



Cyclic Meditation and Sleep Quality: A Review

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Sleep Sci

Abstract

Objectives Insufficient sleep leads to several short- and long-term physical and mental consequences. Yoga is a popularly known complementary health approach that maintains physical and mental health through asanas, meditation, and breathing techniques. Cyclic meditation (CM), derived from one of the Upanishads, is practiced by combining physical postures (asanas) with relaxation techniques. Recent findings emphasize the significance of CM as a means to enhance sleep quality. The current review aims to find the effects of CM on sleep quality through the available scientific data.

Methods The current review includes research articles evaluating CM's effect on sleep quality from various databases such as PubMed, Cochrane, Embase, and Google Scholar up to January 22, 2023. We conducted a literature search using keywords related to CM and sleep quality, and search results were restricted to studies published in the English language.

Results There were 5 articles with 277 participants meeting inclusion criteria, all conducted in India. Of those, 2 were randomized controlled trials and 3 were single-group or two-group pre-post and crossover studies. Participants ranged from healthy volunteers, type-2 diabetic patients, alcohol dependents, and caregivers for special needs children. Based on the available scientific evidence, CM has been found to be effective ($d = 0.56-4.90$) in enhancing the quality of sleep.

Conclusion The CM technique could be tentatively considered as a beneficial practice to improve sleep. However, further, adequately powered, and randomized controlled studies with various other parameters of sleep are required to strongly recommend CM as a stand-alone yogic intervention for sleep disturbance.

Keywords

- ▶ cyclic meditation
- ▶ mind-body practice
- ▶ review
- ▶ sleep quality
- ▶ yoga

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Introduction

Sleep is considered essential for promoting optimal physical and mental health, as well as enhancing the overall quality of life.¹ Duration and quality of sleep are gaining increasing significance in the current healthcare system. This is a fundamental biological process for optimal health and well-being.² Good sleep quality is essential for immune function, cognition, memory, and mood.³ Many factors contribute to poor sleep and its quality.⁴ The factors could be physical, psychological, behavioral, emotional, or environmental.⁵ It is also directly correlated with detrimental impacts on both physical and mental health,⁶ as well as an increased risk of developing obesity, hypertension, diabetes mellitus, cardiovascular disorders, dementia, anxiety, and depression.⁷ Sleep quality could effectively prevent damages and inconveniences caused by daytime sleepiness.⁸ Moreover, recent studies also posit that the quality of sleep declines with aging increasing the risk of mortality, restlessness, pain, and other health-related outcomes.⁹ Conventional management for sleep disorders involves the usage of sedative and hypnotic agents that can induce sleep but with many adverse effects.¹⁰ Due to these adverse effects, the use of complementary and alternative medicine (CAM) including yoga has increased over the past two decades. Yoga is a way of life; it is a mind-body practice and plays a key role in the management of various psychosomatic noncommunicable disorders.¹¹

The yogic technique called cyclic meditation (CM) or 'moving meditation' is derived on the basis of *Mandukya Upanishad*. This technique combines the practice of physical postures or asanas (postures name mentioned in Sanskrit) with relaxation techniques. It begins with a repeating a verse from the *Mandukya Upanishad*, "awaken the mind in states of activity; calm it in moments of agitation; realize the possibilities of the mind in between these two mental states; and, when the mind reaches a state of equilibrium, not disturb it".¹² Followed by isometric muscle contraction, supine rest, standing at ease, centering by balancing the body weight on the different parts of the feet, bending to the right and left sides (*Ardha kati chakrasana* or lateral arc pose), forward bending (*pada hasta-sana* or hand to foot pose), backward bending (*ardha chakrasana* or half wheel pose), and supine rest. During the practice, patient is instructed about awareness and relaxation.¹³ The practice of CM has been associated with a plethora of psychological health benefits. These include stress reduction, diminished anxiety and depression, as well as physiological enhancements like improved memory, heightened attention, reduced autonomic arousal, and enhanced sleep quality.¹⁴ However, the specific impact of this meditation technique exclusively on sleep quality has not yet been explored. This article aims to review the effect of CM on this positive by analyzing available scientific studies.

Methods

Articles evaluating the effectiveness of CM on sleep quality were included in this review. Bibliographic databases, such as PubMed, Cochrane, Embase, and Google Scholar, were

searched from inception up to January 22, 2023. The following keywords "Cyclic Meditation" OR "Moving Meditation" AND "Sleep quality" OR "Sleep" was used in the search. Review articles, conference abstracts, and articles in languages other than English were not included. A total of 145 articles were initially identified through a literature search. After removing duplicates ($n = 35$), studies not related to CM ($n = 78$), and a review article ($n = 1$), only 31 studies were eligible for full-text screening. Effect size (Cohen d) was calculated by the standardized difference between two means, or mean (group 1) - mean (group 2) / standard deviation (SD).¹⁵ The effect size of 0.2 is considered small, 0.5 is medium, and 0.8 is large.¹⁶ This approach enhances the validity of the study's results, facilitates meaningful interpretation of effect sizes, and contributes to understanding the clinical significance of observed outcomes by providing a context for comparison.

