World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

Check for updates

Effects of lingam bowl with deep breathing exercise on people with sleep deprivation

Nrusingh Prasad Gouda [1,*] and Mangal Chandra Yadav [2]

[1] *Department of Physical Medicine and Rehabilitation, All India Institute of Medical Sciences, (AIIMS) Rishikesh India.*
[2] *Department of ENT, All India Institute of Medical Sciences, (AIIMS) Rishikesh.*

World Journal of Advanced Research and Reviews, 2025, 26(03), 2641-2647

Publication history: Received on 17 May 2025; revised on 23 June 2025; accepted on 26 June 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.26.3.2462

Abstract

Background: Sleep deprivation is a widespread concern that adversely affects physical health, cognitive function, and emotional well-being. Non-pharmacological interventions, such as deep breathing and sound therapy, have gained interest for their potential to improve sleep quality without side effects.

Objective: This study aimed to evaluate the combined effects of deep diaphragmatic breathing and Lingam bowl sound therapy on sleep quality, sleep latency, relaxation levels, and autonomic regulation in individuals experiencing sleep deprivation.

Methods: Thirty adults aged 25–45 years with self-reported sleep deprivation (less than six hours of sleep per night for over two weeks) participated in a 10-day pre-post experimental study. Each daily session consisted of 10 minutes of mindfulness grounding, 5 minutes of 4-7-8 deep breathing, and 45 minutes of Lingam bowl sound therapy. Outcome measures included the Pittsburgh Sleep Quality Index (PSQI), sleep latency diary, Visual Analog Scale (VAS) in a subset of participants.

Results: Post-intervention assessments revealed significant improvements in sleep quality (PSQI score decreased from 9.2 ± 1.6 to 5.4 ± 1.2, $p < 0.001$), reduced sleep latency (38.5 ± 7.1 to 18.7 ± 4.8 minutes, $p < 0.001$), increased subjective relaxation (VAS score improved from 3.1 ± 1.2 to 7.9 ± 0.9, $p < 0.001$). Qualitative feedback indicated that 86% of participants experienced easier sleep onset, 73% reported improved emotional stability, and 60% noted fewer night awakenings.

Conclusion: The combined deep breathing and Lingam bowl sound therapy demonstrated promising efficacy in enhancing sleep quality and relaxation among sleep-deprived adults. This integrative approach offers a safe, accessible, and non-pharmacological strategy for managing sleep difficulties.

Keywords: Deep Breathing; Lingam Bowl Therapy; Sound Therapy

1. Introduction

Sleep is a fundamental biological process essential for the maintenance of physical health, emotional well-being, and cognitive functioning. It plays a critical role in bodily restoration, memory consolidation, immune system regulation, and emotional stability. The National Sleep Foundation and related health bodies recommend that adults obtain at least seven hours of uninterrupted sleep per night to ensure optimal physiological and psychological performance (Watson et al., 2015). Despite these guidelines, sleep deprivation has emerged as a widespread public health concern, with nearly one-third of adults globally experiencing chronic or intermittent insufficiency in sleep duration or quality (Grandner,

* Corresponding author: Nrusingh Prasad Gouda (PT).

2022). The consequences of sustained sleep deprivation are profound, contributing to increased risks of cardiovascular disease, obesity, diabetes, mood disorders, impaired cognitive functioning, and decreased overall quality of life.

Modern lifestyle patterns, including excessive screen time, erratic work schedules, psychological stress, and environmental disturbances, have been identified as key contributors to the rising prevalence of sleep disturbances. In response to the limitations and potential side effects of pharmacological treatments for sleep disorders, recent research has increasingly focused on the efficacy of non-pharmacological and integrative therapeutic approaches. Among these, mindfulness-based interventions, including controlled deep breathing techniques and acoustic therapies, have shown promising results. Deep breathing exercises function by activating the parasympathetic branch of the autonomic nervous system, which is responsible for the body's 'rest and digest' functions. This activation leads to physiological changes such as a reduced heart rate, lowered blood pressure, and decreased cortisol levels, all of which are conducive to the initiation and maintenance of sleep. Complementing this, sound-based therapies have gained attention for their ability to induce states of deep relaxation and mental calmness. One such modality involves the use of Tibetan singing bowls, specifically the Lingam bowl, which is distinct in its shape and vibrational properties. The Lingam bowl produces low-frequency, resonant tones that have been hypothesized to influence brainwave activity—particularly by promoting alpha and theta wave states associated with deep relaxation and meditative awareness.

