Effect of High-Intensity Interval Training (HIIT) on Speed and Cardiovascular Endurance among College Students

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Abstract

High-Intensity Interval Training (HIIT) has become one of the most effective training methods for improving physical fitness in a short duration. The present study aimed to determine the effect of an eight-week HIIT programme on speed and cardiovascular endurance among college students. Thirty male undergraduate students (18–22 years) were randomly selected and divided into an experimental group (n=15) and a control group (n=15). The experimental group participated in HIIT sessions three times per week for eight weeks, while the control group continued their regular physical activities without any structured intervention. Speed was assessed using the 50-meter sprint test, and cardiovascular endurance was measured using the Cooper 12-minute run test. Data were analyzed using descriptive statistics and paired and independent sample t-tests at the 0.05 significance level. Results indicated a statistically significant improvement in both speed and cardiovascular endurance in the experimental group compared with the control group. The findings suggest that HIIT is an efficient and practical training method for enhancing physical fitness among college students. Coaches, physical education teachers, and fitness professionals may incorporate HIIT into training programmes to improve athletic performance and general health.

Keywords: HIIT, Speed, Cardiovascular Endurance, Physical Fitness, College Students

Introduction

Physical fitness is a fundamental component of health and sports performance. Speed and cardiovascular endurance are among the most important fitness components required for success in various sports and daily activities. Traditional endurance training requires considerable time, whereas High-Intensity Interval Training (HIIT) has emerged as a time-efficient alternative capable of producing significant physiological adaptations.

Previous research has reported improvements in aerobic capacity, muscular endurance, and metabolic health following HIIT programmes. However, limited studies have examined its combined effects on speed and cardiovascular endurance among Indian college students.

Therefore, the present study investigates whether an eight-week HIIT programme can significantly improve speed and cardiovascular endurance.

Statement of the Problem

To determine the effect of High-Intensity Interval Training on speed and cardiovascular endurance among college students.

Objectives

1. To determine the effect of HIIT on speed.
2. To determine the effect of HIIT on cardiovascular endurance.

Hypotheses

H_0: There will be no significant difference between the pre-test and post-test scores.

H_1: There will be a significant improvement in speed and cardiovascular endurance following HIIT.

Method

Research Design

Experimental pre-test–post-test control group design.

Participants

- Total Participants = 30
- Age = 18–22 years
- Gender = Male
- Experimental Group = 15
- Control Group = 15

Variables

Independent Variable

- High-Intensity Interval Training (HIIT)

Dependent Variables

- Speed
- Cardiovascular Endurance

Training Programme

Duration: **8 Weeks**

Frequency: **3 Sessions per Week**

Session Duration: **30 Minutes**

Structure:

- Warm-up (5 min)
- HIIT (20 min)
- Cool-down (5 min)

Equipment

- Stopwatch
- Measuring Tape
- Running Track
- Cones
- Heart Rate Monitor

Test Administration

Speed Test

50-Meter Sprint Test

Cardiovascular Endurance Test

Cooper 12-Minute Run Test

Statistical Techniques

The following statistical techniques were used:

- Mean
- Standard Deviation
- Paired Sample t-test
- Independent Sample t-test

Results

Table 1

Speed (50-m Sprint Time)

Group	Pre-test Mean ± SD	Post-test Mean ± SD	t-value	p-value
Experimental	7.84 ± 0.29 sec	7.28 ± 0.22 sec	6.54	<0.05
Control	7.82 ± 0.31 sec	7.79 ± 0.30 sec	0.48	>0.05

Table 2

Cardiovascular Endurance (Cooper Test)

Group	Pre-test Mean ± SD	Post-test Mean ± SD	t-value	p-value
Experimental	2350 ± 118 m	2578 ± 130 m	7.13	<0.05
Control	2348 ± 120 m	2360 ± 122 m	0.39	>0.05

Graphical Representation

Speed decreased significantly (better performance), while cardiovascular endurance increased significantly after eight weeks of HIIT in the experimental group.

Discussion

The results demonstrate that the eight-week HIIT programme significantly enhanced speed and cardiovascular endurance among college students.

The improvement in sprint performance may be attributed to increased neuromuscular efficiency, greater recruitment of fast-twitch muscle fibers, and enhanced anaerobic power.

Similarly, cardiovascular endurance improved because repeated high-intensity intervals stimulate adaptations such as increased stroke volume, improved oxygen utilization, and enhanced aerobic capacity.

The findings are consistent with previous investigations by Gibala et al. (2012), Buchheit and Laursen (2013), and Weston et al. (2014), who reported substantial improvements in aerobic fitness following HIIT.

The control group showed no statistically significant improvement because they did not participate in structured training.

Limitations

- Small sample size.
- Male participants only.
- Eight-week duration.
- One college only.
- Nutritional intake was not controlled.

Conclusion

The present study concludes that High-Intensity Interval Training is an effective method for improving speed and cardiovascular endurance among college students. The programme produced statistically significant improvements compared with regular physical activity. Therefore, HIIT can be recommended for physical education programmes, athlete conditioning, and fitness development.

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