informed consent was obtained before data collection. At baseline, participants completed the PSQI, and the researcher reviewed the questionnaires to ensure data completeness.

Nature sound music therapy was administered once each evening before the participant's usual bedtime for three consecutive days. Before each session, the researcher performed hand hygiene, prepared the audio equipment, ensured the participant's privacy by closing the bedside curtain, and assisted the participant into a comfortable lying position. All participants listened to the same prerecorded audio track, entitled "Nature Sound Instrumental Music for Relaxation" for 32 minutes and 42 seconds at a standardized volume level of 30-40%. The audio file had been downloaded in advance to ensure uninterrupted playback. Headphones were used to minimize interference from environmental noise and prevent disturbance to other patients.

On the second and third intervention days, the researcher briefly repeated the procedure and confirmed that the participant was comfortable and ready before initiating the session. The same audio track, device, duration, and volume level were maintained throughout all three sessions to ensure intervention consistency. Hand hygiene was performed before and after each session.

The post-intervention assessment was generally conducted on the fourth day using the PSQI. Participants were asked to complete the questionnaire, after which the researcher checked the

responses for completeness. When a participant remained awake following the third intervention session and data collection was feasible, the post-test was administered on the same evening. After the final assessment, the researcher informed the participant that the study procedures had been completed and expressed appreciation for their participation.

Ethical Considerations

Institutional permission and ethical approval for this study were obtained from Manado Adventist Hospital, North Sulawesi, Indonesia (approval no. 044 /RSAM/I/2026). Before enrollment, all eligible patients received clear information regarding the study objectives, procedures, potential benefits, possible discomforts, and their right to refuse or withdraw from participation at any time without affecting the healthcare services they received. Written informed consent was obtained from all participants before data collection. Participants' privacy, anonymity, and confidentiality were maintained throughout the study, and all collected data were used exclusively for research purposes.

Data Analysis

Data were analyzed using IBM SPSS Statistics. Descriptive statistics were used to summarize participants' sleep quality before and after the intervention. Categorical variables, including good and poor sleep quality, were presented as frequencies and percentages. Continuous variables, including the global PSQI score, were summarized using means and standard deviations. The normality of the pre-test and post-test PSQI scores was assessed using the Shapiro-Wilk test. The results indicated that the PSQI scores were not normally distributed. Differences in sleep quality scores before and after nature sound music therapy were analyzed using the Wilcoxon signed-rank test. All statistical tests were two-sided, and statistical significance was set at $p < 0.05$.

RESULTS

Participant Characteristics

Table 1 presents the demographic characteristics of the 34 participants. Most participants were female (n = 22, 64.7%), while males accounted for 35.3% (n = 12). Regarding age, the largest proportion of participants was aged 30-44 years (n = 15, 44.1%), followed by those aged 18-29 years (n = 10, 29.4%) and 45-59 years (n = 9, 26.5%).

Table 1. Characteristics of Participants (N = 34)

Characteristics	Categories	n	%
Gender	Male	12	35.3
	Female	22	64.7
Age Group (years)	18-29	10	29.4
	30-44	15	44.1
	45-59	9	26.5

Table 2. Baseline PSQI Component Scores and Overall Sleep Quality Among Hospitalized Patients (N = 34)

Sleep Quality Components	n	%	Mean	SD
Subjective Sleep			2.53	0.86
Very Good (0)	0	0.0		
Fairly Good (1)	8	23.5		
Fairly Bad (2)	0	0.0		
Very Bad (3)	26	76.5		
Sleep Latency			1.32	0.77
0 (0)	3	8.8		
1-2 (1)	20	58.8		
3-4 (2)	8	23.5		
5-6 (3)	3	8.8		
Sleep Duration			0.26	0.75
>7 hours (0)	29	85.3		
6-7 hours (1)	3	8.8		
5-6 hours (2)	0	0.0		
<5 hours (3)	2	5.9		
Habitual Sleep Efficiency			0.15	0.44
≥85% (0)	30	88.2		
75-84% (1)	0	0.0		
65-74% (2)	3	8.8		
<65% (3)	1	2.9		
Sleep Disturbances			1.21	0.41
0 (0)	0	0.0		
1-9 (1)	27	79.4		
10-18 (2)	7	20.6		
19-27 (3)	0	0.0		
Use of Sleeping Medication			0.00	0.00
Not during the past month (0)	34	100.0		
Less than once a week (1)	0	0.0		
Once or twice a week (2)	0	0.0		
Three or more times a week (3)	0	0.0		
Daytime Dysfunction			1.79	0.64
0 (0)	0	0.0		
1-2 (1)	11	32.4		

