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Research Article

ASSESSMENT OF ANTI-THYROID PEROXIDASE ANTIBODIES IN WOMEN WITH POLYCYSTIC OVARY SYNDROME: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Polycystic ovary syndrome (PCOS) is a common endocrine disorder associated with metabolic and reproductive dysfunction. Emerging evidence suggests a significant association between PCOS and thyroid autoimmunity, especially elevated anti-thyroid peroxidase (anti-TPO) antibodies. This study aimed to assess anti-TPO antibody levels in women with PCOS and evaluate their clinical, biochemical, and ultrasonographic profile.

Methods: A descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynaecology at a tertiary care hospital, Jaipur, Rajasthan over 18 months. A total of 73 women aged 13–45 years were enrolled: 66 PCOS patients diagnosed using Rotterdam criteria and 7 healthy controls. Detailed history, clinical examination, anthropometry, ultrasonography, and laboratory investigations (serum TSH, free T3, free T4, fasting blood sugar, anti-TPO antibodies, and free testosterone) were performed. Data were analyzed using appropriate statistical methods; $p<0.05$ was considered significant.

Results: Majority of the PCOS patients were aged 21–25 years (37.9%). PCOS patients had significantly higher weight, BMI, and waist–hip ratio compared to controls ($p=0.001$). Hyperandrogenism was present in 50% of PCOS patients, and oligomenorrhoea/amenorrhoea in 97%. Serum free testosterone was significantly elevated in PCOS (3.58±1.67 vs. 1.94; $p=0.012$). Anti-TPO antibody levels were markedly higher in PCOS patients (81.36±45.67 IU/mL) than controls (19.90 IU/mL; $p=0.001$). Free T3 was also significantly higher in PCOS ($p=0.020$), while TSH and free T4 were comparable between groups. Ultrasonography showed increased follicle number and significantly higher ovarian volume in PCOS patients ($p=0.001$).

Conclusion: PCOS is associated with significant metabolic, hormonal, and ultrasonographic abnormalities and a higher prevalence of thyroid autoimmunity. Routine anti-TPO antibody screening in PCOS patients is recommended for early detection and improved clinical management.

KEYWORDS: Polycystic Ovary Syndrome, Anti-thyroid Peroxidase Antibodies, Thyroid Autoimmunity, Hyperandrogenism, Oligomenorrhoea.

Introduction

Polycystic ovary syndrome (PCOS) represents one of the most prevalent endocrine and metabolic disorders affecting women of reproductive age worldwide[1]. The global prevalence of PCOS estimated to range from 4% to 21% depending on the diagnostic criteria employed and the population studied[2, 3]. A higher prevalence of PCOS

among urban women compared to rural women, largely attributed to sedentary lifestyles, high-calorie diets and obesity[4]. However, the apparently lower rural prevalence may also reflect underdiagnosis owing to limited healthcare access and reduced awareness in rural populations.

In the Indian context, the prevalence varies from 3.7% to 22.5% reflecting geographical, ethnic and lifestyle variations across different regions of the country[5]. The syndrome is characterized by chronic anovulation or oligo-ovulation, clinical or biochemical hyperandrogenism and polycystic ovarian morphology on ultrasound examination, presenting with diverse clinical manifestations including menstrual irregularities, hirsutism, infertility, obesity, acne and insulin resistance (Figure 1a) [6,7].

Accumulating evidence suggests a significant association between PCOS and autoimmune thyroid disease (AITD). Anti-thyroid peroxidase (anti-TPO) antibodies, which are serological markers of thyroid autoimmunity, have been reported in 18–40% of women with PCOS[8, 9]. These antibodies are present in over 90% of patients with Hashimoto's thyroiditis and in 40–70% of those with Graves' disease[10]. The relationship between PCOS and thyroid autoimmunity appears bidirectional, involving genetic susceptibility, insulin resistance, hormonal dysregulation, and chronic low-grade inflammation[11,12].

