



EFFECT OF AEROBIC EXERCISES ON STRESS, WAIST HIP RATIO AND BODY MASS INDEX IN OVER WEIGHT ADULTS

Physiotherapy

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ABSTRACT

The World Health Organization defines "overweight and obesity" as abnormal or excessive fat accumulation that may impair health. BMI is based on height and weight; however, it accounts for fat, muscle, bone, and water weight. The objective of the study to find the effect of aerobic exercises on stress, BMI and waist hip ratio. Study was conducted in SVIMS, Tirupati for 12 wks on 30 subjects with age group 18-29 were overweight were included in and perceived stress scale and BMI, WHR was measured at the baseline and after 12 week and there is decrease in PSS and BMI, It has statistically significant $P < 0.05$. This study conclude that aerobic exercises is significantly more effective in reducing stress, as evidenced by improvements in the perceived stress scale and BMI, WHR outcomes among the studied individuals.

KEYWORDS

overweight, obesity, BMI, PSS

INTRODUCTION

As stated by WHO Since 1975, obesity-excess body fat that compromises our physical health—has been a major global health concern (WHO, 2022) ⁽¹⁾ WHO (2003) states that being overweight has a negative metabolic impact on blood pressure, insulin resistance, and cholesterol triglycerides ⁽²⁾. Over 1.9 billion persons (18 years and older) were overweight, according to a 2016 World Health Organization report ⁽³⁾. "Overweight and obesity" is defined by the World Health Organization as abnormal or excessive fat buildup that may have negative health effects.

There are two primary types of fat in the human body: visceral (found in the torso) and subcutaneous (found beneath the skin). Smaller amounts of fat are also stored in the liver, pancreas, heart, and muscle; this type of fat is known as intramuscular fat and is used as fuel during exercise.

The WHO Defines Obesity And Overweight In Adults As Follows:

- A BMI of 25 or higher is considered overweight; and
- A BMI of 30 or more is considered obese ⁽¹⁰⁾.

Overweight is defined as having a body mass index (BMI) of 25–29.9 kg/m², whereas obesity is defined as having a BMI of 30 kg/m² or greater ⁽⁴⁾. Body mass index (BMI) is the commonly used metric for assessing obesity.

The cardio-respiratory and muscular fitness levels of children and adolescents are declining globally as a result of the absence of WHO (2010) recommended physical activity, which raises the risk of being overweight and obese ⁽⁵⁾.

With the waist-to-hip ratio, the waist is measured at the narrowest part of the waist, between the lowest rib and iliac crest, and the hip circumference is taken at the widest area of the hips at the greatest protuberance of the buttocks. Then simply divide the waist measurement by the hip measurement. The WHO defines the ratios of >9.0 in men and >8.5 in women as one of the decisive benchmarks for metabolic syndrome. ⁽⁶⁾

Need Of The Study

- The global prevalence of overweight is escalating in the recent years.
- There are many problems faced by overweight adults like heart diseases, diabetes, osteoarthritis, high blood pressure, high cholesterol.
- Many of the studies have dealt on effectiveness of core strengthening and flexibility in over weight individuals but there are very less studies which have focused on reducing stress, body

mass index and waist hip ratio.

Hence the need of the study is to evaluate the effects of aerobic exercises on stress, body mass index, waist hip ratio in adults.

Aim Of The Study

- The aim of the study is to find out the effect of aerobic exercises on stress, waist hip ratio and body mass index in over weight adults.

Objectives Of The Study

- To evaluate the effect of aerobic exercises on stress among over weight adults.
- To evaluate the effect of aerobic exercises on waist hip ratio among over weight adults.
- To evaluate the effect of aerobic exercises on body mass index among over weight adults.

Materials

- Inch tape (to measure waist hip ratio)
- Paper
- Pen
- Weighing machine

Methodology:

Study Set Up : Svims College Of Physiotherapy

Study Population :

Individuals with overweight with age group of 18- 29 years, both male and female were recruited in this study.

Sampling Design: Purposive sampling design.

Study Period : 6 Months

Treatment Duration: 40 minutes for 5 times in a week

Study Design: Experimental-design {pre and post experimental}

Sample Size : 30

Inclusion Criteria

- Both male and female ⁽⁶⁾
- Age group 18- 29 years
- BMI >25 kg/m² to 29.9 kg/m²

Exclusion Criteria

- Secondary hypertension or non-controlled hypertension (blood pressure $\geq 140/90$ mmHg) ⁽⁷⁾
- Neurological disorders
- Musculoskeletal problems
- Subjects who are not willing to participate.
- Diabetes and cardiac problems

Study Procedure:

The study was commenced after obtaining permission from the Institutional Ethics Committee (IEC num 1707) . 30 adults who fulfilled the inclusion criteria and after obtaining informed consent were included in the study. After explaining the procedure of the study in detail, written informed consents was obtained from them. Baseline measurements of waist hip ratio, body mass index was measured and recorded as pre-test data.

They were assessed after the treatment of 12 weeks. The pre test physiotherapy education was done.

After 12 weeks training program waist hip ratio, body mass index and stress questionnaire, will be recorded as post-test data.

