

EFFICACY OF YOGA THERAPY ON BODY MASS INDEX AND TESTOSTERONE AMONG ADULT WOMEN WITH POLYCYSTIC OVARIAN SYNDROME

¹B.Shalini, ²R. Elangovan

¹Ph.D Scholar, ²Professor and Head,

^{1,2}Faculty of Yoga Sciences and Therapy, Meenakshi Academy of Higher Education and Research (Deemed to be University), West K. K. Nagar, Chennai – 600078, India.

Email: ¹yoginishalini.b@gmail.com, ²relangovantnpesu@gmail.com

ABSTRACT: *To determine the effectiveness of Body Mass Index (BMI) and Testosterone yoga therapy in adult women the random group experimental research was the main goal. Thirty adult women between the ages of 20 and 35 years were randomly chosen using the Chennai random sampling group method for the purpose of study and were split into two groups, I and II, of 15 subjects each. It was hypothesised that the physiological and hormonal variables chosen, such as the Body Mass Index (BMI) and testosterone, will vary substantially from the control group among adult people. Before the start of the training programme, a preliminary evaluation for two classes on Body Mass Index (BMI) and testosterone was carried out. Community I subjects earned 60 minutes of yoga practise, 6 days a week for a cumulative duration of eight weeks. Group II (Control Group) had an active resting place. After the experimental period, the two groups were retested on the same selected dependent variables again. The study of co-variance (ANCOVA) was used to determine the important discrepancies between the experimental group and the control group. The significance test was set at a degree of trust of 0.05. The research findings found that the Intervention Group showed substantial variations between adult women with PCOS compared to the Placebo Group attributable to yoga therapy on selected biochemical and hormonal factors such as Body Mass Index (BMI) and testosterone. The theory was agreed at a confidence level of 0.05. It is also concluded that yoga therapy is effective in preserving a stable body mass index (BMI) and testosterone amount for adult women with PCOS.*

Keywords: *Yoga therapy, Adult Women, Poly Cystic Ovarian Syndrome, Testosterone, Body Mass Index.*

INTRODUCTION

Women in addition to being the back bone of family, also started stepping out of the house and shine professionally as well in the 21st century. The stress and strain they go through in day to day activities is posing a threat on the overall physical as well as mental vitality and vigor of women especially their reproductive health including Endometriosis, Poly Cystic Ovarian Syndrome (PCOS), Uterine Fibroids, Human Immuno Deficiency Virus (HIV), Gynecological Cancer, and Sexually Transmitted Diseases. Any of the ten women battling Poly Cystic Ovarian Syndrome is one of them.

Polycystic ovary syndrome (PCOS) in women of reproductive age, characterised by oligo-

ovulation, hyperandrogenism and polycystic ovarian morphology, is a heterogeneous and complicated disorder. Genetically it may be caused due to epigenetic reprogramming of fetal reproductive tissue following high exposure of androgens in uterus, which may trigger hypothalamic–pituitary–ovarian axis of fetus leading to altered folliculogenesis. It has been found that there is 20–60% of familial occurrence of Poly Cystic Ovarian Syndrome in first-degree relatives. Environmental factors affecting Poly Cystic Ovarian Syndrome involves mutating lifestyle habits such as nutrient deprived diet, ingesting adulterated and junk foods, lack of physical exercise, changing circadian rhythm, psychological pressure built on manipulating personal and professional life, indulging in unhealthy habits say smoking and alcohol consumption.

The World Health Organisation (WHO) reports that 116 million women worldwide (3.4 percent) were affected by PCOS in 2012. Estimates of global PCOS prevalence are widely volatile, varying from 2.2% to as high as 26%. In India, as per the study conducted by Kashmir institute of Medical Sciences on 2019, Prevalence of PCOS ranges from 3.7% to 22.6% distributed across all over the states. In Tamil Nadu, Research says 6% of women are affected by PCOS with women living in urban cities such as Chennai they are 0.1 times more likely to gain PCOS than women in rural areas.

Diagnosis

Rotterdam Criteria devised by European Human Fertility and Embryology Culture is popularly used for diagnosis. Poly Cystic Ovarian Syndrome is present, if any two out of the three following conditions are met.

1. The ovulation of oligo and/or an ovulation
2. Regulation of excess androgen
3. Ovaries polycystic (by gynecologic ultrasound)

Causes: Genetic Tendency, bad dietary choices, weakened immune system, accumulation of toxins, Insulin resistance and obesity.

