



Evaluating The Effect Of Yoga Intervention On Insomnia Symptoms In Middle-Aged Adults

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Abstract: This study evaluates the effectiveness of a yoga intervention in reducing insomnia symptoms, improving sleep quality, and lowering anxiety among middle-aged adults. Insomnia is a common condition in this population, often associated with poor sleep quality and heightened anxiety, which can significantly impact overall well-being. The present study compares an experimental group undergoing a structured yoga program with a control group that did not receive the intervention. The findings indicate a significant improvement in insomnia severity in the experimental group, with a mean difference of 15.92 (SD = 2.55, $p < 0.05$), demonstrating the positive impact of yoga in reducing insomnia symptoms. In contrast, the control group showed a lower mean difference of 13.82 (SD = 2.52), which was not statistically significant ($p > 0.05$), indicating minimal improvement without intervention. Similarly, sleep quality improved significantly in the experimental group, with a mean difference of 14.63 (SD = 2.41, $p < 0.05$). The control group, however, showed negligible change (mean = -0.63, SD = 1.56, $p > 0.05$), suggesting that yoga plays a crucial role in enhancing sleep patterns. In terms of anxiety, the experimental group demonstrated a significant reduction (mean difference = 15.22, SD = 2.28, $p < 0.05$), whereas the control group showed less improvement (mean = 13.7, SD = 2.46, $p > 0.05$).

Keywords: Insomnia, sleep quality, anxiety

INTRODUCTION

Research studies consistently show that sleep disorders are highly prevalent worldwide, affecting a significant portion of the population across all age groups. Insomnia is the most commonly reported sleep disorder, with research estimating that around 10% to 30% of adults experience chronic insomnia symptoms. Population-based studies indicate that transient or occasional insomnia may affect up to 50% of individuals at some point in their lives. The prevalence of sleep disorders tends to increase with age, with older adults reporting higher rates of difficulty in initiating and maintaining sleep. Epidemiological research also shows that women are more likely than men to report insomnia symptoms, possibly due to hormonal, psychological, and social factors. Comorbid conditions such as anxiety, depression, and chronic illnesses are strongly associated with higher rates of sleep disorders. Studies conducted in different countries suggest variation in prevalence due to lifestyle, stress levels, and cultural sleep practices. Overall, research highlights sleep disorders, particularly insomnia, as a major public health concern due to their high prevalence and impact on quality of life. The pathophysiology of insomnia is primarily characterized by a state of hyperarousal, involving increased activity of the central nervous system and heightened stress-response systems, such as elevated cortisol and sympathetic nervous system activity. It also involves dysregulation of sleep-wake mechanisms, including imbalances in neurotransmitters like GABA, serotonin, and orexin, along with disruption of the circadian rhythm that normally regulates sleep timing and quality. Lohitashwa et al. (2015) found that 58% of medical students

were poor sleepers and that poorer health was significantly linked to reduced sleep quality, highlighting the impact of stress on students' well-being. Almojali et al. (2017) reported a strong association between higher stress levels and poor sleep quality in medical students, with lower GPA students being at greater risk, emphasizing the need for stress and academic support interventions. Khalsa's 2004 study examined yoga's impact on chronic insomnia using sleep diaries. Participants showed faster sleep onset, fewer awakenings, and improved sleep quality. Yoga likely reduced stress and arousal, suggesting a promising non-drug treatment, though larger controlled studies are needed. Shree Ganesh et al. (2021) found that a 3-month yoga program significantly improved sleep quality and constipation-related quality of life in adults aged 60–75 compared to controls, suggesting yoga as an effective intervention for promoting healthier aging. Zülfünaz Özer et al. (2021) found laughter yoga improved pain and sleep quality in hemodialysis patients without altering beta-endorphin levels. Evidence shows yoga reduces stress, regulates autonomic function, and enhances sleep, supporting safe, accessible, nonpharmacological management of insomnia and conditions. Alnawwar et al. emphasized yoga's therapeutic value for sleep, highlighting it as an accessible, non-drug approach. Their findings suggest yoga enhances subjective sleep quality, reduces anxiety, eases mental activity, and promotes physiological benefits, supporting better sleep and overall well-being. K. Penders (2021) examined yoga as a nonpharmacological treatment for chronic insomnia in adults using a four-week virtual program. Results showed improved sleep quality, reduced sleep latency, longer duration, and decreased anxiety, though participants' medication use remained largely unchanged overall.

Material and methods:

Subjects:

A total of 120 participants ages 45 to 50 years (mean age years) were recruited for the study. Following their informed consent, each participant was interviewed at the screening visit and, if they met the inclusion criteria and none of the exclusion criteria, they were then allowed for the study. All the insomnia patients were recruited from Raipur city Chhattisgarh. The subjects were divided into two groups a control group and an experimental group, each consisting 60 volunteers who had not previously participated in any specialized yoga program.

