DOI: https://doi.org/10.54393/pjhs.v6i2.2658

PAKISTAN JOURNAL OF HEALTH SCIENCES
(LAHORE)
https://thejas.com.pk/index.php/pjhs
ISSN (E): 2790-9352, (P): 2790-9344
Volume 6, Issue 02 (February 2025)

Original Article

OPEN ACCESS

Frequency of Subclinical Hypothyroidism (SCH) among Patients of Polycystic Ovarian Disease (PCOD) Presenting in Outpatient Department of Tertiary Care Hospital

Ismaa Gul[1], Sadia Ghaffar[1], Attiqa Amin[1], Arifa Zafar[2], Nadia Siddique[3], Nazneen Akhter[4] and Sibgha Kanwal[5*]

[1]Department of Obstetrics and Gynaecology, Fatima Memorial Medical and Dental College Hospital, Lahore, Pakistan
[2]Department of Obstetrics and Gynaecology, Pak Red Crescent Medical and Dental College, Lahore, Pakistan
[3]Department of Obstetrics and Gynaecology, District Head Quarter Hospital, Hafizabad, Pakistan
[4]Department of Obstetrics and Gynaecology, Khan Research Laboratories Hospital, Islamabad, Pakistan
[5]Department of Medicine, Sir Ganga Ram Hospital, Lahore, Pakistan

ARTICLE INFO

Keywords:
Subclinical Hypothyroidism, Polycystic Ovarian Disease, Thyroid Stimulating Hormone, Patients

How to Cite:
Gul, I., Ghaffar, S., Amin, A., Zafar, A., Siddique, N., Akhter, N., & Kanwal, S. (2025). Frequency of Subclinical Hypothyroidism (SCH) among Patients of Polycystic Ovarian Disease (PCOD) Presenting in Outpatient Department of Tertiary Care Hospital: SCH among Patients of PCOD Presenting in Outpatient Department . Pakistan Journal of Health Sciences, 6(2), 80-83. https://doi.org/10.54393/pjhs.v6i2.2658

***Corresponding Author:**
Sibgha Kanwal
Department of Medicine, Sir Ganga Ram Hospital, Lahore, Pakistan
doctorsk33@gmail.com

Received date: 15th December, 2024
Acceptance date: 16th February, 2025
Published date: 28th February, 2025

ABSTRACT

Subclinical hypothyroidism is a prevalent endocrine disorder, often associated with polycystic ovarian disease both of which share a complex interplay of hormonal imbalances, contributing to significant metabolic and reproductive disturbances. **Objectives:** To determine the frequency of subclinical hypothyroidism among patients of polycystic ovarian disease presenting in an outpatient setting. **Methods:** This descriptive cross-sectional study was conducted at the Obstetrics and Gynaecology Department of Fatima Memorial Hospital, Lahore, from December 2022 to June 2023. 155 female having polycystic ovaries were enrolled using non-probability consecutive sampling. Blood samples of the patients were sent to the pathology lab for measurement of serum thyroid-stimulating hormone (TSH) level and frequency of subclinical hypothyroidism (thyroid-stimulating hormone>5mIU/L despite normal serum free thyroxin (0.8 to 1.8 ng/dL) was noted. Data were entered and analyzed using SPSS version 26. **Results:** In the current study mean age and BMI of participants having polycystic ovarian disease were calculated as 28.31 ± 7.7 years and 29.5 ± 5.8 kg/m2, respectively. Among 155 participants 43.2% were married and most of them belonged to the urban population and middle socioeconomic class. Subclinical hypothyroidism was found in 14.8% of female suffering from polycystic ovarian disease. **Conclusions:** It was concluded that this study underscores the high prevalence of subclinical hypothyroidism among patients with polycystic ovarian disease, highlighting the need for routine thyroid function screening in this population. Early detection enables timely interventions and supports a comprehensive approach to managing polycystic ovarian disease and its related comorbidities.

