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RESEARCH ARTICLE

Efficacy of an Integrated Approach of Yoga Therapy in Sleep-Deprived Individuals

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ABSTRACT

Background: Sleep is crucial for brain function and is reversible. The American National Sleep Foundation recommends 7-8 hours of sleep per night. Yoga can improve sleep quality by increasing flexibility and core strength. This study aims to understand and emphasize the advantages of practicing one hour of IAYT (Integrated Approach of Yoga Therapy) for four weeks for adults and early middle-aged people suffering from sleep deprivation.
Methods: A single-group pre-test post-test design, with 40 samples aged between 25 and 50 years, who met the eligibility criteria was included after obtaining informed consent. A one-hour Yoga session based on the Integrated Approach of the Yoga Therapy module was given for 4 weeks, and pre- and post-sleep quality was analyzed with the Pittsburgh Sleep Quality Index (PSQI) scale.
Results: There were significant changes in all the components of PSQI values; as the sleep duration mean value reduced from 2.30 to 1.38 & p <0.000, subjective sleep quality value reduced from 2.75 to 1.80 & p <0.000, sleep latency value reduced from 2.18 to 1.43 & p <0.000 and day time dysfunction value reduced from 1.95 to 0.85 & p <0.000 among the participants.
Discussion & Conclusion: Yoga improves sleep quality by reducing latency, increasing deep sleep, reducing disruptions, and improving efficiency. This study found a significant improvement in sleep quality and quality of life after IAYT in adults who are suffering from sleep deprivation. Further research involving larger samples with controlled clinical settings is recommended.

1.INTRODUCTION

Sleep is a vital physiological condition that accounts for about one-third of human life.[1] It is a natural periodic state of rest where the eyes close and consciousness is lost, reducing bodily movement and responsiveness to external stimuli. Sleep is essential for overall health and well-being[2] Sleep is a reversible behavioral state where perceptual disengagement from the environment is unresponsive. It consists of two stages: nonrapid eye movement (NREM) sleep and rapid eye movement (REM) sleep. The regular sleep pattern starts with NREM, progresses to deeper stages, and ends with a REM sleep episode, repeating every 90

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minutes.[3] Sleep is controlled by two processes: circadian rhythm, which regulates sleep and wakefulness based on retinal input, and the homeostatic process, which increases sleep afterward based on wakefulness and naps. The urge to sleep during wakeful hours is called homeostatic and grows stronger over time. Sleep is essential for brain function, and the American National Sleep Foundation recommends 7-8 hours of sleep per night for maintaining and reestablishing metabolic homeostasis.[4]

Sleep deprivation (SD) is the reduction of sleep time below a person's baseline requirement, whereas sleep restriction (SR) is the partial loss of sleep. Several general health and wellness issues have been connected to SD and SR, including immune system decline, learning and memory difficulties, emotional disturbance, and cognitive decline.[4,5] About 45% of people worldwide suffer from sleep deprivation, which jeopardizes their health and quality of life.[6] The Philips Sleep Survey conducted in November 2009 found that 93% of Indians suffer from sleep deprivation.[7] Sleep deprivation can lead to various pathophysiological issues such as sympathetic hyperactivity, inflammation, oxidative stress, insulin resistance, and atherosclerosis, which can also result in major health issues.[6] Yoga is a renowned mind-body technique emphasizing postures, breathing techniques, and meditation.[8] Yoga and its techniques have a miraculous effect on improving sleep quality, which not only increases flexibility and strength in the core but also has the potential to enhance the quality of sleep.[9]

This study seeks to enhance sleep quality among adults and early middle-aged individuals suffering from sleep deprivation by investigating the benefits of practicing one hour of Integrated Approach of Yoga Therapy (IAYT) over a four-week period.

2.METHODS

2.1Participants:

A total of 40 samples were included in the study, comprising 20 males and 20 females, within an age range of 25 to 50 years. The samples were recruited from the Aadhi Nature Cure and Yoga Clinic in Trichy, Tamil Nadu. A convenience sampling method was employed, including individuals who met the established eligibility criteria. Informed consent was obtained from all participants prior to the commencement of the study.