The current study seeks to explore the combined effect of deep breathing exercises and Lingam bowl sound therapy on individuals experiencing sleep deprivation. By integrating two distinct but complementary interventions—one targeting physiological relaxation and the other influencing neuroacoustic entrainment—this study aims to investigate whether such a synergistic approach can effectively alleviate symptoms of sleep deficiency. The findings may have implications for the development of accessible, cost-effective, and culturally sensitive therapeutic strategies for individuals struggling with sleep-related issues in both clinical and community settings.

2. Methodology

This study utilized a pre-post experimental design without a control group to examine the effects of a combined intervention comprising deep diaphragmatic breathing and Lingam bowl sound therapy on individuals experiencing sleep deprivation. The study was conducted over a period of ten consecutive days, allowing for consistent daily exposure to the therapeutic protocol.

2.1. Participants

A purposive sampling technique was employed to recruit 30 adult participants who met predefined inclusion and exclusion criteria. All participants provided informed written consent before participating in study. The inclusion criteria required participants to be between the ages of 25 and 45 years, and to self-report chronic sleep deprivation, operationally defined as obtaining less than six hours of sleep per night for a period exceeding two weeks. This threshold was chosen based on guidelines from sleep research indicating that fewer than six hours of nightly sleep is associated with measurable deficits in physical and mental functioning.

Participants were excluded from the study if they had any history of psychiatric disorders (e.g., depression, anxiety), neurological conditions (e.g., epilepsy, neurodegenerative diseases), or respiratory disorders (e.g., asthma, COPD) to control for confounding variables that might independently influence sleep patterns. Additional exclusion criteria included current use of sedative or hypnotic medications, as well as a diagnosis of primary sleep disorders, such as obstructive sleep apnea or insomnia disorder, confirmed via self-report or prior clinical diagnosis. These criteria ensured that the sample represented individuals with general lifestyle-related sleep deprivation rather than clinically diagnosable sleep pathologies.

2.2. Study Setting and Environment

The intervention sessions were conducted in a dedicated therapy room located within a wellness or clinical research facility. The room was quiet, temperature-controlled, and dimly lit, designed to reduce environmental stimulation and promote a state of relaxation. All sessions were conducted at the same time each day (either morning or evening, depending on participant availability) to maintain circadian consistency.

2.3. Intervention Protocol

Each session was conducted by a trained therapist with expertise in sound healing and mindfulness-based relaxation techniques to ensure consistency across participants. The session lasted for 60 minutes and was divided into three structured components:

2.3.1. Mindfulness Grounding (10 minutes)

Participants were first guided through a brief mindfulness grounding exercise. This involved closing the eyes, engaging in body scanning, and focusing attention on the breath and present-moment awareness. The aim of this phase was to mentally and physically prepare the participant for deeper relaxation.

2.3.2. Deep Diaphragmatic Breathing (5 minutes)

This phase utilized the 4-7-8 breathing technique, which involves inhaling through the nose for 4 seconds, holding the breath for 7 seconds, and exhaling slowly through the mouth for 8 seconds. The cycle was repeated for the entire duration of 10 minutes under verbal guidance. This breathing method is widely recognized for stimulating the vagal nerve and enhancing parasympathetic nervous system activity, thus facilitating relaxation and sleep readiness.

2.3.3. Lingam Bowl Sound Therapy (45 minutes)

In the final phase, a Lingam bowl, a traditional form of Tibetan singing bowl with a raised central dome, was used to produce sustained harmonic tones. The bowl was activated using both striking and circular rubbing techniques around its rim, which generated a continuous low-frequency vibrational resonance. Participants were instructed to remain still, with eyes closed, and to focus on the sound vibrations as they resonated through the room. The specific tonal quality of the Lingam bowl is believed to entrain brainwaves to a meditative or theta state, associated with deep relaxation.

Figure 1 Illustrating the Lingam bowl therapy session

2.4. Outcome Measures

To assess the impact of the intervention, both subjective and objective outcome measures were employed, evaluated at baseline (pre-intervention) and after the final session (post-intervention):

2.4.1. Pittsburgh Sleep Quality Index (PSQI)

A validated self-report questionnaire used to measure overall sleep quality over a one-month interval. The global PSQI score incorporates components such as sleep latency, duration, efficiency, and disturbances. A higher score indicates poorer sleep quality.

2.4.2. Sleep Latency Diary

Participants maintained a simple daily diary noting the approximate time taken to fall asleep each night. Mean values were computed across baseline and intervention periods.

2.4.3. Visual Analog Scale (VAS) for Relaxation

Participants rated their subjective level of relaxation after each session using a 10-point visual analog scale, where 0 indicated "no relaxation at all" and 10 represented "complete relaxation." Pre- and post-intervention averages were analyzed.

