

ABSTRACT

Background

Polycystic Ovarian Syndrome (PCOS) is the most common female endocrine disorder with prevalence estimates ranging from 2.2 percent to as high as 26 percent depending on the diagnostic criteria used and the ethnicity of the population studied. Most of these reports studied adult women with age ranged from 18 to 45 years. Identifying and treating adolescents with PCOS is of prime importance, as adult women with PCOS have a 10-fold increased risk of developing type 2 diabetes, and a 2-fold increased risk of the metabolic syndrome. Hence the current study was undertaken to estimate the prevalence of PCOS among adolescent girls in South India using Rotterdam's criteria.

Also, there are studies suggesting that chronic stimulation of sympathetic activity, a result of stressful life style, can induce dysregulation of the Hypothalamus-Pituitary-Ovarian axis (HPO axis)/ Hypothalamus-Pituitary-Adrenal axis (HPA axis) in women with PCOS. This points to the need for stress management based life style changes that reduce sympathetic tone and influence the HPO axis. Therefore, the present study was designed to investigate the effect of yoga on adolescent PCOS girls in comparison to the physical exercise program.

Aim

Considering that there have not been many studies exploring PCOS in India, this study was designed with the aim

- a) To estimate the prevalence of PCOS among adolescent girls in a South Indian college hostel, and
- b) To conduct a RCT to study the effect of integrated yoga based life style program in comparison to the standard physical exercise program in adolescent girls with PCOS.

Methods

460 girls between the ages of 15-18 years were screened for PCOS according to the Rotterdam's criteria.

For the interventional study, 90 adolescent girls (aged 15-18 years, $BMI \geq 18.5$) who satisfied the Rotterdam criterion for PCOS and had no prior experience of yoga were randomized into Yoga and Exercise group. The yoga group practiced Integrated Approach of Yoga Therapy (IAYT) module that included *āsanas*, *prāṇāyama* and meditation while the exercise group practiced a matching set of standard physical exercises (1 hour/day, for 12 weeks). All the variables were assessed on day 1 and day 95, keeping 5 days of detraining phase after concluding the intervention.

Results

- a) **Prevalence study:** Out of the 460 girls who were screened (aged 15-18 years), 42 (9.13%) girls satisfied Rotterdam's criteria for PCOS, which increased to 50.46 (10.97%) when imputed data were included.
- b) **Interventional Study:** Comparing the change score between the two groups, Mann-Whitney U test on difference score showed significant ($p < 0.05$) difference between the two intervention groups, with greater improvement in the yoga group as compared to the control group in all the variables of hormonal profile except FSH and Prolactin; in all the variables of biochemical profile except High density lipoprotein (HDL), and also in all the psychological variables except state anxiety. Changes in BMI, waist circumference (WC), hip circumference (HC) and waist-hip ratio (W/H) were non-significantly different between the two groups ($p > 0.05$).

Conclusion

In conclusion, these results suggest that integrated approach of yoga therapy for 12 weeks was significantly better in restoration of normal endocrine and biochemical functions with

improvement in psychological profile of PCOS than physical exercises. It also emphasizes the fact that yoga brings about positive changes at hormonal, biochemical and psychological levels independent of anthropometric changes. Thus, yoga may have contributed to a reduction / normalization of SNS/HPA-axis activation and therefore have beneficial effects on physiological and psychological symptoms in PCOS. Future studies in different age groups and different parts of India and other countries are necessary to support our conclusions.

KEY WORDS:

Adolescent PCOS; Anti-Mullarian Hormone; Endocrine Profile, Insulin Resistance; Lipid Profile, Yoga