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# Thyroid disorders in patients with polycystic ovarian syndrome in Benghazi.

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## Original Research Article

*Abstract*

Background: Recent studies have highlighted a higher occurrence of thyroid abnormalities in women diagnosed with polycystic ovary syndrome (PCOS), although the underlying mechanisms linking the two conditions remain uncertain.

Aim and Objectives: To determine the prevalence of thyroid dysfunction among patients with PCOS.

Methods: A retrospective review of medical records was conducted for 116 patients attending the endocrine clinic in Benghazi medical center during the period from the first of September to the end of October 2020.

Results: The mean age was (35.5±9.8 years), the mean body mass index for the study group was 31.8±6.5kg/m2. Among studied group; 81% of participants had oligomenorrhea, 97.4% had hirsutism, and 84% had ultrasound features of polycystic ovaries; Overall, the prevalence of thyroid disorders among patients with PCOS was 31%, the main thyroid disorder was autoimmune thyroiditis which represented 13.8% followed by subclinical hypothyroidism which found in 9.5% of all participants.

Conclusion: More than one third of the studied group had thyroid disorders. Autoimmune thyroiditis represented the main disorder.

Keywords: PCOS, thyroid, thyroiditis, hypothyroidism, hyperthyroidism, goiter, autoimmune, subclinical.

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## INTRODUCTION

Polycystic ovary syndrome (PCOS) is recognized as one of the most prevalent endocrine conditions in women, typically defined by irregular ovulation, androgen excess, and the presence of polycystic ovaries. It affects 15–20% of women of reproductive age (1). Evidence suggests an association between PCOS and thyroid disorders, particularly autoimmune thyroiditis and nodular goiter (2). Rates of subclinical hypothyroidism (SCH) and autoimmune thyroiditis have been reported to be more common in women with PCOS compared to the general population (3). The Rotterdam Consensus (2003) established the diagnostic framework for PCOS, requiring the presence of at least two of the following: (1) menstrual irregularities such as amenorrhea (absence of menstruation for ≥6 months), oligomenorrhea (cycle length >35 days), or prolonged cycles; clinical or biochemical signs of hyperandrogenism; and ultrasound findings of polycystic ovaries, defined as ≥12 follicles measuring 2–9 mm in diameter and/or an ovarian volume >10 mL (4). Subclinical hypothyroidism affects approximately 4–8% of women of reproductive age (5). Although often asymptomatic, it may present with subtle manifestations including dyslipidemia, hyperglycemia, insulin resistance, menstrual dysfunction, obesity, and infertility—symptoms that may overlap with PCOS (2,6). In primary hypothyroidism, elevated thyroid-stimulating hormone (TSH) and prolactin levels can influence ovarian physiology. Prolactin interferes with ovulation by altering the follicle-stimulating hormone (FSH) to luteinizing hormone (LH) ratio and increasing adrenal androgen secretion. Additionally, TSH may interact with FSH receptors, while prolonged hypothyroidism can lead to collagen accumulation in the ovaries, further aggravating cystic morphology. The degree of ovarian changes often depends on both the duration and severity of the thyroid dysfunction. Recent research has highlighted elevated markers of autoimmunity in women with PCOS, reinforcing the possible link between PCOS and autoimmune thyroid disease (2). In fact, one study showed that the prevalence of PCOS was significantly higher in adolescents (13–18 years) with hypothyroidism and positive thyroid peroxidase antibodies (anti-TPO Ab), compared with controls (46.8% vs. 4.3%) (7). The study aimed to estimate the frequency of thyroid disorders among patients with PCOS at Benghazi medical center.

## PATIENTS AND METHODS

This study was conducted at the Benghazi Medical Center at the endocrine clinic during the period from the first of September to the end of October 2020, a retrospective study of patients' files. The total number of files was 1083, among them 116 patients were diagnosed with polycystic ovarian syndrome.

The questionnaire was adapted from an article (Thyroid profile in polycystic ovarian syndrome) (8).

The questionnaire was divided into three main sections: section A involving personal data (age, marital status, body mass index), section B involving features of polycystic ovarian syndrome (amenorrhea, oligomenorrhea or prolonged cycles, evidence of hyperandrogenism, ultrasonography features of PCOS), and section C involving the type of thyroid dysfunction.

Data analyzed using SPSS version 20. Variables were summarized as frequencies, percentages, means, and standard deviations.

## RESULTS

### I. General characteristics of PCOS patients

The mean age for the study group was 35.5 years with a standard deviation of 9.8 years (35.5±9.8 years), 45.7% were in the age group between 26 to 35 years and most of them were single (66.4%).

The mean BMI for the study group was 31.8±6.5kg/m2.

The result showed most of the patients with polycystic ovarian syndrome were classified as obese class I and overweight, with percentages (29.3%,26.7% respectively) as shown in Table 1.

