



A QUASI-EXPERIMENTAL INVESTIGATION OF THE IMPACT OF INTEGRATED YOGA TECHNIQUES ON INSOMNIA AMONG URBAN PEOPLE

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ABSTRACT

Insomnia, a prevalent sleep disorder, significantly impact the quality of life, particularly in urban populations. This quasi-experimental study investigated the impact of integrated yoga techniques on insomnia among urban people in Patna, Bihar. Research was initiated in the month of October 2023 and 70 participants, aged about 40 to 60 years old, male and female, selected through the purposive sampling method, which was divided into a control (n = 35) and an experimental (n = 35) group. The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality before and after the intervention. The experimental group was given a two-month integrated yoga training including Jal-Neti, flexible asanas, relaxation asanas, Surya Namaskara, Yoga Nidra, and meditation, under the guidance of a certified yoga teacher, while the control group received no intervention. Statistical analysis was performed using Quick-Calcs on the GraphPad website. Results indicated a significant improvement in sleep quality in the experimental group. The findings support the potential benefits of integrated yoga techniques as a non-pharmacological intervention for insomnia and its components, highlighting its role in promoting overall well-being.

Keywords *Integrated Yoga techniques; Insomnia; Urban people.*

- Introduction:** A common sleep disorder called insomnia is characterized by trouble getting to sleep, remaining asleep, or having non-restorative sleep. It has a negative impact on one's physical, mental, and emotional health, which can result in daytime fatigue, diminished cognitive function, and a lower standard of living. Pharmacotherapy, cognitive-behavioural therapy, or a mix of the two are frequently

used as conventional treatments for insomnia. These methods may, however, be limited by issues like side effects, dependence, or insufficient long-term efficacy. Yoga and its practices offer a comprehensive approach to sleep management that addresses both the physiological and psychological aspects of insomnia. It consists of physical postures, breathing exercises, and meditation techniques (Doe & Smith, 2024).

This study explores the impact of an integrated yoga practice that incorporates a variety of techniques, such as prayer at beginning and at the end of the yoga training session, Jal-Neti, Pawanuktasana Part-1, Relaxation asanas, Bhramari pranayama, Suryanaskara, Nadi Shodhana Part-2, Om chanting with Sumerni and meditation, as an intervention for insomnia in urban populations. Incorporating yogic prayer at the beginning and end of yoga sessions can significantly benefit individuals with insomnia by promoting relaxation, reducing stress, improving sleep quality, regulating circadian rhythms, and fostering mental and emotional balance. Consistent yogic practices, such as prayer at the beginning and end of sessions, help in reinforcing circadian rhythms, which are crucial for maintaining regular sleep patterns, Manjunath, N. K., & Telles, S. (2005). Using lukewarm saline water to irrigate the nasal passages is known as Jal-Neti, a yogic method of clearing the nose, it facilitates the removal of nasal congestion, enhances nasal breathing, and encourages relaxation, all of which can help induce sleep, Saraswati (2011). Pawanuktasana Part-1, also referred to as the wind-relieving pose, gently compresses and releases the abdominal region to aid in digestion and ease gastrointestinal discomfort. This, in turn, can improve sleep quality (Saraswati, S. S. 2009). Savasana is a relaxation practice that promotes a state of physical and mental tranquillity, which can enhance both the quality and length of sleep (Saraswati S.S. 2001). The Sun Salutation is also known as Suryanaskara, it is a powerful series of postures that combines breathing with movement. It may help lower stress and improve the quality of sleep by increasing blood circulation, stretching the body, and fostering relaxation (Telles et al., 2012). Nadi Shodhana Pranayama Part 2: The process of breathing through both the left and right nostrils alternately is referred to as alternate nostril breathing. This pranayama improves mental clarity, calms the body, and balances the autonomic nervous system, all of which may help with sleep (Telles et al., 2013). Bhramari pranayama, it is also known as the "bee breath," is a deliberate, slow breathing technique that also includes mimicking a bee's humming sound. It eases tension, encourages relaxation, and quiets the mind, which may help with the onset and length of sleep (Subramanian et al., 2017). Yoga Nidra is a guided relaxation technique that promotes physical, mental, and emotional relaxation. It is also referred to as "yogic sleep." Deep relaxation and restorative sleep are facilitated by its reduction of stress, anxiety, and tension (Balaji et al., 2018). Yoga Nidra is effective in treating insomnia for a number of physiological and psychological reasons, including: Reduction of Sympathetic Nervous System Activity: Research has demonstrated that yoga nidra reduces the activity of the sympathetic nervous system, which lowers levels of stress hormones like cortisol (Kumar et al., 2013). Mind-Body Integration: The technique promotes awareness and mindfulness, which can assist in interrupting the pattern of nervous thoughts that frequently cause insomnia (Saraswati, 2007). Om Chanting with Sumerni and Meditation: Om chanting, when combined with the rhythmic recitation of the word

