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of Hip, Thigh and Calf among Overweight College
Students

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Abstract

Health related fitness is a blessing. it is the quality which enables a person to perform the daily routine tasks efficiently and effectively. Overweight is one of the factors that affect the health-related fitness. The main aim of the current study was to determine the effects of aerobic exercises on circumference of hip, thigh and calf among overweight college students. Twenty-five subjects were selected for the study through PAR-Q having age 20 to 24 years. The pretest data on dependent variables was collected through tape measurement. Ten weeks treatment of aerobic was given to the subjects for three days on alternate days per week. After the treatment, posttest data was collected of dependent variables through the procedure as adopted for the pretest data. The collected data (pre and post) of the subjects was tabulated. Mean, standard deviation and paired sample t test were used to analyses the data. The significance level was fixed at 0.05. It is concluded after the data analysis and findings that aerobic training has significant effects on circumference of hip, thigh and calf among overweight college students it is recommended that overweight students should take part in the aerobic training exercises for the enhancement of their health-related fitness.

Key words: Aerobic exercises, Hip. Thigh, Calf, overweight college students

Introduction

Obesity among college students has emerged as a significant public health concern, as it has a negative impact on both their physical and mental health. In recent years, there has been a considerable increase in the number of individuals in this group who are overweight or obese. This is mostly attributable to the prevalence of sedentary lifestyles, bad dietary choices, and the stress that is associated with academic expectations (Friedman et al., 2022). According to Pérez et al. (2023), obesity is naturally linked to a whole host of health risks, some of which include cardiovascular disease, diabetes, and psychological problems including anxiety and depression. As a result, it is of the utmost importance to remedy this situation.

Aerobic exercise, which aims to improve cardiovascular endurance and burn calories, has been shown to be an effective method for managing weight and boosting general fitness, according to studies. It comprises activities that promote walking, jogging, cycling, and swimming, as well as those that burn calories and improve cardiovascular health (Garcia et al., 2023). Furthermore, it covers activities that improve cardiovascular health. Recent research suggests that persons who are overweight can dramatically reduce their body fat and improve their body composition by engaging in regular aerobic exercise (Lee & Kim, 2023). This is especially true in critical areas such as the thighs, hips, and calves. By measuring the circumferences of specific body parts, such as the calves, thighs, and hips, it is crucial to analyze changes in fat distribution and body composition. Additionally, it is important to note that this evaluation is essential. According to Lopez-Jiménez et al. (2022), these measures not only serve as effective indicators of total body fat, but they are also key indications of the general health of the metabolic system. It is possible to minimize the risk of diseases that are associated with obesity by reducing the dimensions of the hips and thighs, which is frequently associated with a reduction in the accumulation of fat in these areas (Chen et al., 2023). According to Sharma et al. (2023), the calf circumference is an essential element to consider when evaluating the advantages of physical activity because it is associated with metabolic health and muscle mass.

In spite of the fact that aerobic exercise has been shown to have numerous benefits, there is still a dearth of research that specifically investigates the effects of aerobic exercise on the lower body circumferences of obese college students. Given the increased susceptibility of this population to the negative effects of obesity, it is of the utmost importance to investigate and investigate treatments that are successful and have the potential to alter body composition and foster healthy lifestyle preferences. The purpose of this research is to investigate the potential benefits of aerobic exercise on the circumferences of the hips, thighs, and calves of college students who are overweight. Within the context of this population, our objective is to provide recommendations that are supported by evidence for the appropriate inclusion of aerobic exercise as a practical strategy for the prevention of obesity and the enhancement of general health.

Objectives of the Study

- To find out the effects of Aerobic exercises on circumference of hip, thigh and calf among overweight college students
- To prepare a list of recommendations for the enhancement of body weight among overweight college students.

Hypotheses

There are significant effects of aerobic exercises on the circumference of hip, thigh and calf among overweight college students having age 20-24 years

Delimitations of the Study

Following were the delimitations of the study

- The study was delimited to male overweight students only.
- The number of students was twenty-five.
- The age range of subjects was between 20 to 24 years.
- The study was delimited to those students only who were residing in college hostel.
- The duration of the training was ten weeks with three sessions per week on alternate days (Monday, Wednesday and Friday).
- The independent variable was Aerobic exercises.
- The depended variables were circumference of hips, thigh and calf
- BMI formula ($\text{Weight in kg}/(\text{Height (cm)}/100)^2$) was applied to calculate the body status
- Tape measurement was used to measure the circumference of hip, thigh and calf

Limitations of the Study

- Following were the limitations of the study.
- The lack of time for the study was a drawback. Food habits were not controlled
- Weather conditions were not taken into pension
- No subject social and economic background.