Inclusion Criteria:

1. Diagnosis of sleep disorders.
2. Age group 45 to 50 years.
3. Both male and female gender.
4. Written informed consent

Exclusion Criteria:

1. Diagnosis of obesity with Diabetes Mellitus:
2. Individuals who have been diagnosed with Type 1 diabetes mellitus.
3. Pre-diabetes or Metabolic Syndrome and hypertension.
4. Liver disease, heart disease.
5. History of Diabetes-related Complications:
6. Those with a history of diabetes-related complications such as diabetic neuropathy, retinopathy, or nephropathy, which might impact cognitive and physical health.
7. Recent Diagnosis or Uncontrolled Diabetes

Study Design:

This was a pre-post interventional study design having both experimental and control group.

Randomization and treatment allocation:

Patients who were eligible were randomly assigned in a 1:1 ratio using a computer generated randomization list. A total of 60 individuals received yoga therapy for three months, the remaining 60 patients did not receive any yoga therapy.

Intervention:**Yoga Interventions:-**

S. No	Asana Practice	Time	Total time duration
1	PM1 Series Tadasana Tiriyakatadasana Katichakrasana Naukasana Shasankasana Bhumipadamastakasana Suryanamaskara Shavasana	15 minutes	15 minutes
2	Pranayama	10 minutes	10 minutes
3	1. Nadishodhana 2. Bhramari	10 minutes	10 minutes
5	Guided Meditation Yoga nidra with sankalpa	30 minutes	30 mins

Assessments:

The participants (study group= 60 and control group=60) were assessed before the intervention of pre data and after three months of post data. All parameters were subjective such as insomnia index, sleep quality and anxiety. The data were collected through interview methods.

Statistical Analysis:

Data were described using means and standard deviations. The normality of the data was assessed using the Kolmogorov–Smirnov test. Comparisons of quantitative variables were performed using the t-test. Correlations between variables were evaluated using a correlation test. A p-value of < 0.05 was considered statistically significant. Statistical analyses were conducted using SPSS version 23.0 (IBM Corporation, Armonk, NY, USA).

Results:**Table no: 3 Experimental Group:**

Variables pair pre & post	Mean	SD	t value	P value
Insomnia (pre)-(post)	15.92	2.55	18.5	0.000
Sleep quality (pre)-(post)	14.63	2.41	26.49	0.000
Anxiety Pre-Post	15.22	2.28	4.98	0.000

Table no: 4 Control group:

Variables pair pre & post	Mean	SD	t value	P value
Insomnia (pre)-(post)	13.82	2.52	1.0	1.0
Sleep quality (pre)-(post)	-63	1.56	-4.035	1.0
Anxiety Pre-Post	13.7	2.46	1.00	1.0

Insomnia

The mean value of the difference of insomnia of experimental group with yoga is 15.92, SD 2.55 ($p < 0.05$), this shows the improvement in reduction of insomnia severity. In control group without yoga the mean and SD is 13.82 and 2.52 ($p = 1.0 > 0.05$) The improvement is not as compared to experimental group.

Sleep Quality:

The mean value of the difference of sleep quality in experimental group is 14.63, SD is 2.41 ($p < 0.05$), this shows the improvement in sleep quality and in the control group without yoga it is -.63, SD is 1.56 ($p = -4.035$, $p > 0.05$). The improvement is not as compared to experimental group.

Anxiety:

The mean value of the difference of anxiety in experimental group is 15.22, SD is 2.28 ($p < 0.05$), this shows the improvement in reduction of anxiety but in the control group without yoga it is 13.7 SD is 2.46 ($p > 0.05$). The improvement is not as compared to experimental group.

Table 5. Correlation study for experimental group

Correlation	N	Correlation	significance	
Pair 1. Insomnia (pre and post)	60	0.461	<.001	
Pair 2 Sleep Quality (pre & post)	60	-.050	<.001	
Pair 3 Anxiety (pre & post)	60	0.28	<.001	

The co-efficient correlation study is found to be highly significant ($p < 0.05$) it may be calculated that there exists a high degree of correlation between the pre and post recording of all data in experimental group with yoga.

Table 5. Correlation study for control group

Correlation	N	Correlation	significance	
Pair 1. Insomnia (pre and post)	60	0.71	<.001	
Pair 2 Sleep Quality (pre & post)	60	-.050	<.001	
Pair 3 Anxiety (pre & post)	60	0.69	<.001	

The co-efficient correlation study on above all parameters found to be highly significant ($p < 0.001$) it may be calculated that there exists a high degree of correlation between the pre and post recording of all data in control group.

