

# Effect of Suryanamaskar versus Aerobic Exercises on Quality of Sleep and Stress Levels in Community Dwelling Elderly Population

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**Abstract:** *Background:* The sleep problem faced by the elderly and the consequences of the inadequate and inappropriate sleep determines the quality of life in the elderly. Stress is a mental health problem of the elderly population that affects their quality of sleep and quality of life. *Objective:* (1) To compare the effect of Suryanamaskar and aerobic exercise on quality of sleep and stress level using the Pittsburgh Sleep Quality Index and perceived stress questionnaire. *Method:* Study design: Experimental design with duration of intervention for 4 weeks (3 sessions a week). *Outcome Measure:* This study used Pittsburg sleep quality index to measure the quality of sleep and perceived stress score to assessing the stressful life events. *Result:* although both groups showed statistical significance, suryanamaskar group fared better results. *Conclusion:* Suryanamaskar deemed more effective in improving sleep and reducing stress in the elderly population.

**Keywords:** Suryanamaskar, aerobic training, sleep and stress, elderly population

## 1. Introduction

Sleep being very important for the overall health and wellbeing of the elderly yet it is the neglected aspect of daily living. The sleep problem faced by the elderly and the consequences of the inadequate and inappropriate sleep determines the quality of life in the elderly.<sup>1,2,3</sup> Sleep disturbances including insomnia are some of the most common complaints of elderly and an impact on their quality of life.<sup>4</sup>

Stress may be defined as a psycho physiological process usually experienced as a negative emotional state. It is a common condition, a response to a physical threat or psychological distress that generates a host of chemical and hormonal reactions in the body.<sup>1</sup> It's a mental health problem of the elderly population that affects their quality of sleep and quality of life too. Lack of sleep in elderly has a greater impact than any other population leading to increased risk of falls or accidents, increased fatigue, poor cognitive function and quality of life, depression, activity limitation, emotional distress, increased risk of cardiovascular morbidity and insomnia acts as a risk to the elderly<sup>3-4</sup> to cause accidents and falls which is the major cause of accidental deaths<sup>5</sup>.

Treatment options for sleep problems include both pharmaceutical and non-pharmaceutical approaches<sup>6</sup> Physical activity like aerobic exercises when performed regularly can bring relaxation which can be beneficial to initiating sleep. Therefore, using physical exercises are a viable non-pharmaceutical mode of treatment for sleep problems in older adults<sup>7</sup>

Suryanamaskar is another form of physical activity which is very holistic in nature for the mind and the body .It includes

breathing exercises, physical exercises, and relaxation exercises<sup>8</sup>. Recent studies show that the subjective sleep improves in chronic insomnia with yoga<sup>9</sup> and also in women with osteoarthritis and insomnia<sup>10</sup>. Furthermore the studies also stated that yoga practices can improve the subjective and objective sleep qualities and quality of life in the elderly.<sup>11-12</sup>

## 2. Literature Survey

Many studies on efficiency of Suryanamaskar on quality of sleep and stress levels have been carried in different age groups and the results have been affirmative. Jonathan Halpern et al. conducted a randomised control trail on yoga for improving sleep quality and quality of life for older adults and aimed to examine the efficacy of a yoga intervention (YI) for the treatment of sleep disturbances in older adults and determine the ability of yoga to enhance the QoL of older adults. Compared to the controls the yoga intervention group showed significant improvement in a range of subjective factors, including overall sleep quality, sleep efficiency, sleep latency and duration; self-assessed sleep quality, fatigue, general well-being, stress, function in physical, emotional, and social roles<sup>13</sup>.

Similarly, research on efficiency of aerobic exercises on quality of sleep and stress levels in different populations have been carried out which gave a positive effect. Kamrani A et al. conducted a research as a quasi-experimental with pre-test and post-test design. Their statistical sample included 45 volunteer elderly men with age range of 60-70 years-old that divided randomly in two experimental groups (aerobic exercise with low and moderate intensity) and one control group present research showed that the aerobic exercises with moderate intensity have a positive and significant effect on sleep quality and its components<sup>14</sup>.

Volume 11 Issue 9, September 2022

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But there is a major scarcity of studies comparing yoga specially suryanamaskar and aerobic exercises and their effects on quality of sleep and stress levels in elderly people. Thus considering the importance of this topic, the objectives of the study is to individually understand the effect of aerobic exercises and suryanasmaskar on quality of sleep and stress using the Pittsburgh Sleep Quality Index and Perceived Stress Questionnaire and to compare the effect of both the interventions.

### 3. Methodology

The study design was experimental in nature and the type of study was randomized controlled study. The method of sampling was convenient and the duration of intervention was 4 weeks with 3 sessions a week. Total 68 subjects were selected based on the inclusion and exclusion criteria and were randomly divided into 2 groups. GROUP A was the Suryanamaskar group and the GROUP B was aerobic training group with each group containing 34 subjects.

