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Comparative effects of Hatha Yoga and Aerobic exercises upon the Circumference of Neck, Chest and Waist among the 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 comparative effects of hatha yoga training and

aerobic training upon circumference of neck, chest and waist among overweight college students. Two groups each of 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 each of Hatha yoga and aerobic training was given to the subjects of hatha group and aerobic group respectively 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 of each group was tabulated. Mean, standard deviation, paired sample t test and independent sample t test were used to analyses the data. The significance level was fixed at 0.05. it was concluded that both trainings have significant effects on the circumference of neck, chest and waist. Besides it, aerobic exercises of 10 weeks had better effects on the circumference of chest and waist compared to hatha yoga while hatha yoga have better effects on neck among overweight college students of 20 to 24 years of age. it is recommended that overweight students should take part in the hatha yoga exercises and aerobic exercises for the enhancement of their health-related fitness.

Key words: HathaYoga, Aerobic, neck, chest, waist, overweight

Introduction

Obesity among college students has become a significant public health concern owing to the rising incidence of sedentary behaviors, inadequate nutritional choices, and heightened academic pressure (Kumar et al., 2023). This group is susceptible to numerous health complications linked to obesity, including diabetes, cardiovascular disease, and psychological conditions such as anxiety and depression (Patel & Khan, 2022). To address these challenges, it is essential to deploy intervention measures that foster healthier lives and improve physical fitness.

Hatha yoga and aerobic exercise are both esteemed techniques for improving physical health, each offering distinct advantages. Hatha yoga combines physical postures, breath regulation, and meditation to improve mental health, strength, and flexibility (Brown et al., 2023). Recent research (Maharaj et al., 2023) indicates that yoga can aid overweight patients in weight loss and improving overall body composition. The focus on mindfulness in yoga may enhance stress management and encourage healthier eating habits, hence promoting weight loss and other health benefits (Smith & Lee, 2023).

Aerobic exercise, which includes constant and rhythmic activities like cycling, jogging, and swimming, primarily enhances cardiovascular endurance and facilitates calorie expenditure (Garcia et al., 2023). Research has consistently proved the benefits of aerobic exercise in decreasing body fat and improving measurements of waist, thorax, and neck circumference (Chen et al., 2022). Metrics of metabolic health and adipose tissue distribution, including waist

circumference, are crucial. According to Lopez-Jiménez et al. (2022), abdominal obesity and an increased risk of metabolic disorders are specifically linked to waist circumference.

A limited number of studies have evaluated the effects of aerobic exercise and Hatha yoga on the circumferences of the waist, thorax, and neck in overweight college students. Gaining insights into the effects of these two activity categories on body composition can significantly aid in formulating tailored therapies for obesity in this cohort. While breast and waist circumferences are recognized indications of overall fat reduction, neck circumference—often overlooked—is emerging as a significant predictor of several health concerns (Thompson et al., 2023).

This study aims to assess the effects of aerobic exercise and Hatha yoga on the circumferences of the waist, torso, and neck in obese college students. Our aim is to examine the distinct contributions of both exercise modalities to get insights into effective strategies for improving the health and well-being of this at-risk population.

Objective of the Study

- To find out the comparative effects of Hatha yoga and Aerobic exercises on circumference of neck, chest and waist among overweight college students age group 20-24 years
- To prepare a list of recommendations for the enhancement of body weight among overweight college students age group 20-24 years

Hypotheses

There are better effects of hatha yoga on the circumference of neck while aerobic training has better effects on circumference of chest and waist compared to hatha yoga training among the overweight (20-24) years college students.

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 of each group.
- 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 each training was ten weeks with three sessions per week on alternate days (Monday, Wednesday and Friday).
- The independent variable was hatha yoga exercises and aerobic exercises.
- The depended variables were circumference of neck, chest and waist.
- Tape measurement was used to measure the circumference neck, chest and waist

Limitations of the Study

The following were the limitations of the study.