"Sumerni," produces a calming auditory atmosphere and cultivates inner calm, which can help the body and mind get ready for sound sleep (Telles et al., 2007).

2. **Objective of the research:** The objective of this research is to evaluate the impact of integrated yoga techniques on insomnia and its different components by measuring the results using the Pittsburgh Sleep Quality Index (PSQI). The aim and objective of this research have been as follows:

- a. To measure the level of insomnia and its components among urban people.
- b. To explore the benefits and impact of integrated yoga techniques on Insomnia.
- c. To formulate effective strategies to avoid insomnia among urban people.

3. **Research variables:**

- a. **Independent variable:** Practice of integrated yoga techniques.
- b. **Dependent variables:** Insomnia and its components.

4. **Research Hypotheses:** The main hypotheses of the research were as follows:

- a. There would be a significant difference between the respondents of the experimental and the control groups on the measure of the following:
 1. Subjective sleep quality (SQ).
 2. Sleep latency (SL).
 3. Sleep duration (SD).
 4. Habitual sleep efficiency (SE).
 5. Sleep Disturbances (S. Dist.)
 6. Use of sleeping medications (USM).
 7. Daytime dysfunction (D.D).
- b. There would be a significant relationship between integrated yoga techniques and insomnia.

5. Research Methodology

5.1 Sampling: The sample of the study consisted of 70 people in the age group of 40 to 60 years old from urban areas of Patna District. In which 35 were practicing integrated yoga techniques as given in the table A and 35 were not doing yoga, the Purposive sampling technique were used to determine the sample. The pre-test was done before the yoga intervention, and the post-test was done after two months with the same respondents.

5.2 Research Tool: PSQI, or the Pittsburgh Sleep Quality Index, is a widely used self-report questionnaire that assesses sleep quality and disturbances over one month. It's a valuable tool for both clinical and research settings to evaluate sleep patterns and identify sleep issues, including insomnia. The PSQI measures several aspects of sleep through various components, which collectively provide a comprehensive overview of an individual's sleep health. The PSQI comprises 19 self-rated questions and 5 questions rated by a bed partner or roommate (if available). The 19 self-rated items are grouped into seven components, each reflecting a different aspect of sleep quality: Subjective Sleep Quality: This component assesses the individual's perception of their sleep quality. Sleep Latency: This measures how long it takes the individual to fall asleep. Sleep Duration: This records the total amount of sleep the individual gets per night. Habitual Sleep Efficiency: This

calculates the percentage of time spent asleep while in bed. Sleep Disturbances: This component evaluates the frequency of sleep disturbances, such as waking up in the middle of the night. Use of Sleeping Medication: This assesses the frequency of using sleep medication. Daytime Dysfunction: This measures the impact of poor sleep on daily functioning and activities. Scoring the PSQI Each of the seven components is scored on a scale from 0 to 3, with 3 indicating the greatest dysfunction. The scores for these components are then summed to produce a global score, which ranges from 0 to 21. A global score greater than 5 indicates poor sleep quality and suggests the presence of significant sleep disturbances.

5.3 Research Design: Quasi-experimental non-equivalent pre-test and post-test research design has been applied in this study.

5.4 Procedure for Data Collection: Subjects have been approached individually as well as in the groups. The details about the objective of the study to fill up the scale were explained to them. The participants responded without fatigue. Subjects filled out the scale, which was collected.

5.5 Yoga Intervention: The yoga intervention included basic principles of purifications methods (Shatkarma) yoga, Asana, Pranayama, Pratyahara, and meditation.

