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Yoga as a Lifestyle Modification Strategy for Early Prevention of Obesity Related Risks in Healthy Young Men

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ABSTRACT

Background: Overweight, obesity, and abnormal body composition are major contributors to non-communicable diseases globally. Lifestyle modifications, including yoga, are increasingly recognized as effective non-pharmacological strategies for improving metabolic health. However, evidence on the effects of short-term, intensive yoga interventions on body composition remains limited.

Objective: This study aimed to evaluate the effects of a structured five-week yoga intervention on anthropometric, metabolic, and body composition parameters in healthy male adults.

Methods: A pre–post experimental study was conducted among 50 healthy male participants (age range: 18–35 years) recruited from Gurukul Gym, Sarsawa, Dist-Saharanpur, Uttar Pradesh, India. Participants underwent a progressive five-week yoga program consisting of daily sessions (six days per week, 33–85 minutes). Outcome measures included body weight, body mass index (BMI), basal metabolic rate (BMR), body fat percentage, fat mass, lean mass, visceral fat, subcutaneous fat, regional fat (arms, trunk, legs), and skeletal muscle mass (whole body and regional), assessed using bioelectrical impedance analysis. Data were analyzed using paired-sample t-tests in SPSS (Version 26.0), with significance set at $p < 0.05$.

Results: Significant reductions were observed in body weight (63.48 → 57.06 kg, $p < 0.0001$), BMI (23.32 → 20.96 kg/m², $p < 0.0001$), BMR (1526 → 1462 kcal/day, $p < 0.0001$), and body fat percentage (18.45% → 15.62%, $p < 0.0001$). Fat mass and all regional fat indices (visceral, subcutaneous, trunk, arms, legs) declined significantly. Additionally, lean mass and skeletal muscle mass decreased across body regions ($p < 0.0001$).

Conclusion: A five-week structured yoga intervention produced significant reductions in body weight, BMI, body fat, and visceral adiposity among healthy male adults, highlighting yoga's potential as a short-term lifestyle modification strategy. The concurrent decline in lean mass emphasizes the need to integrate dietary monitoring or resistance-based practices to preserve muscle mass. These findings support yoga as a practical and accessible approach for the early prevention of obesity-related risks.

Keywords: *Yoga, Body Composition, Obesity Prevention, Fat Mass, Anthropometry, Short-term Intervention.*

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1. INTRODUCTION

Overweight, obesity, and abnormal body composition have emerged as critical public health challenges worldwide, contributing substantially to the rising prevalence of non-communicable diseases such as type 2 diabetes, cardiovascular disorders, and metabolic syndrome (*Obesity and Overweight*, n.d.). Sedentary lifestyle patterns and poor dietary practices further exacerbate these risks, particularly among young adults who are increasingly exposed to stress, irregular routines, and lack of structured physical activity (Hall et al., 2012).

Yoga, an ancient mind–body discipline rooted in Indian philosophy, has gained global recognition as an integrative health practice. It incorporates physical postures (asanas), breathing practices (pranayama), cleansing techniques (kriyas), and relaxation methods, which together promote physical fitness, metabolic balance, and psychological well-being (Field, 2016; Ross & Thomas, 2010). Unlike conventional exercise, yoga emphasizes both physiological and psychological regulation, making it a promising intervention for lifestyle-related disorders.

Previous studies have demonstrated that yoga interventions can lead to reductions in body weight, body mass index (BMI), fat percentage, and waist circumference, while also improving cardiovascular efficiency, autonomic balance, and metabolic outcomes (Cramer et al., 2014; Johnson et al., 2016). However, most available studies are limited by heterogeneous interventions, small sample sizes, or longer durations (≥12 weeks), leaving a gap in understanding whether short-term, intensive yoga interventions can produce significant changes in body composition.

Given this context, the present study was designed to evaluate the effects of a structured five-week yoga intervention on anthropometric, metabolic, and body composition parameters in healthy male adults. We hypothesized that a short-term, progressive yoga program would significantly reduce body weight, BMI, fat mass, and visceral fat, while also influencing lean mass and skeletal muscle distribution. This study contributes to the growing body of evidence on yoga as a cost-effective, accessible, and holistic approach to managing early risk factors of metabolic disorders.