Outcome Measures:-

1. Stress questionnaire
 2. Waist hip ratio
 3. BMI=weight(kg) m² / height
- To measure stress levels, stress reactions, and the impact of external stressors, the Perceived Stress Questionnaire was employed. The Perceived Stress Score Index (PSSI) was calculated by analyzing the completed questionnaire. With the joy scale inverted, it was calculated by adding together all four of the factors—tension, anxieties, joy, and demand. The higher the stress level, the higher the score index.
 - With the waist-to-hip ratio, the waist is measured at the narrowest part of the waist, between the lowest rib and iliac crest, and the hip circumference is taken at the widest area of the hips at the greatest protuberance of the buttocks. Then simply divide the waist measurement by the hip measurement.
 - Overweight is defined as having a body mass index (BMI) of 25–29.9 kg/m², whereas obesity is defined as having a BMI of 30 kg/m² or greater . Body mass index (BMI) is the commonly used metric for assessing over weight and obesity. However, the BMI is limited by variations in body adiposity for a given BMI across age, gender, and ethnicity since it cannot distinguish between lean mass and fat mass.

Protocol- 12 Weeks

- Treatment protocol-
- Aerobics on for 5 days with rest interval of 2 days with warm up and cool down for 12 weeks
- Measurement of pre and post values.
- All training sessions included three phases:
- Warm-up phase – 5 mins
- Main phase – 30 mins
- Cool-down phase- 5 mins
- The warm-up phase consisted of low intensity (50–60% of maximal heart rate (HR max) exercises performed for five minutes⁽⁸⁾
- Warm up includes stretching of major muscle groups like trunk muscles, quadriceps, hamstring, biceps and triceps.
- The number of repetitions of each exercise was dependent on the subjects muscle strength and number of repetitions performed correctly.

| MODE | FREQUENCY | DURATION | INTENSITY |
|--------------|-------------|----------|----------------|
| Warm up | 5 tms /week | 5 mins | Mild/ moderate |
| Aerobic ex's | 5 tms /week | 20 mins | Mild/ moderate |
| Cool down | 5 tms/ week | 5 mins | Mild/ moderate |

Aerobic Exercises :-**Dance Aerobics:**

- Jazz Grape Wine
- Biceps Curl

Step Aerobics:

V- Box Jump Back.

Statistical Analysis

The data was analyzed with the SPSS software version 23. Individual data was analyzed by intension to treat all continuous data was assessed for normality. Continuous data was described using mean and standard deviation.

Dichotomous outcomes were presented as risk ratios with 95% confidence intervals using paired T – test difference in the outcome was compared within the group. A 'P' value <0.05 was considered

statistically significant.

RESULTS :-

The results were analyzed using SPSS 23 version for the statistical analysis of the study .In the present study , a total number of 30 subjects of age group 18-29 years with overweight who met the inclusion criteria were included into the study with their consent .

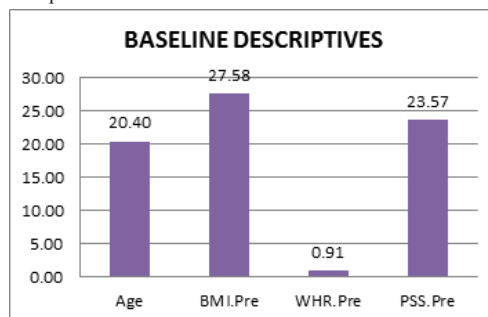
The baseline measurements were taken before the intervention as pre test data.

Table 1 :- Shows The Descriptive Statistics

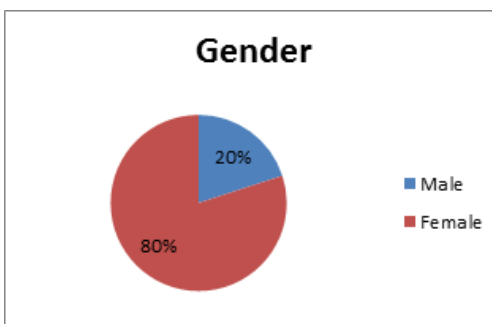
| Descriptive Statistics | | |
|------------------------|-------|----------------|
| | Mean | Std. Deviation |
| Age | 20.40 | 4.34 |
| BMI.Pre | 27.58 | 1.52 |
| WHR.Pre | 0.91 | 0.06 |
| PSS.Pre | 23.57 | 5.39 |
| Male | 6 | |
| Female | 24 | |

Table 1 – Represents the baseline description of the samples.

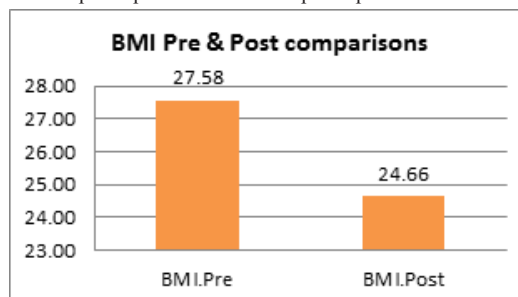
The mean age of 20.40 ± 4.34 were included in the study. The mean baseline measurements of BMI is 27.58 ± 1.52 , Waist hip ratio is 0.91 ± 0.06 and perceived stress scale is 23.57 ± 5.39.

