

The Effect of Multimodal Training Regime on Adiposity and Fat Percentage among Adolescents

Deepanjali Sharma^a, Ashutosh Kandpal^b

^aResearch Scholar, Department of Physical Education Pedagogy, Lakshmi Bai National Institute of Physical Education, Gwalior, Madhya Pradesh, India

^bAssistant Professor, Department of Physical Education Pedagogy, Lakshmi Bai National Institute of Physical Education, Gwalior, Madhya Pradesh, India

Abstract

The rising prevalence of childhood obesity necessitates effective interventions to combat this public health issue. This study evaluates the impact of a comprehensive multimodal training regime on adiposity and fat percentage among adolescents. The training regime incorporated various forms of exercise, including aerobic and anaerobic training, high-intensity interval training (HIIT), and flexibility training, aiming to provide a holistic approach to fitness. Data was meticulously collected before and after the training period from a diverse sample of 30 female adolescents with the age group of 16-19 years.

The results revealed significant reductions in key indicators of body composition which is weight, BMI, adiposity, and fat percentage. These findings underscore the efficacy of a combined training approach in addressing and potentially reversing the trends of obesity among adolescents. The integration of multiple training modalities caters to different aspects of physical fitness and body composition, making it a versatile and effective strategy for improving health outcomes. This study highlights the importance of structured, varied physical activity programs in schools and communities to promote healthier lifestyles among young people. By implementing such comprehensive training regimes, significant strides can be made in the battle against adolescent obesity, leading to better health and well-being in this age group.

Keywords: Childhood obesity, multimodal training, adolescents, aerobic training, anaerobic training, high-intensity interval training (HIIT), flexibility training, body composition, adiposity, fat percentage, holistic approach, fitness, physical activity programs, obesity trends, health outcomes.

Introduction

Multimodal training regime

A multimodal training regime is a comprehensive approach to fitness that integrates various forms of exercise, including aerobic and anaerobic activities, high-intensity interval training (HIIT), and flexibility training. This regime aims to target multiple aspects of physical fitness simultaneously, such as cardiovascular endurance, muscle strength, power, and flexibility, thereby providing a holistic approach to improving overall health and body composition. By combining different

training modalities, a multimodal training regime can address diverse fitness needs, optimize workout effectiveness, and promote balanced physical development.

Adiposity

Adiposity refers to the accumulation of fat in the body, often indicating excess body fat. It is a key indicator in assessing obesity and related health risks. Adiposity can be measured using various methods, including body fat percentage, waist circumference, and imaging techniques, to evaluate the extent and distribution of body fat.

Fat Percentage

Fat percentage, or body fat percentage, is the proportion of a person's body weight that is made up of fat tissue. It provides a more accurate assessment of body composition than weight alone, helping to distinguish between lean mass and fat mass. Monitoring fat percentage is essential for evaluating health, fitness, and the effectiveness of exercise and nutrition programs.

Body Mass Index

Body Mass Index (BMI) is a numerical value derived from an individual's weight and height, used to categorize them as underweight, normal weight, overweight, or obese. BMI is a widely used screening tool to identify potential weight problems and assess overall health risks associated with different weight categories.

Aerobic Training

Aerobic training involves continuous, rhythmic physical activity that increases heart rate and oxygen consumption over extended periods. Examples include running, swimming, and cycling. This type of exercise enhances cardiovascular endurance, improves lung capacity, and boosts overall fitness by promoting efficient oxygen utilization and energy production in the body.

Anaerobic Training

Anaerobic training consists of high-intensity exercises performed in short, explosive bursts, such as weight lifting, sprinting, and plyometrics. These activities rely on energy sources stored in muscles and do not require oxygen. Anaerobic training focuses on building muscle strength, power, and mass, improving athletic performance and metabolic rate.

