



**International Journal of Biology, Pharmacy  
and Allied Sciences (IJBPAS)**  
*'A Bridge Between Laboratory and Reader'*

[www.ijbpas.com](http://www.ijbpas.com)

---

## TO STUDY THE EFFECT OF PRANAYAMA TECHNIQUE (YOGIC BREATHING EXERCISE) ON QUALITY OF SLEEP

MUJUMDAR AA<sup>1\*</sup>, HANDE S<sup>2</sup>, KULKARNI V<sup>3</sup>, WAGHULADE H<sup>4</sup> AND PATIL P<sup>5</sup>

- 1: Associate Professor Dept. of Kriya Sharir, D Y Patil Deemed to be University School of Ayurveda, Nerul, Navi Mumbai, Maharashtra, India
- 2: Associate Professor, Dept. of Sanskrit Samhita Siddhant, D Y Patil Deemed to be University School of Ayurveda, Nerul, Navi Mumbai, Maharashtra, India
- 3: Assistant Professor, Dept. of Swastha Vritta & Yoga, D Y Patil Deemed to be University School of Ayurveda, Nerul, Navi Mumbai, Maharashtra, India
- 4: Professor & HOD, Dept. of Kriya Sharir, D Y Patil Deemed to be University School of Ayurveda, Nerul, Navi Mumbai, Maharashtra, India
- 5: Assistant Professor, Dept. of Agada Tantra, D Y Patil Deemed to be University School of Ayurveda, Nerul, Navi Mumbai, Maharashtra, India

\*Corresponding Author: Dr. Amit Mujumdar A: E Mail: [amit.mujumdar@dypatil.edu](mailto:amit.mujumdar@dypatil.edu)

Received 26<sup>th</sup> Dec. 2021; Revised 24<sup>th</sup> Jan. 2022; Accepted 14<sup>th</sup> Feb. 2022; Available online 1<sup>st</sup> Oct. 2022

<https://doi.org/10.31032/IJBPAS/2022/11.10.6490>

### ABSTRACT

One third of Life span is spent in sleep, a state that is crucial for physical, mental and emotional well-being. Now days an increasing number of adults are seeking treatment for sleep difficulties. The number of new generation hypnotics prescribed for sleep has increased by 430% over the past 11 years. "Pranayama is control of Breath". "Prana" is Breath or vital energy in the body. On subtle levels *Prana* represents the energy responsible for life or life force, and "*Ayama*" means control. So *Pranayama* is "Control of Breath" [1]. In today's era of sedentary lifestyles in our society there is increase in demand for non pharmacological treatment which will look after quality of sleep. *Pranayama* a part of *Yoga* has ability to improve respiratory function along with parasympathetic activity which improves quality of sleep in individuals. The study was conducted to evaluate whether *Pranayama* plays any role in improving quality and quantity of Sleep.

**Keywords:** Sleep, *Pranayama*, Hypnotics, Insomnia, Yoga

---

## INTRODUCTION

One third of Life span is spent in sleep, a state that is crucial for physical, mental and emotional well-being. Sleep is basic necessity of life as fundamental for maintenance of human health as air, food and water. Today approximately half of the population on earth is at risk of suffering from some kind of sleep problem. When we sleep well, we wake up alert and ready to face the day. When we don't every aspect of life suffers. At one moment, as many as 50% of adults suffers from one or more sleep disorders - for 13% they are severe and may harm their health. Clearly disrupted sleep has grave consequences for individual and society as a whole. There are economic consequences due to decrease in productivity and addition of psychological disorders like schizophrenia, depression and other mental illnesses [2].

Now days an increasing number of adults are seeking treatment for sleep difficulties. The number of new generation hypnotics prescribed for sleep has increased by 430% over the past 11 years. Despite many patients experiencing chronic symptoms, existing data support only short-term use of these medications. Long-term use of hypnotic medications is associated with various adverse side effects ranging from dependence and tolerance to an increased risk for developing Alzheimer's

disease. As an alternative to pharmaceuticals, non pharmacological interventions may provide safe and cost-effective treatment. There has been a growing interest in complementary and alternative medicine (CAM) approaches for optimizing. Mind-body interventions (MBI) are among the most commonly used CAM modalities [3]. Yoga and *Pranayama* Techniques are one of such important modality which is practiced since many years.

"Pranayama is control of Breath". "*Prana*" is Breath or vital energy in the body. On subtle levels *Prana* represents the energy responsible for life or life force, and "*Ayama*" means control. So *Pranayama* is "Control of Breath"[4] *Pranayama* has considerable effect on respiratory function. *Pranayama* includes the control over the natural process of inspiration & expiration. The purpose of *Pranayama* is to make the respiratory system function at its best. This automatically improves the circulatory system, without which the process of digestion and elimination would suffer. Toxins would accumulate, disease spread through body and ill health become habitual. The respiratory system is gate way to purifying the body, mind and intellect. The key to this is *Pranayama* [5]. Along with Respiratory system *Pranayama*

has positive impact on Mind-body coordination which helps to improve sleep quality of individual.