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**Table 1:** Body mass index distribution.

| Classification | No. | % |
|---|---|---|
| Normal | 17 | 14.7 |
| Over Weight | 31 | 26.7 |
| Obesity I | 34 | 29.3 |
| Obesity II | 22 | 19.0 |
| Obesity III | 12 | 10.3 |
| Total | 116 | 100% |

## II. polycystic ovarian syndrome

### 1. Hyperandrogenism signs

The clinical signs of hyperandrogenism found in the patients who underwent the study were hirsutism, acanthosis nigricans, and acne. Hirsutism was almost found in all patients, with a percentage of 97.4%. And in some patients, there was more than one sign. While acanthosis nigricans and acne were less frequent with percentages of (18.1%, 7.8% respectively) as shown in Table 2.

**Table 2:** Hyperandrogenism signs distribution.

| Sign | Yes | No | % |
|---|---|---|---|
| Hirsutism | 113 | 3 | 97.4 |
| Acanthosis nigricans | 21 | 95 | 18.1 |
| Acne | 9 | 107 | 7.8 |

### 2. Menstrual cycle

Most patients (81%) presented with oligomenorrhea. Amenorrhea and menorrhagia represented 9.5% for each.

### 3. Pelvis ultrasound

Most patients had ovarian cysts by pelvic ultrasound, with a percentage of 84%.

## III. Thyroid disorders among the studied group

Overall, the prevalence of thyroid disease in polycystic ovarian syndrome was 31% of all participants.

The highest percentage of the studied group (69%) had normal thyroid function, while autoimmune thyroiditis and subclinical hypothyroidism represented (13.8%, 9.5% respectively) Hypothyroid patients represented 1.7% due to either post-surgical hypothyroidism or post-radioactive iodine hypothyroidism. Figure 1

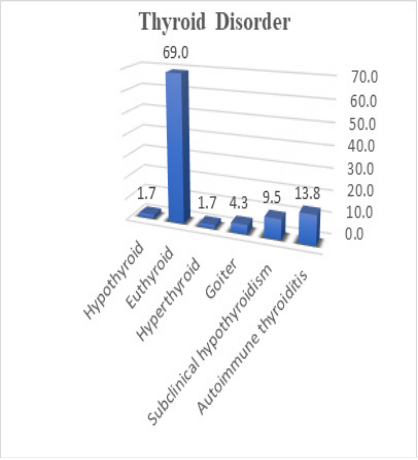



**Figure 1:** Distribution according to thyroid disorders.

## DISCUSSION

The present study found that polycystic ovary syndrome (PCOS) was most frequently observed in women aged 26–35 years, while its prevalence decreased notably during puberty. It was predominantly a condition of reproductive age, with high rates among women of marriageable age in arabic muslim communities. Consequently, many women presented to outpatient clinics with infertility or menstrual abnormalities.

A significant relationship was observed between obesity and thyroid dysfunction. In the present study obesity affected more than a half which was near to that reported by Najem et al. (9) where obesity reported in 57% of their study participants. Thyroid function appeared to influence BMI like diabetes and physical activity (10). While the prevalence of overweight in adolescents with PCOS was 33.3% in Rahmanpour et al which was near to the present study (11).

Among the clinical manifestations of hyperandrogenism, hirsutism was the most common. Similar results were reported by Najem et al. (9) where hirsutism was reported in 90.8% of patients. Acanthosis nigricans and acne in Najem et al study were similar to our study, 15.8%, and 12% respectively. In contrast, Amato et al. (12) documented a lower

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prevalence of hirsutism (57.7%).

Menstrual disturbances were also prevalent; oligomenorrhea was observed in 81% of patients in this study. Comparable results were reported by Najem et al. (9), who found oligomenorrhea in 85.8% of PCOS patients. Ultrasound evaluation revealed features consistent with PCOS was lower than that reported in studies using transvaginal ultrasound (96.7%), likely due to the lower sensitivity and higher operator dependency of transabdominal ultrasound (13,14). Thyroid disorders identified among third of the participants, autoimmune hypothyroidism was the most prevalent. According to prior reports, anti-thyroid antibodies and elevated TSH presented in 27% and 11% of PCOS patients, respectively (15). The prevalence of autoimmune hypothyroidism was 22.1% in Arduc et al. study (16), which was higher than our study. Sinha et al. (17) compared 80 women with PCOS to 80 controls and observed a significantly higher prevalence of goiter (27.5% vs. 7.5%) and subclinical hypothyroidism (22.5% vs. 8.75%) among the PCOS group. As compared to Lubecka et al. (18) the prevalence of subclinical hypothyroidism ranged from 11.3% to 30.3% (mean, 20.3%) among patients with PCOS. Also, in Raj et al. (19) they found that subclinical hypothyroidism more prevalent in participant with PCOS compared to participants without PCOS (43.5% vs. 20.5%).

## CONCLUSION

Overall, the prevalence of thyroid disorders among patients with PCOS was 31%; the main thyroid disorder was autoimmune thyroiditis.

## LIMITATIONS

A retrospective study from a patients' files and some data might be missing.

## RECOMMENDATION

It is recommended that all patients with PCOS undergo routine screening for thyroid function and thyroid-specific autoantibodies, even if clinical signs of thyroid disease are absent.

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