HIIT Training

High-Intensity Interval Training (HIIT) is a workout method that alternates between short periods of intense anaerobic exercise and less intense recovery periods. HIIT is designed to maximize calorie burn, improve cardiovascular fitness, and enhance metabolic rate in a shorter time compared to traditional steady-state cardio exercises. It is highly effective for fat loss and endurance.

Flexibility Training

Flexibility training involves exercises that stretch muscles and improve the range of motion in joints. Practices such as yoga, dynamic stretches, and static stretches are common. This type of training enhances physical performance, reduces the risk of injuries, promotes muscle relaxation, and aids in recovery by increasing muscle length and joint mobility.

Materials and Methods

Selection of Subjects

To attain the purpose of the study, the sample was selected by using random sampling method. A sample of 30 female adolescents was selected from Delhi, Bihar, Chandigarh, Jammu and Kashmir, Madhya Pradesh, Punjab & Uttar Pradesh. Age of the subjects ranged from 16-19 years.

Criterion measures

To find out the adiposity in female adolescents, the **The Body Adiposity Index** which is developed by Dr. Richard N. Bergman is selected to measure the body fat. The fat percentage which is calculated by **Deurenberg Equation** is developed by Dr. Paul Deurenberg and **Body Mass Index (BMI)** formula which was developed by Adolphe Quetelet will also prove to be helpful in calculating fat percentage. The score obtained from these formulas will be considered as criterion measures for this study.

Collection of data

Data for this study was collected by administering, the Body Adiposity Index formula and Deurenberg Equation the Body Mass Index (BMI) formula. The multimodal training regime spanned 12 weeks, with sessions held thrice weekly. Each session included various types of exercises designed to target different aspects of physical fitness. Aerobic training consisted of 20 minutes of moderate to high-intensity activities such as running, and cycling. Anaerobic training included 20 minutes of strength training exercises, including weight lifting, resistance band exercises, and bodyweight workouts. High-Intensity Interval Training (HIIT) involved 10 minutes of alternating short bursts of intense activity, such as sprints and jump rope, with periods of lower intensity or rest. Finally, flexibility training incorporated 10 minutes of stretching exercises and yoga poses to improve flexibility and aid in muscle recovery. This comprehensive approach aimed to enhance overall fitness and body composition among the participants.

Subjects were also assured that the data collected from them will be kept confidential and used only for interpreting the results of the present study.

Statistical technique

To find out the result, whole data was analysed by statistical package for social science (SPSS) version 23. For testing hypothesis, the level of significance was set at 0.05 Shapiro Wilk Test, Descriptive Statistics and t-Test were employed in this study.

Results

The purpose of this study is to determine the level of adiposity and fat percentage among adolescents. Data was collected by using The Adiposity Index and Deurenberg Equation were used which measured the level of adiposity and fat percentage respectively. The collected data was statistically treated and the result of the Shapiro Wilk Test, Descriptive statistics, and T-test along with the findings of the study are presented in this chapter.