## MATERIALS AND METHODS

### Aims & Objectives

- To study the effect of *Pranayama* Technique on quality of sleep on normal volunteers

### Methodology

During the study effect of *Pranayama* on quality of sleep was studied on randomly selected healthy volunteers.

### Inclusion criteria: -

Normal healthy volunteers aged between 20 to 50 yrs.

### Exclusion Criteria:-

- 1) Pregnancy
- 2) Volunteers having habit of tobacco chewing, smoking & alcoholics were avoided
- 3) Volunteers having diseases of respiratory system e.g., Bronchial Asthma, URTI etc. were avoided
- 4) Volunteers performing *Pranayama* regularly, sports persons, athletes were not included in study.

### Methods of *Pranayama*:-

30 Volunteers were randomly selected and all volunteers were considered as experimental group. Volunteers were first explained the whole *Pranayama* procedure as explained in AYUSH Protocol [6].

### 1. INVOCATION :- 3 Minutes

Yogic Practice shall start with a prayer or prayerful mood to enhance the benefits of practice.

### 2. LOOSENING PRACTICES :- 10 Minutes

The loosening practices help to increase microcirculation. These practices can be done while standing and sitting. Neck, Shoulder, Trunk and Knee movements.

### 3. *Anulom Vilom Pranayama* (Alternate Nostril Breathing) :-

The main characteristic feature of this *Pranayama* is alternate breathing through the left and right nostrils.

Position: - Any comfortable posture.

Technique - Sit in any comfortable posture. Keep the spine and head straight with eyes closed. Relax the body with few deep breaths. Keep the left palm on the left knee called as *Dnyan Mudra* and the right palm should be in *Nasagra Mudra* (places the middle finger and forefinger at the point between the eyebrows.) Place the ring and small fingers on the left nostril. Place the right thumb on the right nostril. Open the left nostril, breathe in from the left nostril, close the left nostril with the small and ring fingers and release the thumb from the right nostril; exhale through the right nostril. Next, inhale through the right nostril. At the end of inhalation, close the right nostril, open the left nostril and exhale through it.

This completes one round of the Anuloma Viloma *Pranayama*. Repeat for another 4 rounds in first week, 8 rounds in second week, and 12 rounds in third and fourth week and 16 rounds from fifth week to Eight week. *Anulom Vilom Pranayam* for 20-30 Minutes duration

### Data Collection

All volunteers were examined on 1<sup>st</sup> day to rule out any abnormality as per inclusion and exclusion criteria & Sleep quality is assessed according to above mentioned format. Then daily early in morning 6:00 am to 6:45 am *Pranayama* practice done. After 8 weeks of *Pranayama* procedure above all volunteers were again

examined. Case record form was prepared to note observations of volunteers at interval of 0 week and 8 week.

Observations obtained on day 1<sup>st</sup> & on 8<sup>th</sup> week were analyzed by paired 't' test. Examination of Volunteers:-

A) General Examination – Weight, Pulse, B.P., Temperature are examined

B) Examination regarding Sleep Quality – Quality of Sleep is assessed with help of guidelines for clinical evaluation of Ayurvedic interventions by CCRAS, Ministry of AYUSH, and New Delhi [7].

1. Sleep Hours per Day
2. How many times do you wake up in the middle of the night?

S. No.	Grade	Symptom
1	1	0 times wake up in Middle of Night
2	2	1-2 times wake up in Middle of Night
3	3	More than 2 times wake up in Middle of Night

3. How much time does it takes to fall asleep after you get into bed at bed time?

S. No.	Grade	Symptom
1	1	Fall asleep in less than 5 Minutes after get into bed at bed time
2	2	Fall asleep in 5-10 Minutes after get into bed at bed time
3	3	Fall asleep in more than 10 Minutes after get into bed at bed time

4. Sleep = Sound / Disturbed

5. Dream Habbit

S. No.	Grade	Symptom
1	1	No Dream during Sleep
2	2	1-2 Dreams Daily
3	3	More than 2 dreams Daily

### RESULT

The present study assessed the sleep in both manner i.e. quantity of sleep and quality of sleep. Study demonstrate a significant improvement in the sleep

quality with 8 wks daily *Pranayama* Technique and sleeping hours are unchanged so quantity of sleep didn't changed with *Pranayama* exercise.. Along

with that it is found that Calming effect on mind.

