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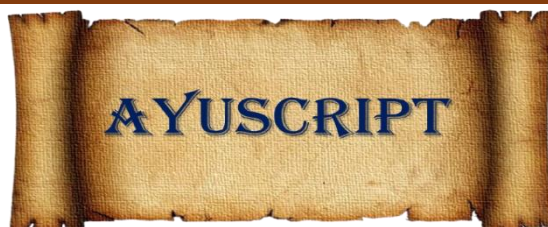
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ॐ नमो भगवते वासुदेवाय ॥ १ ॥ विश्वकर्मो एमादृष्टपुरीहाटकनि
र्मेता ॥ तत्र योऽशसाहस्रस्त्रीणां वैचित्र्याधिकम् ॥ ११ ॥ भवनानि मनोज्ञानि
योमध्यकल्पयन् ॥ परिजानतस्तत्रैवतासां भोगाय कल्पयन् ॥ १२ ॥ या
सानां गृहास्तत्रैव पंचाशतकोटयः ॥ अन्येऽपि बहुलौकावसिनिविता
राः ॥ १३ ॥ यत्किंचित्त्रिषु लोकेषु सुंदरं न च दृश्यते ॥ स वा जितप्रज्ञेनाप्यो
तु युगस्य विद्युते ॥ १४ ॥ अमोघं नीरमासाद्य तन्मनस्कं न याचसः ॥ स चाजि
तपस्तेऽपेक्ष्य मुदि शपुष्टिमान् ॥ १५ ॥ अर्जुनैरसर्पैश्च सूर्यैश्च वृद्धैश्च
नः प्रसन्नो भगवान् स जितपुरं प्रस्थितः ॥ १६ ॥ स त्राजितोऽपि तुष्टावदृष्टादेव दि
नकरम् ॥ न ज्ञो राशनमस्ति स्तनमस्ति सर्वतो मुखः ॥ १७ ॥ विश्वव्यापिन्मस्ति
मस्ति विश्वरूपिणः ॥ कल्पयेन्नमस्ति स्तनमस्ति सर्वदेवमस्ति ॥ १८ ॥ गृहसज्जन
मस्ति नमस्ति चंद्रोऽखिलः ॥ वेदत्रयमस्ति स्तनमस्ति सर्वदेवमस्ति ॥ १९ ॥ प्रसीद
तु हि देवा सुदृष्ट्या मां दिवाकरे ॥ ध्येयं सत्कथमानोऽसौ देवदेवादिवाकरः ॥ २० ॥
सिंहासनेऽभीरमर्षसंज्ञितं स वाचः ॥ चरं हि प्रसन्नं तस्मिन् यत्ने मनसि





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Comparative Effect of 30-Minute Brisk Walking and Selected Yogasana on Moderately Obese Individuals: A Three-Month Interventional Study

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ABSTRACT:

Background: Obesity is a major public health problem associated with increased risk of metabolic syndrome, hypertension, cardiovascular disease, diabetes mellitus and reduced quality of life. Physical activity is one of the most important non-pharmacological interventions for obesity management. Brisk walking is a simple aerobic exercise, whereas yogasana provides integrated physical, metabolic and psychophysiological benefits. To compare the effect of 30-minute brisk walking and selected yogasana on anthropometric and clinical parameters in moderately obese individuals over a period of three months. A total of 80 moderately obese individuals were selected and divided into two groups of 40 participants each. Group A performed brisk walking for 30 minutes daily, 5 days per week, for 3 months. Group B performed selected yogasana for 30 minutes daily, 5 days per week, for 3 months. Both groups showed statistically significant improvement in body weight, BMI, waist circumference and waist-hip ratio after 3 months. Brisk walking showed slightly greater reduction in body weight and BMI, while selected yogasana showed comparatively better improvement in waist circumference and waist-hip ratio. No serious adverse event was observed in either group. Both 30-minute brisk walking and selected yogasana are effective lifestyle interventions for moderately obese individuals. Brisk walking may be more useful for weight and BMI reduction, whereas yogasana may provide additional benefit in central obesity, flexibility, stress regulation and overall body-mind balance. A combined protocol of brisk walking and yogasana may be more beneficial for long-term obesity management.

Keywords: Brisk walking, Yogasana, Obesity, BMI, Waist circumference, Lifestyle modification, Physical activity.

