

Association Between Polycystic Ovarian Syndrome and Thyroid Disorders: A Cross-sectional Study at DMCH, Darbhanga

Preeti Singh¹, Aakarsh Sinha², Akhilesh Kumar³, Alka Mishra⁴, Puja Mahaseth⁵

¹Senior Resident, Department of Obstetrics and Gynaecology, DMCH, Darbhanga, Laheriasarai, Bihar, India

²Senior Resident, Department of Obstetrics and Gynaecology, DMCH, Darbhanga, Laheriasarai, Bihar, India

³Senior Resident, Department of Medicine, NMCH, Patna, Bihar, India

⁴Associate Professor, Department of Obstetrics and Gynaecology, DMCH, Darbhanga, Laheriasarai, Bihar, India

⁵Associate Professor, Department of Obstetrics and Gynaecology, DMCH, Darbhanga, Laheriasarai, Bihar, India

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Corresponding Author: Puja Mahaseth

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Abstract:

Background: PCOS is a common endocrine condition affecting reproductive-age women, often presenting with metabolic and hormonal imbalances. Thyroid dysfunction, particularly hypothyroidism, is frequently observed in these patients. This study aimed to investigate the prevalence and types of thyroid abnormalities among women with PCOS.

Methods: A hospital-based cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, DMCH, Darbhanga, over 12 months (July 2024 to June 2025). A total of 120 women diagnosed with PCOS, aged 18–40 years, were enrolled. Clinical data were collected along with laboratory evaluations including thyroid function tests (TSH, Free T3, Free T4), gonadotropin levels, and pelvic ultrasound findings.

Results: Out of 120 women, 42 (35%) exhibited thyroid dysfunction. Subclinical hypothyroidism was most prevalent (23.3%), followed by overt hypothyroidism (8.3%) and hyperthyroidism (3.3%). The remaining 78 (65%) had normal thyroid profiles. Elevated TSH levels were significantly linked to increased BMI ($p = 0.03$) and menstrual irregularities ($p = 0.04$). Clinical signs such as acne and hirsutism were also more frequent in the thyroid disorder group.

Conclusion: The findings suggest a significant association between PCOS and thyroid dysfunction, especially subclinical hypothyroidism. Routine thyroid screening should be considered for all PCOS patients to allow early intervention and better management.

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Introduction

PCOS is a multifaceted endocrine disorder impacting up to 10% of women in the reproductive age group. It is typically diagnosed based on ovulatory disturbances, signs of hyperandrogenism, and characteristic ovarian morphology on ultrasound. In addition to reproductive issues, PCOS is frequently associated with insulin resistance, obesity, and other metabolic abnormalities.

Thyroid hormones play an essential role in regulating reproductive physiology. Disorders such as hypothyroidism can mimic or exacerbate PCOS symptoms, including irregular menstruation, weight gain, and infertility. Despite this clinical overlap, thyroid dysfunction is often underdiagnosed in PCOS patients. This study was undertaken to

determine the frequency and nature of thyroid abnormalities in women with PCOS attending a tertiary care hospital in Bihar.

Materials and Methods

Study Design and Duration: This cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology, DMCH, Darbhanga, between Sep. 2024 and July 2025.

Study Population: Included were 120 women between the ages of 18 and 40 who had been diagnosed with PCOS using the Rotterdam criteria, which call for at least two of the following three characteristics: polycystic ovaries on ultrasound, hyperandrogenism, or oligo/anovulation.

