

# The Effect of Novel Management Strategies to Improve the Quality Of Life on Obese Pcos Women – An Experimental Study

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## Abstract

**BACKGROUND:** Polycystic ovary syndrome is a common endocrine disorder in women of reproductive age, which is often associated with insulin resistance and obesity. This study focused on improving the quality of life by means of novel management strategies to obese women with polycystic ovarian syndrome.

**METHODS:** 30 Women clinically prediagnosed with Polycystic ovary syndrome were included for the study. Subjects were randomly allocated into experimental and control group. 30 obese PCOS female were selected and divided into 2 groups with informed consent the protocol was explained to the subjects. Group A (n=15) was given aerobic training and HIIT training for alternate days. Group B (n=15) was given diet counselling and lifestyle modification with mild exercises. The outcome of the exercises was measured using BMI, WHR and PCOSQ, vo2max. Results were tabulated using statistical analysis.

**RESULT:** The intervention group showed significant improvement than the control group with ( $p \leq 0.001$ ).

**CONCLUSION:** This study concluded that the novel management strategies given to the obese women having PCOS leads to positive effect on quality of life. Thus the short structured exercises intervened in the study improved the better cardiovascular fitness, weight loss and quality of life.

**KEY WORDS:** Aerobic exercises, High Intensity Interval Training Quality of life, Polycystic ovarian syndrome, Obesity, life style modification.

## INTRODUCTION:

Women are genetically susceptible to development of disorder like obesity and diabetes mellitus which frequently lead to clinical manifestation. There is shut link between PCOS and obesity.<sup>1</sup> There was 4-8% of calculable prevalence. The bulk of PCOS women were overweight or obese.<sup>2</sup> WHO calculable that PCOS effects as 116 million female around the world. More or less 30-40% of girls with PCOS can have anaemia.<sup>3</sup> 85-90% of girls with PCOS bear menses.<sup>4</sup> More than steroid is seen in additional than 80% of female who have PCOS.<sup>5</sup> Higher than 70% of female show hairiness (hirsutism) that is common clinical presentation of hyperandrogenism.<sup>6</sup> Higher than four-hundredth of female with PCOS have physiological condition.

Anovulatory physiological condition is most typically caused as a result of PCOS have physiological condition. Women with PCOS have vital increase in primary and secondary follicles and have traditional range of early follicles. The diameter of cyst

reach up to 4-8mm, it happens due to derangements in issue concerned in vesicle development. Lack of development in dominant cyst results in lack of organic process.<sup>7,8,9</sup>

42-73% of PCOS girls suffer spontaneous miscarriage additional often. PCOS is closely related to fatness. Between 40-80% girls area unit overweight or corpulent. The history of weight gain suggests an infective role of fatness within the subsequent development of the syndrome. The obesity connected co morbidities associates with kind a pair of Diabetes mellitus and circulatory problems. It additionally develops conditions like cardiovascular disease, cardio metabolic dysfunction, and different options of metabolic syndrome.<sup>10,11</sup>

Poly cystic ovarian syndrome could be a disorder, related to cardiorespiratory risk, hypoglycaemic resistance, preventive apnea, and also associated with obesity. In cardiometabolic aspects it's renowned that PCOS concerned not solely physiological condition and emission abnormalities however additionally metabolic disturbances. Nearly 50%-90% PCOS women are insulin resistant.<sup>12</sup> The androgen and CAG has combined with steroid receptor and contribute towards hypoglycaemic resistance in PCOS. Obesity worsen hypoglycaemic resistance results in metabolic dysfunction.

Genetic factors additionally play major role in development of PCOS and obesity. Fat mass and fatness associated sequence was unremarkably develop heritable obesity. The Genetic effects on fat mass offer the data concerning heritability of PCOS. Obese women with PCOS has have options like menstrual irregularities, fertility issues that are complicated and interlink between mental and emotional Functioning.

Rotterdam criteria is important as the poly cystic ovarian syndrome is a spectrum of disease. There are four main classifications: (Rui Wang et al; 2017)

- Frank or classic poly cystic ovary ( hyperandrogenism, chronic anovulation and poly cystic ovary)
- Classic non poly cystic ovary (hyperandrogenism, chronic anovulation and normal ovary)
- Non classic ovulatory poly cystic ovary ( regular menstrual cycle, hyperandrogenism and poly cystic ovary)
- Non classic mild or normo - androgenic poly cystic ovary ( chronic anovulation, normal androgen and poly cystic ovary)

Physical inactivity pays manner for many of the chronic diseases. Weight and fatness have indirect effects on emotional factors and physical factors in patients with PCOS. For set PCOS, the treatment ought to primarily specialize in normalizing hyperandrogenism, abnormal vesicle development, reducing metabolic disturbances and cardiometabolic aspects.

In obese PCOS women, weight loss helps in restoring organic process and physiological state rates, diminishes disease of the skin nigricians, decreases hypoglycaemic agent level, improves psychological concerns and raises internal secretion binding simple protein (SHBG) whereas lowering androgen level.

Making awareness concerning weight management and therapeutic intervention individual used to manage PCOS and risk of PCOS. The life-style intervention is that the initial line medical care for the ladies with PCOS syndrome to reinforce the metabolic and generative manifestations. Novel management strategies are the promising ways for PCOS and obesity is effective means that of maintaining weight loss. Novel management ways for PCOS specialize in maintain weight loss over long term in population level.