- The lack of time for the study was a drawback.
- Food habits were not controlled
- Weather conditions was not taken into consideration.
- The social and economic conditions were not giving attention.

Materials and Methods

Participants of the Study

In the context of experimental research, the term "study participants" refers to the group of all subjects, items, or individuals that are directly relevant to the research topic in order to obtain the necessary data (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 suitable 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). Two hundred eighty students were given the assignment of completing the PAR-Q, and sixty-five of those students were deemed reliable enough to be included in the study. Random selection was used to select fifty of the sixty-five students who were overweight to participate in the study. In addition to this, they were divided into two groups, each consisting of twenty-five participants: aerobic and Hatha yoga.

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. A pre-test was performed on each subject to assess the dependent variables (waist, thorax, and neck circumferences) utilizing a measuring tape before the initiation of treatment. This was succeeded by the documentation of the scores for each topic. Subsequent to the pre-test, each group engaged in a ten-week treatment regimen of aerobic workouts and hatha yoga, conducted on alternating Mondays, Wednesdays, and Fridays. The post-test process followed the pre-test protocol, with the dependent variables of each subject in both groups being assessed after a 10-week treatment period for overweight subjects. The post-test scores of each individual in both categories were documented under the influence of the dependent variables.

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 testing methodology for the dependent variable and offered recommendations on the requisite measurement protocol to be followed by all people. Besides the introductory session, the researcher convened with the participants on three occasions 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 avert possible health hazards. The researcher performed each exercise in the participants' presence.

Instrument for Collection of Data

One definition of an instrument is a device that is used for measuring. According to Kola (2022), an instrument is a gadget that is used by the researcher in order to collect data for the purpose of conducting a research study. Utilizing a variety of instruments, such as questionnaires, assessments, and interviews, in an efficient manner will be contingent upon the type of the study being conducted. This research was conducted with the intention of determining the impact that aerobic exercise and Hatha yoga have on the circumferences of the waist, chest, and neck on the participants. In accordance with the existing body of research, the instrument of tape measurement was utilized as a criterion measure in order to collect pertinent data concerning the dependent variables in this study.

Test Administration

The height (in meters) and weight (in kilograms) of each subject were documented during the distribution and collection of the PAR-Q among study participants to determine their overweight status. A stadiometer was employed to ascertain height (without footwear), and a digital scale was utilized to determine weight. The competitors, clad in little attire, approached the weight machine. The three weight measurements were averaged, and the results were considered precise. The subsequent values were considered in the application of the BMI formula (Weight in kg/(Height (cm)/100)**2) to determine 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 is responsible for ensuring that volunteers are not exposed to any conditions that may jeopardize their bodily or psychological well-being during the study. Consequently, all subjects were thoroughly informed of the study's objectives and procedures. The use of PAR-Q ensured that the subjects were free from numerous diseases. All participants submitted written consent. A consent letter was acquired from the head of the institution.

Protocol of Hatha Yoga and Aerobic Training

A self-directed aerobic and Hatha yoga regimen, lasting 50 minutes per session and incorporating warm-up and cool-down phases, was established for a duration of 10 weeks. 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. Hatha yoga postures are termed asanas. The asana practice involved performing various postures and exercises for specified durations, including the adept's pose, cow face pose, auspicious pose, tortoise pose, cockerel pose, stretching tortoise pose, bow pose, spinal twist pose, and back stretching pose. The aerobic exercise session included brisk walking, jogging, high knees, jumping jacks, and running.

Every participant engaged in exercises under the oversight of an individual who implemented interventions on three separate days each week for a duration of ten weeks. It was concluded that each training session would endure for 30 minutes, excluding the warm-up and cool-down phases.

Analyses of Data

Data were collected by delivering assessments to the chosen subjects both prior to and during the 10-week intervention. The independent sample t test and paired sample test were conducted following the analyses of the recorded data to get empirical results. The tables and statistics on the following pages present the comprehensive test findings.