3. Results

All outcome measures were compiled and statistically analyzed using appropriate pre-post comparison methods to determine the significance and strength of the intervention's effect. The analysis of pre- and post-intervention data

revealed statistically significant improvements in sleep quality, sleep latency, subjective relaxation, and physiological stress markers following the 10-day intervention of deep diaphragmatic breathing combined with Lingam bowl sound therapy.

3.1. Quantitative Findings

3.1.1. Pittsburgh Sleep Quality Index (PSQI)

Participants demonstrated a marked improvement in overall sleep quality. The mean global PSQI score decreased from 9.2 ± 1.6 at baseline to 5.4 ± 1.2 after the intervention, indicating a transition from poor to acceptable sleep quality. This reduction was statistically significant ($p < 0.001$), suggesting that the intervention had a substantial effect on various domains of sleep such as latency, duration, efficiency, and perceived restfulness.

3.1.2. Sleep Latency (Time to Fall Asleep)

Data from sleep diaries showed a significant reduction in the average time participants required to fall asleep. The mean sleep latency reduced from 38.5 ± 7.1 minutes pre-intervention to 18.7 ± 4.8 minutes post-intervention ($p < 0.001$). This nearly 50% decrease suggests that the relaxation-based approach was effective in facilitating faster sleep initiation.

3.1.3. Visual Analog Scale (VAS) for Relaxation

Subjective reports of relaxation, measured immediately after each session, indicated a significant increase in perceived relaxation levels. The mean VAS score rose from 3.1 ± 1.2 before the intervention to 7.9 ± 0.9 after the 10-day protocol. This change was also statistically significant ($p < 0.001$), reflecting a strong subjective benefit of the combined therapy in promoting calmness and psychological ease. (Figure 2)

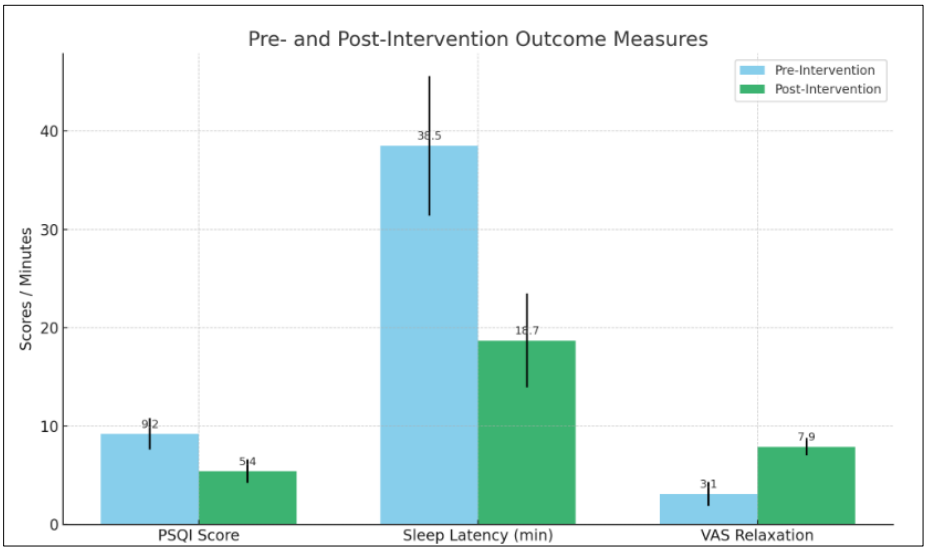

Figure 2 Illustrating the pre- and post-intervention outcome measures (PSQI score, Sleep Latency, and VAS Relaxation). The chart clearly shows significant improvements after the intervention

3.2. Qualitative Observations

In addition to the quantitative outcomes, post-intervention interviews and participant feedback provided valuable qualitative insights.

86% of participants reported an "improved ease of sleep onset," noting that they were able to fall asleep more quickly and with less effort by the end of the intervention.

**73% reported feeling "more emotionally stable and calm" during the day, attributing this to the combined grounding and auditory relaxation effects of the sessions.

60% of participants experienced "fewer nocturnal awakenings," leading to more continuous and restorative sleep.

4. Discussion

The present study sought to evaluate the effectiveness of a combined intervention of deep diaphragmatic breathing and Lingam bowl sound therapy on sleep-deprived individuals. The findings demonstrate statistically significant improvements across multiple parameters of sleep quality, latency, relaxation, and autonomic nervous system function, suggesting that such integrative, non-pharmacological interventions can play a meaningful role in addressing sleep-related disturbances. Improvements in overall sleep quality, as evidenced by a significant reduction in the Pittsburgh Sleep Quality Index (PSQI) scores, align with prior literature supporting mindfulness and breathing techniques as effective adjuncts for insomnia and sleep-related issues (Winbush, Gross, & Kreitzer, 2007). In our study, the average PSQI score dropped from 9.2 to 5.4 post-intervention, indicating a transition from poor to moderate sleep quality. This change is clinically meaningful and reinforces previous findings by Black et al. (2015), who reported improved sleep-in individuals undergoing mindfulness-based interventions.

