

Original Research Article

PREVALENCE OF THYROID DISORDERS IN POLYCYSTIC OVARIAN SYNDROME PATIENTS

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ABSTRACT

Background: Among the general population, the most common endocrine disorders are thyroid disorders and polycystic ovarian syndrome. Both the endocrine disorders share the common gynecological features, predisposing factors thus having a profound effect on the reproductive function in women. The aim of the study is to study the prevalence of thyroid dysfunction in patients with polycystic ovarian syndrome to evaluate the relationship between polycystic ovarian syndromes and assess the Thyroid function status using serum TSH.

Materials and Methods: The study was conducted among the 100 reproductive age group women who came with complaints of menstrual irregularities for a period of minimum three months and /or infertility, age group of 15-45 years visiting the outpatient in the Department of Obstetrics Gynecology, in Tertiary care hospital, Coimbatore. It is a Cross-sectional study conducted for a period of one year. Based on inclusion and exclusion criteria the study participants were recruited. The data was collected using a predesigned and pretested questionnaire. Detailed history regarding menstrual history, clinical examination was carefully analysed. Anthropometric measurements like height, weight, body mass index, waist circumference, hip circumference and waist hip ratio were measured. Laboratory investigations like Fasting Blood Glucose, 2 hr post prandial glucose, Fasting thyroid stimulating hormone and Anti TPO antibodies. The collected data will be entered in the MS excel sheet Windows 10. The analysis was done using SPSS 23. p value <0.05 was considered statistically significant.

Results: The study concludes that Prevalence of Hypothyroid was found to be 21%. The mean age of the study participants 25.83±4.95. Most of the study participants was found in 26-30 years of age (36%). Family history of PCOS was present in 22% of the study participants. Majority of the study participants have Waist hip ratio >0.81 (69%). Overweight was observed in most of the participants 38% followed by obesity 33%. Anti TPO was found to be statistically significant in our study.

Conclusion: Our Study concluded that the prevalence of hypothyroidism was increased in PCOS patients.

Keywords: Hypothyroid, Euthyroid, Polycystic ovarian syndrome, body mass index.

INTRODUCTION

The most common endocrine disorder affecting the reproductive age women is Poly-Cystic Ovarian

Syndrome (PCOS). It constitutes 5-10%.^[1] Polycystic ovarian syndrome also known as Stein and Leventhal syndrome. Various genetic variants and environmental factors combine and contribute

to the pathogenesis.^[2] It generally cause infertility, menstrual disturbance and hyperandrogenism in women.^[3] Due to increased insulin resistance it is associated with increased metabolic and cardio vascular factor. PCOS has both public health and clinical importance as its prevalence has increased to 18% in the premenopausal women with the current Rotterdam diagnostic criteria.^[4] Among the general population the increased prevalence of obesity and metabolic syndrome is contributing to the increased burden of PCOS in our society.^[5]

Thyroid disorders are the most common endocrine disorder globally. Though the etiopathogenesis is completely different both the disorders share many common features. In some studies increase in ovarian volume and cystic changes in the ovaries are found in primary hypothyroidism.^[6] Few studies have shown that the thyroid disorders are more common in women with PCOS compared to normal population.^[7,8] Both the conditions have immense effect on fertility and reproduction. Moreover, hypothyroidism can initiate, maintain or worsen the PCOS. Hence, in the past few years various studies from different parts of the world regarding thyroid disorders in PCOS patient, have tried to study the PCOS-thyroid interface. Mostly the results revealed higher incidence of elevated TSH levels and four times higher prevalence of autoimmune thyroiditis in PCOS subjects. Screening for thyroid disorders in PCOS patients in our community gives a better idea about evaluation of this disorder and the importance of assessing the thyroid function status in them.

With this background about the facts and findings from various literatures, the present study has been proposed to conduct a cross sectional study, investigate the prevalence and etiology of different thyroid disorders in PCOS patients attending Gynecology OPD at Coimbatore Medical College Hospital by using a single and best indicator of thyroid function status- Thyroid Stimulating Hormone (TSH).

Aim and Objective

The aim of this study is

- To study the prevalence of thyroid dysfunction in patients with polycystic ovarian syndrome and
- To evaluate the relationship between polycystic ovarian syndrome and assess the Thyroid function status using serum TSH.

MATERIALS AND METHODS

In our study, we selected 100 reproductive age group women who came with complaints of menstrual irregularities for a period of minimum three months and /or infertility, age group of 15-45

years visiting the outpatient Department of Obstetrics and Gynaecology, Coimbatore Medical College and Hospital. With the ultrasound confirmation of polycystic ovaries we proceeded the study. This study was approved by Institutional Ethic Committee.

