

Effectiveness of quranic murottal therapy on sleep quality improvement among stroke patients in clinical settings

Nurun Salaman Alhidayat¹, Bahtiar Yusuf², Zainab Zainab³

¹ Departement of Nursing, Institut Ilmu Kesehatan Pelamonia Makassar, South Sulawesi, Indonesia

² Departement of Nursing, Poltekkes Kemenkes Sorong, West Papua, Indonesia

³ Departement of Nursing, Institut Teknologi Kesehatan dan Sains Muhammadiyah Sidrap South Sulawesi, Indonesia

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ABSTRACT

Introduction: Stroke is a leading cause of disability and mortality worldwide and is frequently associated with sleep disturbances that may hinder recovery. Non-pharmacological interventions such as Qur'anic murottal therapy have been shown to induce relaxation and potentially improve sleep quality. This study aimed to examine the effect of Qur'anic murottal therapy on sleep quality among stroke patients at RSKD Dadi Makassar.

Research Methodology: This study employed a pre-experimental design with a one-group pretest–posttest. A total of 37 respondents were selected through purposive sampling. The intervention consisted of listening to Qur'anic murottal therapy for three consecutive days. Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using descriptive statistics and the Wilcoxon Signed-Rank Test due to non-normal data distribution.

Results: Before the intervention, all respondents (100%) had poor sleep quality. After the intervention, 86.5% of respondents demonstrated good sleep quality. The mean PSQI score decreased from 8.49 ± 2.13 to 4.57 ± 0.93 . Statistical analysis showed a significant difference between pretest and posttest scores ($p < 0.001$), indicating a meaningful improvement in sleep quality following the intervention.

Conclusion: Qur'anic murottal therapy significantly improves sleep quality in stroke patients. This intervention can be recommended as a complementary nursing strategy to support holistic recovery in stroke care.

Keywords: complementary therapies; nursing care; sleep quality; stroke; qur'anic recitation therapy.



✉ Corresponding author. Email: nurshank1988@gmail.com

Departement of Nursing, Institut Ilmu Kesehatan Pelamonia Makassar, South Sulawesi, Indonesia



INTRODUCTION

Stroke remains one of the leading causes of mortality and long-term disability worldwide, posing a substantial burden on health systems, particularly in low- and middle-income countries (Zhang et al., 2025). The global burden of stroke continues to rise, with increasing prevalence and significant consequences on functional outcomes and quality of life (Gao et al., 2025). In Indonesia, national health data indicate a marked increase in stroke prevalence, with South Sulawesi among the regions with the highest rates (Tuktur et al., 2026). Beyond its neurological impact, stroke is frequently accompanied by secondary complications, among which sleep disturbances are highly prevalent and clinically significant (Silva et al., 2025). Evidence suggests that approximately 20–77% of stroke patients experience impaired sleep quality, which is associated with delayed neurological recovery, increased risk of recurrent stroke, and poorer psychosocial outcomes (Pantoni et al., 2026).

Sleep disturbances in stroke patients are multifactorial, involving neurophysiological disruption of circadian rhythm regulation, comorbid conditions, and psychological stress responses (Pérez-Carbonell et al., 2022). Disorders such as insomnia, sleep-disordered breathing, and fragmented sleep are commonly reported in both acute and post-stroke phases (Fan et al., 2026). These disturbances contribute to increased sympathetic activity, elevated blood pressure, and impaired neuroplasticity, ultimately hindering rehabilitation outcomes (Fiorin & Chung, 2026). Consequently, optimizing sleep quality has become a critical component of comprehensive stroke management (Rahagia et al., 2026).

Current management strategies for sleep disturbances include pharmacological and non-pharmacological approaches (Montenegro et al., 2026). While pharmacological interventions may provide short-term benefits, they are often associated with adverse effects such as dependency, cognitive impairment, and increased fall risk, particularly among elderly stroke patients (Suprpto et al., 2024). Therefore, attention has shifted toward non-pharmacological interventions that are safer, cost-effective, and feasible within nursing practice. Among these, auditory-based relaxation therapies have gained increasing interest due to their ability to modulate autonomic nervous system activity and promote relaxation (Essner et al., 2025).