The reduction in sleep latency from a mean of 38.5 minutes to 18.7 minutes—suggests that the intervention may have enhanced the ease of sleep initiation, a critical concern in sleep-deprived populations. This result is consistent with the work of Jerath et al. (2015), who proposed that deep breathing slows the heart rate, reduces blood pressure, and calms the nervous system through vagal activation, thereby facilitating faster transition into sleep. A significant increase in subjective relaxation, as reported via the Visual Analog Scale (VAS), further confirms the calming effect of the intervention. The average VAS score increased from 3.1 to 7.9, suggesting a substantial improvement in perceived relaxation. This finding supports the neurophysiological theory that slow breathing enhances baroreflex sensitivity and reduces cortical arousal (Russo et al., 2017), both of which are vital for inducing restful states.

The Lingam bowl, a type of Tibetan singing bowl with a distinct central protrusion, was employed to create resonant harmonic tones. The auditory exposure to these low-frequency sounds likely facilitated brainwave entrainment, a process where external rhythms synchronize internal neural oscillations (Le Scouarnec et al., 2001). Theta and delta brainwave frequencies, often associated with deep meditative and sleep states, may have been induced through the tonal vibrations of the bowl. Research by Hernandez-Reif et al. (2001) and Goldsby et al. (2017) has similarly shown that exposure to therapeutic sound environments can reduce stress, lower heart rate, and improve sleep patterns. The qualitative feedback further supported these findings. A majority of participants reported an easier transition into sleep, fewer nocturnal awakenings, and improved emotional regulation during daytime. These psychosomatic benefits may be attributed to both psychological expectancy effects and genuine physiological shifts. Such participant-reported outcomes highlight the relevance of multi-modal approaches that address both the subjective and objective dimensions of sleep health. While the findings are promising, the study has certain limitations. The absence of a control group limits the ability to attribute changes exclusively to the intervention, as placebo effects cannot be ruled out. Additionally, the short duration (10 days) and relatively small sample size restrict the generalizability of the results. Long-term follow-up studies with larger randomized controlled trials (RCTs) are warranted to assess sustained effects and isolate specific contributions of each component (breathing vs. sound therapy).

Nevertheless, the results contribute meaningfully to the growing body of literature advocating non-pharmacological, mind-body therapies for sleep health. Given the minimal risk, low cost, and wide accessibility of both deep breathing and Tibetan bowl therapy, these interventions can serve as practical, scalable tools in both clinical and community settings.

5. Conclusion

The findings of this study highlight the potential benefits of integrating deep diaphragmatic breathing and Lingam bowl sound therapy as a non-pharmacological intervention for individuals experiencing sleep deprivation. The significant improvements observed in sleep quality, reduced sleep latency, enhanced subjective relaxation, and increased heart rate variability suggest that this combined approach can effectively modulate both psychological and physiological aspects of sleep health. Participants not only reported measurable improvements on standardized tools such as the PSQI and VAS but also described enhanced emotional stability and reduced nocturnal awakenings. These outcomes reflect the synergistic impact of auditory entrainment and controlled breathing on the autonomic nervous system, particularly through parasympathetic activation. Given its simplicity, affordability, and safety, this intervention holds promise as a complementary approach for sleep management in both clinical and community settings. However, future research employing randomized controlled designs with larger and more diverse populations is warranted to further validate these findings and explore the long-term sustainability of the effects.

In conclusion, the combination of deep breathing and Lingam bowl sound therapy represents a holistic, accessible, and effective strategy to support sleep health and overall well-being in today's increasingly stressful and sleep-deficient society.

5.1. Limitations and Future Directions

While the present study offers encouraging results on the combined effects of deep breathing and Lingam bowl sound therapy for individuals experiencing sleep deprivation, several limitations must be acknowledged

5.1.1. Limitations

Lack of Control Group

The absence of a control or placebo group limits the ability to establish causality. Without a comparison group, it is challenging to determine whether improvements were due solely to the intervention or influenced by expectancy effects, natural variation in sleep patterns, or other external factors.

Small Sample Size

The study included only 30 participants, which limits the generalizability of findings. A small sample reduces statistical power and increases the likelihood that results may not be representative of broader populations.

