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A COMPARATIVE STUDY TO EVALUATE THE EFFECT OF BHRAMARI PRANAYAMA AND NADISHODANA PRANAYAMA ON QUALITY OF SLEEP IN GERIATRIC AGE GROUP.

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Abstract:

Ageing is the natural process and should be regarded as a normal biological phenomenon associated with physiological, psychological changes. In India, people aged 60 years and above are treated as old. Psychological changes in old age can leads to the changes in the quality of sleep. In Geriatric people undiagnosed and untreated insomnia can cause impaired daily activity and reduced quality of life. According to ayurveda ageing is outcome of kala or parinama and described under 'Svabhavabalapravrittavyadhi'. In Ayurveda Nidra is included under the Trayopasthamba, A quality sleep will resolve the physical and psychological problems of old age people. Modern medicine offers numerous medications to enhance sleep; however, these often come with side effects. As a result, non-pharmacological interventions are increasingly necessary. One effective approach is Pranayama, particularly techniques like Nadishodhana and Bhramari pranayama. These practices can help to calm the nervous system in older adults, leading to improved sleep quality and a better overall quality of life.

INTRODUCTION

The main aim and objective of Ayurveda is "Swasthasya Swasthya Rakshanam[1]" and then gives the importance to "Aaturasya Vikara prashamanam" (cure of the diseases). Prevention is the primary and prime most goal in Ayurveda. Prevention is done by following the Dinacharya (Daily regimen) and Ritucharya (Seasonal regimen), Aahara vihara (food and activities), Sadvritta palana (Good conduct) by following all these rituals, the individual can prevent the occurrence of disease and boost the immunity. From birth to death a person has to undergo different phases in their life, in each stage there will be predominance of particular Dosha. In Jara Avastha there will be predominance of Vata Dosha. Old age is considered as the last phase of life cycle. In ayurveda old age is compared with the torn house in the heavy rain[2]. In the year 2019, there were estimated 694 million old persons in the world. In India although the percentage of aged persons to the total population is low in comparison to the developed countries, the absolute size of the aged population is considerable. By 2025, the number of

elderly people is expected to rise more than 1.2 billion with about 840 million of these in low-income countries.[3] The aged people are facing different psychological and physical issues. Under the psychological problems changes of appetite and sleep pattern is mentioned. During old age the quality of sleep is reduced because old age people are more likely to awaken during the night time and the initiation of sleep is much more long compared to adults. Disturbed sleep can cause less daytime alertness and lack of enthusiasm.

Yoga is One such practice which equally balances the body and mind. It controls the physical as well as mental health. Yoga is a Non pharmacological intervention which is the need of time. In yogic science pranayama is the best solution for controlling the mind and body. Pranayama helps to control the Pranavayu and mind. It helps to improve the sleep quality by controlling the sympathetic and para sympathetic nerve system.

Because of all the above-mentioned benefits of Pranayama in improving sleep quality, here an effort made to evaluate the effect of Pranayama in the improvement of sleep quality and the comparative effect of pranayama in geriatric age group.

OBJECTIVES OF THE STUDY

Primary objectives

Study to evaluate the comparative effect of Bhramari pranayama and Nadishodana pranayama on quality of sleep in the geriatric age group.

MATERIALS AND METHODS

60 subjects fulfilling the diagnostic and inclusion criteria was selected and randomly allocated for the study.

Inclusion Criteria

- Those who are 60-75 years old and mentally fit, can able to follow the command
- Subjects who are willing to give the consent.
- Irrespective of gender both Male and Female are selected for the study.

Exclusion criteria

- Those who are unable to follow the command.
- Those who are under the medications of psychosomatic disorder.

PLAN OF THE STUDY:

SAMPLING METHOD

Simple Randomizing by consecutive method

STUDY DESIGN

Group A (study group-Nadishodana pranayama)

Loosening exercise of major joints has been performed before the practice of Nadishodana pranayama.

PROCEDURE OF NADISHODANA – Subject aged 60-75 years selected for the study was sitting in a meditative posture and the hand in Chinnmudra. While practicing pranayama

Nasikaagra mudra is adopted by folding right index and middle finger and the right thumb is used to close the right nostril, inhalation starts with left nostril. After inhalation, exhaling out completely through the right nostril by closing the left nostril with ring and little fingers. Then inhaling through the right nostril and exhaling out through the left nostril completely. This is considered as 1 cycle. This was Continued up to 9 rounds in morning time with empty stomach[4].

Group B (Control group)
Loosening exercise of major joints has been performed before the practice of Bhramari pranayama.

PROCEDURE OF BHRAMARI –Subjects aged 60-75 years selected for the study was sitting in a meditative posture. Inhalation will be very deep and very slow. Here Soochi mudra / Shanmukhi mudra is adopted where the ears will be closed with index finger by pressing the middle part of the ear ligament into the ear hole. While exhaling out humming bee sound is produced where the lips are closed and 'Ma' kaara sound is produced. Concentration will be on the humming sound. After exhalation hands kept on the knees. This completes 1 cycle. Continues up to 9 rounds in morning time with empty stomach[5].

