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A comparative analysis: Impact of aerobic vs. resistance exercises on body mass index (BMI) among women with polycystic ovary syndrome

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Abstract
Background: PCOS is the very common endocrine issue in females of genital age. Polycystic ovary syndrome is very common disorder now a day because of sedentary life style. Environmental and genetic factors also effect syndrome of the PCOS.
Objective: The main aim of this clinical study is to determine the effects of aerobic exercises and resisted exercises on BMI in women with PCOS.
Settings & study design: A comparative study conducted on BMI in women with PCOS, selected from Fathima Institute of Medical Science, Kadapa, department of OBG.
Material & Methods: 60 women's with PCOS whose BMI is greater than 23 and we separated them in 2 group i.e, group A and group B 30 in each. Than we have 30-minute session of each group in which we performed 5 minute of warm-up, 5 minute of cool down and 20 minute of exercise. Aerobic exercises were performed on Group A and Resisted exercises were performed on Group B for 8 weeks.
Data Analysis: This was done by using parametric 't' test to identify the significance of mean difference of score of BMI, between aerobic exercise and resisted exercise at 0.005 level of significance.
Result: After 8 weeks of treatment there was a significance decrease in BMI in both the groups and more improved result in values of aerobic physical exercise.

Keywords: Consumption, fuel-wood, households, exercise, BMI

Introduction
PCOS is the very common endocrine issue in females of genital age, with a prevalence of up to 10%. Many diagnostic criteria have been proposed, generally centered around the features of hyperandrogenism, oligo-ovulation & polycystic ovarian morphology. Insulin hostility is present in a majority of cases, with compensatory hyperinsulinemia contributing to hyperandrogenemia by stimulation of ovarian androgen secretion & inhibition of hepatic sex hormone-binding globulin production

Polycystic ovary syndrome is very common disorder in today's time because of sedentary life style. Environmental and genetic factors also have a role in the increasing of PCOS. The syndrome is associated with number of disease, like infertility, obstetrical complications; type 2 diabetes mellitus, cardiovascular disease, & mood & eating disorders. Without affecting these diseases, PCOS may became common in our society due to absolute advantages of the syndrome in older times, including small family sizes, reduced exposure to childbirth-related mortality, increased muscle mass & greater capacity to store energy. Obesity is also a cause of PCOS or vice-versa. Treatment is focused on the goals of ameliorating hyperandrogenic symptoms, inducing ovulation & preventing cardio metabolic complications.

In 2001, another National Institutes of Health–sponsored meeting was convened. Here it was generally accepted that the diagnosis of PCOS may include ovulatory female & the group gave more credence to the finding of characteristic polycystic ovarian morphology on ultrasound.

The diagnostic characteristics of PCOS are hyperandrogenemia, hyperandrogsm (hirsutism), oligo anovulation & polycystic ovaries; the three main diagnostic schemes utilize different combinations of these criteria. The generality of PCOS in female of genital age is 8–10%; generality is remarkably similar across different regions across the globe. Insulin hostility, a common characteristic of PCOS that arises in part from adipose tissue malfunction, results in compensatory hyperinsulinemia, which maintains normal glucose levels but adversely effects

ovarian androgen production. Abnormal folliculogenesis & gonadotropin production, particularly luteinizing hormone hypersecretion, also contribute to the development of PCOS; these abnormalities may arise from environmental insults as well as genetic predisposition. Long-term complications of PCOS include infertility, obstetrical complications, type 2 diabetes mellitus, heart disease, and mood & eating disorders.

Treatment of PCOS must be customized to the specific needs of every patient; goals of therapy may include ameliorating hyperandrogenic symptoms, inducing ovulation, regulating menstruation & preventing cardiometabolic complications. PCOS is a common, genetic disorder. Common diseases such as schizophrenia, asthma, & type 2 diabetes, as well as PCOS, have a complex, multifactorial etiology, in which a variety of predisposing genes, not just one gene, interact with environmental factors to produce disease. 41 Studies in families shows the genetic nature of PCOS itself as well as the component composition of PCOS. Subsequently, many population studies have attempted to discover genes that influence PCOS [6].

Operational definition of aerobic exercise

Aerobic exercise is a physical exercise of low to high intensity that depends primarily on the aerobic energy- generating process. More oxygen is required in these exercises as compared to resisted exercise. In these exercises more space & advance equipment are required. Aerobic exercises is also improves cardiovascular syndromes.

Aim objective and hypothesis Aims and Objectives

Aim: To evaluate the effectiveness of the aerobic physical exercises on BMI in women with PCOS.

To evaluate the effectiveness of the resisted exercises on BMI in women with PCOS.

Objectives

- To reduce the symptoms of PCOS.
- To improve the qol of women with PCOS.