2.2.Inclusion criteria:

The participants experiencing sleep deprivation (as assessed by the Pittsburgh Sleep Quality Index, PSQI) must meet several criteria. All participants should possess full ambulatory capabilities and demonstrate literacy in both English and Tamil (the regional language). Furthermore, they must not have any physical or mental disabilities. Punctuality in attending classes is required. Prior to the initiation of the study, participants must voluntarily provide written informed consent.[9]

2.3.Exclusion criteria:

The participants exhibited various comorbidities and were on regular medication or other forms of pharmacological treatment. [10]

2.4.Study design:

A single-group pre-test post-test study design was employed in this investigation. Participants were recruited based on their Pittsburgh Sleep Quality Index (PSQI) questionnaire scores exceeding 10, which indicates poor sleep quality. Data were collected from participants using an assessment and the PSQI questionnaire both prior to the commencement (pre-data) and following the completion (post-data) of the intervention period, which lasted approximately 4 weeks.

3.ASSESSMENT

3.1Pittsburgh Sleep Quality Index (PSQI) scale

PSQI is an effective instrument to measure subjective sleep quality and sleep disturbances. Subjective sleep quality, sleep latency, length, efficiency, sleep disruption, use of sleep medication, and daytime dysfunction are the seven components of the questionnaire, which consists of eighteen questions to differentiate between good and poor sleepers. In this study, the PSQI questionnaire was taken as a scale that is used widely to measure the level of sleep deprivation. [11]

3.2.Intervention

Integrated Approach of Yoga Therapy (IAYT) is based on the principle of five layers of existence of human beings, namely Annamaya kosha (physical level), Pranamaya kosha (subtle energy level), Manomaya kosha (emotional level), Vijnanamaya kosha (level of intellect), and Anandamaya kosha (level of bliss). The yoga module design was done, including the practice of Shitilikarna vyayama, Surya namaskar, three asanas each in standing, sitting, supine, and prone, pranayama, om meditation, relaxation technique, and yogic counseling; the details are given in Table 1.

3.3Data collection and analysis

The data were obtained twice with the assessment of PSQI (Pittsburgh Sleep Quality Index) before the commencement (pre-test) and after the culmination (post-test) of the intervention period of 4 weeks and entered into the Microsoft Excel sheet. The data are expressed as mean, then a paired t-test is done to compare the outputs, and the analysis was done using IBM SPSS Statistics, version 23.

4.RESULTS

After 4 weeks of practice with IAYT, the results showed a significant reduction in the global PSQI score in the participants. There was significant improvement in all the values, as the sleep duration mean value reduced from 2.30 to 1.38 ($p < 0.000$, subjective sleep quality value reduced from 2.75 to 1.80 & $p < 0.000$, sleep latency value reduced from 2.18 to 1.43 & $p < 0.000$ and day time dysfunction value reduced from 1.95 to 0.85 & $p < 0.000$ among the participants. Efficacy of sleep is assessed based on the standard scoring method of the PSQI scale and is summarized below in Table 2 and Figure 1.

5.DISCUSSION

Our study's findings show that 4 weeks of IAYT intervention lead to better overall sleep quality, experiencing fewer sleep-disturbed episodes, falling asleep faster, experiencing less dysfunction during the day, using fewer sleep aids, and improvement in the total PSQI score. According to a previous study (Vierra J., et al. 2022), breathing (pranayama) increases parasympathetic activity while decreasing sympathetic activity; this may improve blood pressure, endothelial function, and heart rate variability. A study shows that yoga practice helps with daytime functioning, depression, exhaustion, and subjective sleep quality—all of which are linked to significant objective changes in sleep in people with chronic insomnia conditions.[12] Another randomized controlled experiment demonstrated that yoga was preferable to Ayurveda and the control group in lowering stress and enhancing quality of life, sleep, and cognitive function.[13] According to a pilot study, people with anxiety disorders may benefit from an integrated yoga program to improve their executive memory and sleep quality.[14] The yoga practice improves the sleep quality and quality of life (QoL) of elderly individuals [15] and also plays a potential role in improving sleep quality, mental health, and QoL of elderly individuals with chronic ailments.[16] A 14-week yoga intervention in male obese individuals showed improvement in quality of life and may reduce obesity.[17] Yogic relaxation techniques like the mind sound resonance technique and cyclic meditation have improved the quality of sleep.[18] Yoga poses can improve sleep quality by reducing latency, increasing deep sleep, reducing disruptions, and improving efficiency. Poor sleep quality is linked to low oxygen saturation during waking hours, leading to decreased physical performance. Sleep apnea and snoring can increase sleep disturbances. Regular yogic breathing exercises and asanas can strengthen upper airway muscles, reducing sleep disturbances. Yoga also increases physical performance and reduces dysfunction over the day by making individuals feel more rested and energized in the morning.[19] The physical aspect of yoga may also contribute to better sleep by increasing thalamic GABA and modifying the noradrenergic and serotoninergic systems to release opioids. Yoga's breathing control and mindfulness techniques cause a significant rise in vagal tone by down-regulating the hypothalamic-pituitary-adrenal axis, lowering the sympathetic tone. This culminates in a notably lowered heart rate and a decrease in plasma catecholamine levels, which lowers physiological arousal and may be one reason for the decreased frequency of sleep disturbances. [18] A review (Liana Spytska, 2024) suggests that there is a direct correlation between mental health and sleep quality, as insufficient sleep impairs emotional, cognitive, and volitional functions. It is crucial to maintain adequate sleep quality since sleep disturbances can exacerbate anxiety, bipolar disorder, depression, paranoia, psychosis, delirium syndrome, phobias, addictions, and obsessive-compulsive disorders.[20] Therefore, an easy non-pharmacological intervention like yoga can be recommended. The strength of this study states that there were no dropouts, and none experienced any side effects; the limitations might be due to nonrandomization.

