INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY

RESEARCH ARTICLE

Effect of Yoga on Sleep, Self-Esteem and Wellbeing Among Overweight and Obese – A Randomized Controlled Trial

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OPEN ACCESS

Received: 21-06-2022
Accepted: 08-10-2022
Published: 16-11-2022

Citation: Chobe MP, Nanjundaiah RM, Chobe S (2022) Effect of Yoga on Sleep, Self-Esteem and Wellbeing Among Overweight and Obese – A Randomized Controlled Trial. Indian Journal of Science and Technology 15(43): 2297-2302. https://doi.org/10.17485/IJST/v15i43.1301

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Funding: Department of Science and Technology, India under the project number - DST/WOS-B/2017/675-HFN

Competing Interests: None

Published By Indian Society for Education and Environment (iSee)

ISSN
Print: 0974-6846
Electronic: 0974-5645

Abstract

Objective: People with obesity have concerns related to their disturbed sleep and poor self-esteem which decreases their health-related quality of life. The study aims to see the effect of yoga on sleep quality, self-esteem, and quality of life among overweight and obese people. **Method:** A total of 46 overweight and obese subjects were recruited and randomly divided into Integrated Yoga (n=23) or Walking (n=23) groups. For the Yoga group, weekly 5 days one hour of Yoga was taught and the walking group was doing a one-hour walk for the same duration for 13 weeks. Loosening practices, asana, pranayama, breathing practices, and relaxation/meditation were taught to the yoga participants. Pittsburg Sleep Quality Index Questionnaire (PSQI), Rosenberg Self-Esteem Scale (RES), and Short Form-36 (SF-36) were used to assess sleep, self-esteem, and quality of life respectively. SPSS version 20 is used for statistical analysis. **Finding:** After 13 weeks of intervention and post-data collection in the Yoga group, paired t-test showed significant improvement in the scores for sleep quality p(>0.001); self-esteem p(>0.001) and quality of life p(>0.001). Whereas there was no significant improvement in the walking group compared to pre scores. After 13 weeks, the PSQI score (3.89±2.21) was reduced significantly in the yoga group than in the walking group (8.12±5.05), t(34) = -3.313, p=0.002. Also, RES score (20.84±4.56) was increased significantly in the yoga group than in the walking (16.12±3.52),t(34)=3.449,p=0.002. **Novelty**: Yoga practice improves the sleep quality, and self-esteem among the overweight and obese people when compared to walking. Quality of life can be improved with regular yoga practice. Further studies with larger sample size and long-term follow-up are warranted.

Keywords: Yoga; Obesity; Sleep; Quality of Life; SelfEsteem; Randomized Controlled Trial

1 Introduction

Overweight and obesity are major problems worldwide and significant contributors to the ill-health of an individual. It occurs mainly due to poor lifestyle practices. The

prevalence and the incidence of obesity are increasing and are posing a threat to the health of an individual [1]. Globally obesity has nearly three times increased since 1975. 39% of adults were overweight, and 13% were obese in 2016 [2]. People with obesity have concerns related to their disturbed sleep and poor self-esteem which decreases their health-related quality of life. Studies suggest that poor sleep is correlated to the weight gain in an individual. This could be due to the impact of lesser sleep duration on dietary intake and physical activity [3]. This sleep disturbance triggers circadian malalignment and affects the energy metabolism [4].

Being out of shape lowers the confidence and develops negativity in the minds of an individual. Studies show a positive association between obesity, poor body satisfaction, and low self-esteem [5–7]. Obesity and associated complications not only affect sleep quality and self-esteem but also reduces the health-related quality of life [8]. Knee pain, breathing difficulty, profuse sweating, and lower exercise tolerance are some of the problems commonly faced by people with obesity which further reduce their quality of life. Evidence suggests that weight loss improves the quality of life as well as the overall vitality, physical functioning, and mental health of an obese individual [9]. Various lifestyle interventions like exercise and limitation of food intake are recommended for dealing with obesity-associated problems.

For the last two decades, yoga is being used as a therapy to deal with various non-communicable diseases and associated complications. Evidence shows that the yoga intervention is effective in weight reduction in overweight and obese people [10]. Also, yoga practice improves sleep and self-esteem in various populations. A recent systematic review and meta-analysis by Wei-Li Wang et al. in 2020 revealed the positive impact of yoga on managing sleep problems [11]. Yoga practice also has a positive impact on the improvement of self-esteem in adolescents [12,13] Yoga practice reduces the sympathetic nervous system activity resulting in parasympathetic dominance. Also, yoga enhances the melatonin levels. Psychological and physiological distress improves after Yoga practice. This results in improvement in sleep and overall wellbeing. However, to date, there is limited evidence of Yoga intervention on sleep quality, and self-esteem among overweight and obese people which is one of the concerns among this population. Looking into this, the randomized controlled study was taken up to estimate the efficacy of yoga intervention in the overweight and obese and compare the results with walking as an active control intervention. As sleep and self-esteem issues are common among overweight and obese people which also affect their quality of life, this study aimed to bring out the evidence for the role of physical activity like walking and a mind body practice like yoga and look into their relevance in combating these issues in current scenario.