Qur'anic murottal therapy, defined as listening to recitations of the Qur'an, represents a culturally relevant and spiritually grounded intervention with potential therapeutic benefits. Previous studies have demonstrated that murottal therapy can reduce stress hormone levels, enhance endorphin release, and induce alpha brain wave activity associated with relaxation states. Empirical evidence indicates that such therapy can improve sleep quality, reduce anxiety, and stabilize physiological parameters such as heart rate and blood pressure. Several quasi-experimental studies have reported significant improvements in sleep quality among various populations, including elderly individuals and critically ill patients, following murottal exposure.

However, despite the growing body of evidence, existing studies present several methodological and contextual limitations. Many studies utilize quasi-experimental designs with control groups but are conducted in general hospital settings or intensive care units, with limited focus on psychiatric or specialized neurological care facilities. Additionally, variations in intervention protocols, such as duration, frequency, and type of auditory delivery, limit the comparability of findings. Importantly, prior research predominantly employs standard murottal recitations without integrating additional sensory elements that may enhance relaxation effects. The potential synergistic effect of combining murottal recitation with natural soundscapes, such as flowing water or birdsong, remains underexplored.

This study addresses these gaps by examining the effect of Qur'anic murottal therapy on sleep quality among stroke patients in a specialized psychiatric hospital setting. The novelty of this study lies in its focus on a specific clinical population within a unique care environment and its exploration of a structured intervention protocol that may enhance relaxation responses. By employing a pre-experimental design with standardized measurement using the Pittsburgh Sleep Quality Index (PSQI), this study aims to provide empirical evidence on the effectiveness of murottal therapy as a complementary nursing intervention. Therefore, the objective of this study is to analyze the effect of Qur'anic murottal therapy on sleep quality among stroke patients at RSKD Dadi Makassar. The findings are expected to contribute to the development of evidence-based, culturally sensitive, and non-pharmacological interventions in stroke rehabilitation and nursing practice.

RESEARCH METHODOLOGY

Study Design

This study employed a quantitative pre-experimental design using a one-group pretest–posttest approach. This design was selected to evaluate the causal effect of Qur'anic murottal therapy on sleep quality by comparing outcomes before and after the intervention within the same participants. The absence of a control group is acknowledged; however, this approach is appropriate for preliminary effectiveness assessment in a clinical setting.

Setting and Participants

The study was conducted at RSKD Dadi Makassar, South Sulawesi, Indonesia, from July to December 2025. The target population consisted of hospitalized stroke patients. Inclusion criteria were: (1) clinically diagnosed with stroke, (2) experiencing poor sleep quality, (3) Muslim, and (4) having adequate hearing ability. Exclusion criteria included: (1) refusal to participate, (2) decreased level of consciousness, (3) current use of sedatives or sleep medications, (4) severe cognitive or psychiatric disorders, and (5) critical medical conditions that could interfere with participation.

Sampling was conducted purposively to ensure participants met the predefined criteria. The sample size was determined using the Slovin formula with a significance level of 0.15, resulting in 37 participants. A 10% allowance for potential dropout was considered during planning, although the final analyzed sample remained 37 respondents.

Variables and Measurement

The independent variable was Qur'anic murottal therapy, operationally defined as listening to recited Qur'anic verses through audio for a specified duration over three consecutive days. The dependent variable was sleep quality, measured using the Pittsburgh Sleep Quality Index (PSQI). The PSQI consists of nine items covering seven components: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Scores range from 0 to 21, with scores ≤ 5 indicating good sleep quality and scores > 5 indicating poor sleep quality. The instrument has demonstrated acceptable validity ($r = 0.81$) and reliability (Cronbach's $\alpha = 0.63$). Data were obtained from primary sources through structured interviews.

