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Comparative Effect of Hatha Yoga and Aerobic Training on Body Mass Index Among Overweight College Students

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Abstract

Health-related fitness is an invaluable asset, as it enables individuals to perform daily tasks with greater efficiency and effectiveness. One important aspect of health-related fitness is body composition. The primary goal of this study was to compare the effects of Hatha yoga

and aerobic training on body mass index (BMI) among overweight college students. Twenty-five participants, aged 20 to 24, were selected for each of two groups using the PAR-Q (Physical Activity Readiness Questionnaire). Pre-test data for the dependent variable were collected using a digital weight scale and stadiometer, with BMI calculated using the formula: **BMI = Weight (kg) / (Height (cm)/100)^2**. The Hatha yoga group and the aerobic training group each underwent a 10-week training program, with sessions held three times a week on alternate days. After the training period, post-test data were collected using the same procedures as the pre-test. The data from both pre- and post-tests were analyzed using SPSS version 24, employing mean, standard deviation, paired sample t-tests, and independent sample t-tests. The significance level was set at 0.05. The findings indicated that both training methods had a significant impact on BMI. Furthermore, the 10 weeks of Aerobic training produced more favorable results on BMI than Hatha yoga among overweight college students aged 20 to 24. Based on these results, it is recommended that overweight students engage in both Hatha yoga and aerobic exercises to improve their health-related fitness.

Key Words: Hatha yoga, Aerobic, Body Mass Index, overweight college students

INTRODUCTION

Overweight and obesity are critical public health challenges, particularly in younger populations such as college students, where lifestyle changes often lead to unhealthy weight gain (Lee, Quek, & Ramadas, 2023). The transition to higher education is frequently marked by an increase in sedentary behaviors, poor dietary habits, and stress, all of which contribute to the rise in body mass index (BMI) and the onset of related health issues such as hypertension, diabetes, and cardiovascular disease (Amit, Mishra, & Verma, 2023). According to the World Health Organization (WHO), the prevalence of overweight and obesity among young adults has been steadily rising, underscoring the urgent need for effective interventions (Hojjat, 2024).

Among various strategies to address this issue, physical activity stands out as a cornerstone of weight management. Exercise not only helps to control body weight but also offers numerous health benefits, such as improved cardiovascular health, enhanced muscle strength, and

better mental well-bein (Lucini, & Pagani, 2021). However, the type of exercise may influence its effectiveness in reducing BMI and promoting healthy body composition. Two commonly used forms of physical activity that have gained attention for their potential in weight management are Hatha Yoga and aerobic training (Govindaraj, Karmani, Varambally, & Gangadhar, (2016).

Hatha Yoga is a form of yoga that combines physical postures (asanas), breathing exercises (pranayama), and meditation. Traditionally viewed as a practice for mental and spiritual well-being, recent studies have increasingly recognized its physical health benefits. Yoga has been shown to positively impact weight management through improved stress reduction, hormonal regulation, and enhanced mindfulness in eating behaviors (Patil et al., 2022). Hatha Yoga also promotes flexibility, strength, and balance, potentially contributing to the reduction of visceral fat and lowering BMI (Kumar et al., 2023).

On the other hand, aerobic training, which includes exercises such as running, cycling, and swimming, is known for its effectiveness in burning calories and promoting fat loss. Aerobic activities increase heart rate and engage large muscle groups, which helps to improve cardiovascular fitness and promote a negative energy balance, leading to weight loss (O'Reilly et al., 2023). Due to its higher intensity, aerobic exercise has long been considered one of the most effective methods for reducing body fat and managing BMI in individuals with overweight or obesity.

Given the potential benefits of both Hatha Yoga and aerobic training, it is crucial to explore and compare their effectiveness in managing BMI, especially in college students who are prone to weight gain during their academic years. While several studies have individually examined the impact of Hatha Yoga or aerobic exercise on body weight (Chauhan et al., 2021; Singh et al., 2022), limited research has directly compared the two modalities in terms of their impact on BMI in overweight college students.