2 Methodology

2.1 Subjects

2.1.1 Source and Setting

Subjects were recruited as per the inclusion and exclusion criteria of the project, sourced from the local community of the city. And the total sample size was 46.

2.2 Design

The present study is a two-arm randomized controlled study.

2.2.1 Inclusion and exclusion Criteria

The study included both male and female subjects who were overweight or obese people but had no co-morbidities other than hypertension (BP$\leq$ 140/90 with or without medications), Diabetes Mellitus (DM) Type 2 (FBS$\leq$ 126mg/dl and PPBS$\leq$ 200mg/dl with or without medications), Obstructive Sleep Apnea and whose body mass index (BMI) was between 23-32 Kg/m^2 [14]. People with age between 20-60 years and who had not practiced yoga before were included in the study.

People who had a history of childhood obesity, overweight or obesity with Hypothyroidism or any genetic syndromes or any neuropsychiatric illness were excluded from the study. Morbidly obese people, overweight or obese with hypertension (BP> 140/90 with or without medications), DM Type 2 (FBS> 126mg/dl and PPBS >200mg/dl with or without medications), who were on insulin, steroids or hormone replacement therapy or any other medication, that can increase weight, those who were unwilling to participate or who were doing yoga since last 1 year were also excluded.

2.2.2 Ethical Consideration

This study received Ethical clearance from the Institutional ethical committee of Swami Vivekananada Yoga Anusandhana Samsthana, Bangalore, and the Central University of Rajasthan, India.

Informed written consent was obtained from all study participants prior to the study.

2.2.3 Intervention

The Yoga group received yoga practices for one hour a day, 5 days a week for 13 weeks. The validated yoga practice module for overweight and obese people was used as a Yoga intervention [15]. Yoga intervention was delivered in the morning between 6 am to 7 am in the naturally lighted, ventilated, nose-free community hall. Qualified yoga therapist taught the yoga practices to the subjects. He was a post-graduate in yoga studies and had more than five years of experience. The regularity of yoga practice was monitored through maintenance of the attendance register. The Control group continued walking for a similar period.

2.3 Assessments

The assessments were done for sleep by using Pittsburg Sleep Quality Index Questionnaire, for self-esteem by using Rosenberg Self-Esteem Scale, and for quality of life by using the Short Form-36 Questionnaire- RAND.

2.3.1 Pittsburg Sleep Quality Index Questionnaire (PSQI)

Pittsburg Sleep Quality Index Questionnaire (PSQI) developed is a self-reporting questionnaire that assesses the usual sleep habits of a person during the past month. It contains 7 components and 19 individual items. Each item is weighed on a 0-3 scale and the total score ranges from 0-21. PSQI had a higher internal consistency with Cronbach alpha of 0.83. A higher score on questionnaire indicates poor sleep quality [16].

2.3.2 Rosenberg Self-Esteem Scale (RSE)

Rosenberg Self-Esteem Scale developed by Morris Rosenberg is a self-report 10-item scale in which all the items are answered on a 4-point Likert scale. Higher scores indicate higher self-esteem. A score less than 15 indicates problematic self-esteem [17]. The scale has good internal consistency and test-retest reliability with a cronbach alpha of 0.86.

2.3.3 Short Form-36 (SF-36) Questionnaire- RAND

Short Form-36 questionnaire is a self-report measure used to indicate the general physical and mental health condition as the overall quality of life. It contains 36 items that cover the eight domains of health [18]. The scale has good internal consistency and test-retest reliability with a Chronbach alpha of 0.791.

Participants of both groups were assessed two to three days before and after the intervention. Subjects were introduced to the assessments by an expert doctor. These self-inventory assessments were filled by subjects by themselves in the presence of a doctor in a quiet room.

Data Analysis

The data of the subjects with attendance 70% and above was subjected to appropriate statistical tests to arrive at the correct conclusions. The normality of data was analyzed using Shapiro Wilk test normality test. Within-group changes were analyzed using the paired sample t-test and the between-group changes were assessed using the independent t-test. Statistical analysis was done using SPSS 20 software.

3 Results and Discussion

Out of recruited participants, 36 subjects completed the study. Of these 19 (9 male, 10 female) were in yoga and 17 (11 male and 6 female) were in the walking group. The mean age of the yoga and walking groups was 38.89 and 33.58 years. The mean body mass index was 28.4 ± 2.59 and 28.0 ± 2.78 in the yoga and walking groups respectively.