Subclinical hypothyroidism, frequently encountered in PCOS, can aggravate insulin resistance, worsen dyslipidemia, and exacerbate hormonal imbalances[13]. Moreover, the presence of anti-TPO antibodies in PCOS has been linked to adverse reproductive outcomes, including decreased ovarian reserve, impaired fertility, increased miscarriage risk, and pregnancy complications (Figure 1b)[14,15].

Despite growing recognition, standardized screening practices for thyroid dysfunction in PCOS are not uniformly established. This study aimed to assess anti-TPO antibody levels in women with PCOS and evaluate their clinical, biochemical, and ultrasonographic profile.

Materials and Methods

Study Design and Setting

This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynaecology at National Institute of Medical Sciences and Research, Jaipur, over 18 months after obtaining the institutional ethical committee approval (Ref no: NIMSUR/IEC/2024/1055, dated: 21/0/2024). Written informed consent was obtained from the participants in either English or the vernacular language (Hindi).

Study Population & Selection Criteria

A total of 73 women aged 13–45 years were included: 66 diagnosed with PCOS according to Rotterdam criteria and 7 healthy controls. Inclusion criteria for PCOS were: diagnosis by Rotterdam criteria (at least two of: ovulatory dysfunction, hyperandrogenism, or polycystic ovarian morphology), age 13–45 years, and written informed consent. Exclusion criteria were: use of oral contraceptives or steroids, hyperprolactinemia, congenital adrenal hyperplasia, Cushing's syndrome, virilizing ovarian tumors, vitiligo, and endometriosis. For minors (<18 years), consent was obtained from parents or legal guardians.

Sample Size Calculation

For a cross-sectional study aiming to estimate a proportion (prevalence), the standard formula used is:

Where:

- = required sample size
- = standard normal variate (for 95% confidence level = 1.96)
- = expected prevalence of the outcome (anti-TPO positivity in PCOS) = 22.86% (≈0.23) [9]
- = desired margin of error (precision) = 10% (0.10)

$$n = \frac{(1.96)^2 \times 0.23 \times (1 - 0.23)}{(0.10)^2}$$
$$= \frac{3.8416 \times 0.23 \times 0.77}{0.01}$$
$$= \frac{3.8416 \times 0.1771}{0.01}$$
$$= \frac{0.6805}{0.01}$$
$$= 68.05 \approx 68$$

Calculated minimum sample size: 68 PCOS patients

Figure 1a.Clinical Presentation of PCOS

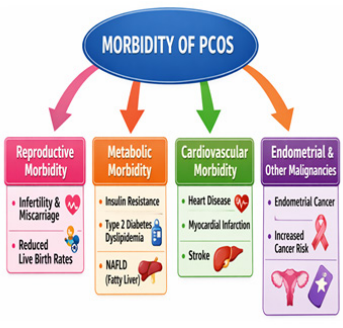

Figure 1b.Complications of PCOS

To account for potential dropouts, incomplete data, or non-response, the study rounded up to 66 PCOS patients (or added a small buffer to reach 73 total including controls). Controls were selected via convenience sampling technique from healthy women attending the same OPD for routine check-ups.

Clinical Evaluation

All participants underwent detailed history taking (menstrual, reproductive, family, and personal history) and physical examination including anthropometric measurements (height, weight, body mass index [BMI], waist–hip ratio [WHR]) and assessment of hyperandrogenism (hirsutism, acne).

Ultrasonography

Pelvic ultrasound was performed to assess ovarian morphology, including follicle number, follicle size, and ovarian volume. Polycystic ovarian morphology was defined according to Rotterdam criteria.

Laboratory Investigations

Fasting blood samples were collected for: Serum thyroid-stimulating hormone (TSH), Free triiodothyronine (free T3), Free thyroxine (free T4), Fasting blood sugar (FBS), Anti-thyroid peroxidase (anti-TPO) antibodies, Serum free testosterone. All the investigations were performed using VITROS INTEGRATED 5600 and SNIBE maglumi X3 autoanalyzers.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Data were compiled, tabulated, and analyzed using descriptive statistics (mean, standard deviation, frequency, percentage). Comparisons between groups were performed using chi-square test and independent t-test as appropriate. A p-value <0.05 was considered statistically significant.