High intensity interval training, cardiopulmonary exercise coaching (aerobic exercises) and life style modification embody weight reduction and improvement in cardio pulmonary risk factors and generative dysfunction. High intensity training (HIT) has been shown to possess bigger impact on hypoglycaemic resistance in adult in danger than moderate continuous training. A pursuit found that top intensity training is the effective way than moderate intensity in enhancing metabolic, generative and emotional upbeat in women with PCOS.

Aerobic exercises will increase peak oxygen consumption (VO<sub>2</sub> peak), that closely associated with total body fat proportion. Aerobic exercises could be a powerful weight loss strategy, significantly for body fat loss. One hundred fifty minutes of moderate aerobic exercises per week improve metabolic syndrome, risk issue together with body composition, hypoglycaemic resistance and glycated haemoglobin (HbA<sub>1c</sub>).

**Benefits of physical activities:**

- Burn lot of calories in brief period of time
- Increases the heart rate
- Promote fat loss
- Gain muscle mass
- Improve oxygen consumption
- Reduce glucose level
- Improve aerobic and anaerobic performance

Life style modification is sort of difficult in girls with PCOS. Evidence proves that regular physical exercises will increase fat burning method have positive impact on IR and PCOS. Life style intervention like sensible diet and exercises reduces the chance of kind a pair of DM, cardiometabolic diseases and metabolic syndrome. According to international proof primarily based guideline for assessment and management of PCOS, the symptoms ought to be assessed, managed and health professionals need to be aware in mind about the impact of PCOS on emotional upbeat on quality of life (QoL). Aerobic physical exercises improvesglycaemic regulation, visceral fattiness, sexual operate, and QoL in PCOS.

**AIM OF THE STUDY:**

- To study the effectiveness of Novel management strategiesin obese women to improve the quality of life.

**OBJECTIVE OF THE STUDY:**

- To determine the effectiveness of aerobic training on obese PCOS women to improve the quality of life.

- To determine the effectiveness of HIIT training on obese PCOS women to improve the quality of life.
- To determine the effectiveness of life style modification on obese PCOS women to improve the quality of life.
- To compare the effectiveness of Novel management strategies( aerobic exercises and HIIT training) and life style modification improving the quality of life in obese PCOS women.

### **NEED OF THE STUDY:**

Many studies were conducted to find the effectiveness of short structured exercises on PCOS women on obesity. There were also many studies on life style modification relating to PCOS.

But there were very limited literature on effectiveness of novel management strategies including short structured exercises and life style modification in improving the quality of life on obese PCOS women.

Hence this study is conducted to find out the effectiveness of novel management strategies(short structured exercises) to improve the quality of life, reduce body composition, improve cardio respiratory capacity on obese PCOS women.

### **BACKGROUND OF THE STUDY:**

- Polycystic ovarian syndrome is a common endocrine disorder in women of reproductive age which is often associated with insulin resistance and obesity. (Priyakumari et al, 2021)<sup>13</sup>. Aerobic exercise increases peak oxygen consumption (vo2 peak) which closely related to total body fat percentage (BF %); aerobic exercise is also a powerful weight loss strategy particularly fat loss. (Jafari s et al, 2021)<sup>14</sup>. Early life style changes may prove to be most effective approach as younger adolescents with PCOS and obesity are more prone to adopt healthy lifestyle changes than older adolescents. (Lass N et al, 2011)<sup>15</sup>

### **METHODOLOGY**

The study is an experimental study with convenient sampling of 30 young obese females. The exercise were carried out for 8 week at Ishari elan mission hospital. Age ranging from 18 to 35 years with BMI of 28,5kg/m<sup>2</sup> were included. Pregnant women, Recent surgeries, Orthopaedic diseases such as osteopenia, Cardiovascular hepatic and pulmonary diseases, Endocrinal diseases like diabetes hypertension adrenal pituitary gland dysfunction were excluded. The Outcome is measured using BMI, Waist Hip Ratio, Cardio vascular fitness test (VO2max), PCOS 26 questionnaire.

### **PROCEDURE:**

30 obese PCOS female were selected and divided into 2 groups with informed consent the protocol was explained to the subjects. Group A (n=15) was given aerobic training and HIIT training for alternate days. Group B (n=15) was given diet counselling and lifestyle modification with mild exercises. The outcome of the exercises was measured using BMI, WHR and PCOSQ, vo2ma.

#### **FOR GROUP A (EXPERIMENTAL GROUP):**

Experimental group includes 15 patients. The heart rate, respiratory rate, vo2 max was recorded for the statistical reports. The subjects were asked to fill the PCOS questionnaire which consisted of 26 items and subjects were answering by ticking the

box represented the presence of symptoms.

**Aerobic training:** A stepper was used for aerobic training (DAY 1, DAY3 & DAY 5)

- 40 minutes of duration per session
- Achieving 80% of maximum heart rate

**WARM UP** 5 minutes

Brisk walking, jogging, muscle stretches such as ( triceps, Biceps, Deltoid, long flexors & extensors of upper limb, hamstrings, quadriceps, and calf stretches) (Krista woods et al; 2007)

**EXERCISES** 30 minutes

- 1 to 4 weeks – 10cm high step
- 5 to 8 weeks – progress to 15 – 20 cm high step ( Priyakumari et al 2021)

**COOL DOWN** 5minutes

Slow walking and muscle stretches such as( triceps, Biceps, Deltoid, long flexors & extensors of upper limb, hamstrings, quadriceps, and calf stretches) (Krista woods et al; 2007)

**HIIT training: Stationary bicycling (DAY 2 & DAY 4)**

40 minutes of duration per session.

