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COMPARING THE EFFECTIVENESS OF OTAGO EXERCISE WITH REACTIVE BALANCE TRAINING VERSUS OTAGO EXERCISE AMONG THE ELDERLY POPULATION TO PREVENT FALLS

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ABSTRACT

BACKGROUND: *Poly cystic ovarian syndrome is a hyper androgenic anovulation syndrome. The heterogeneous condition is characterized by a series of symptoms including hirsutism, irregular menstruation and chronic anovulation. The physiology behind poly cystic ovarian syndrome is the excess secretion of androgen referred to hyperandrogenism which is marked by increased level of testosterone secretion in the blood. Women with polycystic ovary syndrome (PCOS) demonstrate a high prevalence of obesity across all populations studied. The role of decreased energy expenditure through reduced physical activity in contributing to obesity in PCOS is not well studied. The independent benefits of exercise in improving metabolic disease, cardiovascular health, and diabetes have been shown in the general population*

AIM: To study the effectiveness of Aerobic exercise and Swiss ball exercise and on polycystic ovarian syndrome among young obese women.

METHOD: *The study was conducted on 30 Participants; they were divided into 2 groups with 15 participants. Group A performed Aerobic exercise and Group B performed Swiss ball exercise and a hypocaloric diet was given as common for both groups.*

RESULT: *The outcome values obtained were calculated by the Body Mass Index [BMI] and PCOSQ. There was a significant improvement in the pre and post-test values of anthropometric measurement (BMI) within the experimental group. The exercise programme including aerobic exercise training showed significant improvement among poly cystic ovarian syndrome with p value less than 0.001.*

CONCLUSION: *Larger, optimally designed studies are needed to both gain insights into the mechanisms of exercise action and to evaluate the public health impact of exercise of PCOS. The aerobic exercise is effective in reducing the weight in polycystic ovarian syndrome among young obese women with the BMI score and PCOS Questionnaire.*

KEYWORDS: *Poly cystic ovarian syndrome, obese females, aerobic exercise, Swiss ball exercise and BMI.*

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is the most common hormonal disorder in females of reproductive age. It is a hyper androgenic anovulation syndrome. The heterogeneous condition is characterized by a series of symptoms including hirsutism, irregular menstruation and chronic anovulation, metabolic syndrome, obesity, insulin resistance, type 2 diabetes mellitus[1-3]. It's also referred to stein Leventhal syndrome as the describe the term in 1935 stating it a combination of oligomenorrhoea and poly cystic ovaries. The condition is presented with an average of 10 small cysts with a diameter ranging from 2 to 9mm, that can be developed in one or both the ovaries or can be estimated with an ovarian volume exceeding 10m[6,9]. Consequently, women with PCOS are at a two to eight times greater risk of developing impaired glucose tolerance and type 2 diabetes mellitus. As well as a substantial risk for hypertension, dyslipidaemia, and coronary and other vascular disorders. As such, a diagnosis of PCOS portends lifelong cardiometabolic risks, making it essential to develop further strategies to prevent or delay its cardiovascular and metabolic sequelae[11-13].Normal ovulatory women with PAO cannot be considered to have PCOS although many clinicians have based the diagnosis on ultrasound findings. Nevertheless, it is curious that there is this high prevalence of PAO in the normal population, and yet there is a much smaller percentage of women who have PCOS. We have formulated a hypothesis that relates the polycystic ovary (PAO/PCO) to PCOS[14-15]. It is known that PAOs may appear in childhood before any hormonal changes occur at puberty, and they probably arise from genetic and/or environmental influences. We have proposed that various "insults" need to come into play after puberty for women with PAO to develop PCOS. Usually more than one factor may be involved, and the list of these "insults" is long (for instance: insulin resistance, obesity, stress, and dopaminergic dysregulation)[15]. Simultaneously, various individual adaptive or compensatory mechanisms are probably opposing these insults, either to attenuate the expression of PCOS, or to prevent its development altogether. Thus, these adaptive factors may allow a woman never to develop PCOS despite having PAO, or to develop some form of the syndrome later than usual in reproductive life. PCOS is one of leading cause of female subfertility and the most frequent endocrine problem in women of reproductive age. The cysts are not harmful but lead to hormone imbalances and cause problems of periods and make difficult to get pregnant. PCOS is medical condition in which there is an imbalance of female sex hormones. That is, elevated levels of testosterone, androstenedione, prolactin and LH along with normal, high or low Oestrogen level[20,22].