The data was normally distributed for all the outcome variables between yoga and walking group. Given in the Table 1. Within-group pre-post analysis was done by using paired sample t-test. This Analysis showed that the yoga group significantly improved the Global sleep quality, Self-esteem, and health-related quality of life scores after 13 weeks of intervention ($p<0.001$). The walking group showed slight improvement, but the results were not significant in any of the measured variables after 3 months. The Independent t-test for the two group analyses at the 13 weeks showed that there was a significant improvement ($p<0.05$) in the global sleep quality and self-esteem score among the yoga group when compared to the walking group for the same period. There was no significant difference in the quality of life between groups. The effect size of PSQI, RSE, and SF-36 was -0.476, 0.50, and -0.15. This indicates that clinically yoga is moderately effective to improve sleep and self-esteem among overweight and obese. Table 2 gives the details of the results. There was no adverse effect observed or reported by the subjects in either intervention groups.

Table 1. Normality test of Yoga and walking groups

Group		Shapiro-Wilk test		
		Statistic	df	p-value
Global PSQI Score	Walking	0.979	17	0.95
	Yoga	0.908	19	0.07
RSE	Walking	0.894	17	0.06
	Yoga	0.929	19	0.17
SF36	Walking	0.951	17	0.47
	Yoga	0.973	19	0.83

Global PSQI- Pittsburgh sleep quality index, RSE- Rosenberg self-esteem, SF-36- Short form-36

Table 2. Results of pre to post and between Yoga and walking groups

Variables	Group	N	Mean± SD	Mean± SD	Baseline to Post		Between Group		Effect size
			Pre	Post	t	p-value	t	p-value	r
Global PSQI	Yoga	19	7.79±3.79	3.89±2.21	6.37	0.001	-3.313	0.002	-0.48
	Walking	17	8.82±3.94	8.12±5.05	0.72	0.48			
RSE	Yoga	19	15.79±3.52	20.84±4.56	5.74	0.001	3.449	0.002	0.50
	Walking	17	17.12±3.90	16.12±3.52	-1.13	0.276			
SF36	Yoga	19	50.15±8.83	60.65±13.46	-5.02	0.001	-0.88	0.385	-0.15
	Walking	17	58.71±11.46	65.02±16.31	-1.77	0.097			

Global PSQI- Pittsburgh sleep quality index, RSE- Rosenberg self-esteem, SF-36- Short form-36

The present study aimed to compare the impact of yoga and walking on the sleep quality, self-esteem, and quality of life of people with overweight or obesity. For this, recruited subjects followed either yoga or walking for 13 weeks. In the pre to post comparison in yoga group, there was a significant improvement in the sleep, self-esteem, and quality of life. In within group analysis of walking did not show any significant change. When compared to walking, yoga is better in improving sleep quality, and self-esteem thereby accepting our research hypothesis that yoga has positive effect on sleep and self-esteem.

Previous systematic reviews and meta-analysis have reported the positive impact of yoga on sleep, self-esteem, and quality of life. A systematic review conducted in 2020 by Wei-Li Wang et al., concluded that to manage sleep problems yoga could be more beneficial than non-active people [19]. Similarly, other studies prove yoga to be effective to improve the self-esteem and quality of life of yoga practitioners [20,21]. Our study findings are also in line with the previous evidence however in the present study participants were overweight or obese and were compared with the active group.

Sleep disturbance causes the secretion of inflammatory cytokines in the body and acts as one of the risk factors for the development of obesity [22]. Improving sleep quality thus reduces the risk of obesity and other metabolic disorders. Increased weight, getting out of shape, and difficulty in performing the daily activities could directly lead to impaired quality of life. It can also cause psychological stress and this difficulty to regulate emotions can lead to low self-esteem which is commonly present in obese people [23]. A study conducted by Hyunwoo Kang et al., in 2021 showed that mindfulness yoga improves self-esteem and can be used as an alternative treatment strategy to manage psychological issues in middle-aged men [24]. This could be possible by increasing the subjective feeling of enhanced energy. Yoga also helps to reduce stress and strengthen the person emotionally with improved regulation of the sympathetic nervous system and hypothalamic-pituitary-adrenal system [25].

4 Limitations of the Study

The subjects were not screened for sleep disturbances. No objective variables were used to assess sleep and self-esteem. The study was conducted on overweight and obese hence caution about the generalizability of the results should be considered.

5 Conclusion

Yoga practice improves the sleep quality, and self-esteem among the overweight and obese people when compared to walking. Quality of life can be improved with regular yoga practice. Further studies with larger sample size and long-term follow-up are warranted.

6 Funding

This paper has been brought out as a part of the project funded by the Department of Science and Technology, India under the project number - DST/WOS-B/2017/675-HFN.

Acknowledgment

The authors are thankful to all the study participants for their participation. The authors extend heartfelt gratitude to the Department of Yoga in Central University of Rajasthan for its support. Also thankful to Mr. Jitendra Prasad and Mr.Deepchand for their support while delivering the intervention.

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