Sleep Quality Components	n	%	Mean	SD
3-4 (2)	19	55.9		
5-6 (3)	4	11.8		
Overall Sleep Quality			7.38	1.74
Good (0-5)	8	23.5		
Poor (6-21)	26	76.5		

Table 3. Post-Intervention PSQI Component Scores and Overall Sleep Quality Among Hospitalized Patients (N = 34)

Sleep Quality Components	n	%	Mean	SD
Subjective Sleep			1.06	0.65
Very Good (0)	6	17.6		
Fairly Good (1)	20	58.8		
Fairly Bad (2)	8	23.5		
Very Bad (3)	0	0.0		
Sleep Latency			0.88	0.69
0 (0)	10	29.4		
1-2 (1)	18	52.9		
3-4 (2)	6	17.6		
5-6 (3)	0	0.0		
Sleep Duration			0.12	0.33
>7 hours (0)	30	88.2		
6-7 hours (1)	4	11.8		
5-6 hours (2)	0	0.0		
<5 hours (3)	0	0.0		
Habitual Sleep Efficiency			0.09	0.29
≥85% (0)	31	91.2		
75-84% (1)	3	8.8		
65-74% (2)	0	0.0		
<65% (3)	0	0.0		
Sleep Disturbances			0.97	0.46
0 (0)	4	11.8		
1-9 (1)	27	79.4		
10-18 (2)	3	8.8		
19-27 (3)	0	0.0		
Use of Sleeping Medication			0.00	0.00
Not during the past month (0)	34	100.0		
Less than once a week (1)	0	0.0		
Once or twice a week (2)	0	0.0		
Three or more times a week (3)	0	0.0		
Daytime Dysfunction			0.94	0.65
0 (0)	8	23.5		
1-2 (1)	20	58.8		

Sleep Quality Components	n	%	Mean	SD
3-4 (2)	6	17.6		
5-6 (3)	0	0.0		
Overall Sleep Quality			4.06	1.65
Good (0-5)	26	76.5		
Poor (6-21)	8	23.5		

Table 4. Comparison of Global PSQI Scores Before and After Nature Sound Music Therapy (N = 34)

Sleep Quality	Mean	SD	p
Baseline	7.38	1.74	<0.001***
Post-test	4.06	1.65	

Note: *p<0.05 level; **p<0.01 level; ***p<0.001; p-value was calculated using the Wilcoxon signed-rank test.

