



Original Article

Impact of brisk walking and aerobics in overweight women

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Abstract. [Purpose] Lack of physical activity and an uncontrolled diet cause excessive weight gain, which leads to obesity and other metabolic disorders. Studies have indicated that brisk walking and aerobics are the best methods for controlling and reducing weight and body mass composition. [Subjects and Methods] In this study, 45 overweight women were enrolled and divided into 3 groups. Women not involved in brisk walking or aerobics were included in group A ($n = 15$) as control subjects; women involved in brisk walking were in group B ($n = 15$); and those involved in aerobics were in group C ($n = 15$). [Results] This program was carried out 5 days/week for 10 weeks. Pre- and post-measurements of body mass index, waist and hip circumference, and skinfold thickness of the abdomen, subscapular area, biceps, and triceps were recorded for the women in all 3 groups. All values decreased in women who participated in brisk walking and aerobics for 10 weeks. [Conclusion] These results indicate that aerobics with diet therapy is a more effective intervention program for controlling and reducing body mass index and skinfold thickness than brisk walking with diet therapy in North Indian women.

Key words: Overweight, Brisk walking, Aerobics

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INTRODUCTION

Increased time spent on sedentary activities and decreased time spent on physical activities of moderate-to-vigorous intensity have been reported to be independently associated with the risk of developing metabolic syndrome and its components¹⁾. Physical activity is a vital part of a comprehensive weight loss and weight control program. It can decrease abdominal fat, increase cardiorespiratory fitness, and lead to weight loss in overweight and obese adults²⁾. Lifestyle factors related to obesity such as eating behaviors and physical activity play a major role in the prevention and treatment of type 2 diabetes³⁾. Metabolic syndrome refers to a group of symptoms including obesity, high blood pressure (BP), insulin resistance, and hyperlipidemia, with central obesity playing a critical role⁴⁾. Elevated body mass index (BMI) and abdominal obesity are associated with a number of diseases and metabolic abnormalities that have high morbidity and mortality. Obesity is defined as excess accumulation of body fat and is a heterogeneous disorder with a final common pathway in which energy intake chronically exceeds energy expenditure^{5, 6)}. Obesity is a multifactorial condition influenced by the combined effect of genes, the environment, and the interactions between these 2 factors. The prevalence of obesity has risen steadily over the past decades in adults and children to become a global epidemic and represents a major public health challenge. This epidemic shows no sign of abating⁷⁾.

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It was reported by the National Family Health Survey that 15% of women aged 15–49 years in the urban Indian population were obese with the BMI >30 kg/m², and 18% were overweight with a BMI of 25–30 kg/m². The proportion of overweight and obese individuals is 3 times higher in urban areas than in other areas, which could be attributed to lesser physical activity⁸. A study by Agrawal et al.⁹ that involved North Indian women found that the urban lifestyle significantly increased the risk of obesity⁹. It is also commonly believed that easy access to high-fat foods and overeating are the causes of obesity¹⁰. Walking at a pace of 4 mph is considered brisk walking, which is a popular and convenient form of exercise that plays an important role in weight management. It is often recommended for obese individuals, because it increases energy expenditure¹¹. A former study showed that including a moderate-intensity walking program in a weight maintenance program accelerated weight loss and decreased the waist circumference¹². Aerobic exercise includes walking and step aerobics; it improves the efficiency of the aerobic energy-producing systems that can improve cardiorespiratory endurance. Step aerobics has gradually become more popular in fitness and weight loss programs, and is a combination of low-impact aerobic dance movements and step aerobics. Diet and exercise have been proven to be the most effective interventions in weight reduction^{2, 13}. Previous reports on the association between brisk walking and aerobic exercises among North Indian women are limited, and there are no published perspective data on this association. Thus, the present study aimed to investigate the effects of brisk walking and aerobics on body mass composition in overweight North Indian women.

SUBJECTS AND METHODS

Forty-five overweight North Indian women who did not participate in any sport, exercises, or aerobics, and had not been involved previously in a study, were included in this study. All women were recruited from the Maharishi Markandeshwar University (MMU) campus. They were randomly assigned to 3 groups: group A (n = 15); group B (n = 15); and group C (n = 15). Group A was termed the control group; group B, which was termed the walking group, had a controlled diet and performed brisk walking for 45 minutes/day, 5 days/week; and group C, which was termed the aerobic group, had a controlled diet and performed aerobic exercise for 45 minutes/day, 5 days/week¹⁴. The diet was explained to groups B and C, and a diet chart to be followed for 10 weeks was given¹⁵. The BMI, waist circumference, and BP measurements were performed before and after the completion of a brisk walking or step aerobic exercise program for 45 minutes/day, 5 days/week, for 10 weeks. The inclusion criteria were being overweight with BMI <30 kg/m² and 21–30 years of age. Group A did not perform brisk walking or aerobics. Men, pregnant women, and diabetics, and those with musculoskeletal disorders, neurological disorders, cardiovascular disorders, or other gynecological problems were excluded from the study. Women who were not cooperative for this study were excluded. The study received ethical approval from the Department of Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation, MMU, Haryana, India. All women were provided with an explanation of the study program, and written informed consent was obtained.