This study aims to compare the effect of Hatha Yoga and aerobic training on BMI among overweight college students. The research will assess which of these interventions is more effective in reducing BMI, and explore how each modality influences other health parameters such as body fat percentage, metabolic rate, and psychological well-being. By understanding the comparative benefits of these exercise types, this

study seeks to inform the design of more effective, tailored fitness programs for college students, potentially guiding health promotion initiatives within university settings.

This research is critical because it will offer insights into which physical activity, or combination thereof, could be most beneficial for students looking to manage their weight. Moreover, by incorporating both a mind-body approach (Hatha Yoga) and a more physically demanding activity (aerobic exercise), this study may provide a holistic perspective on the role of exercise in combating overweight and obesity in young adults.

Objective of the Study

- To identify the comparative effects of Hatha yoga and Aerobic exercises on body mass index among overweight college students having age 20-24 years
- To prepare a list of recommendations for the enhancement of body weight

Hypothesis

There are better effects of aerobic training on body mass index compared to hatha yoga among the overweight college students of 20-24 years.

Delimitations of the Study

Following were the delimitations of the study:

1. The study focused exclusively on male overweight students.
2. A total of twenty-five students were assigned to each group.
3. Participants were between the ages of 20 and 24 years.
4. The study was limited to students residing in the college hostel.
5. Each training program lasted for ten weeks, with three sessions per week on alternate days (Monday, Wednesday, and Friday).
6. The independent variables in the study were Hatha Yoga exercises and aerobic exercises.
7. The dependent variable was Body Mass Index (BMI).
8. A digital weight scale and stadiometer were used to measure weight and height.

Limitations of the Study

Following were the limitations of the study.

1. A limitation of the study was the constrained time frame.
2. Participants' food habits were not controlled or monitored.

3. Weather conditions were not considered in the study.
4. The study did not account for participants' social and economic backgrounds.

MATERIALS AND METHODS

Participants of the Study

In experimental research, the participants refer to the group of subjects, objects, or individuals directly involved with the research problem, and are central to the collection of the required data. (Addeo, Paoli, Esposito, & Bolcato, 2019). participants of the study were comprised all the male over weight students (20-24 years) who were residing in the college hostel.

Exclusion and Exclusion Criteria

The Physical Activity Readiness Questionnaire (PAR-Q) was used as both an inclusion and exclusion criterion. The PAR-Q is a screening tool that typically consists of closed-ended questions. Fitness trainers use it prior to the start of an exercise program to identify suitable participants and minimize potential health risks. (Bibi *et al.,* 20243After distributing and collecting the PAR-Q from 380 students, 65 were deemed eligible to participate in the study. From these 65 overweight students, 50 were randomly selected as subjects. They were then divided into two groups—Hatha Yoga and Aerobic—each consisting of 25 participants.

Research Design

Research design refers to a structured plan for addressing a research problem (Harwood, 2023). The present study followed an experimental design with a pre-test and post-test format. Before administering the treatment, a pre-test was conducted on each subject to measure the dependent variable (Body Mass Index, BMI) using a digital weight scale and stadiometer. Each subject's BMI score was calculated using the formula: (Weight in kg/(Height (cm)/100)**2)

Following the pre-test, the participants in each group received the designated treatment—Hatha Yoga or aerobic exercises—over a 10-week period, with three sessions per week (Monday, Wednesday, and Friday). After the 10-week intervention, a post-test was conducted on all subjects using the same procedure as the pre-test to measure changes in BMI. The post-test BMI scores for all participants were recorded to evaluate the impact of the treatments.