Achieving 80% of maximum heart rate

**WARM UP** 5 minutes

Brisk walking, jogging, muscle stretches such as ( triceps, Biceps, Deltoid, long flexors & extensors of upper limb, hamstrings, quadriceps, and calf stretches) (Krista woods et al; 2007)

**EXERCISES** 30 minutes

60 repetitions of high intensity interval exercise (8s cycling and 12s passive recovery) on cycle ergometer initially resistance phase was 1.0kg once individual could complete the given workload the resistance would be gradually increased by increments of 0.5kg until reaching 0.05× body weight. (Zhaoweikong et al, 2016)45

**COOL DOWN**5minutes

Slow walking and muscle stretches such as( triceps, Biceps, Deltoid, long flexors & extensors of upper limb, hamstrings, quadriceps, and calf stretches) (Krista woods et al; 2007)

**FOR GROUP B (CONTROL GROUP):**

Control group includes 15 members of clients who fulfil 100% of inclusion criteria. They receive life style modification advices with their daily living activities for being continued for 8 weeks study duration. Pre and post study anthropometric and cardiovascular parameters are recorded.

**LIFE STYLE MODIFICATION.**

Life style modification includes diet, exercise and behaviour therapy. The main aim is to educate people individual principles and techniques to achieve dietary and exercises.

**a) DIETARY MODIFICATION:**

- Increase the intake of fiber instead of carbohydrates. Fiberget digested slowly and hence a slow rise in blood sugar

- Include lot of whole foods in the diet and cut down on junks, processed foods, soda, fruit juices, candy, cookies and ice cream.
- Limit sugars and enriched carbohydrates
- Low salt intake rather use lemon juices, mustard, vinegar, pepper, herbs and spices include almonds, walnuts and flaxseeds.<sup>45</sup>
- DASH diet is included for PCOS women.<sup>46</sup>

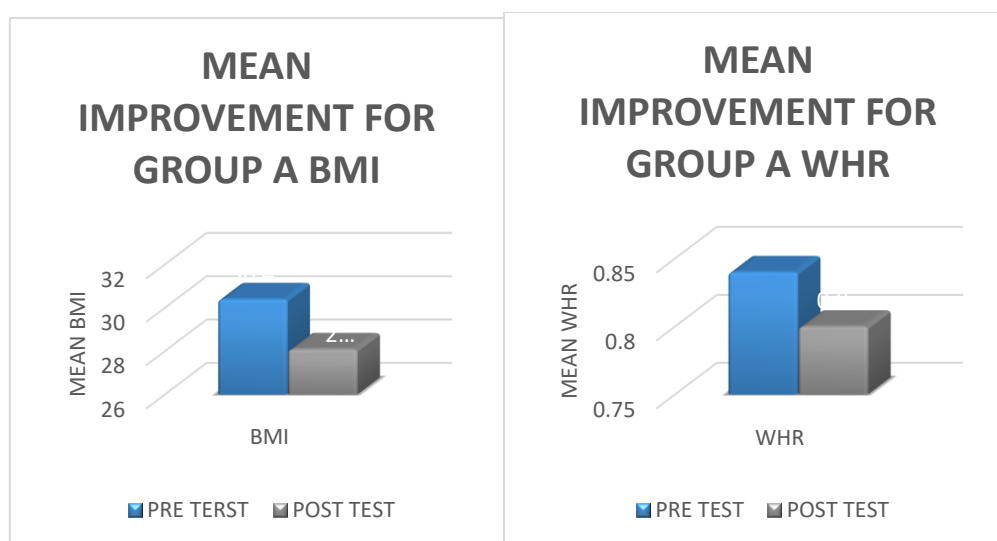
#### b) EXERCISE:

- The subjects were asked to be physically more active this will help to reduce weight or at least maintain weight. For example, small change like using stairs instead of elevators or walking small distance where vehicle is not needed.<sup>45</sup>
- Mild walking and jogging exercises are advised.