PATHOPHYSIOLOGY

The pathogenesis of PCOS has been linked to altered luteinizing hormone (LH) action, insulin resistance, and a possible predisposition to hyperandrogenism. One theory maintains that underlying insulin resistance exacerbates hyperandrogenism by suppressing synthesis of sex hormone–binding globulin and increasing adrenal and ovarian synthesis of androgens, thereby increasing androgen levels[12,14]. These androgens then lead to irregular menses and physical manifestations of hyperandrogenism. The physiology behind poly cystic ovarian syndrome is the excess secretion of androgen referred to hyperandrogenism which is marked by increased level of testosterone secretion in the blood. Woman who are insulin resistant have difficulty in lowering blood sugar level which contributes to the increase of testosterone. Excessive production of androgen leads to the development of primordial follicle at the early gonadotropin stage. The gonadotropin releasing hormone from the hypothalamus leads to release of gonadotropin hormone in the pituitary gland[17]. The luteinizing hormone acts on the luteinizing hormone receptor, thereby releasing the androgen in ovarian theca cells. The follicle stimulating hormone acts on the follicle stimulating hormone receptor to convert the androgen to oestrogen leading to the follicle growth[21-23]. Due to the dysregulation in the neuroendocrinal system, there is marked increasing in

luteinizing hormone than follicle stimulating hormone. Excess luteinizing hormone production causes disruption in the luteinizing hormone surge for releasing egg and also trigger the production of testosterone. Reduced follicle stimulating hormone production causes poor egg development leading to fertility problems.

MATERIALS & METHODOLOGY

This study was done as a comparative experimental study with a sample size of thirty (30) and randomly divided into two groups; Group-A (15) was given Aerobic Exercises and Group-B (15) was given Swiss Ball exercises. The treatment duration is for 12 weeks and 6 sessions per week was given.

Materials: Swiss ball, Inch tape, Weight machine, Treadmill.

Group - A: Performed Aerobic exercises with 10 minutes of warm-up and routine breathing exercises of Diaphragmatic breathing. Stretching exercises given to (Pectoralis major, Biceps, Triceps, Quadriceps, Hamstrings and Calf muscles).Jumping Jack exercises, Squats exercises and High Knee raise exercises were given.Each exercises were done with 10 repetitions with a break of 2 minutes for a single session and six sessions per week was performed for about 12 weeks duration.

Group - B: Swiss ball exercises with 10 minutes of warm-up and routine breathing exercises of Diaphragmatic breathing. Stretching exercises given to (Pectoralis major, Biceps, Triceps, Quadriceps, Hamstrings and Calf muscles). Abdominal curl up, oblique curl up, front plank, knee tuck exercises were given. Each exercises were done with 10 repetitions with a break of 2 minutes for a single session and six sessions per week was performed for about 12 weeks duration.

Hypocaloric High protein diet was permitted to take which is common to both the groups.

OUTCOME MEASURES

Body Mass Index [BMI]

BMI is an indicator of the amount of body fat is present in the body and it is also used as a screening tool to identify whether an adult is at a healthy weight. The formula of BMI=kg/m^2, where kg is a persons weight in kilograms and m^2 is their height in meters square. A BMI between 18.5 and 25 kg/m^2 indicates a normal weight. A BMI of less than 18.5 kg/m^2 is considered underweight. A BMI is between 25kg/m^2 and 29.9 kg/m^2 is considered overweight. A BMI of 30 kg/m^2 or higher is considered obese.

