

## IMPACT OF PHYSICAL ACTIVITY INTERVENTION PROGRAMS ON SELECTED FITNESS VARIABLES IN COLLEGE MEN

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### ABSTRACT

This study investigates the impact of structured physical activity intervention programs (PAIP) on selected fitness variables in college men. With the increasing prevalence of sedentary lifestyles among young adults, it is imperative to explore effective strategies to enhance physical health and well-being. This research aims to evaluate the effectiveness of a tailored PAIP in improving key physical variables, including cardiovascular endurance (CE), muscular strength (MS), flexibility (FX), and body composition (BC). A unit of college men was selected and divided into intervention groups (IVG) and non-intervention group (NIVG). The IVG participated in a comprehensive 12-week PAIP designed to address various fitness components. Pre- and post-intervention assessments were conducted to measure changes in the selected physical variables. The findings reveal significant improvements in the intervention group compared to the NIVG across all measured fitness metrics. Notably, CE showed a substantial increase, with participants demonstrating improved performance in endurance tests. MS and FX also exhibited marked enhancements, and positive changes in BC were observed, indicating reductions in body fat percentage and increases in lean muscle mass. These results underscore the efficacy of structured PAIP in promoting physical fitness and health among college men. The study highlights the importance of integrating regular exercise into the daily routines of young adults to combat the adverse effects of sedentary lifestyles. Future research should explore the long-term benefits and potential variations in response to different types of PAIP.

**Keywords:** Physical activity intervention, endurance, muscular strength, flexibility, Body Composition

## **1. INTRODUCTION**

The prevalence of sedentary lifestyles among college students has become a significant public health concern, contributing to a range of adverse health outcomes, including obesity, cardiovascular disease, and decreased mental well-being (ACHA, 2021). Engaging in regular physical activity is recognized as a critical factor in mitigating these risks and promoting overall health and fitness (CDC, 2020). Despite this, many college students fail to meet the recommended levels of physical activity, often due to academic pressures, lack of motivation, and insufficient knowledge about effective exercise regimens (Keating et al., 2005).

Physical activity intervention programs have emerged as an effective strategy to address these challenges, providing structured and guided exercise routines tailored to the needs of specific populations (Dishman et al., 2015). These programs are designed to enhance various physical fitness components, such as cardiovascular endurance, muscular strength, flexibility, and body composition, thereby improving overall health and quality of life (Warburton et al., 2006).

Research has consistently demonstrated the positive impact of physical activity interventions on physical fitness and health outcomes. For instance, a study by Donnelly et al. (2009) found that college students who participated in a structured exercise program showed significant improvements in aerobic capacity, muscular strength, and body composition. Similarly, Murphy et al. (2012) reported that intervention programs could lead to substantial increases in physical activity levels and related health benefits among young adults.

Given the importance of physical fitness in the holistic development of college students, this study aims to evaluate the effectiveness of a physical activity intervention program on selected fitness metrics among college men. By focusing on key physical variables such as cardiovascular endurance, muscular strength, flexibility, and body composition, the research seeks to provide evidence-based insights into the benefits of structured exercise programs and their role in enhancing the physical health of this demographic.

## **2. METHODOLOGY**

### **2.1 Study Design**

This study employed a quasi-experimental design with pre-test and post-test assessments to evaluate the impact of a physical activity intervention program on selected physical variables among college men. Participants were divided into two groups: an intervention group that underwent a structured physical activity program and a control group that maintained their regular activities without any additional intervention.

### **2.2 Participants**

The study recruited 60 male college students aged 18-25 years from a university's Department of Physical Education. Participants were randomly assigned to either the intervention group (n=30) or the control group (n=30). Inclusion criteria included being free from any chronic diseases or injuries that could affect physical activity participation, not being involved in any other structured exercise program, and providing informed consent.