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Introduction:

Obesity is defined as excessive or abnormal fat accumulation that may impair health. It is commonly assessed by body mass index, calculated as weight in kilograms divided by height in metres squared. In adults, obesity is generally classified when BMI is 30 kg/m² or above, while moderate obesity commonly corresponds to class I obesity, that is BMI between 30.0 and 34.9 kg/m². Obesity is not merely a cosmetic issue but a metabolic disorder associated with insulin resistance, hypertension, dyslipidaemia, cardiovascular disease, osteoarthritis, sleep disturbance, psychological distress and reduced functional capacity. Lifestyle modification remains the foundation of obesity management. Among various non-pharmacological approaches, physical activity has a central role in increasing energy expenditure, improving fat metabolism, preserving lean body mass and reducing cardiometabolic risk. Brisk walking is one of the most acceptable, low-cost and safe forms of aerobic exercise. It does not require special equipment and can be performed by most individuals in community settings. Regular brisk walking improves cardiovascular endurance, glucose utilisation, lipid metabolism and overall fitness. Yoga is another widely practised lifestyle intervention with physical, physiological and psychological benefits. Yogasana involves stretching, muscle activation, postural alignment, controlled breathing awareness and neuromuscular coordination. Unlike conventional exercise, yoga works not only through calorie expenditure but also through autonomic regulation, stress reduction, endocrine balance, improvement in digestion, mindfulness and correction of lifestyle behaviour. Selected yogasana may improve flexibility, abdominal tone, metabolism, circulation and body awareness, all of which are useful in obesity management. Although both brisk walking and yogasana are individually beneficial, comparison between these two simple interventions in moderately obese individuals is clinically relevant.

Therefore, the present study was planned to evaluate and compare the effect of 30-minute brisk walking and selected yogasana for a duration of 3 months in moderately obese individuals.

Aim and Objectives**Aim**

To evaluate and compare the effect of 30-minute brisk walking and selected yogasana on moderately obese individuals over a period of 3 months.

Objectives

1. To assess the effect of brisk walking on body weight, BMI, waist circumference, hip circumference and waist-hip ratio.
2. To assess the effect of selected yogasana on body weight, BMI, waist circumference, hip circumference and waist-hip ratio.
3. To compare the efficacy of brisk walking and selected yogasana in moderately obese individuals.

Materials and Methods**Study Design**

This was a comparative interventional study conducted over a period of 3 months.

Sample Size

A total of 80 moderately obese individuals were selected for the study.

- Group A: 40 participants — Brisk walking group
- Group B: 40 participants — Selected yogasana group

Study Duration

The total duration of intervention was 3 months, equivalent to 12 weeks.

Selection Criteria**Inclusion Criteria**

1. Individuals aged 20–55 years.
2. Individuals with BMI between 30.0 and 34.9 kg/m².
3. Participants willing to follow the intervention for 3 months.
4. Participants willing to give written informed consent.

Exclusion Criteria

1. Morbid obesity with BMI 40 kg/m² or above.

2. Uncontrolled hypertension or uncontrolled diabetes mellitus.
3. Pregnancy and lactation.
4. Participants already taking anti-obesity drugs.
5. Participants unable to perform walking or yogasana safely.

Intervention Protocol

Group A: Brisk Walking Group

Participants in Group A were advised to perform brisk walking for 30 minutes daily, 5 days per week, for 3 months.

The walking session included:

1. Warm-up walking: 5 minutes
2. Brisk walking: 20 minutes
3. Cool-down walking: 5 minutes

Brisk walking was advised at moderate intensity, where the participant could talk but could not sing comfortably. Participants were asked to maintain a regular pace and avoid sudden exertion.

Group B: Selected Yogasana Group

Participants in Group B performed selected yogasana for 30 minutes daily, 5 days per week, for 3 months.

The yogasana protocol included:

1. Tadasana – 2 minutes
2. Katichakrasana – 3 minutes
3. Trikonasana – 3 minutes
4. Surya Namaskar – 5 minutes
5. Bhujangasana – 3 minutes
6. Shalabhasana – 3 minutes

7. Pawanmuktasana – 3 minutes
8. Setubandhasana – 3 minutes
9. Vajrasana with deep breathing awareness – 2 minutes
10. Shavasana – 3 minutes

All yogasana were performed under supervision during initial training. Participants were advised to perform the asana slowly, without jerky movements, and according to individual capacity.