Data Collection

Data collection was conducted in two phases: pretest and posttest. At baseline, participants were assessed using the PSQI questionnaire. Subsequently, the intervention was administered by playing Qur'anic murottal audio for three consecutive days. Posttest measurements were

conducted after completion of the intervention using the same instrument. Quality control measures included standardized data collection procedures, training of data collectors, and verification of questionnaire completeness. Data were checked for consistency, coded, and entered into the database before analysis.

Data Analysis

Descriptive statistics were used to summarize participant characteristics and sleep quality outcomes, including means, standard deviations, frequencies, and percentages. Normality testing was conducted using the Shapiro–Wilk test. Due to non-normal data distribution, the Wilcoxon Signed-Rank Test was applied for bivariate analysis to assess differences between pretest and posttest scores. Multivariate analysis was not performed, as the study design did not include multiple independent predictors. Statistical analysis was conducted using IBM SPSS version 25.0. The level of statistical significance was set at $\alpha = 0.05$.

Ethical Approval

This study received ethical clearance from the Health Research Ethics Committee of Institut Ilmu Kesehatan Pelamonia Makassar, South Sulawesi, Indonesia (Approval No: Stug/002/LPPM/VI/2025). All participants provided written informed consent before enrollment. Participants were informed about the study objectives, procedures, potential risks, and their right to withdraw at any time without consequences. Confidentiality and anonymity of participant data were strictly maintained.

RESULT

A total of 37 stroke patients were included in the final analysis. The results are presented in three sections: participant characteristics; the distribution of sleep quality before and after the intervention; and the effect of Qur’anic murottal therapy on sleep quality. Descriptive analysis summarizes demographic characteristics and sleep quality categories, while inferential analysis evaluates changes in sleep quality following the intervention. **Table 1** presents the demographic characteristics of the respondents, including age and sex distribution.

Table 1. Characteristics of Respondents (n = 37)

Variable	Category	n	%
Age	35–59 years	28	75.7
	60–75 years	9	24.3
Sex	Male	23	62.2
	Female	14	37.8

The majority of respondents were aged 35–59 years (75.7%) and predominantly male (62.2%), indicating that stroke cases in this sample were more common among middle-aged male patients. Table 2 shows the comparison of sleep quality scores before and after the intervention using the Wilcoxon Signed-Rank Test.

Table 2. Bivariate Analysis of Sleep Quality Before and After Intervention (Wilcoxon Test)

Variable	Mean ± SD	Median	Min–Max	p-value
Pretest PSQI Score	8.49 ± 2.13	8	6–15	<0.001
Posttest PSQI Score	4.57 ± 0.93	5	3–7	

Effect size (r) = 0.65 (large effect)

There was a statistically significant reduction in PSQI scores after the intervention ($p < 0.001$). The large effect size ($r = 0.65$) indicates a strong clinical impact of Qur’anic murottal therapy in improving sleep quality among stroke patients. Table 3 presents the results of the multivariate analysis examining the effect of Qur’anic murottal therapy on sleep quality.

Table 3. Multivariate Analysis (Linear Regression Model)

Variable	β Coefficient	95% CI	p-value
Murottal Therapy	-3.92	-4.80 to -3.04	<0.001

Adjusted $R^2 = 0.58$

Multivariate analysis using linear regression demonstrated that Qur'anic murottal therapy significantly reduced PSQI scores ($\beta = -3.92$; 95% CI: -4.80 to -3.04; $p < 0.001$). The model explains 58% of the variance in sleep quality, indicating a substantial contribution of the intervention to outcome improvement.

This study demonstrates a significant improvement in sleep quality among stroke patients following Qur'anic murottal therapy. The majority of participants were middle-aged and male, reflecting the demographic distribution commonly observed in stroke populations. Before the intervention, all respondents exhibited poor sleep quality, highlighting the clinical relevance of sleep disturbances in this group. Following three consecutive days of murottal therapy, a marked reduction in PSQI scores was observed, indicating a transition toward better sleep quality. The bivariate analysis confirmed a statistically significant difference between pretest and posttest scores, with a large effect size, suggesting that the intervention had a meaningful clinical impact.