PCOSQ

The PCOSQ using the decision criteria described in the methods section, 26 items for the Polycystic Ovary Syndrome Questionnaire (PCOSQ) were chosesn and grouped those 26 items into 5 domains: emotions (8 items), body hair (5 items), weight (5 items), infertility (4 items), and menstrual problems (4 items). Each question is associated with a 7-point scale in which 7 represents optimal function and 1 represents the poorest function.

Data Analysis: The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24. Descriptive Paired t-test was adopted to find the statistical difference within the groups & Independent t-test (Student t-Test) was adopted to find the

statistical difference between the groups. 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 Posttest values.

Table 1: Comparison of the Pre and Posttest Values of BMI between Group A and Group B

BMI	Test	Mean	Standard Deviation (SD)	T value	P value
GROUP-A	Pretest	30.35	1.20	18.98	<0.001
	Posttest	24.75	1.40		
GROUP-B	Pretest	30.45	1.81	13.63	<0.001
	Posttest	27.50	1.95		

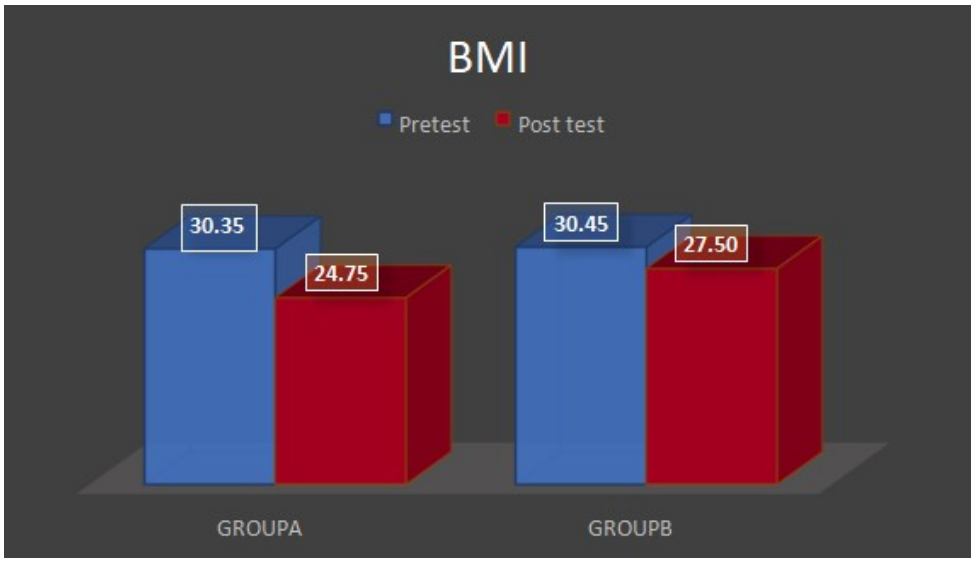

Figure 1: Graphical Representation of the Pre and Post-Test Values of BMI between Group A and Group B.

Table 2: Comparison of the Pre and Posttest Values of PCOSQ between Group A and Group B

PCOSQ	Test	Mean	Standard Deviation (SD)	T value	P value
GROUP-A	Pretest	123.00	6.69	43.74	<0.001
	Posttest	169.80	5.37		
GROUP-B	Pretest	125.00	5.46	27.27	<0.002
	Posttest	147.40	4.64		

