IJAYUSH
International Journal of AYUSH
AYURVEDA, YOGA, UNANI, SIDDHA AND HOMEOPATHY
http://internationaljournal.org.in/journal/index.php/ijayush/

International Journal
Panacea
Research library
ISSN: 2349 7025

Original Research Article | Volume 12 Issue 6 | Nov-Dec 2023

EFFECTS OF THERAPEUTIC YOGA ON BODY COMPOSITION– A PROTOTYPE CLINICAL TRIAL ON OBESE INDIVIDUALS

***Adithya Krishna[1], K. Krishna Sharma[2]**

[1]Research Scholar, Department of Human Consciousness & Yogic Sciences, Mangalore University, Mangalagangotri, Karnataka, India – 574 199.

[2]Professor and Chairman, Department of Human Consciousness & Yogic Sciences, Mangalore University, Mangalagangotri, Karnataka, India – 574 199.

Corresponding author's Email ID: adimave.95@gmail.com

Abstract:

Introduction: Overweight and obesity are global health challenges with significant implications for long-term health. Conventional treatments often fall short in achieving sustained results. In recent years, complementary and alternative therapies have gained attention, and yoga, with its holistic approach, has emerged as a potential intervention. This study aimed to assess the effect of continuous yoga practice on body composition in overweight adolescents.

Methods: Ten individuals with obesity were enrolled in a prospective, single-centre, prototype trial. Participants (n = 10) were selected with BMI above 25 kg/m^2 as inclusion criteria. The selected group engaged in continuous yoga practice, including asanas (physical postures), pranayama (breathing exercises), and relaxation techniques. Change in BMI induced by the Yoga practice was measured along with anthropometric measurements.

Results: The continuous yoga practice group showed significant improvements: BMI decreased significantly at week 10. This suggests that yoga practice positively influenced body composition by reducing excess fat.

Key Words: Obesity, Yoga, BMI, Yoga Therapy

1. Introduction:

Obesity, characterized by excessive fat accumulation in various body regions, poses a risk for cardiovascular and metabolic disorders. Currently, one-third of the global population falls into the overweight category, and indications suggest this trend will continue. This health issue is on the rise worldwide, particularly in developing and newly industrialized nations. Lifestyle changes, physical inactivity, sedentary habits, and excessive calorie intake have contributed to the rapid increase in overweight and obesity rates even in children and adolescents[1]. In 2019, approximately 38.2 million children under 5 years old were overweight or obese. While overweight and obesity were once considered problems primarily in high-income countries, they are now prevalent in low- and middle-income countries, especially in urban settings. In Africa, the number of overweight children under 5 has risen by nearly 24% since 2000, and Asia accounted for almost half of the overweight or obese children in 2019[2]. The prevalence of overweight and obesity among children and adolescents aged 5–19 has surged from 4% in 1975 to over 18% in 2016, affecting both boys and girls[3]. A 2014 health survey in Thailand revealed an increased likelihood of overweight and obesity among individuals aged 15 and older, with higher rates among women and men. Additionally, the Department of Health in Thailand reported that 13.1% of school-aged children were at risk of becoming overweight or obese in 2016, and a significant proportion of teenagers may grow into obese adults[4]. Obesity is associated with an elevated risk of chronic noncommunicable diseases. While college and university students often face sedentary behaviour due to lectures and study routines, educational institutions and student welfare associations promote various forms of physical activity[5].

Therapeutic programs for obese individuals aim to achieve long-term weight maintenance and normalize body weight and fat. These programs modify eating and exercise behaviours, establishing healthier lifestyles. Behavioural components are crucial for permanently changing nutrition and physical exercise habits in obese children and adolescents[6]. Addressing adolescent obesity remains a critical public health challenge, emphasizing the importance of controlling eating habits and promoting physical activity. Although traditional guidelines recommend dietary changes and exercise, exploring alternative forms of physical activity, such as yoga, may offer additional benefits[7]. Yoga, a holistic mind-body practice, has been associated with controlling risk factors for cardiovascular diseases, including hypertension, type II diabetes, insulin resistance, lipid abnormalities, and psychosocial stress. A recent study highlights the potential benefits of transcendental meditation in secondary prevention for coronary heart disease. Additionally, this practice may contribute to weight reduction[12].