Study Design: A Cross-sectional, observation study

Inclusion criteria

- Women aged between 15-45 years with menstrual irregularities or Infertility.
- PCOS confirmation based on revised Rotterdam criteria 2003: (2 / 3 criteria should be satisfied)
- History of oligomenorrhoea (cycle lasting more than 35 days) or long cycles Amenorrhoea (no cycles in the past 6 months).
- Clinical and / or Biochemical features of hyperandrogenism.
- Ultrasonogram finding: Multiple cysts (> 12 in number of 1-2mm) either one or both ovaries.
- Clinical hyperandrogenism is detailed to have features of acne and / or hirsutism and / or androgenic pattern of alopecia. Biochemical hyperandrogenism is characterized by high levels of testosterone.

Exclusion criteria

- Patients on treatment for any thyroid disorders, Oral contraceptives pills, Anticonvulsants, Metformin.
- Other cause of androgen excess state like Congenital adrenal hyperplasia, Cushing syndrome, Virilising tumor, Prolactinoma, and other causes should be excluded
- Other conditions that are similar to PCOS were ruled out by elaborate history and complete physical examination.'

Data collection

Anthropometric measurements like height, weight, body mass indices, waist circumference, hip circumference and waist hip ratio were measured. Laboratory investigations like Fasting Blood Glucose, 2 hr post prandial glucose, Fasting thyroid stimulating hormone and Anti TPO antibodies.

Statistical Analysis

The collected data will be entered in the MS excel sheet Windows 10. Statistical analysis is done by SPSS software version 22. Independent t- test was used to test the association between continuous variables & Chi-square test was applied for test of association between categorical variables. Pearson co-efficient correlation was applied for TSH & anti TPO antibodies. p value <0.05 was considered statistically significant.

RESULTS

Table 1: Clinical Profile of the study participants

Variables	Number(N)
Age category	

≤20 years	16
21-25 years	30
26-30 years	36
31-33 years	18
Complaints	
Amenorrhea	3
Amenorrhea, infertility,	1
Amenorrhea, weight gain	10
Infertility	18
Infertility, weight gain	2
Oligomenorrhea	8
Oligomenorrhea, infertility	25
Oligomenorrhea ,infertility, weight gain	16
Oligomenorrhea, weight gain	14
Weight gain	3
Associated complaints	
Acne	35
Acne,galactorrea	1
Acne,hirsutism	13
Hirsutism	25
N/a	24
Recur-preg loss	2
Menarche	
11 years	2
12 years	15
13 years	29
14 years	30
15 years	15
16 years	6
18 years	3
Marital status	
Unmarried	27
Married	73
Family history	
No family history	78
Family history	22
Waist hip ratio	
<.80	31
>.81	69
Body mass index	
Underweight	6.0
Normal	23.0
Overweight	38.0
Obese	33.0
Ultrasound	
B/L PCO	87
U/L PCO	13
FBS	
<110	90
111-126	3
>127	7
PPBS	
<140	83
141-200	15
>201	2

The mean age of the study participants 25.83 ± 4.95 . Majority of the study participants were in the 26-30 years of age, 36%. 25% of the study participants have complaints like oligomenorrhoea along with infertility. Acne was the most common associated complaint 35%. Most of the study participants attained their menarche at 14 years (30%). Majority of the study participants were married 73%. Family history of PCOS was present in 22% of the study participants. Majority of the study participants have Waist hip ratio $>.81$ (69%). Overweight was observed in most of the participants 38% followed by obesity 33%. 87% of the study participants have bilateral pcos. Most of the study participants have FBS and PPBS within normal limits.

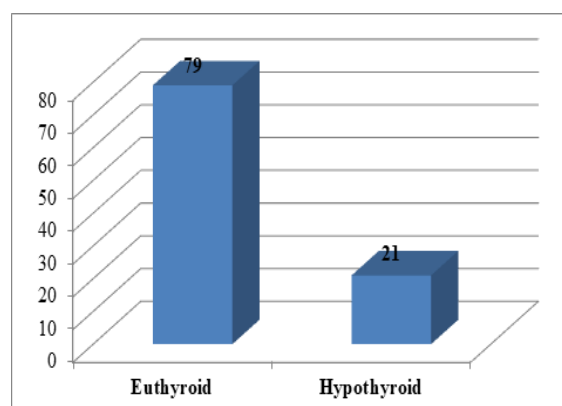


Figure 1: TSH distribution of the study participants

21% of the study participants have Hypothyroid.