2. METHODOLOGY

Study Design
This study was designed as a single-group pre–post experimental trial to evaluate the effects of a structured five-week yoga-based lifestyle intervention on anthropometric, metabolic, and body composition parameters. The study was conducted in accordance with the Consolidated Standards of Reporting Trials (CONSORT) guidelines for non-randomized interventions.

Participants
A total of 50 male participants (n = 50) aged 18–35 years were recruited from Gurukul Gym, Sarsava, Uttar Pradesh, India, using convenience sampling. All participants provided written informed consent prior to enrolment.

Inclusion Criteria
- Healthy adult males aged 18–35 years.
- No prior engagement in regular yoga practice within the past six months.
- Willingness to adhere to the complete 5-week intervention protocol.

Exclusion Criteria
- History of musculoskeletal injury, chronic systemic disease (e.g., diabetes, hypertension, cardiovascular disorders), or major psychiatric illness.
- Current use of medications that could influence metabolism or body composition.
- Individuals engaged in structured athletic training during the study period.

Setting
Department of Applied Yoga and Health, D.A.V. College for Girls, Yamuna Nagar, Haryana.

Intervention Protocol

The yoga intervention lasted for five consecutive weeks, with daily sessions (six days per week) conducted under the supervision of a certified yoga instructor. Each session progressively increased in intensity and duration, beginning with 33 minutes in Week 1 and reaching up to 85 minutes in Week 5.

Components of the Intervention

1. **Warm-up:** Manual jogging and dynamic stretching.
2. **Asanas (Postures):** Surya Namaskar, Tadasana, Trikonasana, Katichakrasana, Naukasan, Samkonasana, Hastottanasana, Padhastasana.
3. **Kriyas (Cleansing Practices):** Agnisar Kriya, Kapalabhati.
4. **Pranayama (Breathing Practices):** Bhastrika, Kapalabhati.
5. **Relaxation:** Shavasana.

Outcome Measures

Pre- and post-intervention assessments were conducted using standardized protocols and validated instruments.

1. **Anthropometric Parameters:** Height (cm), Weight (kg), Body Mass Index (kg/m²).
2. **Metabolic Parameters:** Basal Metabolic Rate (BMR, kcal/day) estimated via bioelectrical impedance analysis (BIA).
3. **Body Composition Parameters:** Total body fat (%), fat mass (kg), lean mass (kg), visceral fat (kg, est.), subcutaneous fat (kg, est.), regional fat (trunk, arms, legs), and skeletal muscle mass (whole body, trunk, arms, legs).
4. **Primary Endpoint:** Change in body weight and body fat percentage.
5. **Secondary Endpoints:** Change in BMI, BMR, visceral fat, and skeletal muscle distribution.

Data Collection

Data were collected at two time points:

- **Baseline (Pre-intervention).**
- **Post-intervention (End of 5 weeks).**

All measurements were obtained using a standardized digital stadiometer, weighing scale, and a validated BIA device (e.g., Omron HBF-701, Omron Healthcare, Japan).

Statistical Analysis

Data were entered in Microsoft Excel and analyzed using IBM SPSS Statistics (Version 26.0, IBM Corp., Armonk, NY, USA). Descriptive statistics (mean ± standard deviation) were calculated for all variables. Normality of data distribution was assessed using the Shapiro–Wilk test. Since the same participants were assessed pre- and post-intervention, paired-sample t-tests were applied to examine within-group changes. Statistical significance was set at $p < 0.05$ (two-tailed). Effect sizes (Cohen's *d*) were calculated to determine the magnitude of changes.

3. RESULT

At baseline, the mean height of participants was 165 cm, which remained unchanged after the 5-week intervention, as expected. However, significant improvements were observed across all other anthropometric, metabolic, and body composition parameters.