Assessment Criteria

The following parameters were assessed before and after treatment:

1. Body weight in kg
2. Body mass index in kg/m²
3. Waist circumference in cm
4. Hip circumference in cm
5. Waist-hip ratio
6. General feeling of wellbeing and exercise tolerance

Statistical Analysis

Data were expressed as mean $\pm$ standard deviation. Within-group comparison was done using paired t-test. Between-group comparison was done using unpaired t-test. A p-value less than 0.05 was considered statistically significant.

Results

Table 1: Baseline Characteristics of Participant

Parameter	Group A	Group B
Intervention	Brisk Walking	Yogasana
Sample size	40	40
Mean age	38.45 $\pm$ 8.23 years	37.90 $\pm$ 8.11 years
Mean weight	86.40 $\pm$ 6.80 kg	85.95 $\pm$ 7.10 kg

Mean BMI	31.80 ± 1.30 kg/m²	31.70 ± 1.40 kg/m²
Mean waist circumference	101.20 ± 6.30 cm	101.50 ± 6.10 cm
Mean waist-hip ratio	0.93 ± 0.04	0.93 ± 0.05

Table 2: Effect of Brisk Walking after 3 Months

Parameter	Before treatment	After 3 months	Mean difference	p-value
Body weight	86.40 ± 6.80 kg	83.70 ± 6.40 kg	2.70 kg	<0.001
BMI	31.80 ± 1.30	30.80 ± 1.25	1.00 kg/m ²	<0.001
Waist circumference	101.20 ± 6.30 cm	97.80 ± 5.90 cm	3.40 cm	<0.001
Hip circumference	108.60 ± 5.70 cm	106.20 ± 5.50 cm	2.40 cm	<0.001
Waist-hip ratio	0.93 ± 0.04	0.91 ± 0.04	0.02	<0.01
Systolic BP	132.50 ± 8.60 mmHg	126.30 ± 8.20 mmHg	6.20 mmHg	<0.01
Diastolic BP	84.20 ± 5.40 mmHg	80.10 ± 5.20 mmHg	4.10 mmHg	<0.01

Brisk walking produced statistically significant improvement in all assessed parameters.

Maximum improvement was observed in body weight, BMI and waist circumference.

Table 3: Effect of Selected Yogasana after 3 Months

Parameter	Before treatment	After 3 months	Mean difference	p-value
Body weight	85.95 ± 7.10 kg	83.95 ± 6.90 kg	2.00 kg	<0.001
BMI	31.70 ± 1.40	30.96 ± 1.37	0.74 kg/m ²	<0.001
Waist circumference	101.50 ± 6.10 cm	97.30 ± 5.80 cm	4.20 cm	<0.001
Hip circumference	108.90 ± 5.80 cm	106.00 ± 5.60 cm	2.90 cm	<0.001
Waist-hip ratio	0.93 ± 0.05	0.90 ± 0.04	0.03	<0.01
Systolic BP	131.80 ± 9.00 mmHg	127.00 ± 8.60 mmHg	4.80 mmHg	<0.01
Diastolic BP	83.90 ± 5.60 mmHg	80.60 ± 5.30 mmHg	3.30 mmHg	<0.01

Selected yogasana also produced statistically significant improvement in all parameters. Greater improvement was observed in waist

circumference and waist-hip ratio, suggesting beneficial effect on central obesity.

Table 4: Comparative Effect between Brisk Walking and Selected Yogasana

Parameter	Group A	Group B	Better response
Body weight	2.70 kg	2.00 kg	Brisk walking
BMI	1.00 kg/m ²	0.74 kg/m ²	Brisk walking
Waist circumference	3.40 cm	4.20 cm	Yogasana
Hip circumference	2.40 cm	2.90 cm	Yogasana
Waist-hip ratio	0.02	0.03	Yogasana
Systolic BP	6.20 mmHg	4.80 mmHg	Brisk walking
Diastolic BP	4.10 mmHg	3.30 mmHg	Brisk walking

The comparative analysis shows that both interventions were effective. Brisk walking showed better reduction in body weight, BMI while selected yogasana showed better reduction in waist circumference, hip circumference and waist-hip ratio.