Yoga as an Intervention: Yoga, a well-known mind-body practice, offers long-term advantages across various health conditions, including obesity[13]. Specific yoga postures,

such as forward bends, twists, and backward bends, target fat reduction around the abdomen, hips, and other areas. Moreover, yoga provides a holistic solution for maintaining a healthy lifestyle, combining cardiovascular benefits with dynamic workouts that require minimal equipment or space[14].

Considering the rising prevalence of obesity among major portion of the community, yoga emerges as a potential preventive measure. Research should explore exercise forms suitable for weight management. For instance, a recent study investigated the effects of continuous yoga programs on weight loss and body composition, shedding light on the combination of classic yoga with aerobic exercise to enhance fat-burning in female adolescents.

2. Materials and Methods

2.1. Study Design and Participants

The study was conceived as a prototype, single-centred, randomized controlled trial (RCT) before patients were recruited. All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institutional Human Ethical Committee on Human Research at Mangalore University, Mangalagangotri, Karnataka, India. The total duration of the study was from January 2021 to December 2023.

Ten participants were selected at the beginning of the study and invited to participate in this research. The type of sampling was purposive sampling, which was set up for the main purpose of this study. The selection criteria included BMI above 25 kg/m^2 and absence of a disease that could have contributed to obesity (e.g., hypothyroidism and polycystic ovarian syndrome). Participants who had other diseases that were disabling or were not controlled with medication or were participating in another research project were also excluded. Written informed consent was obtained from all participants prior to enrolment in this study.

2.2. Therapeutic Yoga Intervention

Participants were given with Yoga Therapy sessions free of charge during the intervention. Yoga Therapy Centre at Department of Human Consciousness & Yogic Science, Mangalore University has a well-established Therapy Hall with all the necessary and basic facilities like floor mat, private cabin to get dressed-up and rest rooms. The intervention was implemented one hour per day for ten weeks, except on government holidays and Sundays. The yoga module was validated by five yoga experts and teachers, and the accepted module was employed out on 10 individuals. The yoga practices included asanas, sun salutation, pranayama and meditation along with relaxation techniques, were introduced under careful supervision of Yoga experts with individual attention during the practice session.

2.3. Assessments of Body Composition

Height was assessed using an FBT height scale. Body composition, including body weight (BW), and BMI was measured before the intervention (day 0) and after the study duration (week 10). Body composition measurement methods are continuously being perfected, with the most commonly used method being bioelectrical impedance analysis (BIA). Before BIA, participants were instructed to remove their shoes and socks, and the bottoms of the feet and palms of the hands were wiped using tissue. Participants were asked to step onto the BIA device, place the soles of their feet on the foot electrodes. Participants were asked to stand with their arms straight so they were not touching their bodies to achieve a proper testing posture, as described in the manufacturer's guidelines. The target heart rate (HR) was checked after 30 min of yoga asanas. Participants checked their own HR for 1 min.

2.4. Statistical Analysis

All statistical analyses were performed using GraphPad Prism® Statistics version 9.3.1. The Mann–Whitney *U* test was used to compare the mean values between groups. The final analysis was interpreted as adjusted odds ratios (AORs) with 95% CIs. A *P* value less than 0.05 indicated statistical significance.

3. Results

3.1. Demographic Characteristics of the Study Participants

Ten participants were initially screened between January 2021 to December 2023. They were either studying, or working at Mangalore University, Mangalagangotri, Karnataka, India. The results demonstrated that the mean weight (kg), and BMI (kg/m^2) were considerably reduced after 10 weeks of yoga practice. The mean BMI (kg/m^2) at Week-0 was significantly greater than that of after Week-10.

Table 1: Demographic characteristics of the study participants.

Characteristics	**Groups**		***P* value**
	Week - 0	**Weeks - 10**	
Weight (kg)	78.08 ± 7.4	74.26 ± 8.2	<0.0001
BMI (kg/m^2)	28.29 ± 0.85	26.83 ± 1.25	<0.0001

Data are presented as the means ± SD. $^{\text{?}}P < 0.05$, significantly different compared to the control group.