Table 6: Body Composition Analysis

Parameter	Pre (Mean)	Post (Mean)	P-value
Height (cm)	165	165	–
Weight (kg)	63.48	57.06	<0.0001
BMI (kg/m²)	23.32	20.96	<0.0001
BMR (kcal/day)	1526	1462	<0.0001
Total Body Fat (%)	18.45	15.62	<0.0001
Fat Mass (kg)	11.71	8.91	<0.0001
Lean Mass (kg)	51.77	48.15	<0.0001
Visceral Fat (kg, est.)	1.17	0.89	<0.0001
Subcutaneous Fat (kg, est.)	10.54	8.02	<0.0001
Sub-Trunk Fat (kg, est.)	3.69	2.81	<0.0001

Parameter	Pre (Mean)	Post (Mean)	P-value
Sub-Arms Fat (kg, est.)	1.58	1.20	<0.0001
Sub-Legs Fat (kg, est.)	5.27	4.01	<0.0001
Skeletal Muscle – Whole Body (kg, est.)	31.06	28.89	<0.0001
Skeletal Muscle – Trunk (kg, est.)	9.32	8.67	<0.0001
Skeletal Muscle – Arms (kg, est.)	6.21	5.78	<0.0001
Skeletal Muscle – Legs (kg, est.)	15.53	14.44	<0.0001

The mean body weight decreased from 63.48 ± SD kg at baseline to 57.06 ± SD kg post-intervention ($p < 0.0001$), corresponding to a significant reduction in Body Mass Index (BMI) from 23.32 to 20.96 kg/m² ($p < 0.0001$). Basal Metabolic Rate (BMR) also showed a significant decline from 1526 to 1462 kcal/day ($p < 0.0001$).

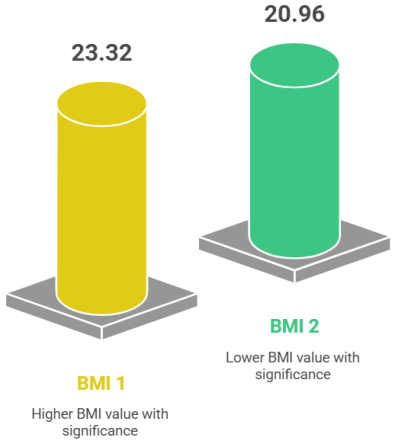

Figure 1: Comparison of BMI Value

In terms of adiposity measures, total body fat percentage was reduced from 18.45% to 15.62% ($p < 0.0001$). This was accompanied by a decrease in absolute fat mass (11.71 to 8.91 kg, $p < 0.0001$) and subcomponents, including visceral fat (1.17 to 0.89 kg, $p < 0.0001$), subcutaneous fat (10.54 to 8.02 kg, $p < 0.0001$), sub-trunk fat (3.69 to 2.81 kg, $p < 0.0001$), sub-arms fat (1.58 to 1.20 kg, $p < 0.0001$), and sub-legs fat (5.27 to 4.01 kg, $p < 0.0001$).

Similarly, significant reductions were found in lean mass and skeletal muscle distribution. Whole-body lean mass decreased from 51.77 to 48.15 kg ($p < 0.0001$). Skeletal muscle of the trunk reduced from 9.32 to 8.67 kg ($p < 0.0001$), arms from 6.21 to 5.78 kg ($p < 0.0001$), and legs from 15.53 to 14.44 kg ($p < 0.0001$).

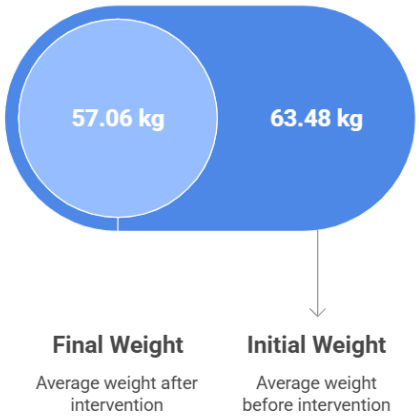

Figure 2: Before and After yoga Intervention Body Weight Comparison

Collectively, these results indicate that the 5-week structured yoga intervention led to a significant reduction in body weight, BMI, fat mass, and regional fat distribution, along with measurable declines in lean body mass and skeletal muscle across body regions. The consistently low *p*-values (<0.0001) across parameters suggest that the intervention produced robust and statistically significant changes.