Discussion:

The present study was conducted to compare the effect of 30-minute brisk walking and selected yogasana in moderately obese individuals over a period of 3 months. The findings showed that both interventions produced significant improvement in anthropometric and clinical parameters. In the brisk walking group, significant reduction was observed in body weight, BMI, waist circumference. Brisk walking is an aerobic exercise that increases energy expenditure and promotes fat oxidation. Regular moderate-intensity walking improves cardiovascular endurance, enhances skeletal muscle glucose uptake and helps in mobilisation of stored fat. The reduction in BMI and body weight observed in the present study may be due to consistent calorie expenditure and improvement in basal metabolic activity.

Waist circumference also reduced significantly in the brisk walking group. This is clinically important because waist circumference is a marker of central obesity and visceral fat. Central obesity is more strongly associated with insulin resistance, hypertension and

cardiovascular risk than general obesity alone. Therefore, even modest reduction in waist circumference has meaningful health significance.

In the selected yogasana group, significant improvement was also observed in body weight, BMI, waist circumference, hip circumference and waist-hip ratio. The reduction in waist circumference was comparatively greater in the yogasana group. This may be attributed to abdominal stretching, compression, twisting movements, improved tone of abdominal musculature and better regulation of digestion and metabolism. Asana such as Trikonasana, Katichakrasana, Pawanmuktasana, Bhujangasana, Shalabhasana and Setubandhasana provide mechanical stimulation to abdominal organs, improve circulation and may support correction of central adiposity.

Yoga also has a psychophysiological role in obesity management. Stress, anxiety, emotional eating and disturbed sleep are known contributing factors for weight gain. Yogasana with relaxation may reduce sympathetic overactivity and improve parasympathetic balance. This may help in reducing stress-related eating behaviour and improving self-control. Regular yoga practice also improves body awareness, discipline, flexibility and motivation towards healthy lifestyle.

When both groups were compared, brisk walking appeared slightly better for reduction in body weight and BMI. This may be because brisk walking provides continuous aerobic activity and higher calorie expenditure within a fixed duration. On the other hand, yogasana showed better improvement in waist circumference and waist-hip ratio, suggesting better effect on central obesity and body composition. Thus, both interventions have different but complementary benefits.

The reduction in body weight, better autonomic regulation and improved physical conditioning. Yogasana may reduce blood pressure through relaxation, reduction in sympathetic tone and improvement in stress response.

The findings of the present study are consistent with previous studies showing that aerobic exercise and brisk walking reduce body weight, BMI and waist circumference. Similarly, yoga-based interventions have been reported to improve anthropometric parameters, metabolic risk factors and quality of life in overweight and obese individuals. From a practical perspective, brisk walking is simple, cost-effective and suitable for community-level obesity prevention. It can be easily advised in outpatient departments, public health programmes and lifestyle clinics. Yogasana is also cost-effective and has additional advantages of improving flexibility, posture, stress, sleep and mental wellbeing. For moderately obese individuals, an integrated lifestyle programme combining brisk walking and yogasana may offer superior long-term results compared with either intervention alone.

Probable Mode of Action

Brisk Walking

1. Increases total energy expenditure.
2. Improves fat oxidation and reduces fat mass.
3. Enhances insulin sensitivity.
4. Improves cardiovascular endurance.

5. Promotes weight reduction through regular aerobic activity.
6. Improves lipid metabolism and vascular function.

Selected Yogasana

1. Improves flexibility and muscle tone.
2. Stimulates abdominal organs and improves digestion.
3. Reduces central obesity through abdominal stretching and compression.
4. Improves autonomic balance.
5. Reduces stress-induced eating behaviour.
6. Enhances mindfulness and lifestyle discipline.
7. Improves posture, respiratory efficiency and overall wellbeing.

Conclusion

The present study concludes that both 30-minute brisk walking and selected yogasana are effective in reducing obesity-related anthropometric parameters in moderately obese individuals over a period of 3 months. Brisk walking produced better improvement in body weight, BMI while selected yogasana produced better improvement in waist circumference, hip circumference and waist-hip ratio. Both interventions were safe, feasible, economical and suitable for routine lifestyle management. Therefore, brisk walking and yogasana can be recommended as effective non-pharmacological interventions for moderately obese individuals. A combined approach including brisk walking, yogasana, dietary regulation and lifestyle correction may provide better and sustained outcomes in obesity management.

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