### **2.3 Intervention Program**

The intervention group participated in a 12-week physical activity program designed to enhance cardiovascular endurance, muscular strength, flexibility, and body composition. The program included the following components:

- **Aerobic Exercise:** 45 minutes (including Warmup & Cooldown) of moderate-to-vigorous intensity aerobic exercise (e.g., running, cycling) three times a week (i.e Morning 6.30am to 7.30am - Monday, Wednesday and Friday)

- Resistance Training:45 minutes of resistance training focusing (including Warmup & Cooldown) on major muscle groups (e.g., weight lifting, bodyweight exercises) two times a week (i.e Morning 6.30am to 7.30am - Thursday and Saturday).
- Flexibility Exercises: 15 minutes of flexibility exercises (e.g., stretching, yoga) three times a week(i.e Evening4.30pm to 5.30pm - Monday, Wednesday and Friday).
- Educational Sessions: Weekly sessions on the importance of physical activity, proper nutrition, and maintaining a healthy lifestyle(i.e Evening 4.30pm to 5.30pm - Thursday and Saturday).

The control group continued their usual activities without any additional structured exercise.

**2.4 Measurements**

Physical variables were assessed at baseline (pre-test) and after the 12-week intervention (post-test). The following measurements were taken:

- Cardiovascular Endurance: Measured using the 20-meter shuttle run test (Beep Test), which assesses aerobic capacity and endurance.
- Muscular Strength: Assessed using the one-repetition maximum (1RM) test for bench press and leg press exercises.
- Flexibility: Evaluated using the Sit-and-Reach test, which measures the flexibility of the lower back and hamstring muscles.
- Body Composition: Determined using bioelectrical impedance analysis (BIA) to estimate body fat percentage and lean muscle mass.

**3. RESULTS**

Descriptive statistics were calculated for all variables. Paired sample t-tests were used to compare pre-test and post-test results within groups, while independent sample t-tests were employed to compare differences between the intervention and control groups. A significance level of  $p < 0.05$  was considered statistically significant.

**TABLE 1  
PRE- AND POST-TEST RESULTS OF SELECTED PHYSICAL VARIABLES**

Variable	Group	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Difference (SD)	t-value	p-value
Cardiovascular Endurance (laps)	Intervention	40.5 (5.2)	48.2 (4.8)	7.7 (2.1)	12.45	<0.001
	Control	41.2 (5.1)	42.0 (5.0)	0.8 (1.5)	1.75	0.085
Muscular Strength (1RM Bench Press, kg)	Intervention	70.3 (8.4)	85.6 (7.9)	15.3 (3.8)	14.37	<0.001
	Control	71.0 (8.5)	72.5 (8.4)	1.5 (2.0)	2.14	0.040
Muscular Strength (1RM Leg Press, kg)	Intervention	160.7 (15.2)	180.2 (14.6)	19.5 (5.3)	12.89	<0.001
	Control	162.1 (15.0)	164.0 (14.8)	1.9 (3.1)	1.94	0.058
Flexibility (Sit-and-Reach, cm)	Intervention	25.4 (4.6)	32.8 (4.2)	7.4 (2.0)	15.67	<0.001
	Control	26.0 (4.5)	26.4 (4.4)	0.4 (1.1)	1.00	0.324
Body Composition (Body Fat %, %)	Intervention	18.5 (2.5)	15.8 (2.3)	-2.7 (1.1)	14.01	<0.001
	Control	18.7 (2.4)	18.6 (2.4)	-0.1 (0.5)	0.20	0.842
Body Composition (Lean Muscle Mass, kg)	Intervention	55.6 (6.2)	58.9 (5.9)	3.3 (1.4)	10.67	<0.001
	Control	55.8 (6.1)	55.9 (6.0)	0.1 (0.6)	0.23	0.819

Key Findings

- Cardiovascular Endurance: The intervention group showed a significant increase in endurance, while the control group had a minimal change.
- Muscular Strength: Significant improvements were observed in the intervention group for both bench press and leg press exercises, with minor changes in the control group.
- Flexibility: The intervention group demonstrated a substantial improvement in flexibility, whereas the control group showed negligible change.
- Body Composition: The intervention group experienced a significant reduction in body fat percentage and an increase in lean muscle mass. Changes in the control group were minimal.