BMI was calculated as weight/height² (kg/m²). BMI was then categorized according to the recommendations of the World Health Organization: below-normal weight (<18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), obese (30.0–39.9 kg/m²), and extremely obese (40 kg/m²). The BMI measurements were performed by trained women in health care centers. Height and body weight were measured without shoes and with light clothing. Height was measured to the nearest 0.5 cm and weight to the nearest 0.1 kg. Waist circumference was measured to the nearest 0.5 cm, at the level between the midpoint of the lowest rib and iliac crest, parallel to the floor, in the standing position. BP was measured by calculating the mean of 2 readings collected at an interval of 30 min in the sitting position. Hypertension was defined as mean systolic BP of 140 mm Hg and/or a diastolic BP of 90 mm Hg¹⁶.

Skinfold thickness is defined as a measurement of body composition in terms of the subcutaneous fat using a skinfold capillary (Cambridge Scientific Industries, Inc., Cambridge, MD, USA)¹⁷. In this study, the pre- and post-intervention skinfold thickness of the subscapular area, abdomen, biceps, and triceps was measured in all the groups.

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS 16.0 SPSS Inc., Chicago, IL, USA) software. All numerical data are expressed as mean±standard deviation. The differences between the variables were computed using the Student's t-test and ANOVA. Groups A and B were evaluated using an unpaired t-test to compare the effects of both interventions—walking with diet control and step aerobics with diet control—on BMI, waist circumference, and BP.

RESULTS

The pre-exercise anthropometric and skinfold thickness data are documented in [Table 1](#). In this study, 45 women were enrolled from the MMU in North India and were divided into 3 groups of 15 subjects each, based on the intervention: control, brisk walking, and aerobics. The mean ages of the women were almost similar among the 3 groups ($p > 0.05$). The anthropometric measurements such as height, weight, BMI, and waist and hip circumference were non-significant ($p > 0.05$). The skinfold thickness of the abdomen, subscapular area, biceps, and triceps were also non-significant ($p > 0.05$). The values recorded before the study were considered pre-values.

The post-values recorded after 10 weeks significantly differed among the 3 groups. The pre- and post-anthropometric and skinfold thickness data are shown in [Table 2](#). The control group participants showed minimal change, as they did not participate in brisk walking, aerobics, or diet therapy. The second (brisk walking) and third (aerobics) groups showed better

results when compared with the control group.

The pre-and post-intervention ANOVA results are shown in Table 3. Weight, BMI, waist circumference, and skinfold thickness of the abdomen, subscapular area, and triceps significantly differed among the 3 groups after 10 weeks of the program ($p < 0.05$). Hip circumference and skinfold thickness of the biceps showed a negative association ($p > 0.05$).

DISCUSSION

The present study aimed to investigate the effects of brisk walking and aerobics on body mass composition in overweight

Table 1. Clinical body measurements of the 3 groups

Anthropometric data	Group A (n = 15)	Group B (n = 15)	Group C (n = 15)
Age (years)	23.7±0.9	23.9±0.9	23.8±0.6
Weight (kg)	66.1±4.2	65.6±3.4	65.5±2.6
Height (cm)	153.7±4.7	152.4±2.9	152.5±2.3
BMI (kg/m ²)	27.8±0.9	27.6±1.4	27.1±1.0
Waist (cm)*	83.6±2.1	85.4±2.1	85.6±2.1
Hip (cm)	98.5±7.8	100.4±10.7	100.5±7.8
Abdomen (mm)	19.1±7.8	18.9±7.1	19.4±8.2
Subscapular (mm)	14.6±4.8	14.2±4.4	14.7±4.4
Biceps (mm)	7.8±2.7	8.3±2.9	8.4±2.8
Triceps (mm)	22.4±3.5	23.5±3.7	23.4±3.9

Kg: kilograms, cm: centimeters, kg/m²: kilogram/meter square, mm: millimeter

*Significant ($p < 0.05$)

Table 2. Comparison of pre- and post-values

Clinical details	Group A (n = 15)		Group B (n = 15)		Group C (n = 15)	
	Pre-values	Post-values	Pre-values	Post-values	Pre-values	Post-values
Age (years)	23.7±0.9	23.7±0.9	23.9±0.9	23.7±0.9	23.8±0.6	23.7±0.9
Weight (kg)	66.1±4.2	65.4±4.1	65.6±3.4	61.4±3.2	65.5±2.6	60.4±2.2
Height (cm)	153.7±4.7	153.7±4.7	152.4±2.9	153.7±4.7	152.5±2.3	153.7±4.7
BMI (kg/m ²)	27.8±0.9	27.2±0.8	27.6±1.4	26.4±1.2	27.1±1.0	25.8±0.8
Waist (cm)	83.6±2.1	82.6±1.9	85.4±2.1	82.1±1.9	85.6±2.1	80.8±1.8
Hip (cm)	98.5±7.8	98.1±7.6	100.4±10.7	96.4±10.1	100.5±7.8	95.1±6.4
Abdomen (mm)*	19.1±7.8	20.2± 8.2	18.9±7.1	14.2±4.9	19.4±8.2	14.3±4.6
Subscapular (mm)	14.6±4.8	15.9±5.1	14.2±4.4	12.8±4.6	14.7±4.4	12.1±4.5
Biceps (mm)	7.8±2.7	8.5±3.4	8.3±2.9	7.6±2.7	8.4±2.8	7.3±2.5
Triceps (mm)	22.4±3.5	24.6±4.8	23.5±3.7	18.8±2.7	23.4±3.9	18.7±2.7

