

A Comparative Study of Aerobic vs Anaerobic Exercise on Weight Loss in Obese Individuals

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Abstract

Obesity has emerged as a global epidemic, and exercise is a cornerstone of non-pharmacological interventions. This study compares the effects of aerobic and anaerobic exercise on weight loss in obese individuals over a 12-week period. Participants were divided into two groups—one performing aerobic and the other anaerobic training. Results showed that while both modalities led to weight loss, aerobic exercise resulted in significantly greater reduction in total body weight and fat percentage. These findings highlight the effectiveness of aerobic exercise for individuals aiming at weight reduction.

Keywords: Obesity, aerobic exercise, anaerobic exercise, weight loss, body fat, exercise physiology

Introduction

Obesity, defined by a body mass index (BMI) ≥ 30 kg/m², is a major public health challenge associated with increased risk of cardiovascular disease, diabetes, and certain cancers [1]. Physical activity is widely recommended to combat obesity. However, the optimal type of exercise—whether aerobic or anaerobic—for effective weight loss remains debated [2].

Aerobic exercise (AE), such as walking, running, and cycling, primarily uses oxygen to generate energy and is known for its ability to burn fat. Anaerobic exercise (AN), such as resistance training or sprinting, relies on energy sources stored in the muscles and promotes muscle hypertrophy [3]. While anaerobic exercise is often associated with improved metabolic health, it is unclear how it compares with aerobic activity in terms of actual weight reduction in obese individuals [4].

This study seeks to evaluate and compare the impact of structured aerobic and anaerobic exercise programs on weight loss and body composition in obese adults.

Materials and Methods

Participants

A total of 60 obese individuals (BMI: 30–35 kg/m²), aged 25–45 years, were recruited. Exclusion criteria included recent participation in structured physical activity programs,

cardiovascular conditions, or orthopedic limitations. Participants were randomly assigned to either the aerobic group (AG) or the anaerobic group (ANG), with 30 individuals in each group.

Study Design

This was a randomized, controlled interventional study conducted over 12 weeks at two urban fitness centers. Both groups underwent supervised training 5 days/week, and all participants were advised to follow a balanced 1800 kcal/day diet.

Intervention Protocols

- **Aerobic Group (AG):** 45 minutes of moderate-intensity treadmill walking or cycling at 60–75% of maximum heart rate.
- **Anaerobic Group (ANG):** Resistance training focusing on large muscle groups using weights at 70–80% of one-repetition maximum (1RM); 3 sets of 10–12 reps per exercise.

Outcome Measures

- **Primary Outcome:** Weight loss (kg)
- **Secondary Outcomes:** BMI, body fat percentage (%), waist circumference (cm)
- Measurements were taken at baseline and post-intervention.

Statistical Analysis

Statistical analysis was performed using SPSS v26. Paired and unpaired t-tests were used to assess within-group and between-group differences. Significance was set at $p<0.05$.

Results

Baseline Characteristics

Participants in both groups were similar in age, weight, and baseline BMI (Table 1).

Table 1. Baseline Characteristics

Variable	Aerobic Group (AG)	Anaerobic Group (ANG)	p-value
Age (years)	34.2 ± 5.8	33.8 ± 6.1	0.81
Weight (kg)	94.3 ± 7.2	93.7 ± 7.5	0.72
BMI (kg/m²)	31.5 ± 1.4	31.4 ± 1.3	0.66

Weight Loss Outcomes

After 12 weeks, both groups exhibited significant weight loss, but the AG demonstrated a more pronounced reduction.

Table 2. Outcome Comparison Between Groups

Variable	AG (Pre)	AG (Post)	ANG (Pre)	ANG (Post)	p-value (AG vs ANG)
Weight (kg)	94.3 ± 7.2	87.6 ± 6.9	93.7 ± 7.5	90.1 ± 7.0	<0.01
BMI (kg/m ²)	31.5 ± 1.4	29.2 ± 1.3	31.4 ± 1.3	30.2 ± 1.2	<0.01
Body fat (%)	38.6 ± 4.5	33.1 ± 3.8	39.2 ± 4.7	35.6 ± 4.1	0.03
Waist circumference (cm)	102.3 ± 6.2	95.2 ± 5.7	101.7 ± 6.0	97.6 ± 5.9	0.04

Figure 1. Percentage Weight Loss in AG vs ANG
(Bar graph showing mean % weight loss across both groups)

Discussion

The findings of this study demonstrate that both aerobic and anaerobic exercises are effective in promoting weight loss, though aerobic exercise showed superior results in reducing total body weight and fat percentage.

These outcomes align with earlier research suggesting that aerobic activity is more effective at burning calories and reducing fat mass [5,6] . Anaerobic exercise, while beneficial for muscle gain and metabolic rate, may not contribute as much to immediate weight loss [7] . However, long-term resistance training could aid weight management through improved resting energy expenditure.

Importantly, waist circumference—a proxy for visceral fat—was reduced in both groups, reinforcing the health benefits of structured exercise interventions.

Limitations

The study duration was limited to 12 weeks. Long-term adherence, dietary intake compliance, and psychosocial factors were not assessed. Future studies should explore hybrid programs combining aerobic and anaerobic modalities for optimal health outcomes.

Conclusion

Aerobic and anaerobic exercises are both effective for weight reduction in obese individuals. However, aerobic training results in significantly greater reductions in weight, BMI, and fat percentage over a 12-week period. Aerobic exercise should be emphasized in obesity management programs, especially in early stages of weight loss interventions.

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