BIOMEDICAL RESEARCH HORIZONS
ISSN: 3106-7689 | 3106-7670
Volume 2, Issue 3, 2025

ASSESSING THE FREQUENCY OF SUBCLINICAL HYPOTHYROIDISM AMONG WOMEN WITH PCOS

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Keywords
Polycystic Ovarian Syndrome (PCOS), Subclinical Hypothyroidism (SCH), Thyroid Dysfunction, Insulin Resistance

Article History
Received: 15 July 2025
Accepted: 17 September 2025
Published: 30 September 2025

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Abstract

Polycystic ovarian syndrome (PCOS) is a common endocrine disorder in reproductive-aged women, often linked to metabolic complications. Subclinical hypothyroidism (SCH), though asymptomatic, shares features with PCOS, including insulin resistance, dyslipidemia, and menstrual irregularities.To determine the prevalence of SCH among women with PCOS at a tertiary care hospital.In this descriptive cross-sectional study, 158 women aged 20–50 years with PCOS (Rotterdam criteria) were recruited from Bahawal Victoria Hospital, Bahawalpur, between April and September 2024. Patients with known thyroid disorders or other endocrine conditions were excluded. Thyroid function tests were performed, with SCH defined as TSH >5.0 mIU/L and normal free T4 (0.91–1.55 ng/dL). Data were analyzed using SPSS v25; associations were assessed with Chi-square and Fisher's exact tests ($p \leq 0.05$).SCH was observed in 36 patients (22.8%). Significant associations were found with elevated BMI, longer PCOS duration, and family history of thyroid disorders.SCH is prevalent in women with PCOS, supporting the need for routine thyroid screening to enable early management and improve outcomes.

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is more than just a reproductive issue—it is a hormonal and metabolic disorder that affects women in multiple ways, often starting silently in their teens or early twenties and continuing well into their adult lives. [1, 2] It's one of the most common endocrine conditions in women of reproductive age, yet despite its high prevalence, it remains under-diagnosed and misunderstood. Many women with PCOS struggle with irregular menstrual cycles, excessive facial or body hair, acne, weight gain, and infertility. But beyond these visible symptoms, PCOS also increases the risk of serious long-term conditions such as type 2 diabetes, hypertension, cardiovascular disease, and psychological distress. The complexity of PCOS lies in its multi factorial nature. It doesn't have a single cause or a one-size-fits-all presentation. Instead, it is thought to arise from a combination of genetic, environmental, and hormonal imbalances. According to the widely accepted Rotterdam criteria, PCOS is diagnosed when two out of the following three features are present: irregular or absent ovulation, clinical or biochemical signs of hyperandrogenism, and polycystic ovaries visible on ultrasound. [3] These criteria have helped standardize diagnosis, but the variability in symptoms from

patient to patient still poses a clinical challenge. Interestingly, there is growing recognition that PCOS does not exist in isolation. It often overlaps with other endocrine disorders, and one of the most commonly associated conditions is subclinical hypothyroidism (SCH). SCH is a mild form of thyroid dysfunction where the thyroid-stimulating hormone (TSH) levels are elevated, but the actual thyroid hormones (T3 and T4) remain within normal limits. Because it doesn't cause obvious symptoms, SCH is often overlooked during routine evaluations. [4] However, its presence can quietly contribute to fatigue, weight gain, mood changes, menstrual irregularities, and fertility problems—all of which are also seen in PCOS. This overlapping symptomatology raises a crucial question: how often do these two conditions coexist, and what is the impact of one on the other?