**Figure 1 :-**

Represents the base line measures of age, BMI .Pre , WHR .Pre and PSS. Pre

**Figure 2:-**

Represents the gender based participants included in the study, there were 6 male participants and 24 female participants.

**Figure 3 :-**

The mean difference for BMI before and after the intervention.

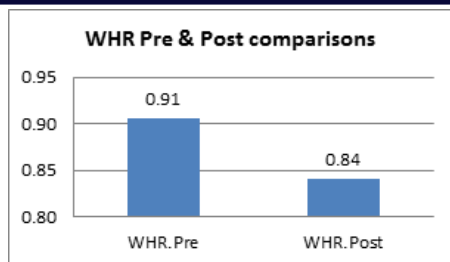


Figure 4 :-

The mean difference in Waist – Hip ratio before and after the intervention.

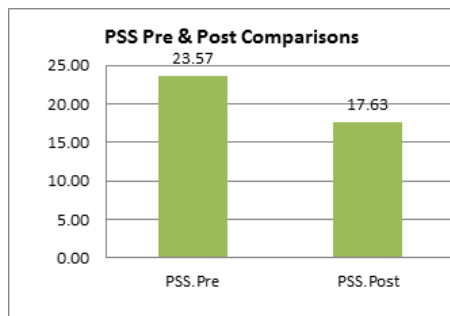


Figure 5 :-

The mean difference in Perceived stress scale before and after the intervention.

DISCUSSION

- Ayşe Sarsanet.AI** - In his study concluded that both aerobic exercise and resistance exercise resulted in improved performance and exercise capacity in obese women. While aerobic exercise appeared to be beneficial with regard to improving depressive symptoms and maximum oxygen consumption, resistance exercise was beneficial in increasing muscle strength^(9,10).
- Kuswahyudi Et.AI** - In his study concluded that there is an effect of aerobic exercise via circuit training to produce stress reduction and weight loss in obese students. Thus, aerobic exercise using circuit training is effective for reducing weight and stress levels in sports students at the Universitas Negeri Jakarta^(11,12).
- Ross E. Anderson Et AI** - In his study concluded that the program of diet plus lifestyle activity may offer similar health benefits and be a suitable alternative to diet plus structured aerobic activity for obese women⁽¹³⁾.
- Kevin Sykeset AI** - in his study concluded that -the effectiveness of moderate aerobic exercise in reducing body weight, body fat percentage and waist circumference whilst maintaining lean body mass in moderately overweight Singaporean females. The study also demonstrated that whether the exercise is performed in a series of short bouts five times a week or in longer bouts twice a week, the results are identical, providing that the total weekly energy expenditure remains the same.⁽¹⁴⁾
- Uma Maheswari** - It is concluded that 15 weeks of exercise at high intensity is more effective in changing the body composition considering the strategy of time commitment in overweight and obese individuals. Effect of Exercise Intensity on Body Composition in Overweight and Obese Individuals.^(15,16)

Limitations

- The study was conducted on only 30 individuals, which is a relatively small sample size. This limits the generalizability of the findings to the broader population of overweight individuals.
- The 12-week duration may not be long enough to observe sustained or long-term effects of aerobic exercises.

Future Recommendations

- Future studies should involve a larger, more diverse sample of participants, including individuals from various age groups, genders, and cultural backgrounds. This would help enhance the generalizability of the findings.
- A follow-up period after the completion of the exercise regimen would help assess the long-term effects of aerobic exercise on stress, WHR, and BMI. Longitudinal studies can provide valuable

insights into the sustainability of exercise-induced improvements and whether any benefits fade over time.

- Future studies could consider incorporating objective measures of stress (e.g., cortisol levels) in addition to self-reported stress scales to provide more accurate and reliable data on the impact of aerobic exercises on stress reduction.
- Further research could investigate the underlying mechanisms by which aerobic exercise impacts stress, WHR, and BMI. This could include exploring hormonal, metabolic, and psychological factors that might mediate the observed benefits.
- Future studies could assess other health outcomes, such as cardiovascular health, sleep quality, and mental health, in addition to stress, BMI, and WHR. This would provide a more comprehensive understanding of the health benefits of aerobic exercise for overweight individuals

CONCLUSION

This study was conducted on 30 individuals who were assessed as overweight. They were trained to do aerobic exercises for 12 weeks. The findings of the study concluded that aerobic exercises is effective in reducing stress, waist hip ratio and body mass index, as evidenced by improvements in perceived stress scale, BMI and WHR outcomes among the studied individuals. These practices promote and reduce levels of stress and changes in waist hip ratio and body mass index. Therefore, it is recommended to incorporate aerobic exercises as a therapeutic intervention for individuals experiencing over weight. The results support the acceptance of the alternate hypothesis, affirming the efficacy of these exercises in managing stress, waist hip ratio and body mass index. Hence the null hypothesis is rejected and alternate hypothesis is accepted.

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