6.CONCLUSION

Yoga has demonstrated a range of impacts on our everyday lives. Yoga has a lot of advantages. Yoga has been demonstrated to enhance the quality of sleep (QoL), which lowers the risk of several systemic illnesses. The present study showed the need for yoga as an intervention among adults to have better sleep and a healthy mind and body. There is a significant increase in sleep quality in the study group post-yoga therapy. The present study shows a need for further research in this area. Therefore, further larger studies with a well-controlled clinical setup and an increase in the number of participants are suggested.

7.AUTHORS' CONTRIBUTIONS

Prashanth S: Concept, design of the study, and manuscript preparation; **Suchitra S. Patil:** Manuscript editing and final approval; **Manirathinam S:** Manuscript editing and review; **Kiruthika R:** Drafting the article, data analysis, and interpretation of data; **Priyanka S:** Acquisition of data, manuscript editing, and review.

8. FUNDING

Nil.

9. ETHICAL APPROVALS

The study started after the approval of the ethical committee with register number 40718080 and with the acquisition of informed consent. The freedom to leave the research at any time, with advance notice, was granted to the participants. Using standardized therapy procedures ensured the participants' safety, and no negative effects were documented. Under no circumstances was the acquired data released; it was kept private.

10. CONFLICTS OF INTEREST

Nil

11. DATA AVAILABILITY

This is an original manuscript and all data are available for only review purposes from principal investigators.

12. PUBLISHERS NOTE

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Table 1: Yoga Intervention module

Sl.no	Type of practices	Duration
1.	Starting Prayer & Preparation	1 minute
2.	*Shithilikarna vyayama*; Slight jumping, Jogging spot, backward and forward, Clapping overhead, & Relaxation	5 minutes (5 rounds each)
3.	Surya Namaskar	5 minutes (6 rounds)
4.	*Asanas:* *Tadasana/ Padahastasana/ Ardha kati chakrasana/ Naukasana/ Paschimottasana/ Marjariasana/ Bujangasana/ Adhomukhasvanasana/ Shalabasana/ Pavanmuktasana/ Vipareetakarni/ setubandhasana/ Makarasana.*	20 minutes (Maintaining each pose for 10 counts)
5.	Pranayama: *Nadishudhi Pranayama, Bhramari Pranayama*	5 minutes (10 rounds each)
6.	*Om* meditation/Deep relaxation technique	10 minutes (1 practice – alternate days)
8.	Ending prayer	2 minutes
9.	Yogic Counselling and Advice (The basic conceptual root for the lifestyle of the individual)	General talk before commencing the intervention 10-15 minutes

Table 2: PSQI before and after intervention among the participants

Components	Pre	Post	p Value
Sleep Quality	2.75	1.80	<0.000
Sleep latency	2.18	1.43	<0.000
Sleep duration	2.30	1.38	<0.000
Sleep efficiency	2.23	1.50	<0.000
Sleep disturbance	1.80	1.08	<0.000
Sleep medication	0.13	0.08	<0.160
Daytime dysfunction	1.95	0.85	<0.000

Figure 1: Graphical representation of the result