Results

Demographic Characteristics

The majority of PCOS patients belonged to the age group 21–25 years (37.9%), followed by 26–30 years (22.7%), whereas in the control group, most participants were in the 26–30 years (57.1%) and 31–35 years (42.9%) age groups. Regarding socioeconomic status, most PCOS patients belonged to class II (43.9%) and class III (34.8%), while all control participants (100%) were from class II. In terms of residence, the majority of participants in both groups were urban (PCOS: 83.3%, Control: 100%). Marital status showed that 65.2% of PCOS patients were married compared to 100% in controls. Overall, demographic variables were comparable between groups without significant differences. Table 1 summarizes the demographic details of the study participants.

Table 1: Demographic Characteristics of the Study Participants

Maternal Demographic	PCOS (n = 66)		Control (n = 7)		Total		p-value
	No.	%	No.	%	No.	%	
Age Group							
≤20	12	18.2%	0	0.0%	12	16.4%	χ2=2.241 P=0.169
21-25	25	37.9%	0	0.0%	25	34.2%	
26-30	15	22.7%	4	57.1%	19	26.0%	
31-35	10	15.2%	3	42.9%	13	17.8%	
>35	4	6.1%	0	0.0%	4	5.5%	
Socioeconomic Status (SES)							
I	6	9.1%	0	0.0%	6	8.2%	χ2=7.957 P=0.147
II	29	43.9%	7	100.0%	36	49.3%	
III	23	34.8%	0	0.0%	23	31.5%	
IV	8	12.1%	0	0.0%	8	11.0%	
Residence							
Rural	11	16.7%	0	0.0%	11	15.1%	χ2=1.374 P=0.241
Urban	55	83.3%	7	100.0%	62	84.9%	
Marital Status							
Married	43	65.2%	7	100.0%	50	68.5%	χ2=3.562 P=0.059
Unmarried	23	34.8%	0	0.0%	23	31.5%	

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Family & Personal Medical History

Family history of thyroid disorders was significantly more prevalent in controls (100%) than PCOS patients (7.6%; p=0.000). Family history of PCOS was observed in 18.2% of PCOS patients (p=0.217). Personal history of thyroid disorder was present in 36.4% of PCOS patients vs. 0% in controls (p=0.051, borderline). Contraceptive history was reported in 15.2% of PCOS patients (p=0.268) (Table 2).

Table 2: Family and Personal History of the Participants

Family History	PCOS (n=66)		Control (n=7)		Total (n=73)		p-value
	No.	%	No.	%	No.	%	
Diabetes mellitus	1	1.5%	0	0.0%	1	1.4%	0.743
HTN	0	0.0%	0	0.0%	0	0.0%	-
Thyroid disorders	5	7.6%	7	100.0%	12	16.4%	0.000*
PCOS	12	18.2%	0	0.0%	12	16.4%	0.217
Personal Medical History							
Personal h/o thyroid disorder	24	36.4%	0	0.0%	24	32.9%	0.051
Past history	0	0.0%	0	0.0%	0	0.0%	-
Drug history	0	0.0%	0	0.0%	0	0.0%	-
Contraceptive history	10	15.2%	0	0.0%	10	13.7%	0.268

* p=0.000 (Significant; p<0.05).

Menstrual Pattern & Reproductive History

Mean age at menarche was comparable between PCOS (14.48 ± 2.11 years) and controls (13.93 ± 0.53 years; p=0.499). Menstrual irregularities were reported in 16.7% of PCOS patients vs. 100% of controls (p=0.001). Regarding obstetric history among PCOS patients: 60.6% had one live birth, 47.0% had parity 1, and 54.5% reported one abortion. Parity and abortion distributions were statistically significant (p=0.028 and p=0.001, respectively) (Figure 2 & Table 3).