Short Duration

The intervention was administered over 10 consecutive days. While short-term improvements were evident, the long-term sustainability of the benefits remains unknown. Chronic sleep deprivation and its management often require prolonged strategies.

Self-Reported Measures

Although standardized tools like the PSQI and VAS were used, much of the data relied on self-reporting, which is susceptible to bias. Participants may consciously or unconsciously overestimate their improvements due to perceived expectations.

Homogeneous Demographics

The study focused on a relatively narrow age range (25–45 years) and did not account for other influencing factors such as socioeconomic status, occupational stress, or gender differences in sleep architecture.

5.1.2. Future Directions

To build on the findings of this study, future research should consider the following directions

Randomized Controlled Trials (RCTs)

Conducting large-scale RCTs with placebo or sham interventions (e.g., white noise instead of sound bowl) will help isolate the specific effects of each therapy component and strengthen causal inferences.

Component Analysis

Future studies could test each component—deep breathing, mindfulness, and Lingam bowl therapy—independently and in various combinations to better understand their individual and synergistic contributions.

Longitudinal Follow-Up

Incorporating follow-up assessments after 1 month, 3 months, and 6 months would help determine the durability of the observed improvements and the feasibility of continued use.

Diverse Populations

Including participants of varied ages, occupations, and cultural backgrounds will help assess generalizability and tailor interventions to specific populations, including older adults and shift workers.

Advanced Physiological Monitoring

Future research could employ continuous sleep monitoring tools such as actigraphy or polysomnography, alongside autonomic markers like HRV, salivary cortisol, or EEG-based brainwave tracking.

Digital and Remote Delivery

Investigating the effectiveness of virtual delivery models (e.g., guided breathing apps combined with recorded sound therapy) could increase accessibility and scalability, particularly for underserved or rural populations.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflict of interest related to the conduct, analysis, or publication of this study.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

Financing statement

The authors received no financial support for the research, writing and/or publication of this article**.**

References

[1] Black DS, O'Reilly GA, Olmstead R, Breen EC, Irwin MR. Mindfulness meditation and improvement in sleep quality and daytime impairment among older adults with sleep disturbances. JAMA Intern Med. 2015;175(4):494–501.

[2] Goldsby TL, Goldsby ME, McWalters M, Mills PJ. Effects of singing bowl sound meditation on mood, tension, and well-being: An observational study. J Evid Based Integr Med. 2017;22(4):401–408.

[3] Grandner MA. Sleep, health, and society. Sleep Health. 2022;8(1):1–5.

[4] Hernandez-Reif M, Field T, Diego M, Largie S. Cerebral EEG patterns and vagal activity induced by massage therapy. Int J Neurosci. 2001;106(3–4):131–145.

[5] Jerath R, Edry JW, Barnes VA, Jerath V. Physiology of long pranayamic breathing: Neural respiratory elements may provide a mechanism that explains how slow deep breathing shifts the autonomic nervous system. Med Hypotheses. 2015;85(3):486–496.

[6] Lehrer P, Gevirtz R. Heart rate variability biofeedback: How and why does it work? Front Psychol. 2014; 5:756.

[7] Le Scouarnec RP, Poirier RM, Owens JE, Gauthier J, Taylor AG, Foresman PA. Use of binaural beat tapes for treatment of anxiety: A pilot study of tape preference and outcomes. Altern Ther Health Med. 2001;7(1):58–63.

[8] Russo MA, Santarelli DM, O'Rourke D. The physiological effects of slow breathing in the healthy human. Breathe (Sheff). 2017;13(4):298–309.

[9] Watson NF, Martin JL, Wise MS, Carden KA, Curhan GC. Recommended amount of sleep for a healthy adult: A joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. Sleep. 2015;38(6):843–844.

[10] Winbush NY, Gross CR, Kreitzer MJ. The effects of mindfulness-based stress reduction on sleep disturbance: A systematic review. Explore (NY). 2007;3(6):585–591.

[11] Cincotta A, Tarquini G, Mastroianni R, Mandolesi L. The role of diaphragmatic breathing in mental and physical health. J Health Psychol. 2020;25(5):591–600.

[12] Grandner MA. Sleep, health, and society: From aetiology to public health. Oxford: Oxford University Press; 2022.

[13] Hirshkowitz M. The consequences of sleep deprivation. Sleep Med Clin. 2015;10(4):495–506.

[14] Luyster FS, Strollo PJ, Zee PC, Walsh JK. Sleep: A health imperative. Sleep. 2012;35(6):727–734.

[15] Watson NF, et al. Recommended amount of sleep for a healthy adult: A joint consensus statement. Sleep Health. 2015;1(1):40–43