4. DISCUSSION

The present study investigated the impact of a structured five-week yoga intervention on anthropometric, metabolic, and body composition parameters in healthy male adults. The findings demonstrated significant reductions in body weight, BMI, BMR, body fat percentage, visceral fat, subcutaneous fat, and regional fat depots, along with decreases in lean mass and skeletal muscle across body regions. These results suggest that even a relatively short-term, intensive yoga protocol can produce substantial physiological changes.

Our results are consistent with previous reports indicating the beneficial effects of yoga on body weight and fat reduction. Cramer et al. (2016) reported in a meta-analysis that yoga interventions were effective for reducing BMI and waist circumference among overweight and obese individuals. Similarly, Khoshnaw & Ghadge (2021) demonstrated improvements in metabolic risk markers following yoga-based lifestyle interventions (Khoshnaw & Ghadge, 2021). The current study extends these findings by showing that measurable changes can occur within just five weeks of intervention, highlighting the efficiency of yoga as a short-term lifestyle modification strategy.

Interestingly, the present study also revealed reductions in lean mass and skeletal muscle distribution. While most prior studies have focused primarily on fat reduction (Field, 2016; Ross & Thomas, 2010), few have reported parallel decreases in lean tissue. This observation could be attributed to the relatively high caloric expenditure during daily yoga sessions and insufficient dietary control, leading to overall weight loss that included both fat and lean compartments. It underscores the importance of integrating balanced dietary strategies with yoga interventions to preserve lean muscle mass during weight reduction programs.

The mechanisms underlying the observed effects may be multifactorial. Yoga asanas, particularly Surya Namaskar and dynamic postures, increase energy expenditure and promote fat oxidation (Mody, 2011). Pranayama practices such as Bhastrika and Kapalabhati may enhance autonomic regulation and metabolic efficiency by stimulating the sympathetic nervous system and improving respiratory dynamics (Dhananjai et al., 2013). Additionally, yoga-induced reductions in stress hormones such as cortisol may downregulate visceral adiposity and improve metabolic balance (Sengupta, 2012). Collectively, these physiological pathways provide a plausible explanation for the improvements in fat and metabolic outcomes observed in this study.

Strengths and Limitations

The strengths of this study include a well-structured, progressive yoga protocol delivered under professional supervision, standardized outcome measures using bioelectrical impedance analysis, and a focused pre–post design that allowed clear within-subject comparisons. However, several limitations should be acknowledged. First, the absence of a control group limits the ability to attribute observed effects exclusively to the intervention. Second, the sample was restricted to young adult males, which reduces the generalizability of findings across genders and age groups. Third, dietary intake and physical activity outside the intervention were not strictly controlled, which may have influenced body composition changes.

Implications and Future Directions

Despite these limitations, the findings provide preliminary evidence that short-term yoga interventions can meaningfully alter body composition and metabolic markers, supporting their role as a practical, non-pharmacological approach for early prevention of obesity-related risks. Future randomized controlled trials with larger, more diverse samples, inclusion of dietary monitoring, and longer follow-up periods are warranted to confirm and expand upon these results. Additionally, integrating resistance-based yoga or complementary nutrition strategies may help preserve lean mass while maximizing fat loss.

5. CONCLUSION

The present study demonstrated that a structured five-week yoga intervention produced significant improvements in anthropometric, metabolic, and body composition parameters among healthy male adults. Notably, reductions in body weight, BMI, body fat percentage, visceral fat, and regional fat distribution were observed, underscoring the potential of yoga as an effective short-term lifestyle modification strategy. Although decreases in lean mass and skeletal muscle were also noted, these findings highlight the need for integrating yoga practice with appropriate dietary strategies to preserve muscle mass while promoting fat loss.

Overall, this study provides preliminary evidence that intensive, short-duration yoga interventions can contribute to early prevention of obesity-related risks. Future randomized controlled trials with larger, more diverse populations, dietary monitoring, and long-term follow-up are warranted to confirm and expand these findings.

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