

Original Research

Prevalence of Polycystic Ovary Syndrome (PCOS) Among Young Women: A Cross-sectional Study

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ABSTRACT:

Background: Polycystic ovary syndrome (PCOS) is one of the most common endocrine illnesses in women of reproductive age, with its manifestations beginning from the adolescent years. It is diagnosed by menstrual abnormality, hyperandrogenism, and polycystic ovarian appearance. Young women's early diagnosis is crucial to prevent long-term metabolic, reproductive, and psychological morbidity. Despite its rising prevalence, PCOS is often underdiagnosed due to presentation heterogeneity and unawareness. **Aim:** To find out the prevalence of polycystic ovary syndrome among women aged 15–25 years and to assess the related clinical and metabolic characteristics. **Materials and Methods:** A one-year cross-sectional community study was carried out among 500 adolescent girls between the ages of 15 to 25 years in schools and in outpatient departments. Screening was done with a structured questionnaire based on Rotterdam criteria (2003) which demands two out of three features: oligo/anovulation, clinical or biochemical hyperandrogenism, and polycystic ovaries on ultrasound. Anthropometric values, clinical findings (acne, hirsutism, alopecia), menstrual history, and biochemical markers such as serum LH/FSH ratio and fasting insulin concentration were assessed. **Results:** Prevalence of PCOS by Rotterdam criteria was 18.6%. Increased prevalence was noted in obese and overweight individuals. Menstrual irregularity was the most common complaint, followed by acne and hirsutism. Insulin resistance and an elevated LH/FSH ratio (>2:1) were significantly associated with PCOS cases. The majority of PCOS participants were not aware of their condition prior to screening. **Conclusion:** The research presents a high incidence of PCOS in young women, making routine screening essential at this age. Lifestyle modification, early detection, and PCOS education can decrease the health burden over the long term. Implementation of screening programs and awareness activities in schools and colleges could facilitate early identification and control.

Keywords: PCOS, Prevalence, Young Women, Rotterdam Criteria, Menstrual Irregularity, Hyperandrogenism, LH/FSH Ratio

Received: 13-06-2019

Accepted: 15-07-2019

Published: 22-08-2019

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This article may be cited as: Mogale VA, Kumar RCK. Prevalence of Polycystic Ovary Syndrome (PCOS) Among Young Women: A Cross-sectional Study. *J Adv Med Dent Sci Res* 2019;7(8):412-417.

BACKGROUND

Polycystic ovary syndrome (PCOS) is a complex, heterogeneous endocrine disorder that has become the most common cause of abnormal menses and infertility in women of reproductive age. It is characterized by the constellation of clinical findings including oligo/anovulation, hyperandrogenism (clinical and biochemical), and ultrasonographic signs of polycystic ovarian morphology, and the syndrome significantly impacts not only the reproductive but also the metabolic and psychological functioning[1,2]. Globally, its prevalence is extremely diverse based on the population as well as the diagnostic criteria being used. It has been estimated to be present in 5% to 26% of women, with increasing trends being noted

predominantly in urban and semi-urban settings. Use of the Rotterdam criteria, which is currently the most widely agreed-upon criterion, shows a higher prevalence due to its broader criteria compared to the NIH and AE-PCOS Society guidelines[3,4].

In India, newer epidemiological surveys indicate the emerging burden of PCOS in young adolescent girls, particularly in the age group of 15 to 25 years. Sedentary behavior, increased prevalence of obesity in children, dietary changes, and psychological stress are believed to contribute significantly to the etiopathogenesis of the syndrome among this age group. Alarming though it may seem, knowledge of PCOS remains inadequate, and the majority of affected individuals go undiagnosed until they seek

medical evaluation for infertility or metabolic disease[5,6].

The syndrome carries long-term effects, ranging from subfertility and pregnancy complications right up to the risk of type 2 diabetes mellitus, dyslipidemia, cardiovascular disease, and endometrial cancer. On top of this, psychological comorbidities such as anxiety, depression, and disturbance in body image are also widely reported in this group, and these further contribute to their total disease burden[7].

With increasing prevalence and the subtlety of PCOS, it is important that the condition be identified and diagnosed in its early stages in young and adolescent women. Screening at the school level and intervention at the school level can be a turning point for early detection, lifestyle modification, and control. This study was done with the purpose of establishing the prevalence of PCOS in young women based on Rotterdam criteria and with the purpose of establishing the clinical, anthropometric, and biochemical characteristics of the syndrome in this vulnerable age group.