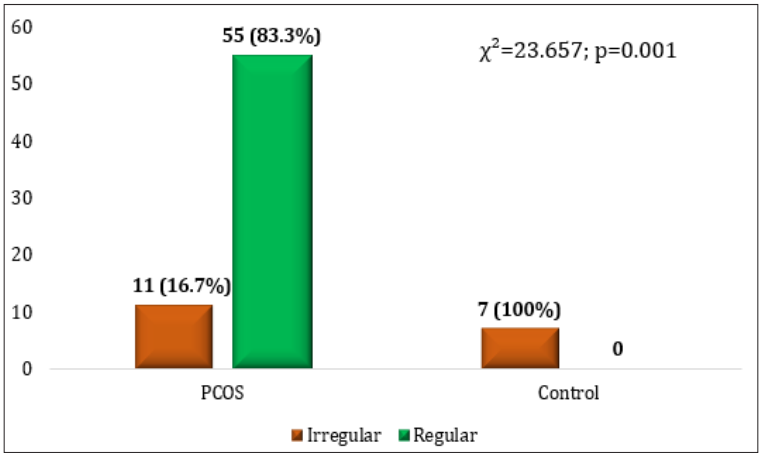

Figure 2.Menstrual Pattern of the Participants

Table 3: Obstetrics History of PCOS patients (n=66)

Obstetrics History	Live		Para		Abortion	
	No.	%	No.	%	No.	%
0	15	22.7%	20	30.3%	12	18.2%
1	40	60.6%	31	47.0%	36	54.5%
2	11	16.7%	15	22.7%	18	27.3%
χ2 value	**4.283**		**7.131**		**22.005**	
p-value	**0.117**		**0.028***		**0.001***	

* Significant (p<0.05)

Anthropometric Parameters

PCOS patients had significantly higher weight (67.56±7.58 vs. 55.00 kg; p=0.001), BMI (25.97±2.02 vs. 21.50 kg/m²; p=0.001), and WHR (0.8777±0.042 vs. 0.8000; p=0.001) compared to controls. Height was comparable between groups (p=0.303) (Table 4).

Table 4: Anthropometric Measurements of the Study Participants

Parameter	PCOS (n=66) Mean ± SD	Control (n=7) Mean	p-value
Height (cm)	161.70±4.30	160.00	0.303
Weight (kg)	67.56±7.58	55.00	**0.001***
BMI (kg/m²)	25.97±2.02	21.50	**0.001***
Waist–hip ratio	0.8777±0.042	0.8000	**0.001***

*Significant

Hyperandrogenism, Oligomenorrhoea & PCOS Phenotypes

Hyperandrogenism was observed in 50.0% of PCOS patients vs. 100% of controls (p=0.011). Oligomenorrhoea/ amenorrhoea was present in 97.0% of PCOS patients vs. 100% of controls (p=0.640). Phenotype D (non-hyperandrogenic PCOS) was most common (45.5%), followed by phenotype A (25.8%), B (21.2%), and C (7.6%) (p=0.001) (Table 5).

Table 5: Hyperandrogenism, Oligomenorrhoea & PCOS Phenotypes of the Study Participants

Variable	PCOS (n=66) n (%)	Control (n=7) n (%)	p-value
Hyperandrogenism	33 (50.0%)	7 (100.0%)	**0.011***
Oligomenorrhoea/ amenorrhoea	64 (97.0%)	7 (100.0%)	0.640
Phenotype			**0.001***
A	17 (25.8%)	0 (0.0%)	
B	14 (21.2%)	7 (100.0%)	
C	5 (7.6%)	0 (0.0%)	
D	30 (45.5%)	0 (0.0%)	

*Significant

Laboratory Investigations

Hemoglobin was significantly higher in PCOS (11.32±1.46 vs. 9.00 g/dL; p=0.001). Fasting blood sugar was lower in PCOS (98.02±9.57 vs. 118.00 mg/dL; p=0.001). Serum free testosterone was significantly elevated in PCOS (3.58±1.67 vs. 1.94; p=0.012). Serum TSH levels were comparable between PCOS (6.79±4.05 mIU/L) and controls (6.68 mIU/L; p=0.941). Free T4 also showed no significant difference (p=0.851). However, free T3 was significantly higher in PCOS (2.86±2.01 vs. 1.03; p=0.020). Most notably, anti-TPO antibody levels were markedly elevated in PCOS patients (81.36±45.67 IU/mL) compared to controls (19.90 IU/mL; p=0.001) (Table 6).