In a 10-week study, participants' weight and BMI showed significant changes. At the beginning (Week 0), the average weight was 78.08 kg (± 7.4), while after 10 weeks, it decreased to 74.26 kg (± 8.2). Similarly, the initial average BMI was 28.29 kg/m^2 (± 0.85), which decreased to 26.83 kg/m^2 (± 1.25) by the end of the study. These findings highlight the impact of the intervention on body weight and composition.

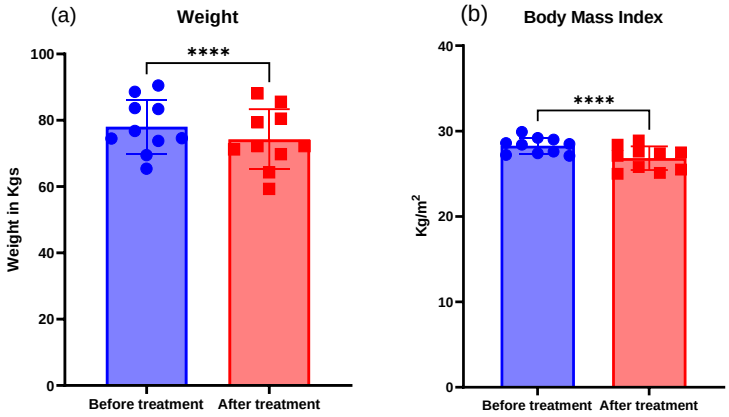

Figure 1: Comparison of (a) Weight and (B) Body Mass Index – Before treatment (Wook – 0) and After treatment (Week – 10) among obese individuals; (**** = p < 0.0005).

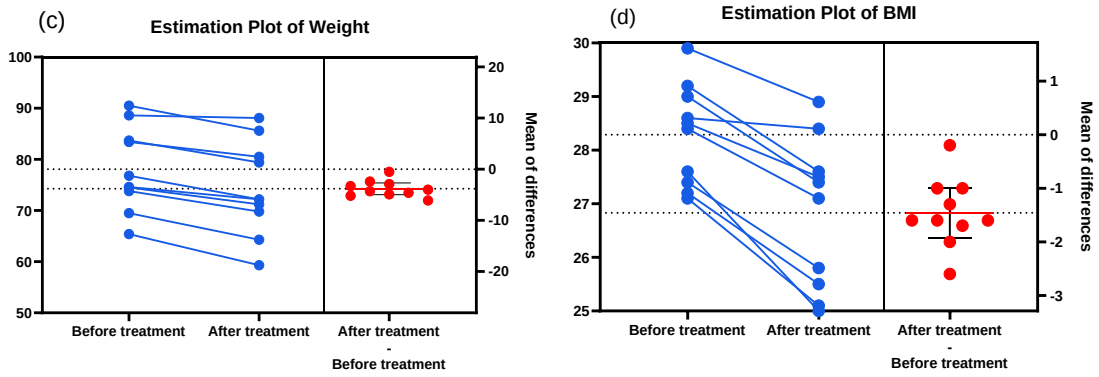

Figure 2: Paired t test (c) Estimation plot of Weight and (d) Estimation plot of Body Mass Index – Before treatment (Wook – 0) and After treatment (Week – 10) among obese individuals; (p < 0.0005). The figure shows change in weight and BMI referring to individual values induced by 10 weeks of Yoga practice.

Figure 2: Individual Weight and BMI Changes Figure 2(c) tracks individual weight changes over time. Participants experienced reductions in weight, with some variability. Figure 2(d) shows the corresponding changes in BMI. The data reflect the effects induced by 10 weeks of yoga practice, emphasizing the importance of lifestyle interventions in managing obesity.

Certainly! Let's delve into a comprehensive discussion and draw meaningful conclusions based on the presented data regarding weight and Body Mass Index (BMI) changes in a 10-week study. We'll explore the implications, potential health benefits, and relevant research findings. Throughout this discussion, I'll reference relevant studies to support our analysis.