Several international studies have explored this association, and the findings have been varied. Some report that around 11–15% of women with PCOS also have subclinical hypothyroidism, while others report figures as high as 40% or more. These differences could be due to variations in population genetics, diagnostic approaches, iodine intake, or sample sizes. [4, 5] But what's consistent is the suggestion that SCH may worsen the metabolic and hormonal imbalances already present in PCOS. It has been linked to worsened insulin resistance, dyslipidemia, and increased infertility—adding another layer of complexity to an already challenging condition. Despite this, in many clinical settings, especially in developing countries like Pakistan, thyroid function is not routinely assessed in women diagnosed with PCOS. This represents a significant gap in care. Many women presenting at gynecology clinics with irregular periods, difficulty conceiving, or weight gain may have an underlying thyroid disorder that is being missed, simply because it's not being actively looked for. In the local context, there is limited data to clarify how frequently subclinical hypothyroidism occurs in women with PCOS. No major studies have been conducted in Southern Punjab to establish this association, particularly in a tertiary care setting like Bahawal Victoria Hospital in Bahawalpur, where a large number of patients with PCOS are managed regularly. Without local evidence, it's difficult to justify routine thyroid screening or to design protocols for early detection and integrated management. [6] That's why this study was undertaken. By assessing the frequency of subclinical hypothyroidism in women already diagnosed with PCOS, we aim to highlight whether thyroid dysfunction is a hidden but common contributor to the PCOS spectrum. Identifying this overlap early can lead to better treatment outcomes, more personalized care, and a preventive approach to complications such as infertility and cardiovascular disease. Ultimately, this research hopes to support the case for making thyroid function testing a routine part of PCOS management in our hospitals—because early detection could be the key to significantly improving the quality of life for these women. [7]

Methodology

This study was designed to explore a question that often goes unasked in routine clinical practice: how frequently does subclinical hypothyroidism (SCH) occur in women who are already diagnosed with polycystic ovarian syndrome (PCOS)? To answer this, we carried out a **descriptive cross-sectional study** at the **Department of Pathology, Bahawal Victoria Hospital, Bahawalpur**, one of the largest tertiary care hospitals in South Punjab. The study spanned a period of **six months**, from **April 2024 to September 2024**. The study population consisted of **158 women aged between 20 to 50 years** who were already diagnosed with PCOS. We did not make the PCOS diagnosis ourselves; instead, we relied on prior clinical assessments made by gynecologists at the hospital's outpatient department. These diagnoses were based on the **Rotterdam criteria**, which require at least two of the following: oligo- or anovulation, clinical or biochemical signs of hyperandrogenism, or polycystic ovarian morphology on ultrasound. By focusing on patients already diagnosed, we ensured a clear, well-defined target group and avoided any ambiguity about PCOS status. We used a **non-probability consecutive sampling** method. This means that every woman who visited the outpatient department during the study period and met the inclusion criteria was considered for enrollment—until we reached our calculated sample size of 158.

To keep the study focused and minimize confounding variables, we applied **strict inclusion and exclusion criteria**.

Inclusion criteria:

- Women aged 20–50 years
- Previously diagnosed with PCOS as per Rotterdam criteria

Exclusion criteria:

- Women with a known history of chronic or overt hypothyroidism (TSH >5 IU prior to PCOS diagnosis)
- Patients with other endocrine disorders such as Cushing's syndrome, congenital adrenal hyperplasia, or androgen-secreting tumors
- Individuals with chronic renal failure, defined as serum creatinine >1.8 mg/dL or those on dialysis
- Smokers with >5 pack-years history, alcohol users (>20 ml/day), and hypertensive patients (BP ≥140/90 mmHg)
- Post-menopausal women

This rigorous selection helped ensure that the thyroid function data we collected would be specifically related to PCOS, without interference from other diseases or lifestyle factors. Once a participant met the inclusion criteria, **informed written consent** was obtained. The purpose of the study, the nature of the thyroid testing, and the implications of the results were explained clearly to each participant in her native language. A structured data collection form (Performa) was used to record: **Demographic details**: age, height, weight, residence (urban/rural), marital status. **Clinical details**: BMI, duration of PCOS, parity, menopausal status. **Personal and family history**: smoking, alcohol use, hypertension, dyslipidemia, family history of PCOS or thyroid disease After collecting this background information, a **blood sample** was drawn from each participant using a disposable sterile syringe. The sample was immediately sent to the **Pathology Laboratory of Bahawal Victoria Hospital** for **thyroid function testing**, which included measurement of TSH, free T4, and T3.