Table 6: Biochemical Investigation and Thyroid Profile

Investigation	PCOS (n=66) Mean±SD	Control (n=7) Mean	p-value
Hemoglobin (g/dL)	11.32±1.46	9.00	**0.001***
FBS (mg/dL)	98.02±9.57	118.00	**0.001***
Free testosterone	3.58±1.67	1.94	**0.012***
TSH (mIU/L)	6.79±4.05	6.68	0.941

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Investigation	PCOS (n=66) Mean±SD	Control (n=7) Mean	p-value
Free T3	2.86±2.01	1.03	**0.020***
Free T4	0.942±0.803	1.000	0.851
Anti-TPO antibodies (IU/mL)	81.36±45.67	19.90	**0.001***

*Significant

Ultrasonographic Findings

The number of ovarian follicles differed significantly between groups (p=0.001). PCOS patients most commonly had 10 or 11 follicles (each 25.8%), while all controls had 12 follicles. Follicle size distribution did not reach statistical significance (p=0.052), with 8 mm being most common in both groups. Ovarian volume was significantly higher in PCOS patients (p=0.001), with 18 mL being most common (28.8%), while all controls had 11 mL (Tables 7).

Table 7: Ultrasonographic Findings of Ovarian Follicles & Volume

Follicle count	PCOS (n=66) n (%)	Control (n=7) n (%)	p-Value
10	17 (25.8%)	0 (0.0%)	**0.001***
11	17 (25.8%)	0 (0.0%)	
12	12 (18.2%)	7 (100.0%)	
13	11 (16.7%)	0 (0.0%)	
14	9 (13.6%)	0 (0.0%)	
Ovarian Volume (mL)			
11	0 (0.0%)	7 (100.0%)	**0.001***
12	10 (15.2%)	0 (0.0%)	
13	11 (16.7%)	0 (0.0%)	
14	7 (10.6%)	0 (0.0%)	
15	7 (10.6%)	0 (0.0%)	
16	12 (18.2%)	0 (0.0%)	
18	19 (28.8%)	0 (0.0%)	

Discussion

This study evaluated the clinical, biochemical, and ultrasonographic profile of women with PCOS, with particular emphasis on thyroid autoimmunity as measured by anti-TPO antibodies.

The majority of PCOS patients in our study were aged 21–25 years (37.9%), consistent with previous reports that PCOS predominantly affects young reproductive-age women. Al-Saab et al. (2014) reported a mean age of 23.8±5.6 years in PCOS women[16], and Sharma et al. (2023) reported 28.25±5.26 years[9]. In the present study, socioeconomic status was mostly class II among PCOS patients (43.9%) and controls (100%), with no significant difference (p=0.147), whereas Devi et al. (2024) reported upper-lower socioeconomic class as the most common group (55.9%) and found a statistically significant difference between groups (p=0.001)[17]. Residence in the present study was predominantly urban in both PCOS (83.3%) and control groups (100%), with no significant association (p=0.241); however, most attached studies did not provide detailed rural–urban comparison. Marital status showed 65.2% married and 34.8% unmarried among PCOS patients, compared with 100% married controls, but this difference was not statistically significant (p=0.059). Overall, the present findings are broadly comparable with published studies showing that PCOS mainly affects women of reproductive age, while differences in socioeconomic status,

residence, and marital profile may be due to variation in study setting, infertility-clinic recruitment, sample size, and population characteristics.