INTRODUCTION

Polycystic ovarian disease is a common endocrine disorder; that affects 4-20% of women [1]. This syndrome is characterized by hyperandrogenism, oligo-amenorrhea and polycystic ovaries. Insulin resistance and hyperandrogenism are amongst the most common endocrine irregularities encountered in polycystic ovarian disease (PCOD) [2]. More than half of females with PCOD are associated with insulin resistance, hyperglycemia, weight gain, and metabolic syndrome [3]. Thyroid disorders are also commonly observed in patients with PCOD, with subclinical hypothyroidism (SCH); affecting 5% to 10%. SCH contributes to subfertility and unfavourable pregnancy outcomes [4, 5]. The relationship between subclinical hypothyroidism (SCH) and PCOD has been reported in the literature, but the mechanisms are still unclear [6, 7]. Thyroid hormones function as insulin agonists in muscles and as antagonists in the liver. Consequently, deficiency in thyroid hormone reduces glucose production and

DOI: https://doi.org/10.54393/pjhs.v6i2.2658

utilization. Some researchers have proposed that insulin resistance, a key factor in the pathogenesis of PCOD, might arise as a result of hypothyroidism [7]. Additionally, hypothyroidism may impair gonadal function, and contribute to anovulatory cycles [8]. While previous studies have reported the coexistence of SCH and PCOD, data on the exact frequency of SCH in PCOD patients remain inconsistent, and there is limited research focusing on its implications for metabolic and reproductive health.

This study aims to determine the frequency of SCH among PCOD patients to better define its burden in our local population. Identifying this prevalence could guide targeted screening and management strategies, ultimately improving reproductive and metabolic outcomes in affected individuals.

METHODS

This descriptive cross-sectional study was done at the Department of Obstetrics and Gynecology, Fatima Memorial Hospital, Lahore, from December 2022 to June 2023 after obtaining synopsis approval from CPSP (REU No: 47315). Using the single-proportion formula, sample size of 155 female was calculated using a 95% confidence level, 5% margin of error and taking an expected percentage of subclinical hypothyroidism as 11.3% in female presenting with PCOD [9]. Power of 80% was assumed to detect meaningful differences in SCH prevalence within the study population. Sample selection was using a non-probability, consecutive sampling technique. In this study, female aged 16-45 years, presenting with PCOD were included. PCOD was diagnosed based on Rotterdam Criteria (2003) criteria: 1. Ovulatory dysfunction, 2. Clinical (hirsutism oligo-menorrhoea/amenorrhea, infertility, acne and acanthosis nigricans) or biochemical signs of hyperanderogenism (normal or low follicle-stimulating hormone, elevated luteinizing hormone), 3. Polycystic ovaries on ultrasonography (follicle number per ovary ≥20, and/or ovarian volume ≥10 mL, ensuring no corpora luteal cysts or dominant follicles are present). Pregnant females, females already diagnosed with overt hypothyroidism or hyperthyroidism, renal disease (creatinine>1.2mg/dl) or liver disease (Alanine aminotransferase (ALT) and Aspartate aminotransferase (AST) >40IU, hepatitis B or C), Hypertension (HTN) (Blood Pressure (BP)≥140/90mmHg), diabetes mellitus (DM)(BSR>186mg/dl), hyperprolactinemia (prolactin >30ng/ml), females receiving hormonal therapy or steroids during last 6 months were excluded. Informed consent was obtained from all patients. Demographic data (name, age, marital status, BMI, duration of symptoms, area of residence, and socioeconomic status) was recorded. Then blood samples of all participants were taken using 5cc disposable syringe under aseptic measures and sent to the laboratory of the hospital for assessment of thyroid function test. Reports were assessed and subclinical hypothyroidism was labelled as positive if thyroid-stimulating hormone (TSH)>5mIU/L despite normal levels of serum-free thyroxin (0.8 to 1.8 ng/dL). Patients diagnosed with subclinical hypothyroidism were referred to an endocrinologist. The data were analyzed through SPSS version 26. Mean and standard deviation were calculated for age, duration of symptoms and BMI. Frequency and percentage were calculated for marital status, area of residence, socioeconomic status and subclinical hypothyroidism. Data were stratified for age, marital status, BMI, duration of symptoms, area of residence and socioeconomic status. Post-stratification, a chi-square test was applied and a p-value <0.05 was taken as significant.