Symptoms: Menstrual disorders such as oligo menorrhoea/amenorrhoea/hypermenorrhoea, central Obesity, infertility, excess Androgens, Hirsutism and androgenic alopecia, oily and acne prone skin, Acanthosis Nigricans (dark patches of skin on folds and creases).

Psychological disorders including anxiety, depression and eating disorders.

Complications: Endometrial cancer, complications in pregnancy such as gestational diabetes, pre-eclampsia and pre term labor, Sleep Apnea, metabolic syndrome such as Cardiovascular disease, high Tri glycerides and High levels of HDL cholesterol, elevated blood pressure and high levels of sugar, Inflammation of liver, Depression.

Yoga Therapy for PCOS

Yoga therapy works at levels much more subtle and deeper than just the physical body ensuring a holistic treatment for Poly Cystic Ovarian Syndrome. Surya Namaskar and Asana (Yoga postures) helps to open up the pelvic area and promotes blood flow to the uterus and massages them soothing inflammations, enhancing their functions. It also stimulates the secretions of entire endocrine system. Regular practise also aids in shedding the excess fat in the body. Pranayama nourishes the body with abundant of pranic energy (life force) which is also very useful to speed up the healing process. Yoga nidra involves conscious relaxation of whole body and exploration of deep impressions stored in the subconscious mind resulting in unwinding them, alleviating the unwanted stress aiding in calm and tranquil mind.

Objectives of the Study

The goal of the research was to determine if, due to yoga therapy, there would be a substantial difference in physiological and hormonal variables among adult women with Poly Cystic Ovarian Syndrome.

Declaration of the Issue

The aim of the study was to assess the impact of yoga therapy on body mass index and testosterone in adult women with Poly Cystic Ovarian Syndrome.

Hypothesis

It was assumed that the group underwent Yoga therapy than the control group of adult women with Poly Cystic Ovarian Syndrome would have major variations in Body Mass Index and Testosterone hormone.

Delimitations

- The study was delimited to women living in north Chennai only
- The subject age range was just between 20 and 35 years of age.
- The dependent variables chosen under physiological variable was Body Mass Index only.
- The dependent variables chosen under hormonal variable was Progesterone hormone only.
- The independent variable chosen was Yoga Therapy only.

Limitations

- In this analysis, considerations such as diet, body composition, and social interactions were not taken into account.
- Factors such as family history and motivational factors were not taken into account in this analysis.
- Certain factors like environmental and climatic conditions, economical background and also day to day work were not taken into consideration.
- The factors like diet, medication and personal habits were not taken in to consideration for the study.

REVIEWS ON RELATED LITERATURE

Patel V et.al.,(2020) Analysed whether thrice-weekly mindful yoga practise in women with PCOS improves endocrine, cardio metabolic, or psychological parameters. For this randomised, con-trolled research arm, which was part of a broader 3-part inquiry, thirty-one women with PCOS between the ages of 23 and 42 years and residing in Erie County, Pennsylvania, were recruited. Either a mind full yoga intervention group or no intervention (control) group is randomly allocated to women. Classes in groups are 1 hour, three times weekly. Measurements taken during the 3-month induction duration were correlated with original endocrine, cardio biochemical, and psychological measurements. Free testosterone, dehydroepiandrosterone, and rostenedione, body mass index, waist-to-hip ratio, fasting blood glucose and insulin levels and ratings of anxiety and depression were included in the measures. The 3-month intervention period was completed by twenty-two females, 13 in the conscientious yoga group and 9 in the control group. Paired comparisons of criteria of pre- and post-intervention found that women who performed the mindful yoga intervention had slightly lower levels of free testosterone

Nidhi Ramet.al., (2013) The results of a therapeutic yoga method were studied in teenage polycystic ovarian syndrome with the traditional workout programme (PCOS). Ninety (90)

teenage girls (15-18 years) from a residential college in Andhra Pradesh were randomised into two classes who met the Rotterdam criterion. A holistic yoga module was performed by the yoga community, while a matching series of physical workouts was practised by the control group (1 hour per day for 12 weeks). Anti-mullerian hormone (AMH-primary outcome), luteinizing hormone (LH), follicle-stimulating hormone (FSH), testosterone, prolactin, body mass index (BMI), hirsutism and menstrual duration were measured upon inclusion and after 12 weeks. The Mann-Whitney differential score test indicates that improvements in the ratio of There is a significantly different AMH ($Y=-2.51$, $C=-0.49$, $p=0.006$), LH, and LH/FSH (LH: $Y=-4.09$, $C=3.00$, $p=0.005$; LH/FSH: $Y=-1.17$, $C=0.49$, $p=0.015$) between the two intervention groups. Changes in testosterone ($Y=-6.01$, $C=2.61$, $p=0.014$) and Adjusted Ferriman and Gallway (mFG) score ($Y=-1.14$, $C=+0.06$, $p=0.002$) between the two groups were both substantially different. In the other hand, improvements in post-intervention FSH and prolactin did not vary substantially between the two groups. Body weight and BMI both demonstrated non-significant differences between the two classes, while menstrual frequency changes were substantially different between the two groups ($Y=0.89$, $C=0.49$, $p=0.049$). A 12-week therapeutic yoga regimen is significantly better than aerobic activity in lowering AMH, LH, and testosterone, hirsutism mFG score, and improving – anti menstrual frequency.