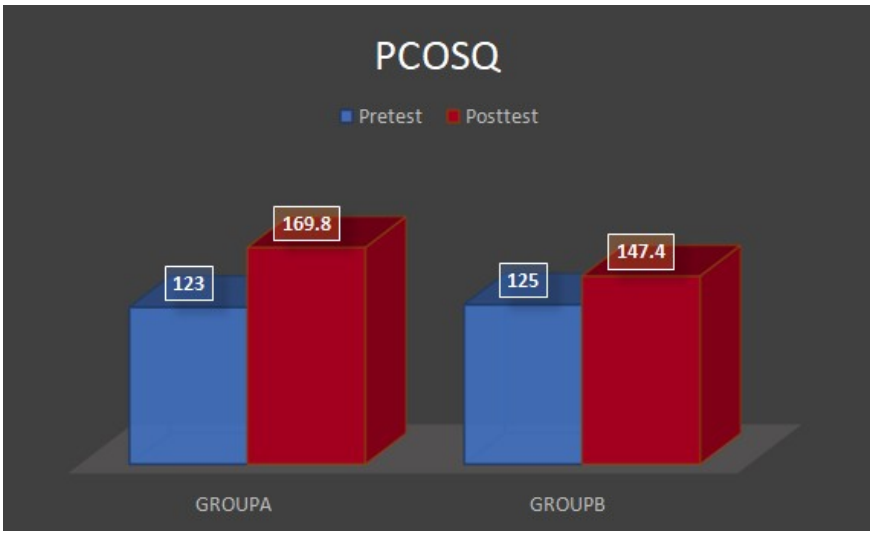

Figure 2: Graphical Representation of the Pre and Post-Test Values of PCOSQ between Group A and Group B.

RESULT

The result of the present study showed the effect of Group A (Aerobic exercises) and Group B (Swiss Ball exercises). In this study, group A performing aerobic exercise with Pre-test mean value 30.35, Post-test mean value 24.75, P value <0.001 shown significant improvement in reducing weight using BMI score, than the group B performing Swiss ball Exercise with Pre-test mean value 30.45, post-test mean value 27.50. When looking on the PCOSQ, Group-A pretest mean was 123.00 and posttest mean was 169.80 and Group-B pretest mean was 125.00 and posttest was 147.40. The statistical analysis revealed the fact that both the groups had significant improvement in the post test mean values but when the groups were compared, Group A (Aerobic Exercises) was more effective than Group B (Swiss Ball exercises).

DISCUSSION

The present study included 30 participants who were randomised into 2 groups with 15 subjects in each group, where group A Performed Aerobic exercise and group B Swiss ball exercise, who underwent proper assessment. There is a paucity in evidence the role of Swiss ball exercises along with aerobic exercise programme significantly reduces body weight, abdominal fat and irregularity in menstruation in women with PCOS. The incidence of type -2 diabetes is seen along with the obesity, so it is important to rule out the consequence of obesity as it is one of the major risks of poly cystic ovarian syndrome in adolescents and young women.

In this study, Group A performing aerobic exercise had shown a greater improvement than Group-B in reducing the BMI scores when comparing the mean values of pretest and posttest scores. Similarly mean scores of PCOSQ had shown much better improvement in Group-A than in Group-B. These changes in improvement have been attributed with exercise and diet modificaitons. The general physical conditioning of the body through exercise has an impact of the aerobic capacity and anaerobic threshold which acts in reducing the heart rate, Blood pressure other physiological and metabolic changes in the body. The Swiss ball exercise which are performed with moderate intensity aid in weight reduction thereby regularizing the menstrual flow, increase the chance of ovulation and balance in hormone production.

CONCLUSION

This study concludes that the Swiss ball exercise programme and aerobic training is beneficial in women with PCOS in reducing body weight, abdominal fat and irregular menses. It is also a safe alternative to high load exercises also improves postural control in subjects with PCOS. Thus, the exercise protocols help in providing a non-pharmacological alternative in women with PCOS in modifying their condition. The aerobic exercise is effective in reducing the weight in polycystic ovarian syndrome among young obese women with the Body Mass Index [BMI] Score and reducing PCOS symptoms using PCOS questionnaire.

LIMITATION

- The sample size is small.
- This study is limited to PCOS only not taking into account other medical condition.
- Pro diabetic and other systemic condition may after the study results hence those patients are not included in study.
- Participants require motivation for a 12 weeks protocol.
- The age group which was limited in this study

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