According to our study definition, **subclinical hypothyroidism** was diagnosed when:

- **TSH >5 mIU/L**
- **Free T4 within the normal range (0.91–1.55 ng/dL)**
- **Absence of overt hypothyroidism symptoms**

Women who were found to have subclinical hypothyroidism were informed about their diagnosis and referred back to their respective consultants for appropriate management and follow-up.

Data Analysis

All collected data were entered into **SPSS version 25.0** for statistical analysis. First, we performed a **Shapiro-Wilk test** to assess the normality of the data. Continuous variables like age, BMI, duration of PCOS, and thyroid hormone levels were expressed as **mean ± standard deviation**. Categorical variables such as presence of subclinical hypothyroidism, family history, marital status, and residence were summarized using **frequencies and percentages**. To identify any associations between SCH and other variables (like BMI, age, or duration of PCOS), we used **Chi-square tests** or **Fisher's exact test** when appropriate. A **p-value ≤ 0.05** was considered statistically significant. Effect modifiers such as age, BMI, family history of thyroid disease, and duration of PCOS were addressed by stratifying the data into subgroups and analyzing SCH frequency within each. This helped us determine whether certain groups of women were more at risk for developing SCH within the broader PCOS population.

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Results

Demographic and Clinical Profile

Table 1: Baseline Characteristics of Study Participants (n=158)

Variable	Mean ± SD / n (%)
Age (years)	29.7 ± 6.2
BMI (kg/m²)	28.9 ± 4.8
Duration of PCOS (years)	4.3 ± 2.1
Marital Status (Married)	110 (69.6%)
Residence (Urban)	97 (61.4%)
Family History of PCOS	42 (26.6%)
Family History of Thyroid Disease	33 (20.9%)
Subclinical Hypothyroidism	36 (22.8%)

Laboratory Findings

Table 2: Thyroid Function Test Results

Parameter	Mean ± SD	Reference Range
TSH (mIU/L)	4.62 ± 2.31	0.5 – 5.0
Free T4 (ng/dL)	1.22 ± 0.15	0.91 – 1.55
T3 (ng/dL)	132 ± 18	60 – 180

36 participants (22.8%) had elevated TSH with normal Free T4 levels, fulfilling the criteria for subclinical hypothyroidism.

Association between SCH and Risk Factors

Table 3: Frequency of Subclinical Hypothyroidism by Stratified Variables

Variable	SCH Present (n=36)	SCH Absent (n=122)	p-value
BMI >30 kg/m²	24 (66.7%)	42 (34.4%)	0.02*
Duration of PCOS >5 years	21 (58.3%)	34 (27.9%)	0.01*
Family history of thyroid disease	12 (33.3%)	21 (17.2%)	0.03*
Urban Residence	21 (58.3%)	76 (62.3%)	0.68
Marital Status (Married)	26 (72.2%)	84 (68.9%)	0.71

Statistically significant association found ($p<0.05$).

Discussion

This study set out to explore a connection that often goes unnoticed in clinical practice—the presence of subclinical hypothyroidism (SCH) in women already diagnosed with polycystic ovarian syndrome (PCOS). While PCOS is one of the most commonly diagnosed endocrine disorders among women of reproductive age, [1] its overlap with other hormonal disturbances like thyroid dysfunction is still underappreciated, especially in resource-limited settings. Our findings shine a light on this hidden overlap and raise important questions about how we manage women with PCOS holistically. In our study population of 158 women with PCOS, we found that 22.8% had subclinical hypothyroidism. This is a significant proportion—nearly 1 in every 4 women—which means that thyroid dysfunction could be quietly influencing the health of many PCOS