Exclusion Criteria

- Patients previously diagnosed or treated for thyroid disease
- Pregnant or breastfeeding women
- Presence of other endocrine conditions like adrenal or pituitary disorders

Data Collection: After obtaining informed consent, participants were evaluated through:

- Detailed clinical history (menstrual cycle pattern, hirsutism, acne)
- Physical examination (BMI, waist circumference, signs of hyperandrogenism)
- Hormonal investigations:
 - Thyroid profile (TSH, Free T3, Free T4)
 - Gonadotropins (LH, FSH), total testosterone
 - Transvaginal or transabdominal pelvic ultrasound

Classification of Thyroid Status

- **Euthyroid:** Normal TSH and T3/T4 levels
- **Subclinical Hypothyroidism:** Elevated TSH with normal T3/T4
- **Overt Hypothyroidism:** Elevated TSH with low T3/T4
- **Hyperthyroidism:** Low TSH with elevated T3/T4

Results

Demographics and Clinical Features

- Mean age: 24.8 ± 4.2 years
- Average BMI: 27.3 ± 3.1 kg/m²
- Menstrual irregularities: 82%
- Hirsutism: 60%
- Acne: 45%

Distribution of Thyroid Function

Thyroid Status	No. of Patients	Percentage
Euthyroid	78	65.0%
Subclinical Hypothyroid	28	23.3%
Overt Hypothyroid	10	8.3%
Hyperthyroid	4	3.3%
Total	120	100%

Statistical Associations

- A significant link was found between raised TSH and elevated BMI ($p = 0.03$)
- Irregular menstruation was more common in patients with thyroid abnormalities ($p = 0.04$)
- Acne and hirsutism were more prevalent in the thyroid disorder group, though not statistically significant

Discussion

The current study aimed to explore the relationship between Polycystic Ovarian Syndrome (PCOS) and thyroid dysfunction among women attending a tertiary care hospital in Darbhanga. Our findings revealed that 35% of women diagnosed with PCOS also had thyroid abnormalities, with subclinical hypothyroidism being the most prevalent form. This observation suggests a significant coexistence of thyroid dysfunction in PCOS patients, reinforcing the need for endocrine evaluation beyond the primary diagnosis.

Subclinical hypothyroidism was the most frequently encountered thyroid disorder in our study, affecting 23.3% of the participants. This aligns with previous studies conducted across India and globally, where similar prevalence rates have been observed. The presence of subclinical hypothyroidism is particularly concerning in women with PCOS because it may worsen clinical symptoms such as menstrual irregularity, infertility,

and weight gain—even when overt signs of thyroid disease are absent.

The association between elevated TSH levels and higher BMI in our study group was statistically significant ($p = 0.03$). This relationship suggests that thyroid dysfunction may contribute to the increased risk of obesity and metabolic abnormalities already present in many PCOS patients. Since both conditions independently affect lipid metabolism and insulin sensitivity, their coexistence may compound the risk of long-term complications like type 2 diabetes and cardiovascular disease.

Menstrual irregularities were observed more frequently in participants with thyroid dysfunction compared to those with normal thyroid profiles ($p = 0.04$). This finding is consistent with the known impact of thyroid hormones on the hypothalamic-pituitary-ovarian axis. Both hypothyroidism and PCOS disrupt normal ovulatory cycles, and when they occur together, the reproductive dysfunction may be more severe and more resistant to treatment.

Clinical features such as acne and hirsutism were also found to be more prevalent in the thyroid dysfunction group, although the differences were not statistically significant. These symptoms are often attributed to hyperandrogenism in PCOS, but thyroid hormones may also play a role by influencing androgen metabolism. While the exact

mechanism remains unclear, the presence of thyroid abnormalities might exacerbate these clinical signs in some patients.

In summary, our findings support the growing body of evidence that thyroid dysfunction, particularly subclinical hypothyroidism, is common among women with PCOS. The overlap in symptoms and shared pathophysiological pathways—such as insulin resistance and hormonal imbalance—highlight the importance of a comprehensive hormonal assessment in these patients. Early detection and appropriate management of thyroid disorders could improve not only metabolic and reproductive outcomes but also overall quality of life in women affected by PCOS.

Conclusion

A substantial number of PCOS patients in this study were found to have concurrent thyroid dysfunction, particularly in the form of subclinical hypothyroidism. Given its potential to exacerbate both reproductive and metabolic problems, thyroid function assessment should be integrated into the routine evaluation of all women with PCOS.

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