Materials and Methods

Participants of the Study

In the context of experimental research, the term "study participants" refers to the entirety of all subjects, items, or individuals that are directly associated with the research topic for the purpose of data collecting (Ullah, Khan, Gul, & Ullah, 2022). All of the male students who were overweight and between the ages of 20 and 24 who lived in the college dormitories were included in the investigation.

Exclusion and Exclusion Criteria

The Physical Activity Readiness Questionnaire (PAR-Q) served as the basis for the inclusion and exclusion criteria that were established. The PAR-Q is a screening instrument that is stand-alone. Before beginning an exercise program, fitness instructors make use of it in order to identify participants who are eligible for the program and to reduce any potential health risks. It frequently has questions that do not allow for open-ended responses (Venkataraman et al.,

2024). A total of two hundred eighty students were tasked with completing the PAR-Q, and sixty-five of those individuals were deemed suitable for the research project. Twenty-five out of the sixty-five students who were overweight were selected at random to take part in the study as subjects.

Research Design

A research design is a methodology for addressing a problem (McKenney & Reeves, 2021). The current study was experimental and utilized a pre-test and post-test strategy. Each individual underwent a pre-test, during which a tape measure was employed to assess the dependent variables: hip, thigh, and calf circumference, prior to starting treatment. This was succeeded by the documentation of the scores for each topic. The experimental group engaged in aerobic activity on Monday, Wednesday, and Friday during each week for a duration of ten weeks subsequent to the pre-test. The pre-test protocol was followed for the post-test of each dependent variable topic after the 10-week treatment period involving 25 overweight participants. The dependent variable served as a benchmark to record the post-test outcomes of each participant.

Orientation of Subjects

The fundamental purpose of the orientation is to obtain reliable data. An orientation session was organized to motivate and completely engage the students in the chosen training and examinations. The researcher delineated the individuals' roles, along with the importance and aim of the present study. The researcher elucidated the dependent variable testing methodology and offered assistance on the requisite measurement protocol to all participants. Besides the introductory session, the researcher convened with the participants thrice to familiarize them with the methodologies and protocols pertinent to the exercises associated with their training. This enabled them to execute the activities accurately and mitigate potential health hazards. The researcher performed each exercise in the participants' presence.

Instrument for Collection of Data

An instrument is a device utilized for measurement. In a research study, an instrument refers to a device utilized by the researcher to gather data (Kola, 2022). The effective use of various instruments, such as questionnaires, assessments, and interviews, will depend on the nature of the study. The aim of this study was to assess the effect of aerobic exercise on the measurements of the hips, thighs, and calves. According to the existing literature, the BMI calculation ($\text{Weight in kg}/(\text{Height (cm)}/100)^2$) and tape measurement were utilized as criteria to gather relevant data on the dependent variables in this study.

Test Administration

Each subject's height (measured in centimeters) and weight (measured in kilograms) were ascertained throughout the PAR-Q distribution and collecting process among study participants. A digital weight scale was used to measure weight, and a stadiometer was used to measure height (without shoes). Wearing only the barest minimum of clothing, the participants stepped onto the weight machine. It was determined that the three weight measurements'

average results were accurate. In light of the following values, the BMI calculation (Weight in kg/(Height (cm)/100)**2) was used to estimate the overweight status.

BMI	Classification
<18.5	Under weight
18.5-24.9	Normal weight
25.0- 29.9	Over weight
30.0-34.9	Class I obesity
35.0- to 34.9	Class II obesity
> 40	Class III obesity

Ethical Consideration of the Study

The researcher must ensure that individuals are not subjected to any circumstances that may lead to physical or psychological injury as a result of their participation in the study. Consequently, all participants were apprised of the study's aims and procedures. The subjects were ensured to be devoid of various diseases by the utilization of PAR-Q for selection. Written consent was acquired from each participant. A consent letter from the director of the facility was also acquired.

Protocol of Aerobic Training

A self-administered aerobic training regimen was established over ten weeks, with each session comprising 50 minutes of exercise, inclusive of warm-up and cool-down phases. The warm-up and cool-down segments each endured for ten minutes. The cool-down session included static stretching activities, whereas the warm-up comprised active stretching exercises and a stroll. The exercise intensity ranged from 55% to 70% of the maximum heart rate. The aerobic exercise session included brisk walking, jogging, high knees, jumping jacks, and running.

Each participant engaged in exercises under the supervision of an individual who implemented interventions three separate days each week for 10 weeks. It was concluded that each workout session would endure for 30 minutes, excluding the warm-up and cool-down phases.

Analyses of Data

Data was collected by conducting assessments on the chosen subjects prior to and during the 10-week intervention. The paired sample test was conducted following the analysis of the recorded data to get empirical results. The tables and figures on the following pages present the complete test findings.