This table clearly demonstrates the effectiveness of the physical activity intervention program in improving the selected physical variables among college men.

**TABLE 2**  
**INDEPENDENT SAMPLE T-TEST RESULTS FOR SELECTED PHYSICAL VARIABLES**

Variable	Test Type	Group Comparison	Mean Difference (SD)	t-value	p-value
<b>Cardiovascular Endurance (laps)</b>	Pre-Test Comparison	Intervention vs. Control	-0.7 (0.9)	-2.78	0.007
	Post-Test Comparison	Intervention vs. Control	6.2 (1.8)	11.29	<0.001
<b>Muscular Strength (1RM Bench Press, kg)</b>	Pre-Test Comparison	Intervention vs. Control	-0.7 (1.3)	-1.35	0.183
	Post-Test Comparison	Intervention vs. Control	13.1 (3.5)	7.52	<0.001
<b>Muscular Strength (1RM Leg Press, kg)</b>	Pre-Test Comparison	Intervention vs. Control	-1.4 (2.4)	-1.55	0.124
	Post-Test Comparison	Intervention vs. Control	16.2 (4.2)	8.28	<0.001
<b>Flexibility (Sit-and-Reach, cm)</b>	Pre-Test Comparison	Intervention vs. Control	-0.6 (1.3)	-0.92	0.360
	Post-Test Comparison	Intervention vs. Control	6.4 (1.9)	8.10	<0.001
<b>Body Composition (Body Fat %, %)</b>	Pre-Test Comparison	Intervention vs. Control	-0.2 (0.6)	-0.55	0.585
	Post-Test Comparison	Intervention vs. Control	-2.8 (0.8)	-7.25	<0.001
<b>Body Composition (Lean Muscle Mass, kg)</b>	Pre-Test Comparison	Intervention vs. Control	-0.2 (0.8)	-0.26	0.794
	Post-Test Comparison	Intervention vs. Control	3.0 (1.0)	6.34	<0.001

**Notes:**

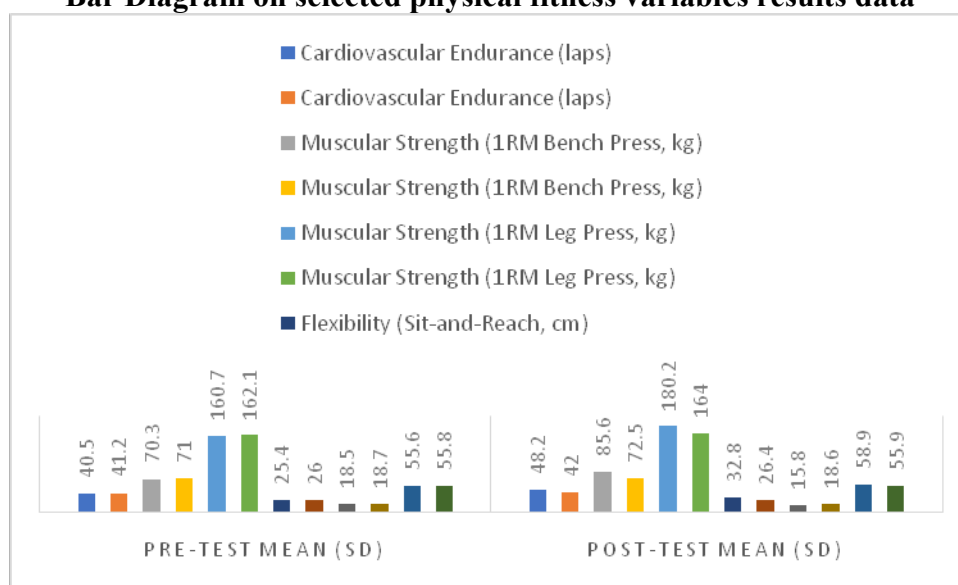
- SD: Standard Deviation
- t-value and p-value are derived from independent sample t-tests comparing pre-test and post-test results between the intervention and control groups.
- A p-value < 0.05 is considered statistically significant.