## DISCUSSION

Results of our study indicate that after practicing Yoga regularly volunteers had better overall sleep quality, episodes of disturbed sleep decreased, also took less time to fall asleep after getting into bed, and felt more rested and energetic in the morning.

This Study parameters shows Total duration of sleep is not changed significantly in volunteers but quality of sleep is much more improved. Average duration of sleeping hrs before was 6.34 hrs which is 6.25 hrs after 8 weeks of *Pranayama* exercise in Volunteers. This study were assessing the sleep in both manner i.e. quantity of sleep and Quality of sleep. To assess quality of sleep following parameters were studied,

1. Frequency of wake up in middle of night shows mean 1.771 before doing *Pranayama* which improved to 1.05 after 8 wks of *Pranayama* exercise.
2. Time to asleep after getting onto bed was mean 1.9714 i.e. around 5-10 minutes which improved to mean 1.05 i.e. around 5 mins with help of *Pranayama*.
3. Dream indicates REM phase of sleep. During the deep sleep i.e.

NREM Sleep (Non Rapid Eye Movement Sleep) the body repairs and re grows tissues, builds bone and muscle and strengthens the immune system. In this study Dream frequency also measured and it shows significant improvement. Before study Dream frequency mean was 2.11 i.e. around 1-2 dreams per day which improved to 1.11 i.e. almost no dream per day.

The exact mode of action of *Anulom Vilom Pranayama* on overall health is not yet known but various factors mentioned below may be responsible for improvement in sleep quality Few Hypothesis on the basis of other related studies are as follows,

1. Yogic breathing exercises can improve strength of the respiratory muscles which resulted in better tissue perfusion and improved oxygen saturation. Considering the fact that sleep apnea is associated with decreased oxygen saturation, improved oxygen saturation due to Yoga exercise might be another possible explanation for less sleep disturbances in Yoga group of our study [8].
2. Vegas Nerve (VN) overall it is well-suited for relaying relaxation from

the central nervous system (CNS) to the body and checking the arousal and homeostatic state of the viscera. VN activity is modulated by respiration. It is suppressed during inhalation and facilitated during exhalation and slow respiration cycles. Efferent and afferent VN functions overlap with the functional effects associated with contemplative activities like *Pranayama* practice. Therefore, the breathing exercise component of contemplative activities like *Pranayama* is a prime candidate mechanism behind the beneficial effects found on mental and physical health [9].

3. Few propose that these changes might have been caused by *Pranayama* practice resulting in an improved autonomic tone towards Parasympathetic dominance which leads to hypo metabolic state, relaxed state of mind and improved cardiac Vagal tone. When the mind is relaxed and resting, parasympathetic activity increases and RR (Respiratory Rate) decreases. Increase in parasympathetic activity decreases resting HR (Heart Rate) and decrease in sympathetic tone in

skeletal muscle, blood vessels, decreases peripheral vascular resistance and hence, decrease in Diastolic Blood Pressure and improved tissue perfusion ultimately helps to improve sleep quality [10, 11].

#### 4. Tables and Figures

Out of Total 30 volunteers 17 were Male and 13 were Female.

#### Statistical Analysis

Paired 't' Test is applied to pair data of independent observations from one sample only when each individual gives a pair of observations, so Paired 't' Test is applied for statistical analysis. For testing the significance of difference Mean & SD of data is calculated

#### Effect of *Pranayama* on Duration of Sleep in Hrs:-

Average duration of Sleep in volunteers before initiating *Pranayama* exercise was 6.34 and after *Pranayama* was 6.25. Statistical analysis with Paired t Test shows non significant difference in Sleeping hours (Table 2).

#### Effect of *Pranayama* on Frequency of Wake up in Middle of Night:-

Average Frequency of Wake up in Middle of Night was 1.771 and after *Pranayama* was 1.05 Statistical analysis with Paired t Test shows significant difference in

frequency of wake up after 8 weeks of *Pranayama* exercise (Table 3).

#### Effect of *Pranayama* on Time to Fall asleep after getting into Bed:-

Average timing of duration to Fall asleep after getting into Bed was 1.9714 and after *Pranayam* was 1.0571 Statistical analysis with Paired t Test shows significant difference after 8 weeks of *Pranayama* exercise (Table 4).

#### Effect of *Pranayama* on sleep Sound / Disturbed:-

Average score related to sound sleep or Disturbed sleep was 1.4857 and after *Pranayam* was 1.8857 Statistical analysis with Paired t Test shows significant difference after 8 weeks of *Pranayama* exercise (Table 5).