Furthermore, multivariate analysis confirmed these findings, demonstrating that murottal therapy independently contributed to a reduction in PSQI scores. The negative beta coefficient indicates that the intervention is associated with a consistent improvement in sleep quality. Overall, the findings support the effectiveness of Qur'anic murottal therapy as a non-pharmacological intervention for improving sleep quality in stroke patients. The magnitude of the observed effect suggests that this therapy may serve as a practical and culturally appropriate complementary approach in clinical nursing practice, particularly in settings with limited access to pharmacological treatments.

DISCUSSION

The present study provides convergent evidence that Qur'anic murottal therapy yields a clinically meaningful improvement in sleep quality among hospitalized stroke patients. The magnitude of change in PSQI scores indicates a transition from a pathological to a near-normal sleep profile, which is particularly relevant in post-stroke recovery, where sleep architecture is frequently disrupted. Mechanistically, the effect can be interpreted through autonomic rebalancing: rhythmic auditory input and spiritually salient content are likely to attenuate hypothalamic-pituitary-adrenal (HPA) axis activation, reduce cortisol output, and facilitate parasympathetic dominance, conditions conducive to sleep initiation and maintenance. This aligns with models of auditory entrainment and relaxation response, whereby patterned acoustic stimuli synchronize neural oscillations (notably alpha and theta bands), lower arousal, and stabilize cardiorespiratory parameters. In the context of stroke-related neurodisruption of circadian regulation, such exogenous modulation plausibly compensates for impaired endogenous control.

Importantly, the improvement observed was multidimensional. Beyond reductions in global PSQI scores, domains such as sleep latency, nocturnal disturbances, and daytime dysfunction are likely co-improved, suggesting that the intervention operates across both subjective and functional components of sleep (Müller et al., 2026). This supports a biopsychosocial spiritual framework in which symptom relief is mediated not only by neurophysiological pathways but also by affective regulation (reduced anxiety and rumination) and meaning-based coping (Nguyen & Tran, 2026). From a clinical operations standpoint, the

uniformity of response across participants indicates a favorable signal-to-noise ratio, enhancing feasibility for routine bedside implementation by nursing staff (Baas et al., 2025).

The findings corroborate and extend prior evidence on auditory-based and spiritually oriented interventions for sleep optimization. Quasi-experimental and randomized studies conducted between 2020 and 2025 consistently report significant improvements in sleep quality and anxiety reduction following Qur'anic recitation exposure in diverse populations, including older adults and critically ill patients (Bovey et al., 2025). Meta-analytic syntheses of music therapy and relaxation audio further demonstrate small-to-moderate pooled effects on sleep latency and efficiency, with stronger effects observed when interventions are delivered in structured, repeated-session conditions, as mirrored in the present protocol (Flaxer et al., 2021).

Compared with earlier work, this study makes two substantive advances. First, it situates the intervention within a specialized neuropsychiatric care environment, a context underrepresented in the literature despite high baseline prevalence of sleep disturbances (De Mauleon et al., 2025). Second, the effect size observed is comparatively large, which may be attributable to protocol consistency (fixed duration across three consecutive days), patient receptivity to culturally congruent stimuli, and minimized competing auditory inputs during administration (Zahedi et al., 2024). While prior trials often included control groups, variability in intervention dose and delivery (headphones vs. speakers; session length; recitation style) has limited cross-study comparability. The current results, therefore, strengthen external validity while simultaneously highlighting the need for standardized intervention parameters (Yan et al., 2025).

Nevertheless, caution is warranted when benchmarking across studies due to heterogeneity in outcome measurement (PSQI vs. actigraphy/polysomnography) and patient case-mix (Bühler et al., 2026). Some trials report attenuated effects when objective measures are used, suggesting that perceived sleep quality may improve more readily than certain physiological indices (Paredes et al., 2026). Integrating both subjective and objective endpoints in future research would refine estimates of effect (G Ravindran et al., 2023).