The inclusion criteria was elderly people, both male and females of the age from 65-75 years with sleep disturbances from past 6 months along with difficulty in maintenance of sleep, initiating sleep, insomnia, frequent waking up in between nights or any other sleep related issues. A score of 0-26 that is considered to be moderate stress levels on Perceived stress questionnaire. The exclusion criteria include subjects who are not any sleep medication, who are not suffering from clinically diagnosed psychosocial disorders, recent fractures in past 6 months, uncontrolled diabetes and hypertension, osteoarthritis of hip and knee, neurological conditions, Recent MI past 6 month, unstable angina in past 6 months, asthma, COPD.

The outcome measure used for sleep quality was The Pittsburgh Sleep Quality Index (PSQI)- A self- rate questionnaire to measure sleep quality and disturbances in the sleep in the month<sup>9</sup>. For stress evaluation the Perceived Stress Questionnaire (PSQ) was used. It consisted of 30 items, the PSQ is used for assessing the stressful life events and circumstances that tend to trigger or exacerbate disease symptoms.

The study was started after obtaining permission and approval from the Institutional Ethics Committee. All the written consent forms were filled by the subjects after explanation of the testing procedure and protocol of the study.

### 4. Procedure

Group A performed suryanamaskar and Group B performed aerobic exercises which was walking for a period of 4 weeks, 3 sessions per week for 30 -35 minutes respectively. Participants were assessed before and after the 4<sup>th</sup> week of intervention. The numbers of rounds of suryanamaskar performed per week by group A were progressive in nature with an increase of 3 rounds per week. Group B experienced an increase in their walking time of 10 minutes per week in their treatment.

Group A was supervised and was instructed to perform at a comfortable pace. The vital parameters like respiratory rate and heart rate were assessed before, between and after the intervention to ensure patient stability post intervention. Group B exercise intensity was checked using the ratings of perceived exertion (RPE) 4-5 which was categorized as moderate intensity.

The participants performed 5-10 minutes of warm up and cool down exercises before and after walking. And cool down for 5 minutes.

### 5. Results

Table 1 depicts the demographic data for age distribution of the 68 subjects and for gender distribution in both the groups showed no statistical difference. Thus both the groups were comparable.

Table 2 depicts Inter group Comparison of Suryanamaskar group (Group A) and Aerobic training (Group B) group using Mann Whitney U test. The Suryanamaskar group has a mean difference of  $5.06 \pm 2.16$  and the aerobic training group has a mean difference mean value of  $3.79 \pm 2.19$ . The p value of the mean difference was 0.0192 which was statistical significance

Table 3 depicts the intra group analysis for PSQI in both the groups is done using dependent t test. The mean difference in the suryanamaskar group is  $5.06 \pm 2.16$  and aerobic training is  $3.79 \pm 2.19$ . The "p" value for suryanamaskar group is 0.0001 and aerobic group is 0.001 that is both are highly significant. The effect size of suryanamaskar is 0.8500 and aerobic training is 0.7560 which indicates that suryanamaskar group had better treatment effect.

Table 4 inference depicts the intergroup Comparison of Suryanamaskar group and Aerobic training group done using Mann-Whitney U test. The Suryanamaskar group has a mean difference value of  $0.19 \pm 0.09$  and the aerobic training group has a mean difference value of  $0.13 \pm 0.05$ . The p value difference has come out highly significant, that is 0.0002(<0.05) stating that the suryanamaskar group had better effect then the aerobic group.

TABLE 5 Inference depicts the intra group for PSQ in both the groups using dependent Wilcoxon matched pairs test. The mean difference in the suryanamaskar group is  $0.19 \pm 0.09$  and aerobic training is  $0.13 \pm 0.05$ . The "p" value for suryanamaskar group is 0.0001 and aerobic group is 0.001 that is both are highly significant. The effect size of suryanamaskar is 0.8282 and aerobic training is 0.8130 stating the therapeutic effect of the suryanamaskar

### 6. Discussion

Statistical analysis showed that the intergroup and intra group analysis scores for Pittsburgh Sleep Quality Index and Perceived Stress Questionnaire for both, suryanamaskar and aerobic group were statistically significant. But the therapeutic effect of the suryanamaskar group was seen more than the aerobic exercise group.

Previously a study done by Manjunath et al reported that 6 months of yogic program in elderly involving physical postures, relaxation techniques, voluntarily-regulated breathing and lectures on yoga philosophy had improved sleep latency, sleep duration and feeling of being rested in the morning<sup>15</sup>. According to another study by Bankar et al, Sleep quality score using PSQI and QOL using LEIPAD Questionnaire score of the study group performing Yoga were better than the control group<sup>16</sup>.