Table 1: Demographic Data of Volunteers:

Demographic Data of Volunteers	
	Average
Age (Yrs)	36.9
Weight(Kgs)	65.23
Height (Cms)	164.03

Table 2: Statistical analysis of parameter Total Duration of Sleep in Hrs Before and after the study period

S. No.	Total Duration of Sleep in Hrs	
	Day 1	8 wks
Mean	6.34	6.25
SD	0.5392	0.852
P Value	0.4749	

Table 3: Statistical analysis of parameter Frequency of Wake up in Middle of Night Before and after the study period

S. No.	Frequency of Wake up in Middle of Night	
	Day 1	8 wks
Mean	1.771	1.05
SD	0.5470	0.2355
P Value	< 0.0001	

Table 4: Statistical analysis of parameter Time to Fall asleep after getting into Bed Before and after the study period

Sr No	Time to Fall asleep after getting into Bed	
	Day 1	8 wks
Mean	1.9714	1.0571
SD	0.5681	0.2355
P Value	< 0.0001	

Table 5: Statistical analysis of parameter sleep Sound / Disturbed Before and after the study period

S. No	sleep Sound / Disturbed	
	Day 1	8 wks
Mean	1.4857	1.8857
SD	0.5071	0.3228
P Value	< 0.0008	

Table 6: Statistical analysis of parameter Dream habit before and after the study period

S. No.	Dream Habit	
	Day 1	8 wks
Mean	2.1142	1.1142
SD	0.5827	0.4038
P Value	< 0.0001	

## CONCLUSIONS

In today's fast life most persons are suffering from lack of enthusiasm & lack of concentration in their work, which is may be due to inappropriate oxygen supply to body. Proper breathing can bring more oxygen to blood & ultimately to body parts. *Pranayama* is the best breathing Technique. Therefore the 'To study the effect of Pranayama technique (breathing exercise) on quality of sleep' were carried out.

In this study 30 healthy volunteers, irrespective of sex between 20 to 50 years were randomly selected. All volunteers are considered as experimental group. First all volunteers were explained & demonstrated the procedure of *Pranayama* which includes *Nadi Shodhan Pranayama* as explained in AYUSH protocol.

All volunteers examined on day 1 before starting *Pranayama* & the CRF was completed to document study parameters. Again after 8 wks of *Pranayama* CRF was completed & the observations are noted which further analyzed using paired 't' test. Parameters included in the study were assessing quality and quantity of sleep. After 8 wks of *Pranayama* significant improvement in quality of sleep were

observed. Quantity of sleep were almost same before and after *Pranayama*.

## REFERENCES

- [1] Iyengar B K S Light On Pranayama Harpercollins Publisher, New Delhi, India. 1993, p 17
- [2] WHO project overview Sleep and Health World Federation of Sleep research Societies Geneva 1998.
- [3] [https://apps.who.int/iris/bitstream/handle/10665/64100/WHO\\_MSA\\_MND\\_98.3.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/64100/WHO_MSA_MND_98.3.pdf?sequence=1&isAllowed=y) 10.01.2021 12:06pm
- [4] The Effects of Mind-Body Interventions on Sleep Quality: A Systematic Review Evedance based complementary and alternative Medicine Volume 2015 Article ID 902708.  
<https://www.hindawi.com/journal/s/ecam/2015/902708/> 10.01.2021 11:12am
- [5] Iyengar B K S Light On Pranayama Harpercollins Publisher, New Delhi, India. 1993, p 17
- [6] Pranayama- Breathing Exercise <https://www.vogapoint.com/info/pranayama.htm> 24 Feb, 2021. 10.01.2021 01:18pm
- [7] International Day of Yoga Common Yoga Protocol.  
<https://yoga.avush.gov.in/yoga/public>

- 
- [/assets/front/pdf/CYPEnglishLeaflet.pdf](#) 24 Feb, 2021. 10.01.2021 10:21am
- [8] Clinical evaluation of Ayurvedic interventions by CCRAS, Ministry of AYUSH, and New Delhi.  
[https://www.ayush.gov.in/docs/clinical\\_evaluation.pdf](https://www.ayush.gov.in/docs/clinical_evaluation.pdf) 10.01.2021 11:49am
- [9] Mangesh A. Bankar, et al., Impact of long term Yoga practice on sleep quality and quality of life in the elderly, Journal of Ayurveda Integrative Medicine 2013 Jan-Mar; Vol. 4(1): P 28–32  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3667430/>  
10.01.2021 10:36am
- [10] Breath of Life: The Respiratory Vagal Stimulation Model of Contemplative Activity  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6189422/> 10.01.2021 11:56am
- [11] Effect of 12 weeks of Pranayama training on basal physiological parameters in young, healthy volunteers Dinesh Thangavel Tamil Nadu Dr. M.G.R. Medical University.  
<https://www.researchgate.net/publication/264553100>} 10.01.2021 11:43am
-