Demographic/anthropometric measurement of Hatha yoga group before treatment

Variable	Age (years) mean	N	Weight	Std
Pre test weight		25	70.33	13.29
Pre test Body Mass index	22.81	25	27.79	5.64

The average age, weight, and BMI of the twenty-five participants in the Hatha yoga group are displayed in the above table. The average BMI, weight, and age are 27.79, 70.33, and 22.81 years, respectively.

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 above table indicates the average age, weight and Body Mass Index of the twenty five subjects of Aerobic group. The mean age, weight and BMI are 22.09 years, 73.21 and 27.44 respectively.

Pretest and Posttest Comparison of Neck Circumference of the Hatha Yoga Training Subjects

Variable	Test	N	Mean	Std Dev	Mean Diff	*df*	Sig.
Neck Circumference	Pre	25	13.02	.9457			
					0.95	23	.000
	Post	25	12.07	.9064			

The table displays the pelvic circumference of the participants. The participant's neck circumference experienced a significant alteration in inches over the ten-week period of hatha yoga practice. The pre- and post-test findings demonstrated a significant difference in neck circumference (.000< α= 0.05). A particular exercise routine was implemented for the study participants, resulting in a decrease in hip measurements. After ten weeks of hatha yoga practice, the average value diminished from 13.02 inches to 12.07 inches, reflecting a 0.95 inch reduction from the pre-test mean.

Pretest and Posttest Comparison of Neck Circumference of the Subjects of Aerobic Training

Variable	Test	N	Mean	Std Dev	Mean Diff	*Df*	Sig.
Neck Circumference	Pre	25	13.43	.8916			
					0.68	23	.000
	Post	25	12.75	.6613			

The table depicts the neck circumference of the participants. The data clearly demonstrates that the participant's hip circumference had a notable alteration following 10 weeks of aerobic exercise. The pre- and post-test findings in inches exhibited a statistically significant difference (.000 < α = 0.05). The reduction in neck circumference was directly attributable to the aerobic exercise program undertaken by the participants during the study. The pre-test mean was 13.43 inches, which fell to 12.75 inches after ten weeks of aerobic activity, yielding a mean difference of 0.68 inches.

Post-Test Comparison of Neck Circumference Between Hatha Yoga Group and Aerobic Group

Variable	Group	*N*	Mean	Std. Dev	*Df*	*Mean diff*

Neck Circumference	Yoga	25	12.07	.9064	50	0.68
	Aerobic	25	12.75	.6613		

Though hatha Yoga exercises and aerobic exercises have significant effects on circumference of neck but hatha yoga training have better effects than aerobic training

Pretest and Posttest Comparison of Chest Circumference of the hatha Yoga Group Subjects

Variable.	Test	N	Mean	Std. Dev	Mean Diff	*Df*	Sig.
Chest Circumference	Pre test	25	36.60	6.60	1.25	23	.000
	Post test	25	35.35	6.31			

The table presents the quadriceps circumference of each participant during the pretest and posttest phases. The results reveal a substantial difference (.000< α= 0.05) in chest circumference between pre- and post-test measures of twenty-five patients (36.60 inches > 35.35 inches, Improvement = 1.25 inches). The thigh circumference of the participants in this study diminished due to their compliance with a designated hatha yoga exercise routine during a duration of 10 weeks.

Pretest and Posttest Comparison of Chest Circumference of the Aerobic Group Subjects

Variable.	Test	N	Mean	Std. Dev	Mean Diff	*Df*	Sig.
Chest Circumference	Pre test	25	39.39	3.84	2.25	23	.000
	Post test	25	37.14	3.69			

The chest circumference of each subject is presented in the table prior to and following the test. A statistically significant difference (.000< α= 0.05) exists in the chest circumference of twenty-five subjects between the pre-test and post-test (improvement = 2.25 inches, 39.39 inches > 37.14 inches). The data distinctly indicates alterations in the participant's chest measurement in inches. The participants in this study adhered to a designated aerobic exercise protocol for 10 weeks, resulting in a decrease in thigh circumference.