Discussion

1. Weight Reduction:

The study demonstrates a significant reduction in weight over the 10-week period. Participants experienced an average weight loss of approximately 3.82 kg (from 78.08 kg to 74.26 kg). This finding aligns with previous research that emphasizes the importance of weight management for overall health[15]. Weight loss has been associated with several positive outcomes, including:

- **Cardiometabolic Improvements**: Even modest weight loss (e.g., 5% of initial body weight) can lead to substantial improvements in cardiovascular risk factors, such as blood pressure, lipid profiles, and insulin sensitivity. These improvements contribute to reduced risk of heart disease and type 2 diabetes.
- **Obesity-Related Cancer Risk**: Excess weight is a known risk factor for various cancers, including breast, colorectal, and endometrial cancers. Weight loss may mitigate this risk by reducing chronic inflammation and hormonal imbalances.
- **COVID-19 Outcomes**: Obesity is associated with severe COVID-19 outcomes. The study's weight reduction findings may have implications for reducing hospitalization rates and complications related to COVID-19.

2. BMI Changes:

The decrease in BMI from 28.29 kg/m^2 to 26.83 kg/m^2 is noteworthy. Here are some key points related to BMI changes:

- **Health Benefits**: Lower BMI is associated with reduced risk of chronic diseases, such as type 2 diabetes, hypertension, and osteoarthritis. The study participants' BMI reduction may positively impact their long-term health[16].

- **Healthy Weight Category**: Achieving a BMI within the healthy weight range (18.5–24.9 kg/m^2) is a desirable goal. The study's findings suggest progress toward this category, which is associated with improved overall health and longevity.

3. Sustainability and Lifestyle:

While the 10-week intervention yielded positive results, sustaining these changes over the long term is crucial. Behavioural modifications, including dietary adjustments, physical activity, and stress management, play a pivotal role[17]. Encouraging participants to adopt sustainable lifestyle practices beyond the study duration is essential.

Conclusion

In conclusion, the 10-week intervention led to significant weight loss and BMI reduction among obese individuals. These changes are associated with improved health outcomes, reduced disease risk, and enhanced quality of life. However, ongoing efforts are necessary to maintain these improvements. Future research should explore personalized interventions and address individual barriers to long-term weight management.

Certainly! Let's discuss the limitations observed in the study and propose future recommendations for further research and practical applications.

Limitations:

Sample Size and Diversity: The study's sample size may limit generalizability. A larger and more diverse cohort would enhance the robustness of findings. Consider stratifying participants by age, gender, and comorbidities to explore subgroup effects.

Duration of Intervention: The 10-week duration might not capture long-term effects. Longer follow-up periods are necessary to assess sustainability. Investigate whether weight loss and BMI changes persist beyond the intervention period.

Lifestyle Factors: The study lacks detailed information on dietary habits, physical activity, and stress levels. Future studies should collect comprehensive lifestyle data to understand the impact of specific behaviours on outcomes.

Future Recommendations:

Long-Term Follow-Up: Conduct a multi-year follow-up to assess weight maintenance and health outcomes. Investigate potential rebound effects after the intervention period.

Behavioural Interventions: Explore behavioural strategies (e.g., cognitive-behavioural therapy, motivational interviewing) to promote sustained weight loss. Address emotional eating, stress management, and adherence to healthy habits.

Precision Medicine: Personalize interventions based on genetic, gut microbiome, and metabolic profiles. Identify responders and non-responders to tailor treatment approaches.

Community-Based Programs: Implement community-based weight management programs.

Engage social support networks and leverage group dynamics for better adherence.

Technology Integration: Develop mobile apps or wearable devices for real-time monitoring and feedback. Gamify weight loss to enhance motivation and engagement.

Health Equity: Ensure inclusivity by recruiting diverse populations. Address disparities in access to weight management resources.

In summary, while the study provides valuable insights, addressing the mentioned limitations and exploring future avenues will advance our understanding of effective weight management strategies. Researchers, clinicians, and policymakers should collaborate to promote healthier lifestyles and reduce obesity-related health risks. Remember that individual responses to weight loss interventions can vary, and personalized approaches are essential for successful outcomes.