Table A – Integrated yoga practice

Sr. No.	Yoga Practices	Duration
1.	Preparation started with the payer	5 Minutes
2.	Jal-Neti, Pawan Muktasana Part 1 (APMB)/ Flexible Asanas, and Relaxation Asanas / Surya Namaskar	10 Minutes
3.	Nadi Shodhana Part-II, Bhramari Pranayama	5 Minutes
4.	Yoga Nidra – Swami Satyanand Sarswati, & OM Chanting with sumerni.	27 Minutes
5.	Q.A. Session	8 Minutes
6.	End with Prayer	5 Minutes

Table A represented integrated yoga techniques and its practices.

Prayer was the beginning of yoga practice, and the shanti mantra was the end of the session. For two months, the yoga training meets every day in the morning for about sixty minutes. 4 days under guidance of certified yoga teacher and 3 days independent yoga practice in a week. Only those who were a part of the experimental group received this intervention. There was no yoga intervention given to the control group.

5.6 Data Analysis: Statistical techniques such as mean, SD, t-test, and MD and Pearson “r” were used for data analysis. The test and p-value are calculated using Quick Calcs online software available on the GraphPad website and Microsoft Excel data analysis tools.

6. Results and Discussion: The results of the study have been presented in tabular form with the help of tables B, C, D and figures 1, 2 and 3. A comparison of the mean of the pre-test and post-test situations was done to

see the changes in participants in the control group shown in table B, figure-1 and participants in the experimental group as shown in table C and Figure 2. There is positive relationship between Integrated yoga techniques and insomnia as represented in the table D and in figure 3.

Table B: Control Group Pre-Test and Post-Test PSQI Scores.

Variable	N	Mean \pm SD (Pre-test)	Mean \pm SD (Post-test)	MD	t-ratio	P Value
Subjective Sleep Quality (SSQ)	35/35	1.63 \pm 0.88	1.54 \pm 0.70	0.09	0.4735	0.6374
Sleep Latency (SL)	35/35	1.57 \pm 0.92	1.63 \pm 0.97	-0.06	0.2655	0.7914
Sleep Duration (SD)	35/35	1.77 \pm 0.84	1.66 \pm 0.73	0.11	0.5848	0.5606
Habitual Sleep Efficiency (HSE)	35/35	1.71 \pm 0.93	1.77 \pm 0.88	-0.06	0.2772	0.7824
Sleep Disturbances (S. Dist.)	35/35	2.03 \pm 0.71	1.77 \pm 0.69	0.26	0.3585	0.7211
Use of Sleep Medication (USM)	35/35	1.74 \pm 0.92	1.66 \pm 0.80	0.09	0.3882	0.6991
Daytime Dysfunction (DD)	35/35	1.60 \pm 0.77	1.69 \pm 0.72	-0.09	0.5051	0.6151
Global PSQI Score	35/35	12.06 \pm 2.45	11.71 \pm 1.95	0.34	0.4227	0.6738

Table B. Tabular representation of the significant difference of the mean of the control group (non-yoga practitioners)

Table B represents Statistical Significance: The two-tailed P values for all components of the PSQI indicate that the differences between pre-test and post-test scores in the control group are not statistically significant ($p > 0.05$ for all components).

This suggests that there were no significant changes in sleep quality in the control group over the study period.

The result demonstrates that there were no significant improvements across all measured sleep variables post-test compared to pre-test. None of the variables showed statistically significant changes, indicating that the intervention did not have a substantial impact on the various aspects of sleep quality in this study sample.