In the present study, family history of thyroid disorders was significantly higher in controls (100%) compared to PCOS patients (7.6%) (p=0.000), while family history of PCOS was observed in 18.2% of PCOS patients but absent in controls, although this was not statistically significant (p=0.217). Diabetes mellitus was present in only 1.5% of PCOS patients and none in controls, with no significant association. These findings show partial agreement and contradiction with existing literature. Rasoulizadeh et al. (2025) reported that autoimmune thyroid disease (AITD) and anti-TPO positivity were significantly higher in PCOS patients compared to controls, suggesting a strong familial or genetic predisposition toward thyroid autoimmunity in PCOS[18]. Similarly, Anusha et al. (2024) demonstrated that anti-TPO antibodies were present in 25.4% of PCOS women compared to only 3% in controls (p=0.001), indicating higher autoimmune thyroid tendency in PCOS groups[19]. In contrast, Tran et al. (2023) found no significant difference in thyroid autoimmunity between PCOS and controls (8.2% vs 8.4%, p=0.932), suggesting that familial or autoimmune predisposition may not always be elevated in PCOS[20]. Similarly, Kim et al. (2022) also reported no significant difference in anti-TPO antibody positivity between PCOS and control groups (4.8% vs 7.6%)[21].

In the present study, the mean age at menarche among PCOS patients was 14.48±2.11 years compared to 13.93±0.53 years in controls, with no statistically significant difference (p=0.499). This indicates that age at menarche was comparable between both groups and does not appear to be a determining factor for PCOS in the studied population. These findings are consistent with several studies in the literature. Rasoulizadeh et al. (2025) also reported no significant association between age-related baseline characteristics and PCOS occurrence, suggesting that age at menarche does not significantly differ between PCOS and control groups[22].

Menstrual irregularities were observed in 16.7% of PCOS patients, whereas all control participants (100%) had menstrual irregularity, and this difference was statistically significant (χ^2=23.657, p=0.001). However, the majority of PCOS patients (83.3%) reported regular cycles. This finding shows a significant association between groups, but the pattern is opposite to what is typically expected in PCOS. Hyperandrogenism was observed in 50.0% of PCOS patients compared to 100% of controls, and this difference was statistically significant (p=0.011). Oligomenorrhoea/amenorrhoea was present in 97.0% of PCOS patients and 100% of controls, with no statistically significant difference (p=0.640). Thus, while hyperandrogenism showed a significant association, menstrual disturbance in the form of oligomenorrhoea was almost universal in both groups. Hyperandrogenism is consistently reported by Menon et al. (2017) identified hyperandrogenism as the second most common clinical manifestation in PCOS patients, following menstrual irregularities, supporting its strong association with the syndrome[23]. This discrepancy may be due to patient recall bias or the inclusion of phenotype D (non-hyperandrogenic) patients who may have more regular cycles.

The most important finding of our study is the markedly elevated anti-TPO antibody levels in PCOS patients (81.36±45.67 IU/mL) compared to controls (19.90 IU/mL; p=0.001). This is consistent with multiple previous studies. Menon et al. (2017) reported significantly higher anti-TPO levels in PCOS (25.8±2.9 vs. 14.5±2.3 IU/mL; p<0.009)[23]. Al-Saab et al. (2014) found similar results (39.9±59.5 vs. 18.9±11.2 IU/mL; p<0.05)[16]. Rasoulizadeh et al. (2025) in a large study of 1047 PCOS patients reported median anti-TPO levels of 12.0 IU/mL vs. 4.0 IU/mL in controls (p=0.002)[22]. Anusha et al. (2024) found anti-TPO positivity in 25.4% of PCOS vs. 3% of controls[19]. Notably, TSH levels in our study were comparable between groups (p=0.941), which is consistent with several studies[14,16,20], that found no significant difference in TSH despite elevated anti-TPO antibodies. This dissociation suggests that thyroid autoimmunity may precede overt thyroid dysfunction in PCOS patients. The prevalence of anti-TPO positivity in our study (approximately 22-25% based on mean values) aligns with these reports.

The number of follicles showed a statistically significant difference between PCOS and control groups (χ^2=22.005, p=0.001). Among PCOS patients, the most common follicle numbers were 10 and 11 (each 25.8%), followed by 12 (18.2%), whereas all control participants (100%) had 12 follicles. These findings are consistent with the diagnostic criteria of PCOS, where increased follicular number is a key ultrasonographic feature. The most common follicle size among PCOS patients was 8 mm (39.4%), followed by 7 mm (25.8%) and 6 mm (21.2%), while all control participants (100%) had follicles measuring 8 mm. Menon et al. (2017) and Al-Saab et al. (2014) described polycystic ovarian morphology as consisting of multiple small follicles without emphasizing significant variation in size between groups[16,23].