References

1. Na Nongkhai MP, Yamprasert R, Punsawad C. Effects of Continuous Yoga on Body Composition in Obese Adolescents. Evid Based Complement Alternat Med. 2021 Aug 25;2021:6702767. DOI: 10.1155/2021/6702767. PMID: 34484400; PMCID: PMC8410386.

2. Cramer H., Thoms M. S., Anheyer D., Lauche R., Dobos G. Yoga in women with abdominal obesityЧa randomized controlled trial. *Deutsches Ärzteblatt international.* 2016;113(39):645–652. doi: 10.3238/arztebl.2016.0645.

3. Zwiauer K. F. Prevention and treatment of overweight and obesity in children and adolescents. *Eur J Pediatr.* 2000;159(1):56–68. doi: 10.1007/pl00014367.

4. American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Expert Panel Report: Guidelines (2013) for the management of overweight and obesity in adults. *Obesity (Silver Spring)* 2014;22(2):41–410.

5. Manchanda S. C., Madan K. Yoga and meditation in cardiovascular disease, *Clinical Research in Cardiology.* 2014;103(9):675–80. doi: 10.1007/s00392-014-0663-9.

6. Swift D. L., Johannsen N. M., Lavie C. J., Earnest C. P., Church T. S. The role of exercise and physical activity in weight loss and maintenance. *Progress in Cardiovascular Diseases.* 2014;56(4):441–447. doi: 10.1016/j.pcad.2013.09.012.

7. Tian D., Meng J. Exercise for Prevention and Relief of Cardiovascular Disease: Prognoses, Mechanisms, and Approaches. *Oxidative Medicine and Cellular Longevity.* 2019;2019:11. doi: 10.1155/2019/37567502019.3756750

8. Telles S., Sharma S. K., Kala N., Pal S., Gupta R. K., Balkrishna A. Twelve weeks of yoga or nutritional advice for centrally obese adult females. *Frontiers in Endocrinology.* 2018;9:p. 466. doi: 10.3389/fendo.2018.00466.

9. Angus P. Y., Ugwu F. N., Tam B. T., et al. One year of yoga training alters ghrelin axis in centrally obese adults with metabolic syndrome. *Frontiers in Physiology.* 2018;91321

10. Suresh K., Chandrashekara S. Sample size estimation and power analysis for clinical research studies. Journal of Human Reproductive Sciences. 2012;5(1):7–13. doi: 10.4103/0974-1208.97779.

11. Hainsworth K. R., Liu X. C., Simpson P. M., et al. A pilot study of iyengar yoga for pediatric obesity: effects on gait and emotional functioning. Children (Basel) 2018;5(7):p. 92. doi: 10.3390/children5070092.

12. Mamatha Shree C., Prashanth K. S., Girija B. Effect of short-term pranayama on perceived stress, sleep quality, heart rate, and blood pressure. International Journal of Physiology. 2019;7(2):111–115. doi: 10.5958/2320-608x.2019.00054.

13. Grasdalsmoen M., Eriksen H. R., Lønning K. J., Sivertsen B. Physical exercise and body-mass index in young adults: a national survey of Norwegian university students. BMC Public Health. 2019;19(1):p. 1354. doi: 10.1186/s12889-019-7650-z.

14. Kristal A. R., Littman A. J., Benitez D., White E. Yoga practice is associated with attenuated weight gain in healthy, middle-aged men and women. *Alternative Therapies in Health and Medicine.* 2005;11(4):28–33.

15. Fryar CD, Carroll MD, Afful J. Prevalence of overweight, obesity, and severe obesity among adults aged 20 and over: United States, 1960–1962 through 2017–2018. NCHS Health E-Stats. 2020[1]

16. Bailey-Davis L, Wood GC, Benotti P, et al. Impact of sustained weight loss on cardiometabolic outcomes. Am J Cardiol. 2022;162:66-72.

17. Wing RR, Lang W, Wadden TA, et al; Look AHEAD Research Group. Benefits of modest weight loss in improving cardiovascular risk factors in overweight and obese individuals with type 2 diabetes. Diabetes Care. 2011;34(7):1481-1486.