METHODOLOGY

60 came forward, 45 were screened and 30 adult women were randomly selected from Chennai, between the age range of 20 and 35 years, and were split into two categories, I and II, with 15 participants in each group, to fulfil the purpose of the experimental random survey sample. A preliminary assessment on the two groups (I and II) on the selected dependent variables was carried out prior to the start of the training programme. Community I subjects were given 60 minutes of yoga therapy, six days a week for a total of eight weeks.

Yoga therapy involving Loosening the Joints, Surya Namaskar followed by Asanas such as Padahasthasana, Sarvangasana, Halasana, Matsyasana, Bhujangasana, Salabhasana, Dhanurasana, BaddhaKonasana, Arthamatsyendrasana, Ushtrasana, Mandukasana, Shashangasana, Paschimottasana and Pranayama practices such as Kapalabhati, Basthirika Nadishodana followed by Yoga Nidra. Group II (Control Group) during the duration of the experiment, participants were able to experience their routine and regular lifestyle without any special preparation.

After eight weeks, the two groups were retested again on the same selected dependent variables such as Body Mass Index (BMI) and testosterone was measured. In order to classify the significant differences between the control group and the study group, Co-Variance Analysis (ANCOVA) was used. At a degree of confidence of 0.05, the significance test was set.

RESULTS AND DISCUSSIONS

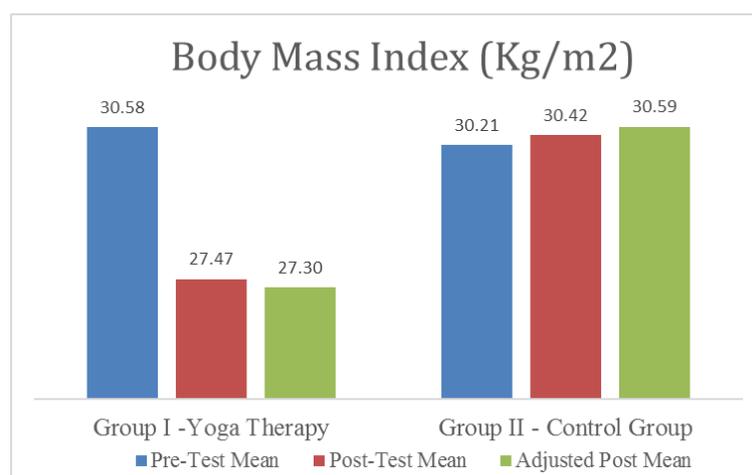
Through the Study of Co-variance (ANCOVA) to determine the significant discrepancy, statistical analysis was carried out on the data relating to the variable collected from the two groups before and after the training period, and the hypothesis was tested at a confidence level of 0.05.

Table I Computation of covariance study of preparation group and control group on body mass index (Kg/m² scores)

Test	Group 1 Yoga Therapy	Group2 Control Group	Source of Variance	Degrees of Freedom	Sum of Squares	Mean Sum of Squares	F-Ratio
Pre	30.58	30.21	Between	1	30.21	30.21	2.09
			With in	28	403.78	14.42	
Post	27.47	30.42	Between	1	65.30	65.30	5.29*
			With in	28	345.80	12.35	
Adjusted Post	27.30	30.59	Between	1	80.91	80.91	153.63*
			With in	27	14.33	0.53	

A significant degree of trust of 0.05. (Table F-ratio for 1 and 28 at 0.05 confidence level (df) = 4.2, 1 and 27 (df) = 4.21)

The F value obtained on the 2.09 pre-test scores was smaller than the 4.20 F value needed to be relevant at the 0.05 mark. This showed that the pre-test and post-test groups did not vary significantly, and the pre-test randomization was identical. As the F value of 5.29 was higher than the F value of 4.20 requested, the analysis of the post-test scores showed that there was a major gap between the groups. This demonstrated that the differences between the post-test approaches of the subjects were significant. Modified mean scores were calculated and subject to statistical treatment, taking into account the groups' pre and post test scores. The obtained F value of 153.63 was larger than the necessary F value of 4.20. This revealed that, thanks to 12 weeks of yoga therapy treatment, there was a noticeable improvement in the Body Mass Index (decreased) among adult women with PCOS. The result of this study on Body Mass Index is in line with the study conducted by NidhiRam et.al.,(2013). For a clearer interpretation of the outcomes of this analysis in Figure -1, the ordered modified means on the Body Mass Index is shown via the bar diagram.