*Significant ($p < 0.05$)

Table 3. ANOVA results for post-values

	Group A (n = 15)	Group B (n = 15)	Group C (n = 15)
Age (years)	23.7±0.9	23.7±0.9	23.7±0.9
Weight (kg)*	65.4±4.1	61.4±3.2	60.4±2.2
Height (cm)	153.7±4.7	153.7±4.7	153.7±4.7
BMI (kg/m ²)*	27.2±0.8	26.4±1.2	25.8±0.8
Waist (cm)*	82.6±1.9	82.1±1.9	80.8±1.8
Hip (cm)	98.1±7.6	95.4±9.1	95.1±6.4
Abdomen (mm)*	20.2± 8.2	14.2±4.9	14.3±4.6
Subscapular (mm)	15.9±5.1	12.8±4.6	12.1±4.5
Biceps (mm)	8.5±3.4	7.6±2.7	7.3±2.5
Triceps (mm)*	24.6±4.8	18.8±2.7	18.7±2.7

*Significant ($p < 0.05$)

North Indian women. The present study showed that aerobics with diet therapy is a better intervention for reducing BMI than brisk walking with diet therapy. The strength of the current study lies in the enrollment of control subjects of the same gender and similar age, thus minimizing the potential influence of variables in adiposity and physical fitness. The term “overweight” is defined as excessive fat accumulation, with a BMI in the range of 25.1–29.9 kg/m². The proportion of overweight individuals is expected to increase to 1.3–2.0 billion. The estimated death rate among overweight women is 2.8 million per annum¹⁸. BMI is known to be the standard measurement for obesity. Waist circumference is routinely used as an anthropometric variable to identify health risks associated with obesity. It has been shown that BMI and waist circumference independently contribute to the prediction of total body fat in overweight women.

Many previous studies have suggested that aerobics and brisk walking are the best methods for weight reduction^{19, 20, 29}. The difference between obesity and overweight is defined by the BMI. An individual who gains approximately 20% weight than the normal, i.e., 25–30 kg/m² or 1.0–1.2 prime, is identified as being as overweight, whereas an individual with BMI >30 kg/m² or 1.2–1.4 prime is identified as obese. Body fat composition is directly linked to obesity-related complications. Skinfold thickness is a parameter for body fat assessment, and it provides a good estimate of obesity and body fat distribution. It is a direct assessment of adiposity, a component of excess weight, which leads to pathology and influences BMI^{21, 22}. Skinfold thickness measurement is noninvasive and inexpensive, and can be readily applied in clinics, laboratories, and schools²³.

In the current study, aerobic exercise stimulated fat catabolism, established favorable BP responses, and promoted cardiovascular fitness. Regular exercise has a positive effect on mobilization and use of fatty acids from adipose tissues. It also facilitates protein retention in skeletal muscles and retards its breakdown rate. The fat-burning, protein-sparing benefits of regular exercise contribute to fat loss in a weight-loss program¹³. A previous study concluded that participating in brisk walking and aerobics in combination with diet therapy 3 days/week, for 10 weeks, did not lead to a significant reduction in BMI or waist circumference²⁴. The current study was carried out with the same interventions (brisk walking and aerobics + diet) performed 5 days/week, for 10 weeks, and the results, which differed from other studies^{24, 25}, supported this observation that vigorous exercise in obese women may reduce BMI. Another study involved young women who performed an aerobic dance exercise program; it was found that aerobic dance decreases body tissue and subcutaneous fat in young women²⁶. Maciejczyk et al.²⁷ conducted an aerobics study involving male subjects, and the results were negative. Lee et al.²⁸ concluded from their results that the effects of exercise therapy on blood lipids in obese women were significantly associated and shown the differences. Based on these results, it was concluded that aerobics and diet therapy can decrease BMI and body mass composition in overweight women. The limitations of this current study were the small sample size, recruitment of women and avoiding the obese women, and no male participants. In addition, other activities such as sports, physical activity, and swimming were not included.

In conclusion, the results verified that aerobics with diet therapy could be a more effective intervention for controlling and reducing BMI and anthropometrics compared to brisk walking with diet therapy. Future studies involving individuals of all age groups, both sexes, and different ethnicities with metabolic syndrome and other diseases are required.

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