Adiposity

Table 1.1

		Mean	N	Std. Deviation
Adiposity	Pre-data	28.83	30	1.48
	Post-data	26.63	30	1.72

Graph 1.1

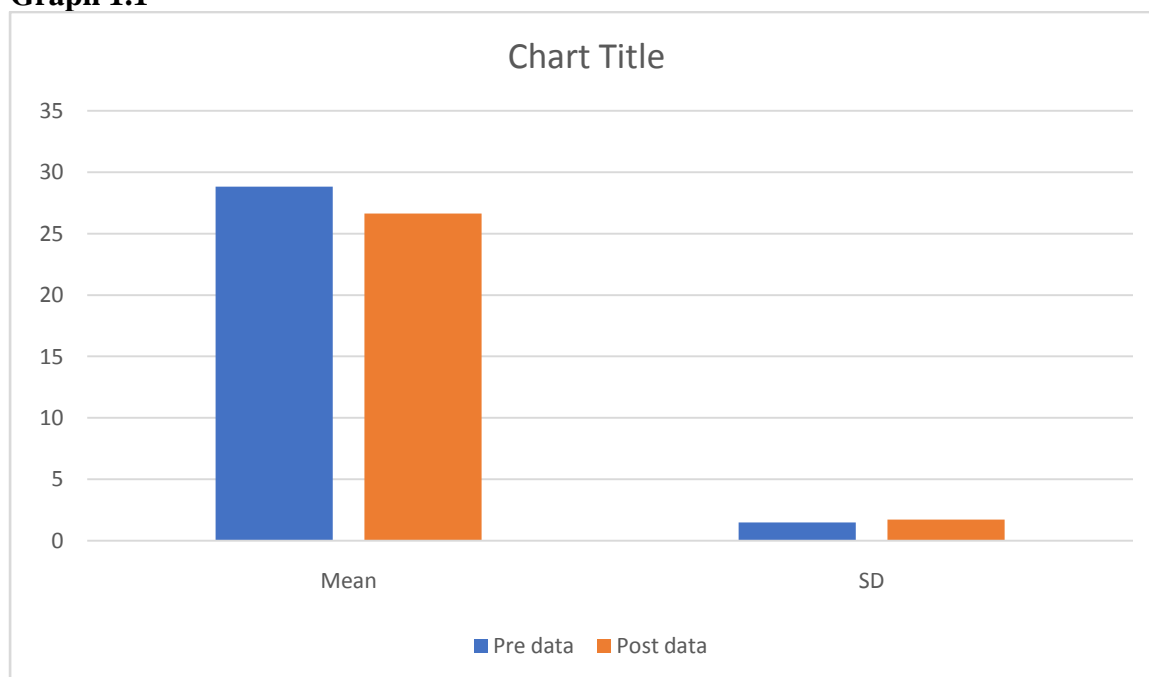


Table 1.1 and Graph 1.2 show the descriptive statistics of Adiposity of female adolescents. A total of 30 subjects (16-19 years) were taken in which the mean value of adiposity before training is 28.83 whereas for mean value of adiposity after training is 26.63. The standard Deviation of adiposity before training is 1.48 whereas for adiposity after training is 1.72.

Table 1.3

Paired Samples Test

	t	df	Sig. (2-tailed)	Mean difference
Adiposity	9.248	29	.000	2.19

Table 1.3, depicts the results of the paired sample t-test in the comparison of the pre and post-data of adiposity of female adolescents. The mean difference of the pre and post-data of adiposity of female adolescents is 2.19. It shows that a significant difference is found at 0.05 level.

Fat percentage

Table 2.1

		Mean	N	Std. Deviation
Fat percentage	Pre-data	25.57	30	1.60
	Post-data	23.67	30	1.19