* Significant at 0.05 level of confidence

Figure: 1 Bar diagram showing the mean differences on the body mass index groups (Kg/m² scores)

Table-II Computation of analysis of covariance of training groups and control group on testosterone hormone (Scores in ng/dL)

Test	Group I Yoga Therapy	Group 2 Control Group	Source of Variance	Degrees of Freedom	Sum of Squares	Mean Sum of Squares	F- Ratio
Pre	71	72.27	Between	1	72.27	72.27	2.14
			With in	28	944.93	33.75	
Post	60.33	71.73	Between	1	974.70	974.70	33.52*
			With in	28	814.27	29.08	
Adjusted Post	60.59	71.48	Between	1	877.91	877.91	35.93*
			With in	27	659.78	24.44	

Significant at 0.05 level of confidence. (Table F-ratio at 0.05 level of confidence for 1 and 28 (df) =4.2, 1 and 27 (df) =4.21)

On pre-test scores 2.14 the F value obtained was smaller than the required F value of 4.20 to be meaningful at level 0.05. This showed that there was no substantial difference between the pre-test and post-test classes, and the pre-test randomization was similar. The review of the post-test scores revealed that there was a substantial differential between the classes, as the F value of 33.52 was higher than the F value of 4.20 demanded. This showed that the variations between the subjects' post-test approaches were important. Adjusted mean scores were measured and subjected to statistical treatment, taking into account the pre and post test scores of the categories. The F value of 35.93 obtained was greater than the F value of 4.20 required. This revealed that there was a major (decreased) variation in testosterone hormone care among adult women with Poly Cystic Ovarian Syndrome due to 12 weeks of yoga therapy. The result of this study on Testosterone hormone is in line with the study conducted by **Patel V et.al., (2020)**

In order to help explain the effects of this analysis, the ordered modified means for Testosterone hormone is shown in Figure -2 via the bar diagram.

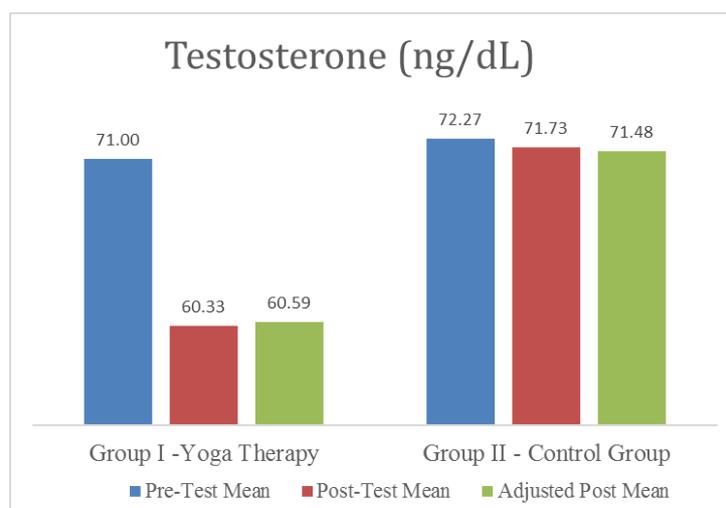


Figure 2 Showing the mean difference among the bar diagram experimental and control groups on testosterone (ng/DL)

* Significant at 0.05 level of confidence

On Hypothesis Analysis

It was hypothesised that the Body Mass Index and Testosterone Hormone in the Yoga Therapy Community would vary substantially from the control group of adult women with Poly Cystic Ovarian Syndrome. The above results of the study on Body Mass Index and Testosterone have been substantiated with the observations also made by the experts **Patel V et.al.,(2020)** [5] and **Nidhi Ram et.al., (2013)** [6]. At 0.05 level of confidence the hypothesis was accepted.

CONCLUSION

It is concluded that major variations in the Body Mass Index were found (decreased) and Testosterone hormone levels (decreased) among experimental group I compared to control group due to Yoga therapy among adult women with Poly Cystic Ovarian Syndrome. Hence, Yoga therapy is good for adult women suffering from PCOS.

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