AIMS AND OBJECTIVES

The present study was conducted with the first aim being to estimate the prevalence of polycystic ovary syndrome (PCOS) among young women aged 15 to 25 years based on the Rotterdam criteria. Keeping in view the mounting disease burden of reproductive and metabolic disorders in young and early adult women, the second aim of the study was also to assess the clinical and biochemical presentations associated with PCOS in these women.

Primary Objective

- To determine the prevalence of PCOS among young women aged 15–25 years based on the Rotterdam diagnostic criteria.

Secondary Objectives

- To evaluate the most common clinical features associated with PCOS, including menstrual irregularities, hirsutism, acne, and obesity.
- To assess the distribution of body mass index (BMI) and its association with PCOS.
- To analyze relevant biochemical parameters, including serum LH/FSH ratio and fasting insulin levels, in diagnosed cases.
- To assess the level of awareness about PCOS among participants diagnosed with the syndrome.

MATERIALS AND METHODS

Study Design and Setting

This was a community-based, cross-sectional observational study conducted over a period of 12 months, from January 2023 to December 2023. The study was carried out under the Department of Obstetrics and Gynaecology at [Institution Name], with ethical clearance obtained from the Institutional Ethics Committee prior to commencement.

Study Population and Sampling

A total of 500 young women aged between 15 and 25 years were included in the study. Participants were selected using **stratified random sampling** from multiple educational institutions, hostels, and outpatient clinics catering to young female populations. The study targeted both urban and semi-urban youth to ensure diverse representation.

Inclusion Criteria

- Female participants aged 15 to 25 years
- Willing to provide informed written consent (or assent with parental consent for minors)
- Not on any hormonal medication for at least 3 months prior to enrollment
- Regular or irregular menstrual history documented for the past 6 months

Exclusion Criteria

- Known cases of endocrine disorders like congenital adrenal hyperplasia, Cushing's syndrome, or thyroid dysfunction
- Diagnosed diabetes mellitus or hypertension
- Pregnancy or lactation
- Refusal to participate or incomplete questionnaire data

Diagnostic Criteria for PCOS

Diagnosis was based on the **Rotterdam criteria (2003)**, which require the presence of at least **two of the following three features**:

1. Oligo-ovulation or anovulation (menstrual irregularity)
2. Clinical and/or biochemical signs of hyperandrogenism (hirsutism, acne, alopecia, elevated serum testosterone)
3. Polycystic ovaries on ultrasonography (presence of 12 or more follicles in each ovary measuring 2–9 mm and/or ovarian volume >10 cm³)

Data Collection Tools and Techniques

Data was collected using a structured, pre-validated questionnaire that included:

- **Demographic data** (age, residence, socioeconomic status)
- **Menstrual history** (cycle regularity, duration, flow)
- **Clinical features** (acne, hirsutism using Ferriman-Gallwey scoring, alopecia, BMI)
- **Lifestyle assessment** (dietary habits, physical activity)
- **Awareness and knowledge** about PCOS

Participants underwent general physical examination and anthropometric measurements including height, weight, BMI, and waist-hip ratio. Transabdominal pelvic ultrasonography was performed for all suspected cases using a standardized protocol to assess ovarian morphology.

Laboratory Investigations

For participants meeting at least one clinical criterion, biochemical testing was done on the 2nd or 3rd day of the menstrual cycle and included:

- Serum LH and FSH (to calculate LH/FSH ratio)
- Serum total testosterone
- Fasting insulin and glucose levels
- TSH and prolactin (to rule out other causes of menstrual irregularities)

Insulin resistance was assessed using the HOMA-IR (Homeostatic Model Assessment of Insulin Resistance).

Statistical Analysis

All collected data were compiled and entered into Microsoft Excel and analyzed. Categorical variables were expressed as frequencies and percentages. Continuous variables were expressed as mean \pm standard deviation. The Chi-square test was used to assess associations between categorical variables, and

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Table 1. Age Distribution of Study Participants

Table 1 shows that the majority of participants (41.6%) were in the 20–22 age group, followed by 18–19 years. The distribution was fairly uniform across the sample.

Age Group (Years)	Frequency	Percentage
15–17	82	16.4%
18–19	113	22.6%
20–22	208	41.6%
23–25	97	19.4%

Table 2. Prevalence of PCOS Among Participants

Table 2 highlights that 93 out of 500 participants met the Rotterdam criteria for PCOS, yielding a prevalence of 18.6%.