#### STATISTICAL ANALYSIS:

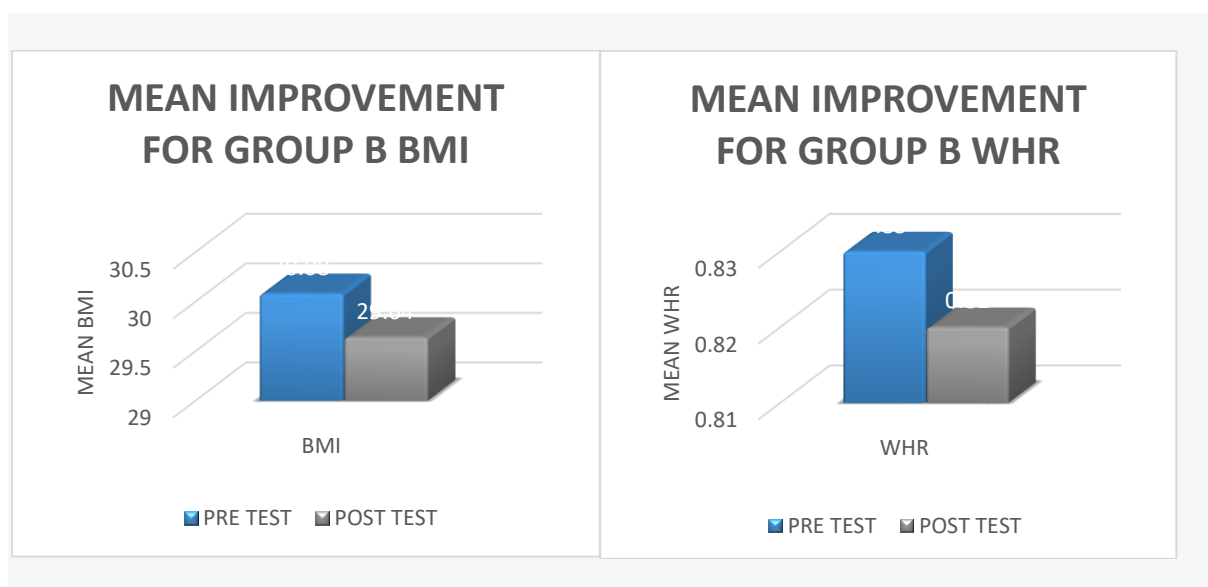
**Table 1. Outcome measures before and after the interventions BMI and WHR of Group A**

OUTCOME	PRE TEST		POST TEST		t-VALUE	p-VALUE
	MEAN	SD	MEAN	SD		
BMI	30.40	1.12	28.09	1.07	7.35	0.000
WHR	0.84	0.05	0.80	0.06	17.39	0.000



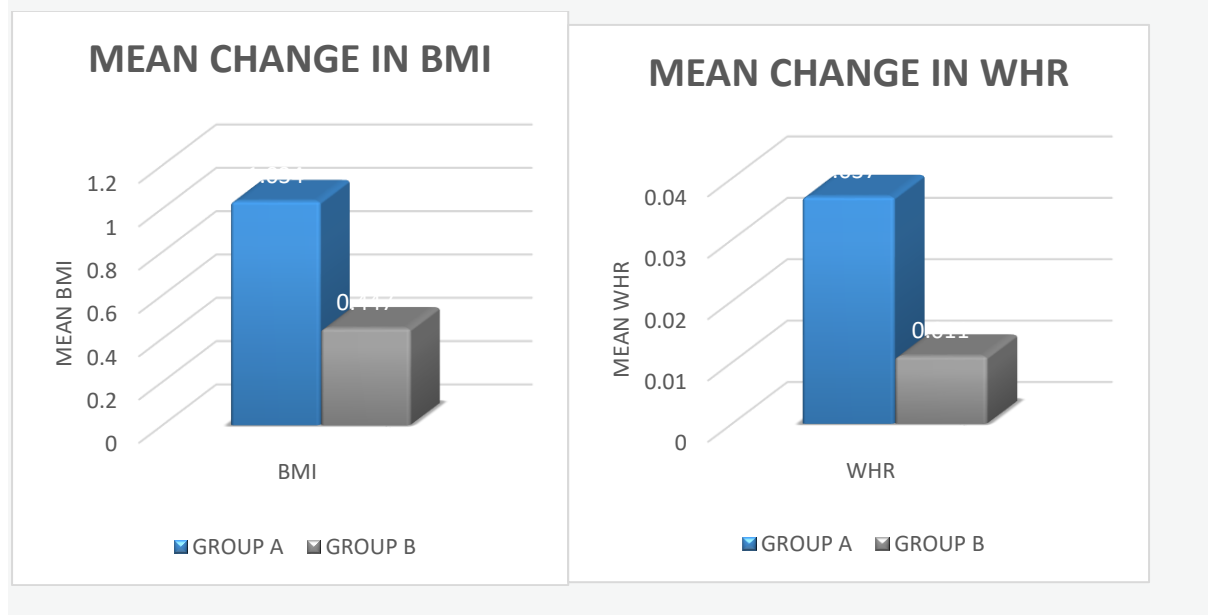
**Table 2. Outcome measures before and after the interventions BMI and WHR of Group B**

OUTCOME	PRE TEST		POST TEST		t-VALUE	p-VALUE
	MEAN	SD	MEAN	SD		
BMI	30.08	0.80	29.64	0.91	11.05	0.000
WHR	0.83	0.04	0.82	0.04	12.47	0.000