Orientation of Subjects

The goal of the orientation was to ensure the collection of reliable data. To motivate and engage the participants in the selected tests and training, an orientation session was conducted. During this session, the researcher explained the participants' roles, as well as the purpose and significance of the study. The researcher also clarified the methods for testing the dependent variables and provided detailed instructions on the procedures to follow for measurements. In addition to the orientation, the researcher held three practice sessions with the participants to familiarize them with the techniques and procedures involved in the exercises for each training type. This ensured that the participants could perform the exercises correctly and minimize the risk of injury. The researcher personally demonstrated each exercise to the participants to ensure proper execution

Instrument for Collection of Data

An instrument is a tool used for measurement. In research, an instrument refers to any device or tool employed by the researcher to collect data (Karunarathna, Gunasena, Hapuarachchi, & Gunathilake, 2024) Various types of instruments, such as questionnaires, interviews, and tests, can be used, depending on the nature of the study. The present study aimed to compare the effects of Hatha Yoga and aerobic exercises on Body Mass Index (BMI). Based on the available literature, a digital weight scale and stadiometer were used as the criterion measures to collect data related to the dependent variable in this study

Test Administration

In order to determine the overweight status of the subjects, the height (in centimeter) and weight (Kilogram) of each subject were determined during distribution and collection of PAR-Q among the participants of the study. The height (without shoes) was determined through stadiometer while the digital weight scale was used to determine weight. The participants stepped onto the weight machine in bare feet and minimum clothes. The average results of the three weight measurements were considered accurate. The BMI formula (Weight in kg/(Height (cm)/100)**2) was applied to determine the over weight status in the light of the following values.

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

It becomes the responsibility of the researcher not to put the subjects in a situation where they might be at risk of getting physically and psychologically injures owing to their participation in the study. For this purpose, all the subjects were clearly informed about the purpose and procedure of study. The subjects were selected through PAR-Q which ensured that they were free from different diseases. A written consent was obtained from each subject. Likewise, a consent letter was also got from the head of the institution.

Protocol of Hatha Yoga and Aerobic Training

A self-administered Hatha Yoga and Aerobic training program, each lasting 50 minutes per session (including warm-up and cool-down), was designed to run for ten weeks. The warm-up and cool-down periods were each 10 minutes long. Dynamic stretching exercises and walking were incorporated into the warm-up, while static stretching exercises were included in the cool-down. The intensity of the exercises ranged from 55 to 70% of the maximum heart rate.

For the Hatha Yoga sessions, participants performed a variety of asanas, including the auspicious pose, tortoise pose, cockerel pose, stretching tortoise pose, bow pose, spinal twist pose, back stretching pose, adept's pose, cow face pose, and waist twisting pose, with each pose held for a specific duration.

The Aerobic training session consisted of brisk walking, jogging, jumping jacks, high knees, and running.

All participants completed the exercises under supervision, with a 10-week intervention, meeting three alternate days each week. Each exercise session (excluding warm-up and cool-down) lasted 30 minutes.

SECTION A

Matching Process

Comparison between age, height and weight measurements of Hatha yoga group and Aerobic group before treatment

Variables	Groups	N	Mean	St. Dev	Std. Error	Df	T	Sig.
Age (years)	Hatha Yoga Group	25	21.80	1.45	.41	48	1.965	.062
	Aerobic Group	25	22.47	1.53	.385			
Height (cm)	Hatha Yoga Group	25	168.07	7.05	1.66	48	1.756	.092
	Aerobic Group	25	169.27	5.25	1.38			
Weight (kg)	Hatha Yoga Group	25	76.69	13.29	2.37	48	.472	.641
	Aerobic Group	25	78.21	13.01	1.45			

SECTION B: COMPARISON SECTION

Pretest and Posttest Comparison of Body Mass Index of the Hatha Yoga Subjects

Variable	Test	N	Mean	Std Dev	Mean Diff	Df	Sig.
Body Mass Index	Pre	25	27.79	5.64	1.47	24	.000
	Post	25	26.32	5.21			

The Table shows the body mass index of the subjects. Data shows prominent changes in the body mass index of the participant, and indicates a significant difference (.000< α= 0.05) in body mass index between the pre-test and post-test effect of ten weeks of hatha Yoga on body mass index. The decrease in the body mass index was due to a special exercise protocol that was applied to participants during the course of study. In the pre-test mean value was 27.79 BMI and after ten

weeks of hatha Yoga mean value decreased to 26.32 BMI which paved the way to mean difference 1.47 BMI.