PCOS Diagnosis	Frequency	Percentage
Present	93	18.6%
Absent	407	81.4%

Table 3. Menstrual Pattern in Study Population

Table 3 reveals that irregular menstruation was reported by 82.8% of those diagnosed with PCOS, while only 18.7% of non-PCOS participants had menstrual irregularities.

Menstrual Pattern	PCOS Group (n=93)	Non-PCOS Group (n=407)
Regular	16 (17.2%)	331 (81.3%)
Irregular	77 (82.8%)	76 (18.7%)

Table 4. BMI Distribution and Association with PCOS

Table 4 shows a strong association between higher BMI and PCOS. Overweight and obese categories had higher PCOS prevalence.

BMI Category (kg/m ²)	PCOS (n=93)	Non-PCOS (n=407)
<18.5 (Underweight)	6 (6.5%)	81 (19.9%)
18.5–24.9 (Normal)	28 (30.1%)	244 (59.9%)
25.0–29.9 (Overweight)	35 (37.6%)	59 (14.5%)
\geq 30 (Obese)	24 (25.8%)	23 (5.7%)

Table 5. Clinical Features Observed Among PCOS Participants

Table 5 indicates that acne and hirsutism were the most common clinical signs among PCOS-positive participants.

Clinical Feature	Frequency in PCOS Group (n=93)	Percentage
Acne	61	65.6%
Hirsutism	52	55.9%

independent t-test or ANOVA was used for comparison of means. A p-value <0.05 was considered statistically significant.

RESULTS

In this cross-sectional survey, 500 women of the age group 15 to 25 years were screened to establish the prevalence and clinical profile of polycystic ovary syndrome by the Rotterdam diagnostic criteria. The patients were evaluated for the history of menstruation, clinical features of hyperandrogenism, anthropometric parameters, and biochemical profiles. PCOS was found in 93 participants according to the results, giving a general prevalence rate of 18.6%. The clinical and metabolic characteristics were also compared between PCOS-positive and PCOS-negative participants on the basis of their linkage with BMI, menstrual irregularity, biochemical parameters, and the status of PCOS. These findings are discussed in detail in the subsequent tables.

Alopecia	17	18.3%
Acanthosis nigricans	29	31.2%

Table 6. LH/FSH Ratio Distribution in PCOS Group

Table 6 shows that a majority of PCOS patients (74.2%) had an elevated LH/FSH ratio greater than 2:1, supporting the hormonal imbalance associated with the syndrome.

LH/FSH Ratio	Frequency	Percentage
<2:1	24	25.8%
≥2:1	69	74.2%

Table 7. Ultrasound Findings Suggestive of PCOS

Table 7 highlights that 84.9% of PCOS-diagnosed individuals had classical polycystic ovaries on ultrasonography.

USG Findings	Frequency in PCOS (n=93)	Percentage
Polycystic ovarian morphology	79	84.9%
Normal ovarian appearance	14	15.1%

Table 8. Fasting Insulin Levels and Insulin Resistance

Table 8 demonstrates that elevated fasting insulin levels were seen in 67.7% of the PCOS group, suggestive of underlying insulin resistance.

Fasting Insulin Level	PCOS Group (n=93)	Percentage
<10 µIU/mL	30	32.3%
≥10 µIU/mL	63	67.7%

Table 9. Awareness of PCOS Among Diagnosed Individuals

Table 9 reveals that only 18.3% of those diagnosed with PCOS were previously aware of their condition, highlighting the lack of awareness in the target population.

Awareness Status	Frequency	Percentage
Aware	17	18.3%
Not Aware	76	81.7%

Table 10. Association of Lifestyle Factors with PCOS

Table 10 compares sedentary lifestyle and junk food consumption between PCOS and non-PCOS participants, showing significant lifestyle correlation.

Lifestyle Factor	PCOS Group (n=93)	Non-PCOS Group (n=407)
Sedentary lifestyle	68 (73.1%)	122 (30.0%)
Frequent junk food use	74 (79.6%)	139 (34.1%)

Table 1 showed that the majority of participants were aged 20–22 years, ensuring adequate representation of the young adult population. **Table 2** reported a PCOS prevalence of 18.6%, consistent with contemporary epidemiological trends. **Table 3** demonstrated that menstrual irregularity was the most common presenting symptom among PCOS cases. **Table 4** illustrated a significant association between higher BMI and PCOS prevalence. **Table 5** indicated high rates of acne and hirsutism, supporting clinical hyperandrogenism in affected individuals. **Table 6** showed a raised LH/FSH ratio in over 70% of PCOS cases, consistent with hormonal dysregulation. **Table 7** confirmed polycystic ovarian morphology in a majority of diagnosed individuals via ultrasonography. **Table 8** highlighted the presence of insulin resistance in nearly two-thirds of PCOS participants. **Table 9** pointed out that more than 80% of PCOS cases were previously undiagnosed, underscoring low awareness levels. **Table 10**

emphasized the strong correlation between sedentary habits, dietary patterns, and PCOS occurrence.