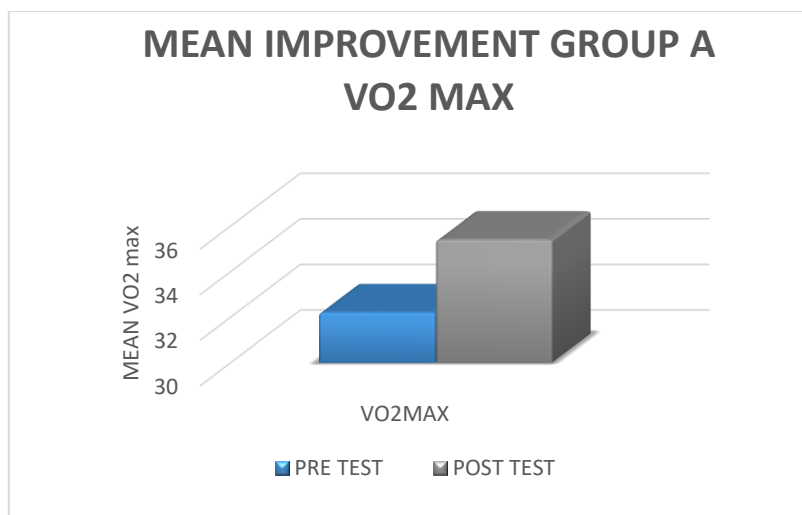
**Table 3. Comparison of outcome measures before and after the interventions of Group A (experimental) and Group B (Control)**

OUTCOME	Group A	Group B	t-VALUE	p-VALUE
BMI	-1.03±0.55	-0.45±0.16	-4.01	0.000
WHR	-0.04±0.01	-0.01±0.00	-11.04	0.000



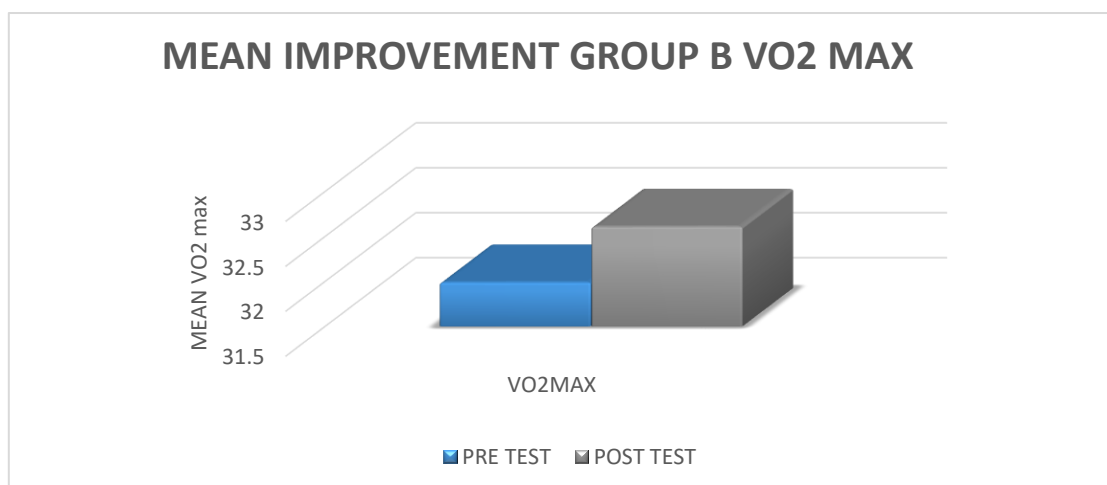
**Table 4. Outcome measures before and after the interventions VO2 max of Group A**

OUTCOME	PRE TEST		POST TEST		t-VALUE	p-VALUE
	MEAN	SD	MEAN	SD		
VO <sub>2</sub> max	32.21	1.47	35.40	1.57	14.39	0.000



**Table 5. Outcome measures before and after the interventions VO2 max of Group B**

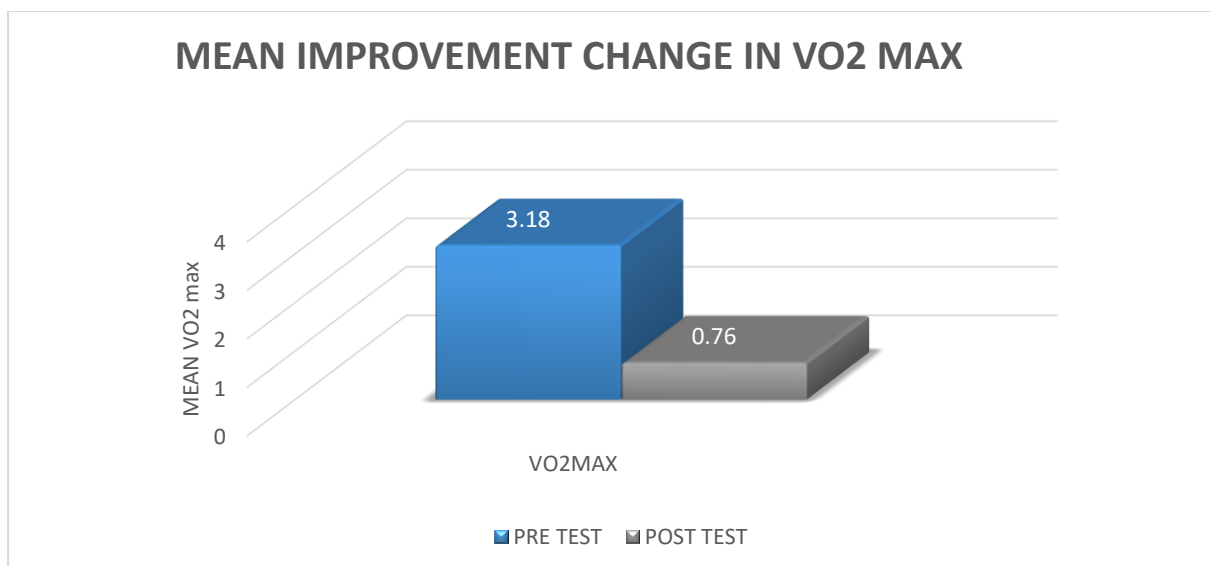
OUTCOME	PRE TEST		POST TEST		t-VALUE	p-VALUE
	MEAN	SD	MEAN	SD		
VO <sub>2</sub> max	31.95	1.22	32.70	1.34	5.08	0.000