Discussions:

The present study with pre post design was conducted to investigate the effect yogic intervention with insomnia patients on different parameters like insomnia index, sleep quality and anxiety in Raipur city who willingly participated for the study for three months. Our results showed that there is reduction in above parameters in study group ($p < 0.05$) where the control group did not show any significant results. This result shows that the effect of yogic intervention has got the positive result on above parameters.

Comparison with Insomnia:

Rubio-Arias et al. (2017) found exercise significantly reduces insomnia severity in middle-aged women. Aerobic, resistance, and yoga interventions improved sleep, especially with moderate intensity and durations ≥ 8 weeks. Exercise is an effective, non-pharmacological, low-cost insomnia treatment, though standardized protocols are needed. Afonso et al. (2012) randomized postmenopausal women with insomnia (50–65) into yoga, stretching, or control groups for four months. Among 44 completers, yoga produced greater reductions in insomnia and menopausal symptoms, improving quality of life and stress more than comparators. Overall, Zeichner et al. (2017) found CBT-I, mindfulness, and yoga reduced insomnia in breast cancer patients. ISI scores improved, with CBT-I most effective. Mindfulness and yoga offered moderate benefits, especially reducing distress, supporting nonpharmacological approaches to enhance sleep and wellbeing. Study by Bastien, Vallieres, and Morin (2001) validated the Insomnia Severity Index as a reliable, consistent, and sensitive tool. It showed consistency, test–retest reliability, correlation with sleep measures, and responsiveness to treatment, supporting its use in clinical and research settings.

Comparison with Sleep Quality:

Chaoul et al. (2018) randomized 227 breast cancer patients to Tibetan yoga, stretching, or usual care during chemotherapy. Overall sleep and fatigue did not differ, but yoga reduced short term disturbances, and regular practice improved longer term sleep outcomes significantly. Buchanan et al. studied whether 12 weeks of yoga or aerobic exercise improved sleep in menopausal women with hot flashes. In 186 participants, neither intervention significantly changed objective sleep measures. However, yoga reduced sleep variability among women with poor baseline sleep, suggesting a modest stabilizing benefit in this subgroup. Tramontano et al. (2021) reviewed therapy exercises for sleep disturbances in neurological rehabilitation. Ten studies (747 participants) showed significant improvements in sleep quality, total sleep time, efficiency, and reduced wake time. Benefits included less fatigue and insomnia. Despite positive findings, protocols and study quality limit conclusions, requiring further high-quality research. Lowe et al. (2019) systematically reviewed exercise interventions for adult insomnia, including aerobic, resistance, and yoga. They found that regular moderate exercise can improve sleep quality and reduce insomnia symptoms, with effects seen in both short- and long-term programs. Aerobic exercise was most effective. The review also noted methodological limitations and called for stronger randomized controlled trials.

Comparison with Anxiety:

Virginia Lemay et al. (2021) examined stress among student pharmacists and faculty during COVID-19. A six-week program of weekly Yin yoga and guided meditation was tested. Surveys (BAI, Perceived Stress Scale, mindfulness measures) showed reduced anxiety and stress and increased mindfulness, with effects lasting up to six months. Gustav Jonsson et al. (2020) investigated integrating yoga with emotion-focused psychoeducation and compassion-focused therapy for depression and anxiety. Participants were randomly assigned to integrative group treatment or treatment as usual. Findings showed the combined approach was feasible in primary healthcare and could support management of depression and anxiety symptoms effectively. Angela Gallagher et al. (2020) examined whether an adapted yoga program could reduce anxiety and depression in high-risk pregnant women on bed rest in hospital. Participants in the intervention group attended biweekly yoga sessions, while controls did not. Using HADS, results showed significant reductions in anxiety and depression ($p < 0.001$), yoga effectiveness.

Conflict of interest:

The authors of this research paper assert that there is no conflict of interest in order to publish this paper.

Suggestions of Future Work:

Studies on biochemical variables may throw light on the mechanisms.

Financial support and sponsorship: No financial support and sponsorship was required for this research in which the study was conducted.

Conclusion:

Based on the above results the conclusions are as follows: The study demonstrates that a structured yoga intervention significantly reduces insomnia severity, anxiety and the improvement of sleep quality in the patients of insomnia individuals compared to the control group. Yoga, as a non-pharmacological and holistic approach, proved to be an effective tool for improving physical and psychological parameters in individuals suffering from insomnia. The results suggest that incorporating yoga into insomnia management programs may offer substantial health benefits beyond conventional care.

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