Pretest and Posttest Comparison of Body Mass Index of the Aerobic Subjects

Variable	Test	N	Mean	Std Dev	Mean Diff	Df	Sig.
Body Mass Index	Pre	25	27.44	4.36			
					2.07	24	.000
	Post	25	25.37	3.96			

The Table shows the body mass index of the subjects. Data shows prominent changes in the body mass index of the participant, and indicates a significant difference (.000< α= 0.05) in body mass index between the pre-test and post-test effect of ten weeks of Aerobic on body mass index. The decrease in the body mass index was due to a special exercise protocol that was applied to participants during the course of study. In the pre-test mean value was 27.44 BMI and after ten weeks of aerobic mean value decreased to 25.37 BMI which paved the way to mean difference 2.07 BMI.

Post-test Comparison of Body Mass Index between Hatha Yoga Group and Aerobic Group

Variable	Group	*N*	Mean	Std. Dev	*Df*	*Mean diff*
Body Mass Index	Yoga	25	26.32	5.21	48	0.95
	Aerobic	25	25.37	3.96		

Though both hatha yoga and aerobic training have significant effects on the BMI yet aerobic training have better effects on Body Mass index than hatha yoga.

FINDING OF THE STUDY

In the light of the existing literature, it was hypothesized that there would be better effects of aerobic training on Body Mass Index compared to hatha yoga among the over weight (20-24) years college students. when the data was analyzed, it was found that aerobic training has better effects on the Body Mass Index compared to hatha yoga hence the hypothesis H1 is hereby accepted.

CONCLUSION

The main objective of the study was to find out the comparative effect of

Hatha yoga and aerobic training on the Body Mass Index among overweight college students having age 20 to 24 years. After analyses and findings, it was concluded that both trainings have significant effects on the Body Mass Index. In addition to it, aerobic exercises of 10 weeks have better effects on the Body Mass Index compared to hatha yoga among overweight college students of 20 to 24 years of age.

RECOMMENDATIONS

1. The study demonstrated that both Hatha Yoga and aerobic exercises improve health-related fitness and reduce Body Mass Index (BMI) among overweight students. Therefore, it is recommended that overweight students engage in regular Hatha Yoga or aerobic exercises.
2. Citizens are a nation's most valuable asset, and their efficiency and effectiveness in performing tasks are directly linked to their health. To raise awareness about the benefits of Hatha Yoga and aerobic exercises, seminars, workshops, and conferences should be organized.
3. Students represent the future of a nation. To improve their health-related fitness, Hatha Yoga and aerobic exercises should be incorporated into the curriculum of all educational institutions.
4. Physical trainers should consider recommending and including Hatha Yoga and aerobic exercises in their training protocols to enhance the health-related fitness of their trainees.

THE IMPLICATIONS FOR FUTURE RESEARCHERS

1. The present study was conducted in a college setting. Future researchers may consider expanding their studies to include schools and universities.

2. The age range of participants in this study was 20 to 24 years. Future studies could explore a broader range of age groups.

3. This study focused solely on male students. Future research could include female students to examine potential gender differences.

4. In addition to Hatha Yoga and aerobic training, future researchers could investigate other types of training as independent variables.

5. The dependent variable in this study was Body Mass Index (BMI). Future studies may explore additional dependent variables, such as psychological, physiological, and sociological factors.

6. In the current study, each training session lasted 60 minutes,

with an intensity of 60 to 70% of the maximum heart rate, over a period of 10 weeks, with three sessions per week. Future research could examine different durations, intensities, and frequencies of exercise sessions.

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