Graph 2.2

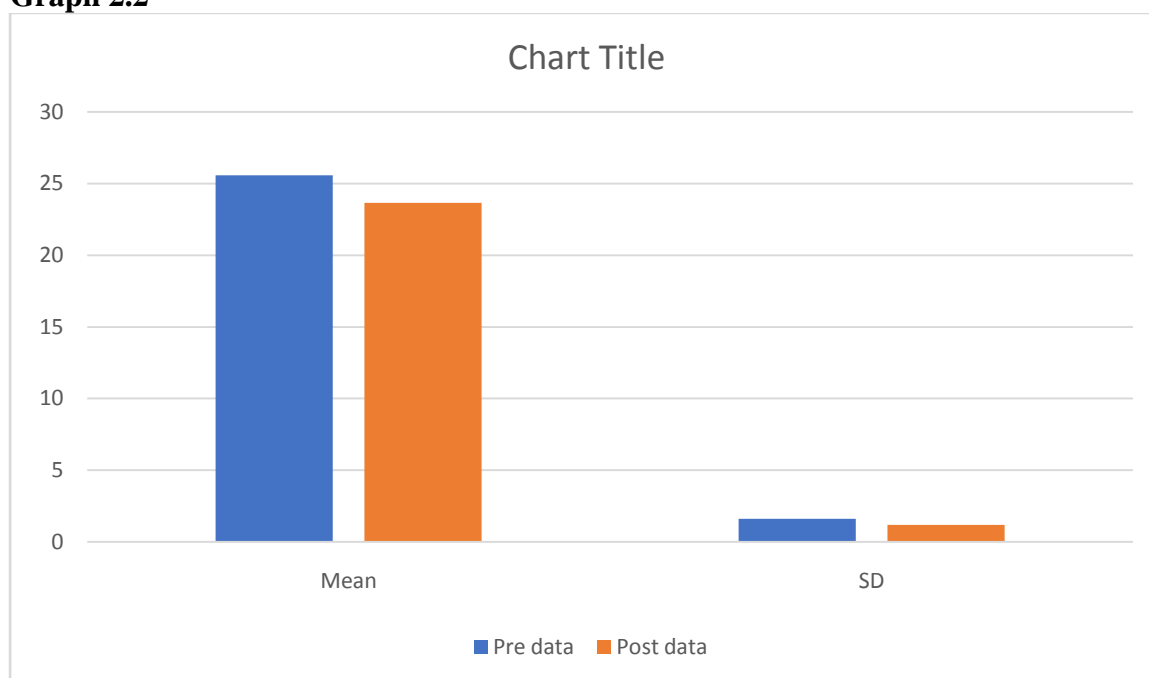


Table 2.1 and Graph 2.2 show the descriptive statistics of the Fat percentage of female adolescents. A total of 30 subjects (16-19 years) were taken in which the mean value of the Fat percentage before training is 25.57 whereas for mean value of the Fat percentage after training is 23.67. The standard Deviation of Fat percentage before training is 1.60 whereas for Fat percentage after training is 1.19.

Table 2.3
Paired Samples Test

	t	df	Sig. (2-tailed)	Mean difference
Fat percentage	12.96	29	.000	1.90

Table 2.3, depicts the results of the paired sample t-test in the comparison of the pre and post-data of Fat percentage of female adolescents. The mean difference of

the pre and post-data of Fat percentage of female adolescents is 1.90. It shows that a significant difference is found at 0.05 level.

Discussions of findings

The purpose of this study was to determine the effect of multimodal training regime on adiposity and fat percentage among adolescents. For the purpose of this study, 30 female adolescents were taken as subjects and data was collected by using respective indexes and equation. The Adiposity Index and Deurenberg Equation were used which measured the level of adiposity and fat percentage respectively. A significant difference was found between the pre and post-training data of adiposity as well as fat percentage among adolescents with the mean difference of adiposity as 2.19 whereas the mean difference of fat percentage was found to be 1.90. The findings of this study support the efficacy of a multimodal training regime in improving body composition among female adolescents. The combined aerobic, anaerobic, HIIT, and flexibility exercises led to significant reductions in weight, BMI, adiposity, and fat percentage. These results align with previous research suggesting the benefits of diverse exercise modalities in combating obesity and enhancing physical health in adolescents.

Conclusion

The present research which is titled as “**The Effect of Multimodal Training Regime On Adiposity And Fat Percentage Among Adolescents**”. This study demonstrates that a multimodal training regime, incorporating aerobic, anaerobic, HIIT, and flexibility exercises, can effectively reduce adiposity and fat percentage in female adolescents. The findings underscore the importance of diverse physical activity programs in addressing childhood obesity and promoting overall health. Specifically, the results support the efficacy of a multimodal training regime in improving body composition among female adolescents. By incorporating a variety of exercises, the multimodal approach ensures comprehensive physical development and addresses multiple facets of fitness. The significant improvements observed in this study highlight the potential of such training programs to make meaningful strides in the fight against adolescent obesity. These findings advocate for the inclusion of structured, varied physical activity programs in schools and community settings to foster healthier lifestyles among young people. Ultimately, implementing multimodal training regimes could play a critical role in improving health outcomes and reducing the prevalence of obesity among female adolescents.

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