STUDY PERIOD
30 Days. Subjects were reviewed after 15 days during the study period.

ASSESMENT CRITERIA
Changes of Two groups was collected and data is analyzed through Pitts burgh Sleep quality Index.

SUBJECTIVE CRITERIA
Changes in the quality of sleep felt by the subjects
Pitts burgh sleep quality index (PSQI)

OBSERVATION AND RESULTS
Effect on Total score on PSQI scale within the group is tested with Paired t test- Group A:

TOTAL SCORE	MEAN	N	S.D	S.E.M	Mean Difference	%	T	P Value	Interpretation
BT	13.33	30	1.39	.255	4.00	30.00	14.52	.000	HS
DAY 15	9.33	30	1.29	.236					
BT	13.33	30	1.39	.255	8.56	64.2	22.75	.000	HS
DAY 30	4.76	30	1.56	.286					

Effect on Total score on PSQI scale within the group is tested with Paired t test- Group B:

TOTAL SCORE	MEAN	N	S. D	S.E.M	Mean Difference	%	T	P Value	Interpretation
BT	12.93	30	1.01	.185	4.53	35.0	24.63	.000	HS
DAY 15	8.40	30	1.19	.217					
BT	12.93	30	1.01	.185	9.06	70.0	35.77	.000	HS
DAY 30	3.86	30	1.35	.247					

Subjective parameter between the group with Un- paired t test

TOTAL SCORE	Group	N	Difference in mean	Unpaired t-test				Interpretation
				S. D	S.E.M	T	P	
BT-15th Day	Group A	30	4.000	1.508	.2754	1.61	.114	NS
	Group B	30	4.533	1.008	.1840			
BT-30th Day	Group A	30	8.566	2.062	.3765	1.10	.276	NS
	Group B	30	9.066	1.387	.2534			

Changes in quality of sleep felt by the subjects is assessed by PSQI scale.

Score No.		**0th Day**	**15th Day**	**30th Day**
1.	When have you usually gone to bed?			
2.	How long (in minutes) has it taken you to fall asleep each night?			
3.	What time have you usually gotten up in the morning?			
4.	A. How many hours of actual sleep did you get at night?			
	B. How many hours were you in bed?			

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5.	during the past month how often have you had trouble sleeping because you:	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
	A. Cannot get to sleep within 30 minutes: 0th day				
	15th day				
	30th day				
	B. Wake up in the middle of the night/early mornings: 0th day				
	15th day				
	30th day				
	C. Have to get up to use the bathroom 0th day				
	15th day				
	30th day				
	D. Cannot breathe comfortably 0th day				
	15th day				
	30th day				
	E. Cough or snore loudly 0th day				
	15th day				
	30th day				
	F. Feel too cold 0th day				
	15th day				
	30th day				
	G. Feel too hot 0th day				
	15th day				
	30th day				
	H. Have bad dreams 0th day				
	15th day				
	30th day				
	I. Have pain 0th day				

	15th day				
	30th day				
	J. Other reasons, please describe including how often you have had trouble sleeping because of these reasons: 0th day				
	15th day				
	30th day				
6.	How often have you taken medicine (prescribed /over the counter) to help you sleep? 0th day				
	15th day				
	30th day				
7.	How often have you had trouble staying awake while driving, eating meals/engaging in social activity? 0th day				
	15th day				
	30th day				
8.	How much of a problem has it been for you to keep up enthusiasm to get things done? 0th day				
	15th day				
	30th day				
9.	How would you rate your sleep quality overall? 0th day	Very Good (0)	Fairly Good (1)	Fairly Bad (2)	Very Bad (3)
	15th day				
	30th day				

Component 1	#9 Score	0th C1	15th	30th
Component 2	#2 Score (<15min (0), 16-30min (1), 31-60 min (2), >60min (3)) + #5a Score (if sum is equal 0=0; 1-2=1; 3-4=2; 5-6=3)	C2		
Component 3	#4 Score (>7(0), 6-7 (1), 5-6 (2), <5 (3)	C3		

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Component 4	(total # of hours asleep) / (total # of hours in bed) x 100 >85%=0, 75%-84%=!, 65%-74%=2, <65%=3	C4		
Component 5	# sum of scores 5b to 5j (0=0; 1-9=1; 10-18=2; 19-27=3)	C5		
Component 6	#6 Score	C6		
Component 7	#7 Score + #8 score (0=0; 1-2=1; 3-4=2; 5-6=3)	C7		
	Total score			
	Global PSQI			

A total score of "5" or greater is indicative of poor sleep quality.
If you scored "5" or more it is suggested that you discuss your sleep habits with a healthcare provider