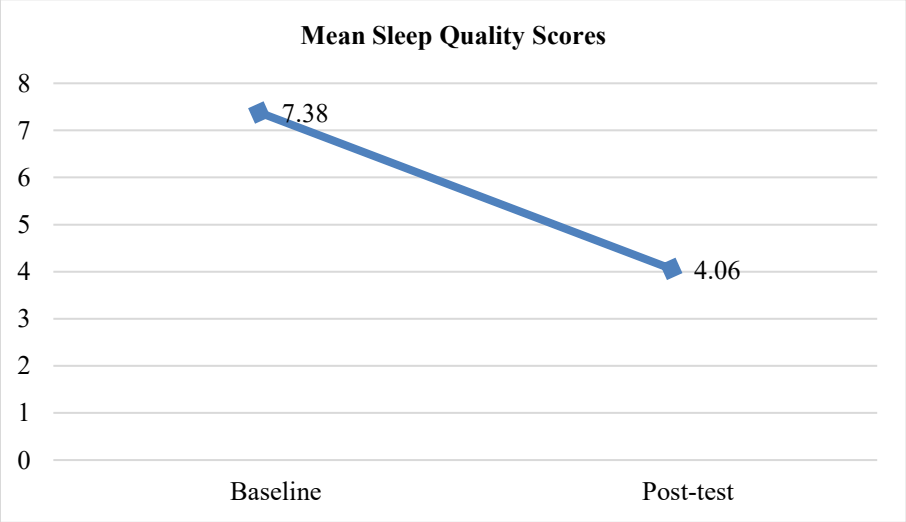

Figure 1. Difference in mean sleep quality scores

Pre-Intervention Sleep Quality

Table 2 describes the baseline components of sleep quality among hospitalized patients. The highest mean score was observed for subjective sleep quality at 2.53 (SD = 0.86), followed by daytime dysfunction at 1.79 (SD = 0.64). In contrast, the lowest mean score was recorded for the use of sleeping medication at 0.00 (SD = 0.00), with all participants (100%) reporting no use of sleeping medication during the previous month. The mean global PSQI score was 7.38 (SD = 1.74). Based on the PSQI cut-off score of >5, 76.5% of participants were categorized as poor sleepers.

Post-Intervention Sleep Quality

Table 3 describes the post-intervention components of sleep quality

among participants. The highest mean score was observed for subjective sleep quality at 1.06 (SD = 0.65), followed by sleep disturbances at 0.97 (SD = 0.46) and daytime dysfunction at 0.94 (SD = 0.65). In contrast, the lowest mean score was recorded for the use of sleeping medication at 0.00 (SD = 0.00), with all participants (100%) reporting no use of sleeping medication. The mean global PSQI score after the intervention was 4.06 (SD = 1.65). After the intervention, 23.5% of participants were categorized as poor sleepers, whereas 76.5% were categorized as good sleepers.

Effect of Nature Sound Music Therapy on Sleep Quality

Table 4 and Figure 1 compare the global PSQI scores before and after nature sound music therapy among hospitalized patients. The mean global PSQI score decreased from 7.38 (SD = 1.74) at baseline to 4.06 (SD = 1.65) after the intervention. There was a statistically significant difference between the baseline and post-intervention scores ($p < 0.001$).

DISCUSSION

The present findings indicate that nature sound music therapy may be a promising adjunctive strategy for improving sleep quality in hospitalized patients. The reduction in mean global sleep score and the reversal in the proportion of poor versus good sleepers suggest that the intervention was not only statistically significant but also clinically relevant. This pattern is directionally consistent with broader recent evidence showing that bedtime music listening improves perceived sleep quality in adults with insomnia and in medically ill populations. Jespersen et al. (2023) found that music was superior to conventional care across 10 randomized trials involving 726 hospitalized participants, while Li et al. (2025) similarly concluded that music therapy improved sleep quality in older adults. The updated Cochrane review by Jespersen et al. (2022) supports the view that music-listening interventions can improve subjective sleep outcomes in adults with insomnia, although certainty remains limited by heterogeneity and trial quality. Taken together, the current study extends this literature by suggesting that a brief, nurse-deliverable nature-sound format may have comparable short-term utility in general inpatient wards.

From a clinical perspective, the magnitude and pattern of change across sleep quality components strengthen the practical relevance of the findings. In the current sample, subjective sleep quality improved substantially, and daytime dysfunction also decreased, suggesting that the intervention may have influenced not only nighttime rest but also next-day functioning. This is important in inpatient care, where disturbed sleep is shaped by noise, unfamiliar surroundings, procedures,

illness-related anxiety, and altered routines, and where even modest improvements may support comfort, coping, and recovery. Recent international literature has increasingly emphasized that low-risk, non-pharmacological sleep interventions deserve attention in hospital care. Mendonça et al. (2025) framed sleep-enhancing nursing interventions in hospital wards as an important and still underdeveloped area. Jespersen et al. (2023) also supported the usefulness of music-based approaches specifically in inpatient settings.