RESULTS

The mean age, duration of symptoms and BMI of female was calculated as 28.31 ± 7.7 years, 11.26 ± 6.7 months and 29.5 ± 5.8 kg/m2, respectively. Out of 155 participants, 43.2% were married, 58% of female had an urban residence 28.5% of women belonged to the poor and 45.8% belonged to the middle socioeconomic class (Table 1).

Table 1: Patient-Related Demographic Characteristics

Parameters		n=155
Age (Mean ±S D) Years		28.31 ± 7.7 Years
Duration of Symptoms (Mean ± SD) Months		11.26 ± 6.7 Months
BMI (Mean ± SD) kg/m^2		29.5 ± 5.8 kg/m^2
Marital Status n (%)	Married	67 (43.2%)
	Unmarried	88 (56.8%)
Residence n (%)	Rural	65 (42%)
	Urban	90 (58%)
Socioeconomic Status n (%)	Low	44 (28.4%)
	Middle	71 (45.8%)
	High	40 (25.8%)

The pie chart shows that the frequency of subclinical hypothyroidism was noted as 14.8% among female suffering from PCOD (Figure 1).

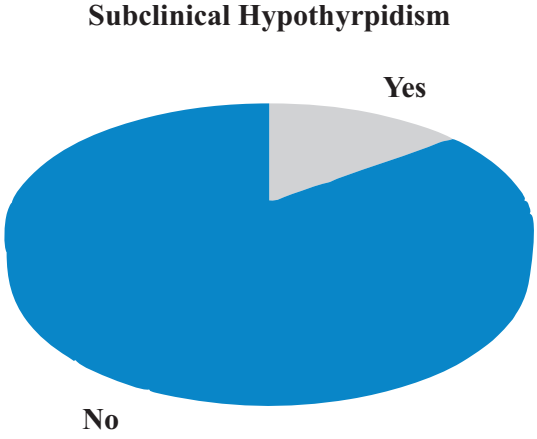

Figure 1: Frequency of Subclinical Hypothyroidism

DOI: https://doi.org/10.54393/pjhs.v6i2.2658

Patient data were stratified to analyse the association between SCH and various patient characteristics. A statistically significant association was observed between BMI and SCH ($p<0.001$), indicating a higher prevalence of SCH in patients with BMI <30 compared to those with BMI >30. Other factors, including age, marital status, duration of PCOD, residence, and socioeconomic status, were not significantly associated with SCH ($p>0.05$) (Table 2).

Table 2: Subclinical Hypothyroidism About Patient's Characteristic

Parameter		Subclinical Hypothyroidism		p-value
		Yes	No	
Age	16-30 Years	16 (16.2%)	83 (83.8%)	0.538
	31-45 Years	7 (12.5%)	49 (87.5%)	
Marital Status	Married	8 (11.9%)	59 (88.1%)	0.376
	Unmarried	15 (17%)	73 (83%)	
BMI	<30	21 (25.3%)	62 (74.5%)	<0.001
	>30	2 (2.8%)	70 (97.2%)	
Duration of PCOD	<6 Month	10 (16.9%)	49 (83.1%)	0.562
	>6 Months	13 (13.5%)	83 (86.5%)	
Residence	Rural	9 (17.3%)	43 (82.7%)	0.407
	Urban	11 (13.9%)	68 (86.1%)	
Socioeconomic Status	Poor	4 (91.%)	40 (90.9%)	0.264
	Middle	14 (19.7%)	57 (80.3%)	
	High	5 (12.5%)	35 (87.5%)	