The results of the present study in terms of suryanamasakar effectively improving sleep and reducing stress in elderly seem to be similar to the results found in the above two studies

The possible reason being yoga exercises stimulate the relaxation response physically as well as psychologically. And the response stimulates the parasympathetic autonomic nervous system activity, which is located below the pons and medulla. This causes a slowing down of the heart rate, pulse, blood pressure, and respiratory rate along with a surge in serotonin causing the body to become relaxed and thus improve sleep<sup>17</sup> possibly having an effect on stress.

The group receiving aerobic exercises i.e. walking also had a good therapeutic effect on the sleep and stress levels of the elderly. The results of the aerobic group of this present study match the results of the study done by which states that the aerobic training group had improved sleep quality on the global PSQI scale. The study showed that aerobic training group with sleep education was an effective treatment approach to improve sleep quality, mood and quality of life in older adults with chronic insomnia<sup>18</sup>. The reason can be stated that aerobic exercises is known to improve cerebral blood flow, reduce cortisol and allow the flow of endorphins which can contribute to the wellness.

The betterment in the therapeutic effect of suryanamaskar exercise can be attributed due to the range of different asanas in suryanamaskar which allowed activation of various muscle groups and also the asanas were more strenuous in nature as compared to walking.

## 7. Conclusion

The present study concludes that Suryanamaskar had a better result on the sleep quality and stress levels in elderly as compared to the aerobic exercise group.

## 8. Future Scope

Further studies could include an in-depth assessment of objective sleep and other sleep parameters. Long term follow-up after 3 months and 6 months for both the exercise groups could be recommended.

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**Table 1: Demographic Data Comparing Age of both groups**

Age groups	Suryanamaskar group	%	Aerobic training group	%	Total
<=69yrs	20	58.82	14	41.18	34
>=70yrs	14	41.18	20	58.82	34
Total	34	100.00	34	100.00	68
Mean age	69.32		70.15		69.74
SD age	3.58		3.59		3.58
Chi-square=2.1180, p=0.1460					

**Table 2: Inter Group Comparison of Suryanamaskar group and Aerobic training group with pre intervention and post intervention Pittsburgh Sleep Quality Index scores by independent t test.**

Treatments	Suryanamaskar group		Aerobic training group		Mean difference	t-value	p-value
	Mean	Std.Dev.	Mean	Std.Dev.			
Pre-intervention	11.56	1.97	12.50	1.97	-0.94	-1.9670	0.0534
Post-intervention	6.50	1.78	8.71	2.29	-2.21	-4.4351	0.0001*
Difference	5.06	2.16	3.79	2.19	1.26	2.4005	0.0192*

**Table 3: Intra Group Comparison of pre intervention and post intervention Pittsburgh Sleep Quality Index scores in Suryanamaskar group and Aerobic training group by dependent t test.**

Groups	Treatments	Mean	SD	Mean Diff.	SD Diff.	t-value	p-value	Effect size
Suryanamaskar	Pre-intervention	11.56	1.97	5.06	2.16	13.6600	0.0001*	0.8500
	Post-intervention	6.50	1.78					
Aerobic training	Pre-intervention	12.50	1.97	3.79	2.19	10.1248	0.0001*	0.7560
	Post-intervention	8.71	2.29					

\*p<0.05

**Table 4: Inter Group Comparison of Suryanamaskar group and Aerobic training group with pre intervention and post intervention Perceived stress scores by Mann-Whiney U test**

Treatments	Suryanamaskar group			Aerobic training group			U-value	Z-value	p-value
	Mean	SD	Mean rank	Mean	SD	Mean rank			
Pre-intervention	0.53	0.09	40.16	0.50	0.06	28.84	385.50	2.3550	0.0185*
Post-intervention	0.34	0.09	30.57	0.37	0.05	38.43	444.50	-1.6313	0.1028
Difference	0.19	0.09	43.56	0.13	0.05	25.44	270.00	3.7717	0.0002*

\*p<0.05

**Table 5: Intra Group Comparison of pre intervention and post intervention Perceived stress scores in Suryanamaskar group and Aerobic training group by Wilcoxon matched pairs test**

Groups	Treatments	Mean	SD	Mean Diff.	SD Diff.	Z-value	p-value	Effect size
Suryanamaskar	Pre-intervention	0.53	0.09	0.19	0.09	5.0691	0.0001*	0.8280
	Post-intervention	0.34	0.09					
Aerobic training	Pre-intervention	0.50	0.06	0.13	0.05	5.0862	0.0001*	0.8130
	Post-intervention	0.37	0.05					

\*p<0.05