**Table 6. Comparison of outcome measures before and after the interventions VO2 max of Group A (Experimental) and Group B (Control)**

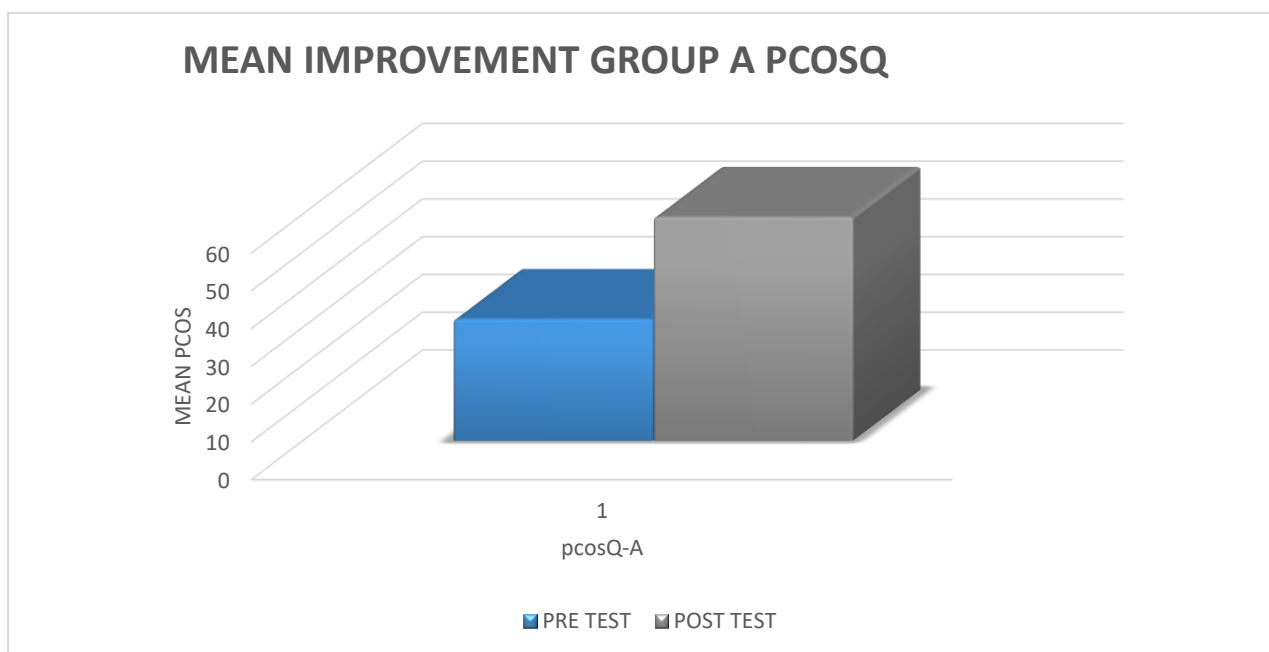
OUTCOME	Group A	Group B	t-VALUE	p-VALUE
VO <sub>2</sub> max	3.18±0.86	0.76±0.57	9.08	0.000





**Table 7. Outcome measures before and after the interventions PCOS-Q of Group A**

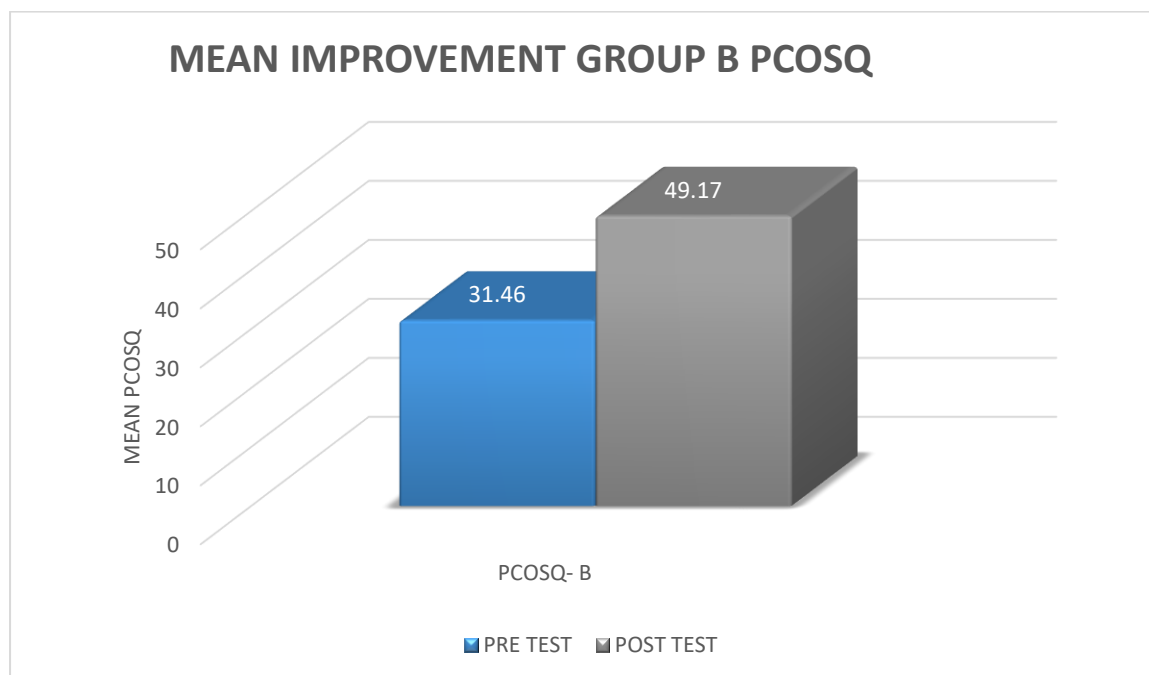
OUTCOME	PRE TEST		POST TEST		t-VALUE	p-VALUE
	MEAN	SD	MEAN	SD		
PCOSQ	32.17	1.58	59.20	7.84	13.40	0.000