DISCUSSION

In the current study, subclinical hypothyroidism was found in 14.8% of female having PCOD [10]. Comparable results were obtained in a similar study conducted recently in Pakistan by Abdullah *et al.*, in which among 136 patients studied, 19.1% were found to have SCH [11]. Another locally conducted study by Fatima *et al.*, found similar results [12]. In contrast, a study by Raj *et al.*, found a higher frequency of SCH 43.5% among women diagnosed with PCOD vs 20.5% among those without PCOD [13]. However, Rojhani *et al.*, suggest that its prevalence was similar between PCOD patients and controls [14]. Furthermore, previous studies investigating this association have yielded mixed results [15]. While most clinical studies have reported a higher prevalence of SCH in women with PCOS. Zhang *et al.*, in a study, found that SCH does not increase the risk of PCOD after adjusting for confounding factors [16]. A meta-analysis by Ding *et al.*, revealed a significant combined odds ratio of 3.59 for SCH risk in PCOD patients compared to controls, with the TSH cutoff value taken being ≥4 mIU/L [15]. Hypothyroidism is commonly observed in PCOD patients, suggesting a significant correlation and risk of thyroid disorders in this vulnerable population [17, 18]. Furthermore, it was collectively suggested a higher prevalence of metabolic syndrome among SCH patients, indicating that it may exacerbate lipid and glucose-related metabolic disturbances in females with PCOD [19]. Early identification and management of SCH through comprehensive thyroid profiling can play a crucial role in mitigating the metabolic and reproductive complications associated with PCOD, thereby improving patient outcomes and overall quality of life [20]. This study suggests that lower TSH levels may also be clinically significant, particularly in women of reproductive age or those planning pregnancy. Future research should consider evaluating SCH using alternative TSH thresholds to provide a more comprehensive understanding of its role in PCOS.

CONCLUSIONS

It was concluded that this study underscores the high prevalence of subclinical hypothyroidism among patients with PCOD, highlighting the need for routine thyroid function screening in this population. Early detection enables timely interventions and supports a comprehensive approach to managing PCOD and its related comorbidities.

Authors Contribution

Conceptualization: IG, SG, SK
Methodology: AA
Formal analysis: SK
Writing review and editing: IG, SG, AA, AZ, NS, NA, SK
All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] 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; 13(4): 261-71. doi: 10.4103/jhrs.JHRS_95_18.

[2] Salari N, Nankali A, Ghanbari A, Jafarpour S, Ghasemi H, Dokaneheifard S *et al.* Global Prevalence of Polycystic Ovary Syndrome in Women Worldwide: A Comprehensive Systematic Review and Meta-Analysis. Archives of Gynecology and Obstetrics. 2024Sep;310(3):1303-14.doi:10.1007/s00404-024-07607-x.

[3] Ali AT, Al-Ani O, Al-Ani F, Guidozzi F. Polycystic Ovary Syndrome and Metabolic Disorders:A Review of the Literature.African Journal of Reproductive Health. 2022Sep;26(8): 89-99.doi:10.29063/ajrh2022/v26i8.9.

[4] Xing Y, Chen J, Liu J, Ma H. The Impact of Subclinical Hypothyroidism On Patients with Polycystic Ovary Syndrome: A Meta-Analysis. Hormone and Metabolic Research.2021 Jun; 53(06): 382-90. doi: 10.1055/a-