In the present study, ovarian volume showed a highly statistically significant difference between PCOS and control groups (χ^2=73.654, p=0.001). The most common ovarian volume among PCOS patients was 18 mL (28.8%), followed by 16 mL (18.2%) and 13 mL (16.7%), whereas all control participants (100%) had an ovarian volume of 11 mL. These findings are in strong agreement with Rasoulizadeh et al. (2025) and Anusha et al. (2024) both highlighted polycystic ovarian morphologies, including increased ovarian size and follicular distribution, as a key diagnostic criterion[19,22] Additionally, Mohammed et al. (2017) reported that PCOS

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is associated with increased ovarian volume and cystic changes, supporting the present study findings[24].

However, the study has certain limitations. One, small sample size, especially very limited control group (n=7), which may affect reliability and generalizability of results. Second, hospital-based study design, leading to selection bias and limiting applicability to general population. Third, cross-sectional nature of the study does not allow assessment of causal relationships between PCOS and thyroid autoimmunity. Moreover, limited obstetric history analysis without comparison group, reducing interpretability of fertility outcomes. Thyroid evaluation focused mainly on anti-TPO antibodies; other autoimmune markers (e.g., anti-TG antibodies) were not assessed.

Conclusion

This study demonstrates that women with PCOS have significantly elevated anti-thyroid peroxidase antibody levels compared to healthy controls, indicating a strong association between PCOS and autoimmune thyroid involvement. PCOS patients also exhibit higher BMI, WHR, free testosterone, and free T3 levels, along with characteristic ultrasonographic findings of increased follicle number and ovarian volume. These findings highlight the importance of comprehensive evaluation, including thyroid antibody screening, in the management of PCOS patients for early detection and improved clinical outcomes.

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Conflict of Interest

The authors do not have any conflicts of interest.