Hypothesis

Null Hypothesis (H_0)

There will be no significant effects of aerobic physical exercises and resisted physical exercises on body mass index (BMI) in women with polycystic ovary syndrome.

Alternative Hypothesis (H1)

There will be significant effects of aerobic physical exercises and resisted physical exercises on body mass index (BMI) in women with polycystic ovary syndrome.

Review of literature

Goodarzi, M., Dumesic, D *et al.* (2011) [1] on study Polycystic ovary syndrome: etiology, pathogenesis and diagnosis. The central diagnostic features of PCOS are hyperandrogenemia, hyperandrogenism (hirsutism), oligo anovulation and polycystic ovaries

Zawadzki, J. K. *et al.* (1992) [2] done a study in Polycystic Ovary Syndrome and conclude BMI is a primary mediator in the relationship between PCOS and the HRQL reductions experienced by girls with the disorder.

Solomon CG. *et al.* (1992) write in his article on the epidemiology of polycystic ovary syndrome: Prevalence and associated disease risks that PCOS may increase the risk for several syndromes, including type 2 diabetes, dyslipidemia, hypertension, cardiovascular disease, pregnancy-associated diabetes and hypertension, and some cancer.

Sirmans SM, *et al.* (2014) [4]. On a study on Epidemiology, diagnosis, and management of polycystic ovary syndrome found that treatment should be individualized; it should also focus on all metabolic consequences and decreasing future complications. This study is done in 2014.

Goodarzi MO, *et al.* (2006) [5] in a study on Diagnosis, epidemiology, and genetics of the polycystic ovary syndrome in 2006 at best practice & research Clinical endocrinology & metabolism. Have a result that despite repeated attempts to identify the putative gene or genes responsible for this disorder, the PCOS gene(s) remain elusive.

Eilertsen TB, *et al.* (2012) [6]. In a study on Anti-Mullerian hormone in the diagnosis of polycystic ovary syndrome: in 2012 get a conclusion that anti-Mullerian hormone (AMH) may be a good substitute for polycystic ovarian morphology (PCOM) in diagnosing PCOS.

Methodology

Research study design: Comparative study.

Study setup: The study was conducted at: Fathima Institute of Medical Science, kadapa, Outpatient Department of OBG.

Type of sampling: Purposive sampling.

Study tools

1. Questionnaires
2. BMI measurement scale.

Inclusion criteria

1. Women with polycystic ovary syndrome.
2. Women age between 18-40 year.
3. BMI≥23 kg/m.
4. Willing to participate in exercises.

Exclusion criteria

1. Women with systemic disease like heart disease, kidney disease and lung disease.
2. Known disorders that mimic the polycystic ovary syndrome, such as congenital adrenal hyperplasia, androgen-secreting tumors, and Cushing's syndrome.

Sample size: 60 Subjects.

Study duration: 6 Months.

Variables

Independent: Aerobic Physical exercise and Resisted Physical exercise.

Dependent: BMI.

Confounding: Age.

Outcome Measures

BMI - Body mass Index measurement scale. Body shape questionnaire.

Method

We gathered the information of 60 women with polycystic ovary syndrome who's BMI is greater than 23 and we separated them in 2 group i.e., group A and group B 30 in each. Than we have 30-minute session of each group in which we performed 5 minute of warm-up, 5 minute of cool down and 20 minute of exercise.

Aerobic exercises were performed on Group A and Resisted

exercises were performed on Group B for 8 weeks.
After this we done satirical analysis on both group and compare their analysis in between.

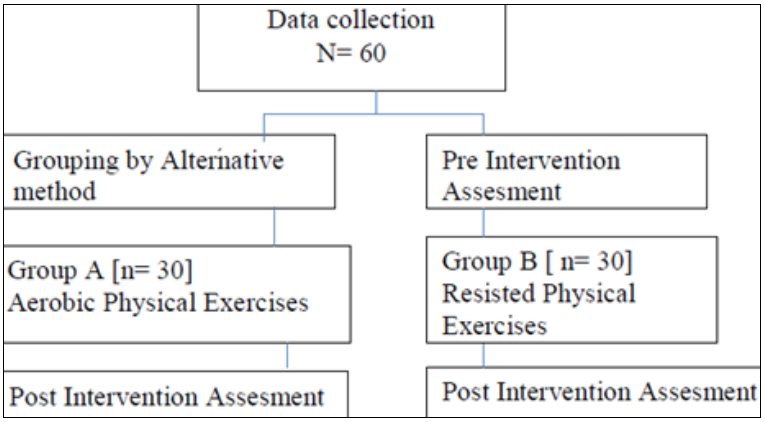

Fig 1: Procedure chart

Data analysis and result

A maximum of 60 patients with polycystic ovary syndrome were selected for the study and the collected information of all these samples were entered into the computer database. The prevalence of an outcome variable along with 95% of confidence limits was calculated in the study and the responses of frequencies were calculated and analyzed by help of various statistical tools. Descriptive and inferential statistics were implemented as statistical tools to analyze the gathered data statistically. The descriptive statistical analysis was used to execute the main features and characteristic of patients with polycystic ovary syndrome and to analyze the value of BMI pre-intervention and post intervention respectively. However, the inferential statistics is used for identification of test of significance.

