



Comparative Efficacy of Suryanamaskara and Kapalbhathi Pranayama on Anthropometric Measurements and BMI in Sthaulya (Obesity): A Randomized Clinical Trial

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Abstract : Background: Sthaulya (obesity) is a disorder defined by excessive accumulation of Meda Dhatu (fat tissue) and Mamsa Dhatu (muscle tissue).¹ It is objectively quantified in modern medicine by Body Mass Index (BMI) and other anthropometric measurements.² Yogic interventions are commonly prescribed for managing these objective parameters.

Objective: To evaluate and compare the efficacy of Kapalbhathi Pranayama (Group A) and Suryanamaskara (Group B) on objective parameters, specifically weight, BMI, and body circumferences, in patients with Sthaulya.

Methods: A 60-day, open-label, randomized clinical trial was conducted with 60 patients diagnosed with Sthaulya (BMI > 24.9 kg/m²).³ Patients were randomly assigned to Group A (n=30), performing 15 minutes of Kapalbhathi daily, or Group B (n=30), performing 15 minutes of Suryanamaskara daily.³ Objective parameters (Weight, BMI, Neck, Mid-arm, Chest, Abdomen, Hip, and Mid-thigh circumferences) were measured at baseline and after 60 days. Within-group analysis was conducted using the Paired t-test, and between-group comparisons used the Unpaired t-test.⁴

Results: Both interventions produced highly significant (p<0.001) within-group reductions in weight and BMI.⁵ ⁶ Group A (Kapalbhathi) demonstrated a mean weight reduction of 7.72% and a BMI reduction of 8.46%.⁵ Group B (Suryanamaskara) showed a mean weight reduction of 3.12% and a BMI reduction of 3.35%.⁶ The comparative analysis for weight and BMI showed a highly significant (p<0.001) difference in favor of Group A.⁷ For body circumferences, Group B showed significant reductions in more areas (6/7) than Group A (5/7).⁸ ⁹ Furthermore, the comparative analysis of circumference reduction was highly significant (p<0.001) or significant (p<0.05) in favor of Group B for all measures except the forearm.¹⁰

Conclusion: Both Kapalbhathi Pranayama and Suryanamaskara are effective practices for the objective management of Sthaulya. Kapalbhathi produced a statistically superior reduction in overall weight and BMI. However, Suryanamaskara was significantly more effective at reducing regional body circumferences, suggesting a greater impact on body toning and fat redistribution.

IndexTerms - Obesity, Sthaulya, BMI, Anthropometry, Kapalbhathi, Suryanamaskara, Weight Loss, Clinical Trial.

1. Introduction

Sthaulya (obesity) is a chronic medical condition defined in Ayurveda as an abnormal increase in *Meda Dhatu* (fat tissue) and *Mamsa Dhatu* (muscle tissue).¹ This accumulation leads to the cardinal signs of *Chala Sphika*, *Udara*, *Stana* (pendulous buttocks, abdomen, and breasts).¹ This classical definition directly correlates with the modern objective criteria for obesity, which is defined as an abnormal or excessive fat accumulation that poses a health risk.² This is most commonly assessed using the Body Mass Index (BMI), with a BMI over 25 kg/m² considered overweight and over 30 kg/m² as obese.² ¹¹

In India, the prevalence of obesity has reached 40.3%,¹² and it is a major risk factor for diabetes, hypertension, and heart disease.¹³ Management requires interventions that can correct metabolic imbalance. Yogic practices

are well-regarded for this purpose. Kapalbhathi, a vigorous breathing technique, is known to stimulate abdominal organs, enhance metabolism, and increase basal metabolic rate.¹⁴ Suryanamaskara (Sun Salutation) is a comprehensive, rhythmic sequence of 12 postures that provides a cardiovascular workout, tones muscles, and stimulates the digestive system.¹⁵

While both are used for weight loss, their comparative efficacy on objective anthropometric measures is not well-documented. This study aims to compare the effects of Kapalbhathi Pranayama and Suryanamaskara on weight, BMI, and body circumferences in patients with Sthaulya.

2. Materials and Methods

2.1. Study Design

This was a 60-day, open-label, randomized, parallel-group clinical trial.³ It was conducted at the Swasthavritta OPD at the Institute for Ayurved studies and research, Kurukshetra, Haryana.³

2.2. Participants

60 patients diagnosed with Sthaulya were enrolled. Inclusion criteria were: age 25-50 years, BMI > 24.9 kg/m², and providing informed consent.³ Patients with secondary obesity (e.g., due to hypertension or endocrine disorders) were excluded.³

2.3. Interventions

Patients were randomly assigned to one of two groups (n=30 each) for 60 days:

- **Group A:** Kapalbhathi Pranayama for 15 minutes daily.³
- **Group B:** Suryanamaskara for 15 minutes daily.³

2.4. Assessment Criteria

Objective parameters were the primary focus. Measurements were taken at baseline (0th day) and post-intervention (60th day).