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References

1. Cedars-Sinai. Polycystic Ovary Syndrome [Internet]. Available from: https://www.cedars-sinai.org/health-library/diseases-and-conditions/p/polycystic-ovary-syndrome.html
2. World Health Organization. Polycystic ovary syndrome [Internet]. Geneva: WHO; 2025 Feb 6 [cited 2025 Nov 5]. Available from: https://www.who.int/news-room/fact-sheets/detail/polycystic-ovary-syndrome
3. Deswal R, Narwal V, Dang A, Pundir CS. The prevalence of polycystic ovary syndrome: a brief systematic review. Journal of human reproductive sciences. 2020 Oct 1;13(4):261-71.
4. Roya R, Mohammad Akbar A, Wajeeda T, Avinash B, Humaira M, Avvari BB, Ayapati MG, Vikram AA, Taalia NA, Mohammed SA. An Indian evidence-based study of prevalence, phenotypic features, lifestyle modifications of polycystic ovarian syndrome patients. J. Gynecol. Women's Health. 2021;21(1):556069.
5. Ganie MA, Vasudevan V, Wani IA, Baba MS, Arif T, Rashid A. Epidemiology, pathogenesis, genetics & management of polycystic ovary syndrome in India. Indian Journal of Medical Research. 2019 Oct 1;150(4):333-44.
6. Paik S, Roy S, Julekha A, Murthy B. Polycystic Ovary Syndrome (PCOS): A Comprehensive Review. IJFMR. June 2025;7(3):1-5.
7. Chandrashekar AS, Patil P. Polycystic ovarian syndrome: effect of hormones, associated comorbidities and recent advances in therapy. Int J Innov Sci Res Technol. 2024;9(5):1892-900.
8. Auda SA, Gatea EA, Radhi ZA. Evaluation of thyroid autoimmunity markers in polycystic ovarian syndrome in women. Biomedicine. 2023;43(3):893-6.
9. Sharma VK, Baidya S, Kandel P, et al. Positive Thyroid Peroxidase Antibody among Women with Polycystic Ovarian Syndrome Visiting an Infertility Clinic at a Tertiary Care Centre. JNMA. 2023;61(268):941.
10. Roos A, Links TP, Gans RO, et al. Thyroid peroxidase antibodies, levels of thyroid stimulating hormone and development of hypothyroidism in euthyroid subjects. Eur J Intern Med. 2010;21(6):555-9.
11. Janssen OE, Mehlmauer N, Hahn S, et al. High prevalence of autoimmune thyroiditis in patients with polycystic ovary syndrome. Eur J Endocrinol. 2004;150(3):363-9.
12. Romitti M, Fabris VC, Ziegelmann PK, et al. Association between PCOS and autoimmune thyroid disease: a systematic review and meta-analysis. Endocr Connect. 2018;7(11):1158-67.
13. Peddemul A, Tejovath S, Hassan D, et al. Influence of Subclinical Hypothyroidism on Women With Polycystic Ovary Syndrome: A literature review. Cureus. 14(8):e28468.
14. Busnelli A, Paffoni A, Fedele L, Somigliana E. The impact of thyroid autoimmunity on IVF/ICSI outcome: a systematic review and meta-analysis. Hum Reprod Update. 2016;22(6):775-90.
15. Seungdamrong A, Steiner AZ, Gracia CR, et al. Preconceptional antithyroid peroxidase antibodies, but not thyroid-stimulating hormone, are associated with decreased live birth rates in infertile women. Fertil Steril. 2017;108(5):843-50.
16. Al-Saab R, Haddad S. Detection of thyroid autoimmunity markers in euthyroid women with polycystic ovary syndrome: a case-control study from Syria. International journal of endocrinology and metabolism. 2014 Jul 1;12(3): e17954.
17. Devi M, Washington JK. A Study of Antithyroid Peroxidase Antibody and Its Correlation with Polycystic Ovary Syndrome in Reproductive Age Group Women. Frontiers in Health Informatics. 2024 Apr 1;13(3).

18. Rasoulizadeh Z, Eftekhar M, Ghadiri-Anari A, Akbarian E, Soleimanizad Z, Emarati A, Ordooei M. Prevalence of anti-thyroid peroxidase antibodies among women with polycystic ovary syndrome. Scientific Reports. 2025 Sep 29;15(1):33563.
19. Anusha KH, Thyagaraju C, Nandeesha H. Assessment of Thyroid Auto-antibodies in Euthyroid Infertile Women with Polycystic Ovarian Syndrome-A Cross-sectional Analytical Study. Journal of Human Reproductive Sciences. 2024 Oct 1;17(4):269-74.
20. Tran VT, Ly LD, Nguyen MH, Pham TD, Tran LT, Tran MT, Ho VN, Nguyen NT, Hoang HL, Vuong LN. Thyroid peroxidase antibodies in infertile women with polycystic ovary syndrome. Reproductive Sciences. 2023 Oct;30(10):3071-6.
21. Kim JJ, Yoon JW, Kim MJ, Kim SM, Hwang KR, Choi YM. Thyroid autoimmunity markers in women with polycystic ovary syndrome and controls. Human Fertility. 2022 Jan 1;25(1):128-34.
22. Rasoulizadeh Z, Eftekhar M, Ghadiri-Anari A, Akbarian E, Soleimanizad Z, Emarati A, Ordooei M. Prevalence of anti-thyroid peroxidase antibodies among women with polycystic ovary syndrome. Scientific Reports. 2025 Sep 29;15(1):33563.
23. Menon M, Ramachandran V. Antithyroid peroxidase antibodies in women with polycystic ovary syndrome. The Journal of Obstetrics and Gynecology of India. 2017 Feb;67(1):61-5.
24. Mohammed S, Awooda HA, Rayis DA, Hamdan HZ, Adam I, Lutfi MF. Thyroid function/antibodies in sudanese women with polycystic ovarian disease. Obstetrics & Gynecology Science. 2017 Mar;60(2):187-92.

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