Subjective Parameter tested within the group by Wilcoxon's Sign Rank test

Group	Before treatment	After treatment	Interpretation
C1 Mean			
A	2.300	.866	HS
B	2.600	1.033	HS
C2 Mean			
A	1.866	.733	HS
B	1.66	.533	HS
C3 Mean			
A	2.233	1.233	HS
B	2.133	.766	HS
C4 Mean			
A	2.66	.766	HS
B	2.400	.500	HS
C5 Mean			
A	1.800	.600	HS
B	1.866	.200	HS
C6 Mean			
A	.233	033	NS
B	.033	.000	NS
C7 Mean			
A	2.300	.900	HS
B	2.23	.900	HS

Subjective parameters tested between the group by Man Whitney Test

Groups	Mean Rank		Z Value	P Value
	A	B		
C1 Mean				
BT-AT	32.2	28.78	.873	.383
C2 Mean				
BT-AT	30.37	30.63	.068	.946
C3 Mean				
BT-AT	29.93	31.07	.281	.779
C4 Mean				
BT-AT	30.45	30.45	.038	.970
C5 Mean				
BT-AT	35.83	25.17	2.64	.008
C6 Mean				
BT-AT	28.0	33.0	1.99	.046
C7 Mean				
BT-AT	29.97	31.03	.269	.788

Probable mode of action of Bhramari Pranayama

Bhramari Pranayama helps create harmony and balance between the sympathetic and parasympathetic nervous systems. Several studies have observed hypersynchronous activity in the high gamma range in the left medial temporal lobe following the practice of Bhramari Pranayama, characterized by high-frequency biphasic ripples[6].

There remains a vast unexplored area regarding the effects of Bhramari Pranayama. This slow-paced breathing technique is performed with a humming bee sound during exhalation, unlike other pranayama practices. The acoustic vibrations produced by the humming sound, combined with the yogic posture, may play a significant role in achieving the desired effects of the practice. Since the brain lacks stretching exercises like those for other body parts, head vibrations generated by one's own voice could serve as a safe and effective alternative without harming brain tissues. This practice appears to influence various bodily systems and has potential benefits for the respiratory system, autonomic nervous system, stress reduction, anxiety management, and overall emotional well-being of the practitioner[7].

Probable mode of action of Nadishodhana Pranayama

Alternate nostril breathing, or Nadishuddhi Pranayama, involves a rhythmic sequence of deep inhalation, breath retention, and exhalation. Each cycle enhances oxygen supply to the lungs, aiding in the oxidation and removal of waste products like carbon dioxide from the bloodstream. The exhalation phase significantly expels carbon dioxide from the lungs, effectively purifying the blood and reducing residual waste.

After just two or three cycles, a substantial amount of impurities is eliminated. This practice allows key organs, such as the lungs and heart, to experience optimal rest. Since the physical activity of body muscles is minimal during pranayama, the production of carbon dioxide decreases, reducing oxygen demand. This, in turn, allows the heart to rest more completely, fostering deep relaxation and overall body rejuvenation[8].

Discussion

The sleep disturbances were assessed by using PSQI, it comprises of different questions regarding the subjective parameters of quality of sleep. The duration of sleep is improved after treatment in Group A. Most of the people are spend time on bed before getting sleep, that may be the reason for delayed initiation of sleep. Proper education regarding sleep hygiene was given to the participant and Pranayama helped to improve the sleep duration.

Nadishodana pranayama, which has been shown to correct neurological processes, alleviate emotional tension, and promote feelings of rejuvenation and relaxation, Nadishodana pranayama can help decrease the time it takes to fall asleep, leading to improve in overall sleep quality. Day time dysfunctions is a collection of symptoms that can occur due to poor sleep quality or other conditions, and can negatively impact daily life.

The regulated breathing pattern in Nadi Shodhana Pranayama causes regulation of the HPA axis. Hence, reduction in Blood Pressure is observed. Previous studies shows that reduction in stress, anxiety and balances the nervous system which will helpful for improving the sleep quality. For the better sleep modern medicine having lot of sleep medications, but these Sleep medications are associated with many side effects by long term use. Geriatric age group people are already under many medications related to their health condition; hence a Non pharmacological intervention is the need of time such as Yoga. By relaxing the mind, the sleep disturbances can be reduced. Mental health disorders, including stress, depression, and anxiety, have also been targeted by Nadishodana pranayama interventions. The calming effects of this practice on the nervous system and its potential to influence the hypothalamus, a key regulator of emotional responses, underlie its therapeutic benefits in this domain[9,10].

Conclusion

Nadi Shodhana Pranayama causes regulation of the HPA axis. Hence, reduction in Blood Pressure is observed. Previous studies shows that reduction in stress, anxiety and balances the nervous system which will helpful for improving the sleep quality.

In this study, both Nadishodana and Bhramari pranayama demonstrated significant improvements in sleep among the elderly. However, the Nadishodana group showed slightly better results compared to the Bhramari group. Despite this, the differences between the two groups were not statistically significant, suggesting that both techniques are effective for enhancing sleep, with only minor variations in outcomes. Therefore, it can be concluded that both pranayama practices can aid in improving sleep in the geriatric population.

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