DOI: https://doi.org/10.54393/pjhs.v6i2.2658

1463-3198.
[5] Shi D, Du J, Kang H, Feng L, Liu F. The Effect of Subclinical Hypothyroidism On Hormonal and Metabolic Profiles and Ovarian Morphology in Patients with Polycystic Ovary Syndrome: A Cross-Sectional Study. Gynecological Endocrinology.2024 Dec; 40(1): 2358219. doi: 10.1080/09513590.2024.2358219.
[6] Gawron IM, Baran R, Derbisz K, Jach R. Association of Subclinical Hypothyroidism with Present and Absent Anti-Thyroid Antibodies with PCOS Phenotypes and Metabolic Profile. Journal of Clinical Medicine.2022 Mar; 11(6): 1547. doi: 10.3390/jcm11061547.
[7] Nayak PK, Mitra S, Sahoo J, Mahapatra E, Agrawal S, Lone Z. Relationship of Subclinical Hypothyroidism and Obesity in Polycystic Ovarian Syndrome Patients. Journal of Family Medicine and Primary Care.2020 Jan; 9(1): 147-50. doi: 10.4103/jfmpc.jfmpc_654_19.
[8] Rao M, Wang H, Zhao S, Liu J, Wen Y, Wu Z *et al.* Subclinical Hypothyroidism Is Associated with Lower Ovarian Reserve in Women Aged 35 Years or Older. Thyroid.2020 Jan; 30(1): 95-105. doi: 10.1089/thy.2019.0031.
[9] Huang R, Zheng J, Li S, Tao T, Liu W. Subclinical Hypothyroidism in Patients with Polycystic Ovary Syndrome: Distribution and Its Association with Lipid Profiles. European Journal of Obstetrics and Gynecology and Reproductive Biology.2014 Jun; 177: 52-6. doi: 10.1016/j.ejogrb.2014.04.013.
[10] Raj D, Pooja FN, Chhabria P, Kalpana FN, Lohana S, Lal K *et al.* Frequency of Subclinical Hypothyroidism in Women with Polycystic Ovary Syndrome. Cureus.2021 Sep; 13(9). doi: 10.7759/cureus.17722.
[11] Abdullah Choudhry M, Umar MF, Saif S, Haider Q, Jaffar M. Frequency of Subclinical Hypothyroidism among Patients of Polycystic Ovarian Syndrome (PCOS). Pakistan Journal of Medical and Health Sciences. 2022 Apr; 16(02): 1004-.doi:10.53350/pjmhs221621004.
[12] Fatima A, Mansoor A, Nawaz F, Ilyas A, Hassan M, Fatima T. Frequency of Subclinical Hypothyroidism among Patients of Polycystic Ovarian Syndrome (PCOS). Pakistan Journal of Medical and Health Sciences.2021 Nov; 15(11): 3511-3512. doi: 10.53350/pjmhs2115113511.
[13] Raj D, Pooja FN, Chhabria P, Kalpana FN, Lohana S, Lal K *et al.* Frequency of Subclinical Hypothyroidism in Women with Polycystic Ovary Syndrome. Cureus.2021 Sep 4; 13(9). doi: 10.7759/cureus.17722.
[14] Rojhani E, Rahmati M, Firouzi F, Saei Ghare Naz M, Azizi F, Ramezani Tehrani F. Polycystic Ovary Syndrome, Subclinical Hypothyroidism, The Cut-Off Value of Thyroid Stimulating Hormone; Is There a Link? Findings of A Population-Based Study. Diagnostics. 2023 Jan; 13(2):316.doi:10.3390/diagnostics13020316.
[15] Ding X, Yang L, Wang J, Tang R, Chen Q, Pan J *et al.* Subclinical Hypothyroidism in Polycystic Ovary Syndrome: A Systematic Review and Meta-Analysis. Frontiers in Endocrinology.2018Nov;9:700.doi:10.3389/fendo.2018.00700.
[16] Zhang B, Wang J, Shen S, Liu J, Sun J, Gu T *et al.* Subclinical Hypothyroidism Is Not A Risk Factor for Polycystic Ovary Syndrome in Obese Women of Reproductive Age. Gynecological Endocrinology. 2018 Oct;34(10):875-9.doi:10.1080/09513590.2018.1462319.
[17] Van der Ham K, Stekelenburg KJ, Louwers YV, Van Dorp W, Schreurs MW, Van der Wal R *et al.* The Prevalence of Thyroid Dysfunction and Hyperprolactinemia in Women with PCOS. Frontiers in Endocrinology.2023Oct;14:1245106.doi:10.3389/fendo.2023.1245106.
[18] Bonakdaran S, Milani N, Khorasani ZM, Hosseinzadeh M, Kabiri M. Is There a Relation Between Hypothyroidism and Polycystic Ovary Syndrome and Its Metabolic Components? Current Diabetes Reviews. 2023 Feb;19(2):103-10.doi:10.2174/1573399818666220426090324.
[19] Saei Ghare Naz M, Amirshekari S, Ramezani Tehrani F. The Effects of Subclinical Hypothyroidism on Clinical and Biochemical Features and Complications of Polycystic Ovary Syndrome: A Narrative Review. Iranian Journal of Endocrinology and Metabolism. 2023 Sep; 25(3): 273-82.
[20] Tyagi S, Narrey N, Gupta S, Thagele SN. Prevalence of Thyroid Dysfunction in Polycystic Ovarian Syndrome among Indian Women: A Cross-Sectional Study. Research Journal of Medical Sciences.2024Sep;18:620-3. doi: 10.36478/makrjms.2024.9.620.623.