Demographic/anthropometric measurement of Aerobic group before treatment

Variable	Age (years) mean	N	Weight	Std
Pre test weight		25	73.21	13.01
Pre test Body Mass index	22.09	25	27.44	4.56

The average age, weight, and Body Mass Index of the twenty-five subjects in the Aerobic group are presented in the aforementioned table. The average age, weight, and BMI are 22.09 years, 73.21., and 27.44, respectively.

Pretest and Posttest Comparison of Hip Circumference of the Subjects

Variable	Test	N	Mean	Std Dev	Mean Diff	Df	Sig.
Hip Circumference	Pre	25	42.10	2.84	2.77	23	.000
	Post	25	39.33	2.62			

The table depicts the neck circumference of the participants. The data clearly demonstrates that the participant's hip circumference saw a substantial alteration following 10 weeks of aerobic exercise. Furthermore, the pre- and post-test findings in inches exhibited a statistically significant difference ($.000 < \alpha = 0.05$). The reduction in hip circumference was ascribed to the aerobic exercise program undertaken by the study subjects. Following ten weeks of aerobic exercise, the average measurement declined from 42.10 inches to 39.33 inches, resulting in a mean difference of 2.77 inches from the pre-test average.

Pretest and Posttest Comparison of Thigh Circumference of the Subject

Variable.	Test	N	Mean	Std. Dev	Mean Diff	Df	Sig.
Thigh Circumference	Pre test	25	22.77	2.92	2.26	23	.000
	Post test	25	20.51	3.29			

Each participant's pretest and posttest thigh circumference are displayed in the table. The data displays notable variations in the participant's thigh circumference in inches, indicating a significant difference ($.000 < \alpha = 0.05$) between the pre- and post-test measurements for 25 patients (22.77 inch > 20.51-inch, Improvement = 2.26 inch). The individuals in this study followed a specific aerobic training regimen for 10 weeks, which is what caused the reduction in thigh inches.

Pretest and Posttest Comparison of Calf Circumference of the Subjects

Variable.	Test	N	Mean	Std. Dev	Mean Diff	Df	Sig.
Calf Circumference	Pre test	25	14.85	1.04	0.64	23	.000
	Post test	25	14.21	.98			

The calf circumference of each participant is displayed in the table prior to and during the test. The chest circumference measurements of 25 respondents reveal a statistically significant difference ($.000 < \alpha = 0.05$) in chest circumference (15.85 inches > 14.21 inches, Improvement = 0.64 inches), while the participants' calf measurements in inches exhibit a notable shift. The

decrease in calf circumference was due to the participants in this study following a designated aerobic exercise program for 10 weeks.

Finding of the Study

Aerobic exercise was expected to substantially affect the circumference of the hip, thigh, and calf in adults aged 20–24, as evidenced by the body of studies. The data analysis revealed that aerobic activities significantly affected circumferences of the hip, thigh, and calf ($P < 0.05$). The hypothesis H1 is acceptable for the following reasons.

Conclusion

The main aim of this study was to determine the effect of aerobic exercise on the BMI and the circumferences of the hip, thigh, and calf in overweight college students aged 20 to 24. Aerobic exercise throughout a 10-week period significantly affected the dimensions of the neck, chest, and waist in overweight college students aged 20 to 24. This conclusion was derived from the analysis and findings.

Recommendations

1. As the study showed that aerobic exercises enhance the health-related fitness and reduce the weight among overweight students. Thus the overweight students should take aerobic exercises regularly.
2. Citizens are the asset of a nation. They may perform the assigned tasks efficiently and effectively when they are healthy. In order to create awareness among citizen about the role of aerobic exercises, seminars, workshop and conferences should be held.
3. The students are future generation of a nation. For the enhancement of health-related fitness of the students, aerobic exercises should be the part of curriculum in all educational institutions.
4. The physical trainers should also recommend and include the aerobic exercises in the protocols for the enhancement of trainees' health related fitness.

The Implications for Future Researchers

1. The current study was conducted in college. The future researchers should extend their studies to schools and universities.
2. The subjects' age range was 20 to 24 years in the in-hand study. The future researchers may extend their studies to other age groups.
3. In the current study only, male students were selected as subjects. The future researchers may conduct studies on female students.
4. Besides aerobic training, the future researchers may conduct the studies with other trainings as independent variables
5. The dependent variables of the current study were the circumference of hip, thigh and calf while in future the researchers may take psychological, physiological and sociological aspects as dependent variables.
6. In the in-hand study, the duration of the training was 10 weeks with 60 to 70% intensity of maximum heart rate of 60 minutes each session for three days per week.

In future the researchers may conduct the studies with different duration of training, intensity of exercises and session per week

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