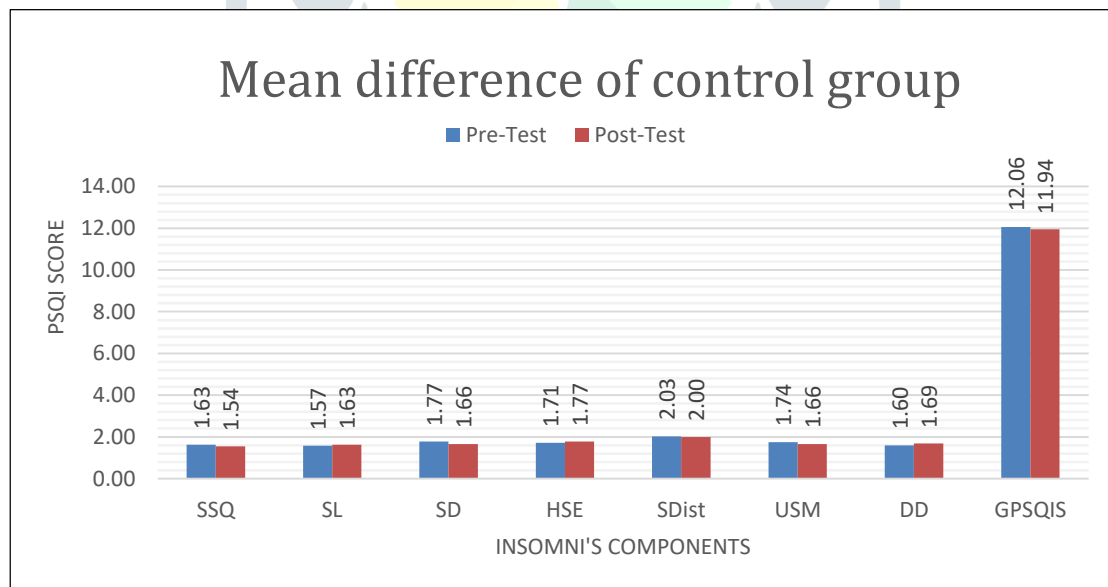


Fig. 1. Graphical representation of the significant difference of the mean of the control group (non-yoga practitioners)

Table C: Experimental Group Pre-Test and Post-Test PSQI Scores: A comparison of the mean of the pre-test and post-test situations was done to see the changes in participants in the experimental group (yoga practitioner) and is shown in Table B. Pre-test mean and post-test mean scores of the experimental group (Yoga Practitioner) with results of paired t-tests for insomnia and its components level.

Variable	N	Mean ± SD (Pre-test)	Mean ± SD (Post-test)	MD	t-ratio	P Value
Subjective Sleep Quality (SSQ)	35/35	1.60 ± 0.60	0.89 ± 0.53	0.71	5.2468	0.0001
Sleep Latency (SL)	35/35	1.54 ± 0.95	1.06 ± 0.76	0.49	2.3342	0.0225
Sleep Duration (SD)	35/35	1.74 ± 0.78	1.14 ± 0.60	0.60	3.6071	0.0006
Habitual Sleep Efficiency (HSE)	35/35	1.69 ± 0.90	1.11 ± 0.63	0.57	3.1234	0.0026
Sleep Disturbances (SDist)	35/35	1.97 ± 0.66	1.63 ± 0.69	0.34	2.1066	0.0388
Use of Sleep Medication (USM)	35/35	1.77 ± 0.97	0.94 ± 0.68	0.83	4.1451	0.0001
Daytime Dysfunction (DD)	35/35	1.66 ± 0.94	1.09 ± 0.78	0.57	2.7607	0.0074
Global PSQI Score	35/35	11.97 ± 2.08	7.86 ± 1.67	4.11	9.1155	0.0001

Table C. Tabular representation of the significant difference in the mean of the experimental group (Yoga Practitioner)

Table C represents Statistical Significance: The two-tailed P values for all components of the PSQI indicate that the differences between pre-test and post-test scores in the experimental group are statistically significant ($p < 0.05$ for all components). This suggests that the integrated yoga intervention led to significant improvements in sleep quality in the experimental group. **Subjective Sleep Quality (SSQ):** Participants exhibited a substantial improvement in subjective sleep quality following the integrated yoga intervention, with a mean decrease of 0.71 points on a scale of 0 to 3. The t-ratio of 5.2468 and a p-value of 0.0001 indicate a highly significant improvement in subjective sleep quality post-intervention. **Sleep Latency (SL):** There was a significant reduction in sleep latency, as reflected by a mean decrease of 0.49 units. The t-ratio of 2.3342 and a p-value of 0.0225 suggest a statistically significant improvement in sleep latency after the yoga program. **Sleep Duration (SD):** Participants experienced a notable increase in sleep duration, with a mean increase of 0.60 units. The t-ratio of 3.6071 and a p-value of 0.0006 indicate a highly significant improvement in sleep duration post-intervention. **Habitual Sleep Efficiency (HSE):** There was a significant enhancement in habitual sleep efficiency, with participants showing an average increase of 0.57. The t-ratio of 3.1234 and a p-value of 0.0026 demonstrate a statistically significant improvement in habitual sleep efficiency after the yoga intervention. **Sleep Disturbances (S. Dist.):** The integrated yoga program led to a significant reduction in sleep disturbances, with a mean decrease of 0.34. The t-ratio of 2.1066 and a p-value of 0.0388 suggest a statistically significant decrease in sleep disturbances post-intervention. **Use of Sleep Medication (USM):** Participants reported a substantial reduction in the use of sleep medication, with a mean decrease of 0.83. The t-ratio of 4.1451 and a p-value of 0.0001 indicate a highly significant decrease in the use of sleep medication after the yoga program. **Daytime Dysfunction (DD):** There was a significant improvement in daytime dysfunction post-intervention, with a mean decrease of 0.57. The t-ratio of 2.7607 and a p-value of 0.0074 demonstrate a statistically significant improvement in daytime dysfunction after the yoga intervention. **Global PSQI Score:** The overall PSQI score significantly improved post-intervention, with an average decrease of 4.11. The t-ratio of 9.1155 and a p-value of 0.0001 indicate a highly significant improvement in the overall PSQI score after the integrated yoga program.