**Table 8. Outcome measures before and after the interventions PCOS-Q of Group B**

OUTCOME	PRE TEST		POST TEST		t-VALUE	p-VALUE
	MEAN	SD	MEAN	SD		

PCOSQ	31.46	0.85	49.17	3.12	19.79	0.000
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**Table 9. Comparison of outcome measures before and after the interventions of Group A (Experimental) and Group B (Control)**

OUTCOME	Group A	Group B	t-VALUE	p-VALUE
VO <sub>2</sub> max	27.02±7.81	17.71±3.46	4.22	0.000

### RESULT AND INTERPRETATION:

This survey provided demographic data from 30 patients aged 18–24 years with a BMI greater than 28.5 kg/m<sup>2</sup>. As a result, the study was completed by 15 patients in the training group and 15 patients in the control group. To ensure their willingness to participate in a study, all patients were given a written consent form. By convenient sampling method, the 30 patients who were included in the study were divided into two groups: experimental group (EG) (A) and control group (CG) (B). Anthropometric measurements such as weight, BMI, waist and hip circumference, waist-height ratio, and cardiovascular parameters such as heart rate (HR), respiratory rate (RR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and maximum amount of oxygen consumption were evaluated in all 30 cases.

The anthropometric and cardiovascular parameters of training group and control group were listed based on the statistical data analysis in the above given tables.

The statistical analysis of the study showed significant improvement from the obtained values of the outcome measures, of both the groups, by comparing the pre and post test values.

### Pre and post test values of BMI measurement:

The pre and post mean values of group A performing aerobic exercises and high intensity interval training is 30.40 and 28.09; the values for group B performing Life style modification is 30.08 and 29.64. Group A is more significant in decreasing the BMI in the PCOS population.

**Pre and post test values of waist hip circumference measurement:**

The pre and post mean values of group A performing aerobic exercises and high intensity interval training is 0.84 and 0.80; the values for group B performing Life style modification is 0.83 and 0.82. Group A is more significant in reducing the waist hip circumference among PCOS women.

**Pre and post test values of VO2 max (cardio respiratory fitness) measurement:**

The pre and post mean values of group A performing aerobic exercises and high intensity interval training is 0.84 and 0.80; the values for group B performing Life style modification is 0.83 and 0.82. Group A is more significant in improving the VO2 max among PCOS women.

**Pre and post test values of PCOS questionnaire:**

The pre and post mean values of group A performing aerobic exercises and high intensity interval training is 32.17 and 59.20; the values for group B performing life style modification is 31.46 and 49.17. Group A is more significant in improving the PCOS in the polycystic ovarian syndrome.

By comparing the pre and post mean values, group A is found to be more significant in improving the life of the pcos women with a p value less than 0.001

**DISCUSSION:**

The study investigated the efficacy of an 8-week structured training regimen on obese PCOS patients. Many studies have found that exercise training enhances cardiopulmonary functional capacity and metabolic syndrome parameters in overweight PCOS patients; however, the purpose of this study is to assess the effects of scheduled exercise program in obese PCOS patients. It was observed that 8 weeks of structured exercise was beneficial in optimizing anthropometric, cardiovascular, and metabolic parameters, along with regulating menstrual cycles in obese PCOS patients.

Few studies on PCOS have reported that the beneficial outcomes from exercise training are being related to the reduction in the risk of cardiovascular dysfunction and delays the induction of metabolic syndrome activation of proteins in insulin signal transduction in skeletal muscles. Therefore, by following a systematic exercise program, PCOS patients can improve their cardiopulmonary functioning capacity and insulin sensitivity. Modalities other than fitness have been suggested for the treatment of PCOS. The alternate hypothesis formulated was to show a significant difference in the novel management strategies intervention given on obese women with polycystic ovarian syndrome in terms of measures such as body mass index, waist hip ratio, VO2max, PCOSQ.