Table 2: Association of age with TSH levels among the study participants

Variables	TSH		Total	P value
	Euthyroid	Hypothyroid		
Age				
≤20 years	11(69%)	5(31%)	16(100%)	.662
21-25 years	25(83%)	5(17%)	30(100%)	
26-30 years	28(78%)	8(22%)	36(100%)	
31-33 years	15(83%)	3(17%)	18(100%)	
BMI			6(100%)	.118
Underweight	6 (100%)	0 (0%)	23(100%)	
Normal	21 (91%)	2 (9%)	38(100%)	
Overweight	32 (84%)	6 (16%)	33(100%)	
Obese	20 (61%)	13 (39%)		
USG				.354
B/L PCO	70 (80.5%)	17 (19.5%)	87(100%)	
U/L PCO	9 (69%)	4 (31%)	13(100%)	
Waist hip ratio				.787
<.80	25 (81%)	6 (19%)	31(100%)	
>.80	54 (78%)	15 (22%)	69(100%)	
FBS				.586
<110	70(78%)	20(22%)	90(100%)	
111-126	3(100%)	0(0%)	3(100%)	
>127	6(86%)	1(14%)	7(100%)	
PPBS				.596
<140	66(80%)	17(20%)	83(100%)	
141-200	12(80%)	3(20%)	15(100%)	
>201	1(50%)	1(50%)	2(100%)	
Anti TPO				.001*
<9	79(91%)	8(9%)	87(100%)	
>9	0(0%)	13(100%)	13(100%)	

Table 3: Association of Ovarian volume 1 and ovarian volume 2 with TSH levels among the study participants

	Ovarian volume one	Ovarian volume 2
Euthyroid (N=79)	11.81±2.940	11.82±2.42
Hypothyroid (N=21)	11.43±1.805	11.24±2.18
P value	.573	.327

The mean ovarian volume 1 and 2 is less in hypothyroid group compared to euthyroid and the

difference was found to be not statistically significant.

Table 4: Rotterdam Criteria

PCOS Patients As Per Rotterdam Criteria (No. of. Criteria Satisfied)	Percentage (%)	Number of Patients
Patients With Menstrual Irregularities &Usg- Pco (2/3)	88%	64
Patients Having Clinical F/O Hyperandrogenism, Usg- Pco (2/3 Criteria)	76.60%	53
Patients With Bio-Chemical Evidence of Hyperandrogenism, Usg-Pco (2/3 Criteria)	26.02%	19
Patients Having Menstrual Irregularities, Clinical & / Biochemical F/O Hyperandrogenism, Usg- Pco (All 3 Criteria)	60%	44

In our study, PCOS women with all three criteria were 60% (44), those with clinical F/O hyperandrogenism and Ultrasound finding of Polycystic ovaries were 76.6% (53) those with Biochemically hyperandrogenic and Ultra sound with polycystic ovaries were 26.02% (19), with menstrual irregularities and USG-PCO were 88%.

DISCUSSION

PCOS is a non-communicable disease emerging as a threat among the young reproductive age group woman. Screening methods for at risk patients is necessary for early identification and prevention of the disease, rather than cure of the disease. The most common cause for female infertility is menstrual abnormalities, apart from anatomical and genetic pathologies. Major relating factors for this menstrual abnormalities are from ovarian cause like Polycystic ovarian Syndrome and /or the general

causes like Hypothyroidism, Hyperprolactinemia, Hyperinsulinemia, these determinants pose separate risk for infertility and anovulation. PCOS and thyroid disorders are more often related endocrine disorders present in young reproductive age group women. With this clinical background, we have initiated this study with the aim to understand the prevalence of thyroid disorders in newly diagnosed PCOS patients. A cross sectional observational study was conducted among 100 newly diagnosed PCOS women who came with the complaints of PCOS to the Gynecology outpatient department at Coimbatore Medical College Hospital for menstrual irregularity and infertility. These patients were diagnosed based on revised Rotterdam criteria, 2003 for PCOS. Serum TSH level of 5µU/L as the upper limit to diagnose hypothyroid patients we have found the prevalence of hypothyroidism among 100 recently diagnosed PCOS women. The study

revealed that around 21% patients were diagnosed to have hypothyroidism.