1. **Weight (kg) and Body Mass Index (BMI):** BMI calculated as kg/m².³
2. **Body Circumferences (cm):** Measurements were taken for the Neck, Mid-arm, Forearm, Chest, Abdomen, Hip, and Mid-Thigh.³
3. **Investigations:** Random Blood Sugar (RBS) was assessed to rule out complications.³

2.5. Statistical Analysis

Data were analyzed using Sigma stat 3.5 software.⁴ The Paired t-test was applied for within-group (pre/post) analysis of objective parameters (weight, BMI, circumferences). The Unpaired t-test was applied for between-group comparisons of the mean change.⁴ Significance was defined as $p < 0.05$ (Significant) and $p < 0.001$ (Highly Significant).⁴

3. Results

3.1. Effect on Weight and BMI

Both groups showed highly significant ($p < 0.001$) reductions in weight and BMI after 60 days.

- **Group A (Kapalbhathi):** Showed a 7.72% reduction in weight and an 8.46% reduction in BMI.⁵

- **Group B (Suryanamaskara):** Showed a 3.12% reduction in weight and a 3.35% reduction in BMI.⁶

The comparative analysis (Table 4.2.9) confirmed this difference. The mean reduction in both weight and BMI was highly significant ($p < 0.001$) in Group A compared to Group B.⁷

3.2. Effect on Body Circumferences

Within-group analysis showed significant reductions in both groups.

- **Group A (Kapalbhati):** Showed statistically significant ($p < 0.05$) reductions in 5 of 7 areas: Mid-arm, Chest, Abdomen, Hip, and Mid-Thigh. Reductions in Neck and Forearm were insignificant.⁸
- **Group B (Suryanamaskara):** Showed statistically highly significant ($p < 0.001$) or significant ($p < 0.01$) reductions in 6 of 7 areas: Neck, Mid-arm, Chest, Abdomen, Hip, and Mid-Thigh. Reduction in Forearm was insignificant.⁹

The comparative analysis (Table 4.2.6) clearly favored Group B. The difference between groups was highly significant ($p < 0.001$) for Neck, Mid-arm, Abdomen, Hip, and Mid-Thigh, and significant ($p = 0.002$) for Chest, all in favor of Suryanamaskara. The forearm showed no significant difference.¹⁰

3.3. Effect on RBS

There was no significant difference in Random Blood Sugar (RBS) values within or between the groups, indicating the interventions did not negatively impact glycemic control in this non-diabetic cohort.¹⁶

4. Discussion

The results present a nuanced distinction between the effects of Kapalbhati and Suryanamaskara. Both interventions were effective, yet they excelled in different areas.

Kapalbhati (Group A) produced a significantly greater reduction in total body weight and BMI.⁷ This is strongly supported by its proposed mode of action. Kapalbhati is an "abdomino-respiratory-autonomic exercise" involving forceful exhalations that vigorously contract the abdominal muscles.¹⁴ This action is believed to stimulate the digestive organs, increase the basal metabolic rate (BMR), and enhance fat metabolism.¹⁷ The result is a greater consumption of calories and a reduction in overall fat deposition, reflected in the superior total weight loss.

Suryanamaskara (Group B), conversely, was significantly more effective at reducing body circumferences.¹⁰ While it also burns calories as a cardiovascular exercise, its primary benefit appears to be in body toning and reshaping. Suryanamaskara is a full-body workout that engages multiple muscle groups, including the core, arms, shoulders, and thighs.¹⁵ This engagement builds and tones lean muscle mass. This muscle toning, combined with fat reduction, leads to a more "sculpted" and "streamlined appearance," which is directly reflected in the greater reduction of circumference measurements. This explains why Group B could have superior circumference reduction even with less total weight loss, as the body composition was likely shifting from fat to lean muscle.¹⁷

This study highlights that Kapalbhati is a powerful metabolic tool for gross weight reduction, while Suryanamaskara is a superior practice for body toning, flexibility, and regional fat reduction.

5. Conclusion

Both Kapalbhati Pranayama and Suryanamaskara are effective, non-pharmacological interventions for managing the objective parameters of Sthaulya (obesity). However, their effects are distinct. Kapalbhati Pranayama demonstrated superior efficacy in reducing overall body weight and BMI. Suryanamaskara was

significantly more effective in reducing body circumferences, indicating a greater effect on body toning and fat redistribution.

The choice of intervention may be tailored to the patient's specific goals. Kapalbhata may be preferred for maximal weight loss, while Suryanamaskara is ideal for improving body shape, flexibility, and muscle tone.

6. References

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