Exercises and diet modifications are very important as there is a lot of lifestyle changes and sedentary behaviour among the adolescent population. The exercises are identified to reduce the obesity and the risk of cardiovascular diseases. This statement was supported by the study, **Volkan Turan et al, (2015)<sup>47</sup>**, In addition, most PCOS studies have found that along with dietary plan lifestyle modifications should be included in the treatment of these patients. However, there is no consensus on the basic variables of exercise training, including type, intensity, duration, frequency, and progression, which is then used to evaluate that, whether effects of a training program are preserved even after cessation of study period. They concluded that 12 weeks of non-exercising resulted in the massive loss of all beneficial modifications obtained from the exercise program. As a result, in order to reap the benefits of exercise, it is essential to maintain practicing throughout one's life. Though some observers have examined the impact of

diet plan on PCOS, we found that structured exercise was indeed beneficial, at least in the short term.

In group A the mean BMI reduced 30.40kg/m<sup>2</sup> to 28.09kg/m<sup>2</sup> and mean waist to hip reduced from 0.84 to 0.80. In group B, the mean reduction was from 30.08kg/m<sup>2</sup> to 29.64kg/m<sup>2</sup> and mean waist to hip ratio reduced from 0.83 to 0.82. This was supported by the study, **MortezaTaghav et al, (2011)**<sup>47</sup>This reduction in weight is because, the aerobic exercise enhances glycogen synthase capillarization and hexokinase.

Life style modification enhance and improves fertility outcomes and reduce the risk of co morbidities such as diabetes, thyroid and other metabolic syndrome this was supported by the study, **AfsanehKhademi MD et al, (2010)**<sup>48</sup>the study suggest that, it is emphasized that life style modification is most preferred and most effective method of treatment for polycystic ovarian syndrome.

**Randeva et al, (2012)**<sup>49</sup> showed that exercise such as regular walking help in reducing waist hip ratio which is an indicator of diabetes and other morbidities and homocysteine level also an indicator of cardiovascular risk in overweight women in polycystic ovarian syndrome.

**Claudio L et al, (2015)**<sup>50</sup>The higher HR, generally observed during sub maximal bicycle in respect of TM exercise, has been reported to result from a lower stroke volume, possibly due to reduced venous return deriving from compression of vessels as they pass through muscle contracting with high tension generating high intra luminal pressure as those observed in cycling.

In this experimental study we have shown that the novel management strategies (aerobic exercises, HIIT and life style modification) is well tolerated by overweight subjects and can be used to evaluate individual cardio respiratory fitness and physical fitness. **Stephen H. Boutcher et al, (2015)**<sup>51</sup>suggest that, Regular HIIE produces significant increases in aerobic and anaerobic fitness and brings about significant skeletal muscle adaptations that are oxidative and glycolytic in nature. And improve weight loss and fat loss. This supports the current study.

In order to determine whether the BMI, WHR, QOL, VO<sub>2</sub>max can serve as a practical means of measuring anthropometric, quality of life, cardiovascular fitness respectively for obese women this study has been conducted. Using clinical data it was possible to predict the expected outcome measures during the study, in both the groups.

The current study was hypothesis that novel management strategies has significant improvement in QOL (Quality of Life), VO<sub>2</sub>max (cardio respiratory fitness) and there was significant reduction in body mass, waist hip ratio, heart rate and maximum heart rate, blood pressure. The effects of interventions shows better result in Group A (HIIT) rather than Group than Group B (cycle ergometer training)

The outcome of the study has suggested that the HIIT program is a valuable option of treating overweight young women by improving cardiac function.

We have found that both intervention group (aerobic exercises and HIIT) and control group (life style modification) were effective measures to increase VO<sub>2</sub>max. The subjects in intervention group, however, obtained a more sustained improvement than those in control group. This statement was supported by the study, **Tauseef Nabi et al, (2015)**<sup>52</sup> The maximum oxygen uptake [vo<sub>2</sub>max], an internationally accepted parameter to evaluate the cardio respiratory fitness reflects the amount of oxygen utilized by working muscles during maximal exercise. It is the best index of aerobic capacity and gold standard for cardio respiratory fitness.

**CONCLUSION:**

PCOS is a metabolic disorder that influences on body structure, physical activity, and mental health in the majority of people who adopt sedentary lifestyles. High-intensity short-term exercise assists obese women in managing the symptoms of PCOS, resulting in a greater increase in physical health and quality of life. Short term training program includes the high intensity interval training along with aerobic training as a circuit mode of exercise training can improve the anthropometric parameters include weight, waist and hip circumference, WHR and the cardiovascular parameters include maximum oxygen consumption during the total period of 8 weeks exercise training. The physical activity given to the obese PCOS women enhances the quality of life and self esteem. It reduces the risk of cardiovascular abnormalities and other associated diseases.

**LIMITATIONS:**

The current study has certain limitations.

- The duration of the study is so short period.
- The sample size is small
- Long term effects was not assed
- The parameters such as body fat, muscle mass, energy expenditure were not measured.

**RECOMMENDATIONS:**

- Future study may require long duration period.
- Future research can be done using different age group.
- Future study can be done using different aerobic and high intensity interval training exercises.
- Long term effects can be evaluated using these protocols.
- Future research may include to measure body fat, muscle mass, energy expenditure for obese PCOS subjects.
- Future research may include more quality of life parameters to investigate the study
- Future research needed on HIIT and CE training to improve Physical fitness using various physical evaluation test such as push up test, shuttle run test, vertical jump test, sit and reach test.

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