patients without anyone realizing it. [2] Our results align with findings from other international studies, though the exact prevalence varies. For example, a population-based study by Rojhani et al. reported a frequency of 11.6%, while another by Velija-Asimi et al. found rates as high as 42%. This variation can likely be explained by differences in population genetics, iodine sufficiency, study designs, and even lab assay techniques. Still, our local figure of 22.8% adds important data to this global conversation—especially because very few studies have been conducted in Pakistani populations, and none in Southern Punjab to our knowledge. One of the most interesting patterns in our data was the strong association between SCH and elevated BMI. Women with a BMI over 30 kg/m² were significantly more likely to have SCH. This is consistent with other research showing that hypothyroidism—even in its subclinical form—can slow down metabolism and contribute to weight gain. [3, 4] For women with PCOS, who already face difficulties with weight management, the added burden of even mild thyroid dysfunction could make things even harder. This finding alone suggests that thyroid screening should be considered more routinely, especially in overweight or obese PCOS patients. Another notable observation was the association between longer duration of PCOS and higher frequency of SCH. It raises the possibility that prolonged hormonal imbalance may gradually disrupt thyroid function over time, or vice versa. [7] Additionally, a positive family history of thyroid disease also showed a statistically significant link, reinforcing the idea that genetics and underlying autoimmune tendencies may play a role in both conditions. Interestingly, variables like marital status, place of residence, and parity did not show significant associations, suggesting that SCH in PCOS may be more closely tied to internal metabolic and hormonal factors than to external lifestyle or social variables. [8]

The clinical implications of these findings are meaningful. Subclinical hypothyroidism may not cause classic symptoms, but its impact is very real—especially in a population that is already at risk for infertility, insulin resistance, and metabolic syndrome. There is growing evidence that untreated SCH can worsen lipid profiles, increase insulin resistance, and contribute to ovulatory dysfunction, all of which are already common challenges in PCOS. Identifying and treating SCH early might improve reproductive outcomes, help with weight loss efforts, and even reduce the risk of future cardiovascular disease. Unfortunately, despite this evidence, thyroid function is not routinely tested in many PCOS patients, particularly in lower-resource settings like ours. Many women presenting with fatigue, weight issues, or infertility are often treated for PCOS alone, without a comprehensive endocrine workup. [5, 7] Our study supports the idea that thyroid screening should be integrated into the routine evaluation of PCOS patients, particularly for those who are overweight, have longstanding symptoms, or a family history of thyroid issues. Of course, every study has its limitations. Ours was a single-center study, and while the sample size was adequate, a multicenter approach with a more diverse population would have strengthened the findings. We also focused solely on subclinical hypothyroidism and did not assess autoantibodies (like anti-TPO), which could have added insight into autoimmune thyroiditis—another common condition linked with PCOS. Still, we believe this study contributes valuable data to a topic that is often overlooked. It also highlights the importance of seeing PCOS not as a single disease, but as a broader endocrine syndrome that can affect multiple systems—and be affected by them in turn. [9]

Conclusion

This study revealed a noteworthy insight: nearly one in four women with polycystic ovarian syndrome (PCOS) in our local population also had subclinical hypothyroidism (SCH). That's not just a number—it's a signal. It suggests that a significant number of women may be dealing with two overlapping hormonal imbalances at the same time, often without realizing it. [6] We found that subclinical hypothyroidism was more common in women with a higher body mass index, a longer duration of PCOS, and those with a family history of thyroid disease. These connections aren't just statistically significant—they're clinically meaningful. They tell us that certain women are at higher risk and should be evaluated more thoroughly. Our findings

highlight a gap in everyday clinical practice: thyroid function testing is not routinely included in the workup of PCOS, even though it clearly should be. [4] The two conditions share many symptoms—like irregular cycles, weight gain, fatigue, and infertility—so it's easy for one to mask the other. But without identifying SCH, we may be missing an important piece of the puzzle that could help women feel better, conceive more easily, and avoid long-term complications like cardiovascular disease or diabetes. The message from this study is simple but important: we need to think beyond PCOS as a standalone diagnosis. We need to look at the broader hormonal environment, especially the thyroid, which often plays a silent but powerful role in women's health. By including routine thyroid screening—especially in high-risk patients—we can detect issues early, intervene appropriately, and provide more complete, compassionate care. Looking ahead, we hope that larger, multi-center studies will build on this data, and that institutional guidelines will begin to reflect the growing body of evidence connecting PCOS and SCH. Most of all, we hope this study encourages clinicians to ask one more question, order one more test, and consider the possibility that what looks like "just PCOS" might be part of something more.

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