Prevalence of Hypothyroidism & Subclinical Hypothyroidism in Various Conditions

	General Population	Infertility	Peer Group Pcos Study	This Study
Hypo- Thyroidism	10-11% 2-4% (20-40 Yrs Women)	23.9%	2.5%	21%

In a case control study which was done by Maryam et al,^[9] there was a notable prevalence of autoimmune thyroiditis and goiter was seen in PCOS patients. Sridhar et al,^[10] revealed that is a significant prevalence of 1.04% (2/13) of polycystic ovarian syndrome and infertility in hypothyroid patients. In our study, 21% of our patients had abnormal thyroid values. This shows that in our study there is a significant correlation between thyroid disorders and PCOS, which is reinforced by the studies done by Maryam et al & Sridhar et al. A similar study in which there was a significant relationship between hypothyroidism was seen in PCOS women done by Onno E Janssen et al (20.6%).^[11]

Age: The mean age of the study participants was found to be 25.83±4.95. Similar results was also found in Shanmugham D et al,^[12] 26±4.2 years. The age distribution table gives us the information that serum TSH level was very high between 20-30yrs. This is due to the demand of thyroxine is very high in the age group of 20 to 30 yrs by all organs, mainly the reproductive system, which is considered due to normal physiological high requirement. If the physiological demand for thyroxine is not fulfilled properly, it could be the reason resulting in infertility. The mean age group of patients included in our study is 25.83, with more high numbers in the age group is between 26 to 30 years. (36%), and the second most involved age group in the study population is between 21 to 25 years (30%).

Body mass index: The mean BMI in the study population was found to be 28.08(±5.78), which was higher than the normal limits. Similarly in Shanmugham D et al,^[12] study the mean BMI was found to be 29 ±4.4. The mean waist hip ratio was about 0.83(±0.07). 69% of the population have waist hip ratio of <0.80 and 31 % have waist hip ratio of >0.81. The BMI distribution among the study population shows that 38% of them were overweight and 33% were obese. 6% were underweight and 23% had normal BMI. In Shanmugham D et al,^[12] study obesity was found to be 32%. This shows that there is a strong association between obesity and PCOS in our study. Obesity plays a vital role in the development of the PCOS in susceptible individuals. Obesity, mainly the abdominal phenotype, is responsible for the insulin resistance and the features associated with hyperinsulinemia in women with PCOS. Therefore, it plays a key role in hyperandrogenism, mainly in women with obesity. PCOS women present with more severe features of hyperandrogenism and associated clinical features (such as hirsutism, menstrual irregularities and anovulation) than the patients with normal-weight PCOS.

Complaints: The most common presenting complaints was Oligomenorrhea with infertility (25%) followed by infertility (18%) and Oligomenorrhea, infertility and weight gain combined (16%), with associated symptoms among the study population-acne (35%) and hirsutism (25%), all these features were attributed due to hyperandrogenism and chronic anovulation.

Laboratory parameters: In our study 87% had bilateral PCOS and 13% had unilateral PCOS. The mean ovarian volume 1 was 11.73(± 2.73), the mean ovarian volume 2 of the study group was 11.69(±2.37) in comparison to the normal volume of 1.2-9.4 cm³ which signifies that the study population fits under Rotterdam criteria.

The mean TSH value of the study participants was 5.99(±14.26). It signifies that the mean population in our study group comes under hypothyroidism. According to the study, 79% of the population comes under euthyroid state and 21% of them come under hypothyroidism.

The mean anti TPO antibody in our study group was 6.87, which is within the normal limits. 87% of them had anti TPO values of <9.00 and only 13% had anti TPO values of greater than 9.00, anti TPO antibody test quantifies the antibodies targeted against thyroid peroxidase, it is an enzyme present in the thyroid gland. This enzyme has an important role in the synthesis of thyroid hormones. Among the 79 euthyroid participants, all 79(100%) had anti TPO of <9.00 and in 21 hypothyroid participants, 8 participants (38.1%) had anti TPO of <9.00 and 13 participants (61.9%) had anti TPO of >9.00. This shows that hypothyroid PCOS participants had higher anti TPO values and significant correlation between autoimmune thyroiditis and PCOS. The present study and meta- analysis provides information that there is a high prevalence of autoimmune thyroid disorders in patients with PCOS compared to healthy individuals. Therefore, we should take into account that screening for thyroid function status and thyroid-specific auto antibodies in patients with PCOS, even in the absence of symptoms related with thyroid disorders. In Shanmugham D et al,^[12] study the prevalence of Goitre was found to be 11% and Subclinical Hypothyroidism was found to be 18%.

CONCLUSION

The prevalence of hypothyroidism was increased in PCOS patients. Thus early correction of hypothyroidism in the management of infertility associated with PCOS.

Limitations of the Study: The sample size was less in our study. The study results cannot be generalized as the study was done in a single center. A case control study design will give more knowledge on the hormonal profile.

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