Results

The literature search yielded a total of 31 eligible articles. Only five articles met the criteria and were included for this review. The main characteristics of these studies were shown in ► **Table 1**. All of them were conducted in India. Among the five included studies, two^{17,18} adopted a randomized controlled trial design, the remaining three adopted single-group pre-post,¹² two group pre-post,¹⁹ and single-group crossover study design.²⁰ All the included studies assessed the quality of sleep by various questionnaires such as the Pittsburgh sleep quality index (PSQI),^{12,17} sleep quality self-scaled instruments,¹⁹ self-rated sleep questionnaire,²⁰ polysomnography,²⁰ and sleep quality.¹⁸ Among included studies, participants were healthy volunteers,^{18,20} type 2 diabetes patients,¹² alcohol dependent,¹⁷ and caregivers for children with special needs.¹⁹

The first study was performed by Sanjib et al., to find the effect of CM on sleep among 30 male healthy individuals aged between 20 and 33 years. The intervention group practiced CM for 23 minutes twice a day and the control group were asked to take supine rest (SR) for the same duration. Whole night polysomnographic measures which include time in bed (TIB), sleep period time (SPT), total sleep time, sleep onset latency, rapid-eye movement (REM) latency, number of awakenings/hours, sleep efficiency, wakefulness after sleep onset (WASO) percentage, and the percentages of SPT (Sleep period time) spent in stages 1 (S1 percent) and 2 (S2 percent), slow-wave sleep (SWS) percent, and REM sleep percent, and self-rating of sleep questionnaire were studied on the night following a day for both CM and supine rest. The results showed that the percentage of SWS is significantly higher (28.01%) and the percentage of rapid eye movement sleep is lower (15.44%) in CM intervention. The number of awakening/hours also lowers significantly ($p < 0.005$, $d = 0.56$) in the CM group ($M = 1.67$, $SD = 0.55$) compared with SR ($M = 2.03$, standard deviation [SD] = 0.72). Also, the self-rated sleep evaluation showed that the duration of sleep following CM intervention was significantly ($p < 0.010$) higher than SR.²⁰

Table 1 Characteristics of included studies.

First author (year)	country	Study design	Participants with a sample size	Intervention details	Outcome measures	Findings
Patra et al. ²⁰ (2009)	India	Single-group Crossover study	30 male participants, 22.3 ± 4.6-years-old	CM twice (23 minutes each time)	Polysomnographic recordings, self-rating sleep questionnaire	Subjective rating of sleep was better ($d = 0.56$), increased SWS, decreased time spent in REM sleep, reduced number of awakenings per hour.
Varghese et al. ¹² (2018)	India	Single arm pre-post study	30 patients with type 2 diabetes, male & female, 50.12 ± 11.15-years-old	CM 5 days a week for 4 weeks	PSS, state anxiety inventory, Beck depression inventory, PSQI, and WHOQOL-BREF	CM improves the overall quality of sleep scores ($d = 0.61$).
Arun et al. ¹⁷ (2018)	India	Randomized controlled trial	82 (CM group: 41; control group: 41) males, 21–50-year-old, alcohol-dependent	CM for 10 days	Alcohol use disorder identification questionnaire, Tinetti assessment tool, clinical institute withdrawal assessment of alcohol scale, PSQI, and WHOQOL	The practice of 10 days of CM improves sleep quality ($d = 4.90$).
Sreenivas et al. ¹⁹ (2019)	India	Two groups pre-post study	25 (CM group: 10; yoga group: 15), secondary caregivers, 25–50-years-old	CM for 40 minutes, 3 days a week, for 2-months follows up.	WHOQOL BREF and sleep quality self-scaled instrument	CM group showed a significant improvement in sleep quality ($d = 2.11$).
Manjeesh ¹⁸ (2021)	India	Randomized controlled trial	60 volunteers (CM group: 30; control group: 30), male and female, age group 30–60 years	CM 30 minutes daily for 21 days.	Sleep revolution sleep quality, DASS 21, and center of epidemiological study depression scale	CM showed improvement in sleep quality ($d = 0.68$).

Abbreviations: CM, cyclic meditation; DASS, depression, anxiety, and stress scale; PSS, Perceived Stress Scale; PSQI, Pittsburgh sleep quality index; REM, rapid-eye movement; SWS, slow-wave sleep; WHOQOL, World Health Organization Quality of Life; WHOQOL-BREF, World Health Organization Quality of Life Brief Version

A single-arm pre-post study was conducted by Mathew et al. to find the impact of CM on sleep and psychological wellbeing in 30 type 2 diabetes mellitus patients. The patients practiced 23 minutes of CM daily, 5 times a week, for 1 month in a public auditorium. The practice was supervised by a yoga expert, and recording tapes containing instructions were provided. The perceived stress scale, state anxiety inventory, Beck depression inventory, Pittsburgh sleep quality index (PSQI), and WHO quality of life (WHOQOL) were assessed before and after 1 month of CM practice. After the intervention, PSQI results showed significant improvement in subjective sleep quality ($p = 0.050$), sleep latency ($p = 0.001$), sleep duration ($p = 0.010$), sleep disturbance ($p = 0.030$), and daytime dysfunction ($p = 0.090$), which suggests overall improvement in quality of sleep ($d = 0.61$). Also, there was a significant improvement in the QOL score and a significant reduction in the anxiety, depression, and stress score, indicating improvement in the quality of life of type 2 diabetes mellitus patients after 1 month of CM intervention.¹²