The broader meta-analytic evidence by Li et al. (2025) suggests that music's sleep-promoting effects are robust enough to appear across different clinical and age-defined populations, which lends plausibility to the present findings despite the modest sample size. The current study therefore contributes preliminary ward-based evidence that nature-sound music could be incorporated into routine bedtime nursing care as a pragmatic complement to environmental and symptom management, rather than as a standalone remedy.

Several physiological and psychological mechanisms may explain why nature-sound music therapy was associated with better sleep in this study. Relaxing auditory input may reduce presleep arousal by attenuating sympathetic activation and facilitating parasympathetic dominance. In a crossover trial, Kuula et al. (2020) found that presleep music listening increased immediate heart-rate variability and, relative to control, was associated with a lower proportion of stage N2 sleep (44.8% vs. 48.3%) and a higher proportion of N3 sleep (24.5% vs. 22.0%), suggesting a shift toward deeper sleep physiology.

Electroencephalography (EEG)-based research by Gao et al. (2020) indicated that slow-wave-sleep (SWS) brain-wave music may improve sleep efficiency and alter neurophysiological markers in a direction consistent with deeper sleep. Music may work through multiple overlapping pathways, including relaxation, distraction from intrusive thoughts, emotional regulation, and masking of disruptive background sounds. These mechanisms are especially relevant in the hospital context, where environmental noise and cognitive-emotional arousal often co-occur. For nature sounds specifically, the likely added value is that they are repetitive, non-demanding, and ecologically familiar, which may create a calming auditory foreground without the cognitive load that lyrical or highly dynamic music can impose. Nonetheless, direct mechanistic research on nature-sound interventions in hospitalized adults remains limited, so these explanatory pathways should be regarded as plausible rather than definitively established (Gao et al., 2020; Jespersen et al., 2022; Kuula et al., 2020).

Limitations and Future Directions

This study has several limitations. The small sample size, single-group design, and absence of a control group limited the generalizability of the findings and prevented the observed changes from being attributed solely to the intervention. Variations in room noise, temperature, sound preferences, stress, psychological conditions, and daily activities may also have influenced the outcomes. In addition, the timing of the post-test was inconsistent, and the different recall periods used for the pre-test and post-test may have reduced measurement comparability. Therefore, the findings should be interpreted cautiously.

Future studies should employ randomized controlled or quasi-experimental designs with appropriate control groups to provide stronger evidence regarding the effectiveness of nature sound music therapy. Multicenter studies involving larger and more diverse samples are also recommended to improve external validity. The timing of post-intervention assessments should be standardized, and the same recall period should be applied at baseline and follow-up. Researchers may also consider using sleep assessment instruments specifically designed for short-term evaluation or combining subjective questionnaires with objective measures, such as actigraphy, to obtain a more comprehensive assessment of sleep quality. Longer intervention periods and follow-up assessments are recommended to determine whether the beneficial effects of nature sound music therapy are sustained over time.

CLINICAL IMPLICATIONS

Nature sound music therapy may be incorporated into inpatient nursing care as a simple, low-cost, non-invasive intervention to support sleep among eligible patients. Nurses should first assess sleep quality, hearing ability, clinical stability, patient preferences, and tolerance to auditory stimulation.

Hospitals are encouraged to develop standardized protocols covering patient selection, sound type, volume, duration, timing, equipment hygiene, and documentation. This therapy should complement, rather than replace, the assessment and management of underlying sleep disturbances such as pain, dyspnea, anxiety, nocturia, medication effects, noise, and lighting.

CONCLUSION

This study demonstrated that nature sound music therapy significantly improved the sleep quality of hospitalized patients at Manado Adventist Hospital. After receiving the intervention for three consecutive nights, most participants shifted from poor to good sleep quality. These findings indicate that nature sound music therapy may be used as a simple, safe, affordable, and feasible non-pharmacological

intervention to promote sleep quality in inpatient nursing care.

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