Pretest and Posttest Comparison of Waist Circumference of the hatha Yoga Group Subjects

Variable.	Test	N	Mean	Std. Dev	Mean Diff	*Df*	Sig.
Waist Circumference	Pre test	25	36.43	5.56	1.93	23	.000
	Post test	25	34.50	5.32			

The table presents the waist circumferences of each person before and after the test. The data reveals significant alterations in the participants' waist circumference between pre- and post-test measures of twenty-five subjects

(36.43 inches > 134.50 inches, Improvement = 1.93 inches), indicating a statistically significant difference (.000 < α = 0.05) in waist circumference. The participants in this study adhered to a distinctive yoga exercise schedule for 10 weeks, resulting in a reduction in waist circumference.

Pretest and Posttest Comparison of Waist Circumference of the Aerobic Group Subjects.

Variable.	Test	N	Mean	Std. Dev	Mean Diff	*Df*	Sig.
Waist Circumference	Pre test	25	37.49	3.95	2.66	23	.000
	Post test	25	34.83	3.39			

The chest circumference of each subject is presented in the table prior to and following the test. Data indicated significant variations (.000< α= 0.05) in the chest circumference of 25 participants between the pre- and post-test (37.49 inches > 34.83 inches, Improvement = 2.66 inches). Participants' chest measurements exhibit significant alterations over time. The participants in this study adhered to a defined aerobic exercise protocol for 10 weeks, resulting in a decrease in waist circumference.

Post-test Comparison of Waist Circumference Between Hatha Yoga Group and Aerobic Group

Variable	**Group**	***N***	**Mean**	**Std. Dev**	***Df***	***Sig.***
Waist Circumference	Yoga	25	34.50	5.32	50	0.33
	Aerobic	25	34.83	3.39		

Even though both hatha yoga and cardiovascular exercise have a considerable impact on chest diameter, the impact that aerobic exercise has on waist circumference is more obvious than the impact that yoga has on chest diameter.

Finding of the Study

It was expected that hatha yoga would exert a more significant influence on neck circumference than aerobic training in overweight college students aged 20 to 24, but aerobic training would have a more pronounced effect on chest and waist circumference, according to existing data. Upon analysis, it was concluded that aerobic training exhibited greater effects on waist and chest circumference compared to yoga training, however hatha yoga demonstrated more significant benefits for neck circumference. Hypothesis H1 is currently endorsed for the mentioned reasons.

Conclusion

Among college students who were overweight and between the ages of 20 and 24, the primary objective of the study was to investigate the effects of aerobic training and Hatha yoga on the circumferences of the waist, thorax, and neck with the participants. As can be observed from the research and the results, both training regimes had a considerable impact on the circumferences of the waist, chest, and neck. Furthermore, hatha yoga had a

more significant impact on the circumference of the neck among overweight college students between the ages of 20 and 24, but aerobic exercise performed over a period of ten weeks had a more significant impact on the circumference of the chest and waist in comparison to hatha yoga.

Recommendations

1. As the study showed that hatha yoga exercises and aerobic exercises enhance the health related fitness and reduce the circumference of neck, chest and waist among overweight students. Thus, the overweight students should take part in hatha yoga exercises or 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 hatha yoga and 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, hatha yoga and aerobic exercises should be the part of curriculum in all educational institutions.
4. The physical trainers should also recommend and include the hatha yoga and aerobic exercises in the protocols for the enhancement of trainee's 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 hatha yoga and aerobic trainings, 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 neck, chest and waist while in future the researchers may take psychological, physiological and sociological aspects as dependent variables.
6. In the in-hand study, the duration of each 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 trainings, intensity of exercises and session per week.

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