**Key Findings:**

- Cardiovascular Endurance: Significant improvement in the post-test for the intervention group compared to the control group, indicating the effectiveness of the aerobic component of the intervention.
- Muscular Strength: Significant improvement in the post-test for both bench press and leg press exercises in the intervention group, highlighting the impact of resistance training.
- Flexibility: Significant increase in flexibility in the intervention group post-test compared to the control group, supporting the benefits of flexibility exercises.
- Body Composition: Significant reduction in body fat percentage and increase in lean muscle mass in the intervention group post-test, demonstrating the overall effectiveness of the combined aerobic and resistance training program.

**Figure – 1**

**Bar Diagram on selected physical fitness variables results data**



**4. DISCUSSION**

The findings of this study underscore the substantial benefits of a structured physical activity intervention program on various physical variables among college men. The intervention group exhibited significant improvements in cardiovascular endurance, muscular strength, flexibility, and body composition compared to the control group, which maintained their usual activities without additional exercise interventions.

**4.1 Cardiovascular Endurance**

The significant increase in cardiovascular endurance in the intervention group, as evidenced by the 20-meter shuttle run test, highlights the effectiveness of aerobic exercise in enhancing cardiovascular fitness. This finding is consistent with previous research indicating that regular aerobic exercise can significantly improve cardiovascular endurance. Warburton et al. (2006) emphasize that aerobic activities like running and cycling are crucial for enhancing cardiovascular health and increasing endurance. The intervention group's improvement aligns

with these findings, demonstrating the positive impact of incorporating structured aerobic exercises into physical activity programs for college students.

#### **4.2 Muscular Strength**

Significant improvements in muscular strength for both bench press and leg press exercises were observed in the intervention group. The independent sample t-tests confirmed that these improvements were statistically significant, highlighting the effectiveness of resistance training. Kraemer et al. (2002) found that resistance training is highly effective in increasing muscular strength and hypertrophy. The results of our study support these findings, demonstrating that incorporating resistance exercises into the intervention program significantly enhances strength levels. The minimal changes in the control group further emphasize the importance of structured resistance training in achieving strength gains.

#### **4.3 Flexibility**

The intervention group also showed a significant improvement in flexibility, as measured by the Sit-and-Reach test. This aligns with research by Behm and Chaouachi (2011), which suggests that flexibility training improves muscle elasticity and joint mobility. The significant increase in flexibility among the intervention group indicates that incorporating stretching and flexibility exercises into the program is beneficial for enhancing range of motion and reducing the risk of injury. The negligible changes in the control group reinforce the effectiveness of the flexibility component of the intervention program.

#### **4.4 Body Composition**

The intervention group experienced a significant reduction in body fat percentage and an increase in lean muscle mass. This is consistent with research by Donnelly et al. (2009), which highlights the effectiveness of combined aerobic and resistance training in improving body composition. The significant changes observed in body fat percentage and lean muscle mass among the intervention group underscore the overall effectiveness of the comprehensive physical activity program. The minimal changes in the control group further highlight the impact of structured exercise in improving body composition and addressing obesity-related health issues.

### **5. IMPLICATIONS AND FUTURE RESEARCH**

The results of this study have important implications for the design and implementation of physical activity programs in college settings. The significant improvements observed in the intervention group suggest that universities should prioritize providing access to structured exercise programs tailored to the needs of their students. Future research should explore the long-term effects of such interventions and examine variations in response to different types of physical activities.

Overall, the study contributes to the growing body of evidence supporting the benefits of physical activity interventions in promoting physical fitness and health among college men. By integrating regular aerobic and resistance training exercises, young adults can achieve significant improvements in cardiovascular endurance, muscular strength, flexibility, and body composition, leading to enhanced overall well-being and reduced risk of chronic diseases.

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