The demographic information of study subjects such as age and average were presented using Mean ± Standard Deviation (Min-Max). Results on categorical measurements are presented in numbers with frequency and percentages (%).

This was assumed that the observations recorded for continuous variables had followed a normal distribution and overall assuming the normality of the gathered data. Therefore, a parametric test, paired t-test was used to identify the significance of mean difference of BMI in patients between pre and post intervention of exercises in groups (group A and group B). Independent sample t-test was used to observe the significance of mean difference of BMI of group A and group B. The probability value, $p>0.05$ was considered as statistically significant but the probability value from $p<0.08$ to $p<0.06$ was considered as suggestively or poorly significant. However, the probability value from $p<0.05$ to $p<0.02$ was considered as statistically significant while from $p<0.01$ to $p<0.001$ was considered as statistically highly/strongly significant.

Table 1: Effect of Aerobic physical exercises on body mass index (BMI) in woman with polycystic ovary syndrome

Syndrome	N	Mean	S.D.	t-value	p-value
Pre	30	27.48	3.19	2.08	<0.05
Post	30	25.71	3.40		

Table no. 1 shows the results of Effect of Aerobic physical exercises on Body Mass Index (BMI) in woman with polycystic ovary syndrome. Mean value of BMI in pre and post syndrome of Aerobic physical exercises are 23.28 and 23.85. There is a significant difference between mean of Body Mass Index (BMI). Calculated t-value is 2.08 which is significant at degree of freedom 58 and 0.05 level of significance because calculated t-value is greater than tabulated t-value 2.02. So we can say that there is a significant effect of Aerobic physical exercises on Body Mass Index (BMI) of woman with polycystic ovary syndrome because mean value of Body Mass Index (BMI) in post syndrome of Aerobic physical exercises Body is less than mean of Body Mass Index (BMI) in pre-syndrome of Aerobic physical exercises. It mean that Aerobic physical exercises is effective to reduce Body Mass Index (BMI) of woman with Polycystic Ovary Syndrome.

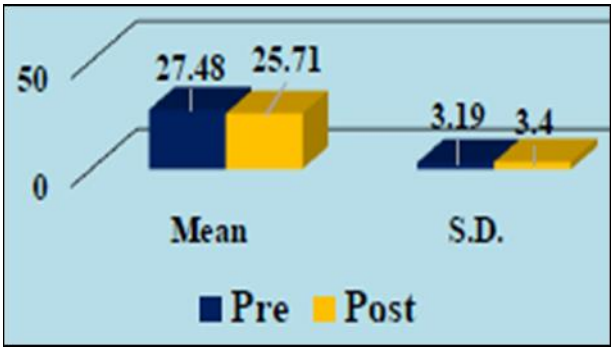

Fig 2: Effect aerobic physical exercise on body mass index (BMI) in woman with polycystic ovary syndrome

Table 2: Effect of Resisted Physical Exercises on Body Mass Index (BMI) in woman with Polycystic Ovary Syndrome

Syndrome	N	Mean	S.D.	t-value	p-value
Pre	30	27.48	2.87	1.14	<0.05
Post	30	26.91	2.80		

Table no. 2 shows the results of Effect of Resisted Physical Exercises on Body Mass Index (BMI) in woman with polycystic ovary syndrome. Mean value of BMI in pre and post syndrome of Resisted Physical Exercises are 27.75 and 26.91. There is no significant difference between mean of Body Mass Index (BMI). Calculated t-value is 1.14 which is not significant at degree of freedom 58 and 0.05 level of significance because calculated t-value is less tabulated t- value 2.02. So we can say that there is no significant effect of Resisted Physical Exercises on Body Mass Index (BMI) of woman with polycystic ovary syndrome It mean that Resisted Physical Exercises is not effective to reduce Body Mass Index (BMI) of woman with Polycystic Ovary Syndrome.