The results show a considerable improvement from the pre-test to the post-test in all evaluated sleep characteristics. Better subjective sleep quality, shorter latency, longer sleep duration, enhanced efficiency, fewer sleep disruptions, lower dependency on sleep aids, less dysfunction throughout the day, and an overall higher

PSQI score were all reported by the participants. These findings imply that a variety of components of the quality of sleep were positively impacted by the intervention.

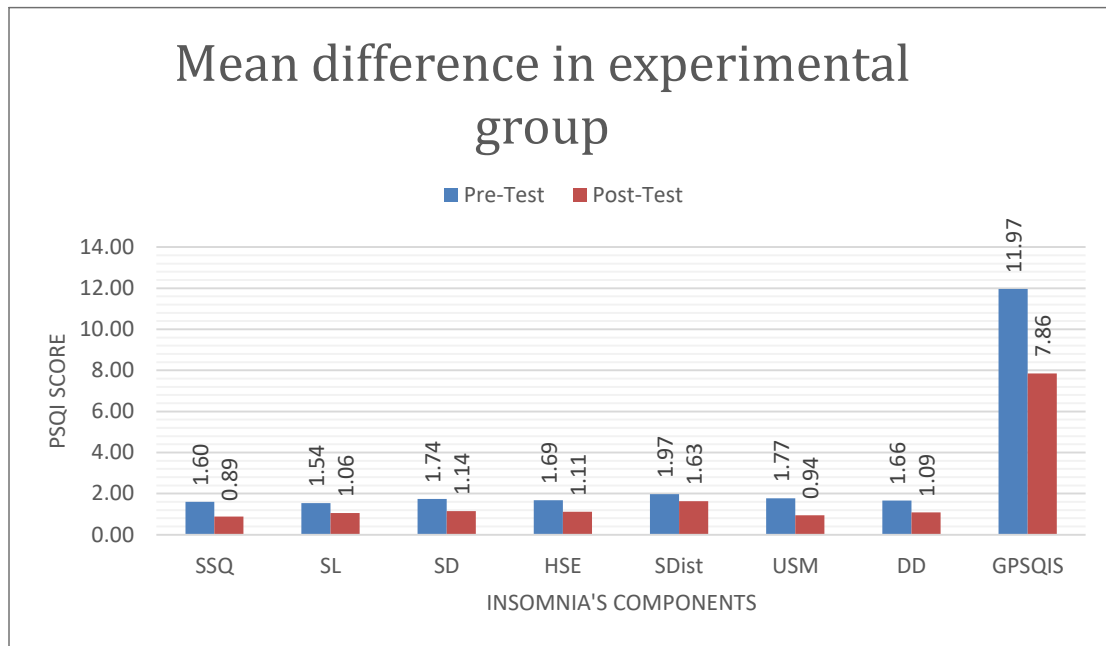


Fig. 2. Graphical representation of the significant difference in the mean of the experimental group (Yoga Practitioner)

Table D: Correlation between Integrated Yoga Techniques and Insomnia Levels

Variables	Correlation Coefficient (r)	p-value
Integrated Yoga Techniques & Insomnia Levels	0.356	< .01