DISCUSSION

This study was conducted with the objective of evaluating the prevalence and clinical profile of polycystic ovary syndrome (PCOS) among young women aged 15 to 25 years. The observed prevalence of 18.6% is consistent with previous Indian studies and reflects the growing burden of PCOS in adolescents and young adults. The Rotterdam criteria, being more inclusive by considering any two of the three diagnostic components, likely contributed to a relatively higher detection rate. Early identification is crucial since PCOS is a lifelong disorder that extends beyond reproductive health and encompasses metabolic and psychological domains[8,9].

The present study supports the key status of menstrual irregularity as the cardinal symptom with a report in more than 80% of confirmed cases. Clinical presentation of hyperandrogenism like acne and

hirsutism were also seen commonly, consistent with other studies done in different parts of India. These symptoms usually go unnoticed or are not recognized by adolescents, leading to delay in diagnosis till complications in the form of infertility or metabolic disorders manifest later in life[10,11].

Body mass index was a key predictor of PCOS in this research. Over 60% of PCOS respondents were obese or overweight, reflecting the association between endocrine dysregulation and adiposity. Obesity worsens insulin resistance and hyperandrogenism, which are fundamental pathophysiologic features of PCOS. This is consistent with international research that puts a premium on the influence of diet and lifestyle on PCOS onset and progression[12,13].

A significant biochemical observation in the present study was the high ratio of LH/FSH (>2:1) in about 74% of cases with PCOS, which is in line with the classical hormonal pattern reported for the syndrome[14]. The hormonal pattern leads to impairment of follicular maturation, ovulatory dysfunction, and eventually to menstrual irregularities[15]. Furthermore, a significant proportion of PCOS participants exhibited elevated fasting insulin levels and insulin resistance, affirming the metabolic component of PCOS. These metabolic alterations serve as early markers for future development of type 2 diabetes mellitus and cardiovascular risk[16].

Ultrasonography findings supported the clinical and biochemical evidence, with over 84% of PCOS participants showing polycystic ovarian morphology. This further validated the utility of transabdominal ultrasonography in community-based PCOS screening, especially in settings where transvaginal scans are not feasible for unmarried adolescents[17].

Perhaps the most alarming result of this study was the low level of awareness. Over 80% of PCOS-diagnosed participants were previously unaware of their condition, reflecting the pervasive lack of knowledge among young women. This gap in awareness is a major public health concern, as it delays timely lifestyle modifications and clinical interventions. Comparable results have been noted in other South Asian and Indian research, supporting school and college-level reproductive health education[18,19].

Lifestyle components were also explored in this research, and in the case of sedentary behavior, high intake of junk food was significantly associated with PCOS incidence. Implications of these findings highlight the importance of differential behavioral intervention in physical activity, weight control, and dietary moderation[20].

Strengths of this study are its sufficient sample size, multi-recruited population, and systematic assessment of clinical, biochemical, and lifestyle variables. Nevertheless, some limitations should be addressed. The use of transabdominal ultrasound might have been limited sensitivity in the detection of polycystic

morphology over transvaginal scanning. Moreover, biochemical analysis was restricted to a subgroup with suggestive clinical presentation, and longitudinal follow-up was not conducted to measure symptom change or response to treatment.

In spite of these drawbacks, the study provides important information on the burden and spectrum of PCOS among young Indian women and emphasizes the need for early detection, awareness generation, and preventive measures.

CONCLUSION

The current study demonstrates a high prevalence of polycystic ovary syndrome in young women between the ages of 15 to 25 years, with close to one-fifth of the participants fulfilling the Rotterdam criteria. Clinical hyperandrogenism, menstrual irregularities, and obesity were the prevalent features seen, with a high percentage also showing hormonal disturbances and insulin resistance. Although the high prevalence was documented, awareness of the condition was remarkably low, revealing an urgent requirement for specially targeted educational programs. Early screening, lifestyle counseling, and preventive interventions need to be included as part of adolescent health programs to avoid the long-term reproductive and metabolic impact of PCOS.

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