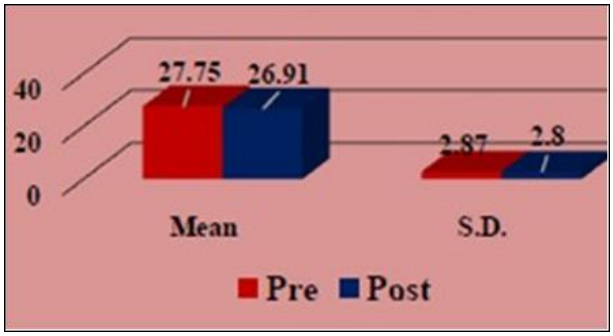

Fig 3: Effect of resisted physical exercise on body mass index (BMI) in woman with polycystic ovary syndrome

Table 3: Comparison of effect of Aerobic physical exercises and resisted physical exercises on Body Mass Index (BMI) in woman with polycystic ovary syndrome

Syndrome	N	Mean	S.D.	t-value	p-value
Pre	30	25.71	3.4	1.49	<0.05
Post	30	26.91	2.80		

Above table 4.03 shows the result of "Comparison of effect of Aerobic physical exercises and Resisted Physical Exercises on Body Mass Index (BMI) in woman with Polycystic Ovary Syndrome". Mean values of Body Mass Index (BMI) in post syndrome of Aerobic physical exercises and Resisted Physical Exercises are 4.69 and 3.73. There is a significant difference between mean of Body Mass Index (BMI). Calculated t-value is which is 3.74 significant at the degree of freedom 58 at 0.05 level of significant because calculated t-value is greater than (2.00) minimum value at 0.05 significant level. So we can say that there is a significant effect of Aerobic physical exercises on Body Mass Index (BMI) in woman with Polycystic Ovary Syndrome because mean of Body Mass Index (BMI) in post Aerobic physical exercises is less than mean of Body Mass Index (BMI) in post syndrome of Resisted Physical Exercises. It mean that Aerobic physical exercises is more effective than Resisted Physical Exercises to reduce Body Mass Index (BMI) in woman with Polycystic Ovary Syndrome.

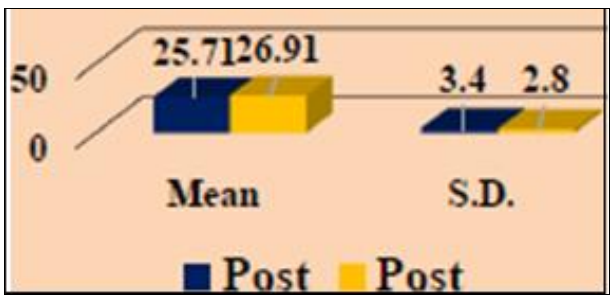

Fig 4: Comparison of effect of aerobic physical exercise and resisted physical exercise on body mass index (BMI) woman with polycystic ovary syndrome

Table 4: Effect of Aerobic physical exercises on Body Shape in woman with polycystic ovary syndrome

Syndrome	N	Mean	S.D.	t-value	p-value
Pre	30	2.30	1.26	6.76	<0.05
Post	30	0.60	0.56		

Table no. 4 shows the results of Effect of Aerobic physical exercises on Body Shape in woman with polycystic ovary syndrome. Mean value of Body Shape in pre and post syndrome of Aerobic physical exercises are 2.30 and 0.60. There is a significant difference between mean of Body Shape. Calculated t-value is 6.73 which is significant at degree of freedom 58 and 0.05 level of significance because calculated t-value is greater than tabulated t-value 2.02. So we can say that there is a significant effect of Aerobic physical exercises on Body Shape of woman with polycystic ovary syndrome because mean value of Body Shape in post syndrome of Aerobic physical exercises Body is less than mean of Body Shape in pre-syndrome of Aerobic physical exercises. It mean that Aerobic physical exercises is effective to improve Body Shape of woman with Polycystic Ovary Syndrome.

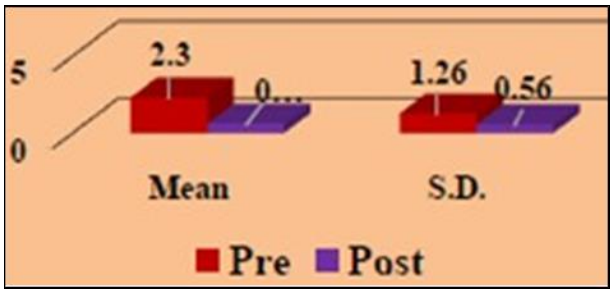

Fig 5: Effect of aerobic physical exercise on body shape in women with polycystic ovary syndrome

Table 5: Effect of resisted physical exercises on body shape in woman with polycystic ovary syndrome

Syndrome	N	Mean	S.D.	t-value	p-value
Pre	30	1.80	0.85	2.43	<0.05
Post	30	1.17	1.15		

Conclusion

According to results of the study we can conclude that there is a significant effect of Aerobic physical exercises on Body Mass Index (BMI) and Body Shape in woman with Polycystic Ovary Syndrome. Aerobic physical exercises is more effective than Resisted Physical Exercises.

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