A study conducted by Arun et al. examined the effect of CM on the quality of sleep, withdrawal symptoms, balance, and gait in alcohol-dependent individuals. This randomized controlled study was designed to compare the effect of CM on sleep quality with the control group. A total of 82 alcohol-dependent individuals from deaddiction camp, were randomly assigned to the intervention ($n = 41$) and control ($n = 41$) groups after being screened with the alcohol use disorders identification test (AUDIT). The intervention group received CM for 10 days whereas the control group was not given any kind of yogic intervention. The PSQI was measured before and after intervention in both groups. After the CM intervention for 10 days, there was a significant ($p < 0.001$, $d = 4.90$) improvement observed in the quality of sleep compared with the control group.¹⁷

Another study, done by Srividhya et al. to find the effect of yoga and CM on the quality of sleep and quality of life among secondary caregivers of special need children. A pre-post comparative study was designed with a sample size of 25 subjects, including both genders (numbers not

reported), to assess the quality of life and sleep quality using the WHO-QOL and the sleep condition indicator (SCI). Out of 25 subjects, 15 were assigned to be in a yoga group and practiced for 2 days a week for 8 weeks, whereas 10 subjects were taught to practice CM for 40 minutes, 3 days a week, for 2 months of follow-up. The participants were assessed at the baseline and at the end of the study after 8 weeks. The results showed that the CM intervention was significant in improving sleep quality (pre- $M = 17.3$, $SD = 3.02$; post- $M = 24.4$, $SD = 3.66$, $p = 0.000$, $d = 2.11$) and quality of life among secondary caregivers of special need children.¹⁹

A randomized controlled trial was conducted by Manjeesh et al. to assess the effects of CM on sleep quality, psychological well-being, and quality of life among working professionals, during the COVID-19 lockdown. A total of 60 participants (CM group = 30; control group = 30), comprising both males and females in the age range of 30–60 years, were included. The CM group received treatment for 30 minutes daily over a continuous 21-day period, while the control group did not engage in any yoga practice. Sleep quality and depression, anxiety, stress were assessed using the depression, anxiety, and stress scale – 21 items (DASS-21) before and after the intervention. The results showed a positive impact ($d = 0.68$) on sleep quality and quality of life in the CM group (pre-sleep quality: $M = 24.00$, $SD = 3.91$; post-sleep quality: $M = 26.48$, $SD = 3.34$), as well as a reduction in anxiety and depression among working professionals during the Covid-19 pandemic.¹⁸

Discussion

A yogic technique called CM has shown numerous psychobiological effects. The primary objective of this review is to investigate the impact of CM on sleep quality. Based on the available scientific evidence, this technique exhibits a medium to larger ($d = 0.56$ – 4.90) effect in enhancing the quality of sleep. To the best of our knowledge, this review is the first-ever to demonstrate the positive effects of CM on sleep quality.

This unique meditation technique is also called 'moving meditation', as it emphasizes on the mindfulness component of various asanas performed in a sequence. The current review demonstrated that CM could effectively improve the quality of sleep at both subjective levels and in polysomnography parameters. The amount of SWS was higher, with the number of awakenings per hour and REM sleep being lesser after the practice of this meditation technique.²⁰ A previous review was conducted on CM including various psychobiological parameters such as occupational stress levels, anxiety, autonomic and respiratory variables, metabolism, and oxygen consumed.¹⁴ However, the current review exclusively focuses on the effect of CM on sleep quality. There are multiple components to this technique such as asanas (postures), focused on synchronized breathing and guided relaxations, which might improve sleep quality by reducing perceived stress and anxiety.¹² Previous studies reported that practice of CM could significantly reduce stress by shifting the sympatho-vagal balance in favor of parasympathetic dominance.^{21,22} Many relaxation techniques are

documented to reduce the responsiveness to external stimuli and can contribute to improvement in quality of sleep.²³

Though CM has shown beneficial effects on various aspects of sleep, one major limitation of this review is that none of the included trials were conducted on patients with insomnia or other sleep-related conditions. Similarly, the study designs were heterogeneous across the included trials, especially in terms of the interventions given for the control group. Further adequately powered studies are required, especially on patients with sleep-associated conditions, to assess the long-term impact of CM on sleep quality.

Conclusion

The practice of CM has been shown to improve the quality of sleep compared with control or supine-rest groups. Further studies are encouraged to assess the long-term efficacy of CM on sleep quality, particularly in patients with sleep disturbances, to substantiate the clinical significance of this meditation technique.

Informed Consent

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Conflict of Interests

The authors have no conflict of interests to declare.

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