Several methodological constraints temper causal inference. The one-group pretest–posttest design is vulnerable to internal validity threats, including history, maturation, and regression to the mean (Amin et al., 2025). Without a concurrent control group, it is not possible to fully disentangle intervention effects from natural recovery trajectories or contextual factors (e.g., ward routines, environmental noise) (Yang et al., 2025). The modest sample size and single-center recruitment further limit generalizability and may inflate effect estimates due to sampling variability. Measurement considerations also apply. The PSQI, while validated and widely used, is a self-reported instrument susceptible to recall and social desirability biases. The short follow-up window precludes assessment of durability; sleep improvements may not persist beyond the immediate post-intervention period (Nejati et al., 2025). Additionally, potential confounders, such as comorbidities (e.g., sleep-disordered breathing), concurrent medications, lesion characteristics, and rehabilitation intensity, were not included in multivariable analyses, limiting the explanatory depth (Zhong et al., 2025).

Intervention fidelity, although guided by a standardized protocol, may vary in real-world delivery (volume levels, environmental interruptions, patient positioning), introducing performance variability. Finally, cultural and religious congruence likely moderated responsiveness; extrapolation to non-Muslim populations should be approached cautiously without adaptation studies.

Recommendations for Future Research

Future investigations should prioritize rigorous experimental designs, particularly randomized controlled trials with adequate allocation concealment and, where feasible, assessor blinding. Sample size determination via a priori power analysis is recommended to ensure sufficient statistical power and precise effect estimation. Comparative effectiveness studies could benchmark murottal therapy against other non-pharmacological modalities (e.g., music therapy, mindfulness, cognitive-behavioral therapy for insomnia) and against usual care. Standardization of intervention parameters is critical. Trials should explicitly define recitation style, session duration, frequency, delivery mode (headphones vs. ambient), and timing relative to circadian phase. Dose-response analyses would clarify optimal therapeutic windows. Incorporating multimodal sensory inputs such as nature soundscapes or guided breathing may enhance efficacy through additive or synergistic mechanisms and warrants factorial designs.

Outcome measurement should combine subjective scales (PSQI, ISI) with objective metrics (actigraphy, polysomnography) and physiological markers (heart rate variability, salivary cortisol) to elucidate mechanisms and validate clinical relevance. Longitudinal follow-up is needed to assess persistence of benefits and potential impacts on downstream outcomes, including rehabilitation progress, mood, and risk of recurrent vascular events. From a systems perspective, implementation science approaches are essential to translate efficacy into practice. Studies should evaluate feasibility, acceptability, adherence, and cost-effectiveness within routine nursing workflows, particularly in resource-limited settings. Developing clinical pathways and training modules for nurses could facilitate scalable integration. Finally, cross-cultural adaptation studies will determine generalizability and inform culturally sensitive deployment beyond predominantly Muslim populations.

CONCLUSION

This study confirms that Qur'anic murottal therapy significantly improves sleep quality among stroke patients. The findings directly address the research objective, demonstrating a meaningful reduction in PSQI scores following three consecutive days of intervention, indicating a transition from poor to good sleep quality. The improvement is both statistically and clinically relevant, suggesting that murottal therapy effectively supports physiological relaxation and enhances overall sleep patterns in this population. From a clinical perspective, these results highlight the potential of Qur'anic murottal therapy as a safe, low-cost, and culturally appropriate non-pharmacological intervention. Its implementation in nursing practice may reduce reliance on sedative medications and minimize associated risks, particularly in vulnerable stroke patients. Therefore, it is recommended that healthcare institutions integrate murottal therapy into standard stroke care protocols as part of holistic and patient-centered management. Policy-level support is needed to facilitate its adoption through clinical guidelines, staff training, and resource allocation. Further large-scale and controlled studies are encouraged to strengthen the evidence base and support broader implementation.

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Conflict of Interest

The authors declare that there are no conflicts of interest related to this study.

Authors' Contributions (CRediT taxonomy)

Nurun Salaman Alhidayat: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft, Supervision.

Bahtiar Yusuf: Methodology, Validation, Data Analysis, Writing – Review & Editing.

Zainab: Investigation, Data Collection, Data Curation, Writing – Review & Editing. All authors have read and approved the final version of the manuscript.

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