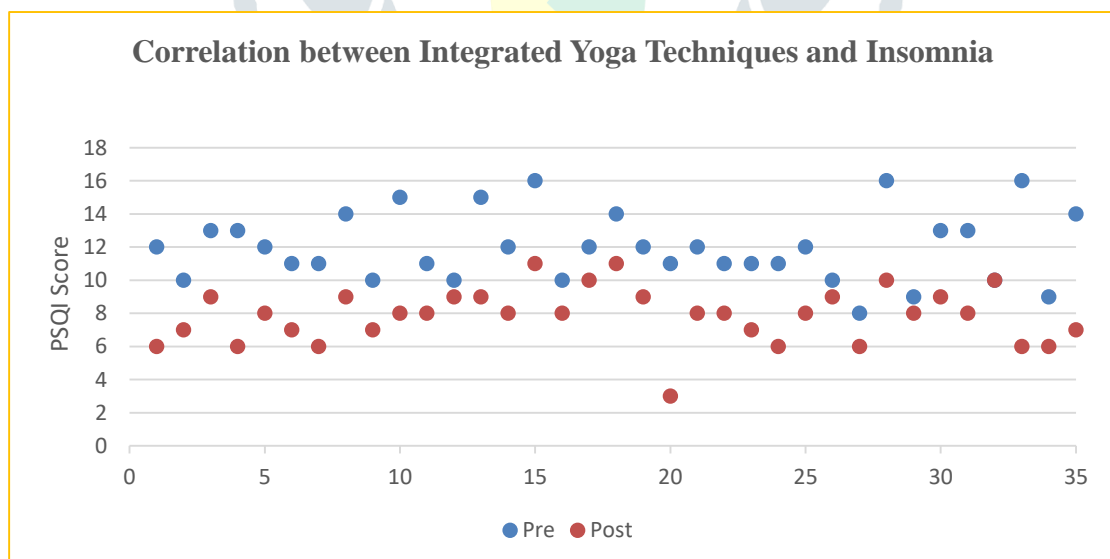


Fig.3 Graphical representation of positive relationship between Integrated yoga techniques and insomnia on level of PSQI score.

Table D and figure 3 represent a correlation coefficient (r) of 0.356 suggests a moderate positive relationship between the variables. In the context of integrated yoga techniques and insomnia. Direction of Relationship: The positive sign of the correlation coefficient indicates that as the use of integrated yoga techniques

increases, levels of insomnia also increase. This is somewhat unexpected, as many might assume yoga would reduce insomnia. Strength of Relationship: $r = 0.356$, the relationship is moderate. It's neither weak nor strong but indicates a noticeable trend. **Significance:** Given $p < .01$, the correlation is statistically significant, meaning the observed relationship is unlikely due to chance. It's important to delve deeper into potential reasons for this positive relationship. It could be that individuals with higher insomnia are more likely to seek out and use integrated yoga techniques as a remedy, hence the positive correlation. Alternatively, there may be other underlying factors that influence both the extent of yoga practice and levels of insomnia. Research supported that Yoga of Immortals Intervention Reduces Symptoms of Depression, Insomnia and Anxiety. Verma, S. et al. (2021).

These findings suggest that the integrated yoga intervention effectively improved various aspects of sleep quality and reduced insomnia symptoms among the participants, highlighting the potential benefits of yoga in managing insomnia as shown in the graph of the experiment group. The results indicate that integrated yoga techniques, including flexible asanas, Jalneti, Surya Namaskara, Yoga Nidra, and meditation, significantly improved sleep quality among urban people suffering from insomnia. The experimental group showed significant improvements in all components of the PSQI, including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, daytime dysfunction, and overall global PSQI scores, compared to the control group. This suggests that integrated yoga practices may offer a holistic and effective approach to managing insomnia and improving sleep quality among urban populations.

7. **Conclusion:** The integrated yoga technique and its practices significantly reduce the score level of insomnia and its various components, according to a quasi-experimental investigation. When compared to the control group, participants' reports of insomnia and its components were lower, suggesting that yoga can be a useful tool for managing insomnia. According to the study's findings, integrated yoga practices greatly enhance sleep quality and lessen insomnia in urban dwellers. The results underscore the role that yoga plays in enhancing general well-being and lend credence to the potential advantages of yoga as a non-pharmacological intervention for insomnia. Future studies should look into the long-term effects of yoga interventions and how they affect various age groups living in urban areas.

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