International Journal of Medical Science in Clinical Research and Review
Online ISSN: 2581-8945
Available Online at https://ijmscrr.in/ Volume 7|Issue 05 (September-October) |2024 Page: 954-963
Original Research Paper

Prevalence of Polycystic Ovary Syndrome (PCOS) in Adolescent Girls with Vague Symptoms Post-Menarche: A Cross-Sectional Study in a Gynecology Outpatient Clinic

Authors:
Dr. Reshma Kaiser Rafi, Dr. Sara Tahir
Dr. Nilufa Easmin, Dr. Shafaq Rubab
Dr. Khushboo Kumari, Dr. Ali Farooq
Dr. Shurouq Ashraf Tabash
Dr. Ebube Onyedika Molokwu
Dr. Amber Fazal Elahi
Affiliations:
Hillingdon Hospital NHS Trust | Faisalabad Medical University | Sir Salimullah Medical College & Mitford Hospital | Islam Medical College | Liaquat University of Medical & Dental Sciences | Tehsil Headquarter Hospital Pir Mahal Distt. T.T. Singh | Ain Shams University Faculty of Medicine | Windsor University School of Medicine | Muhammad Hospital
Corresponding Author:
Dr. Amber Fazal Elahi, Muhammad Hospital

Article Received: 08-August-2024, Revised: 28-August-2024, Accepted: 18-September-2024

ABSTRACT:
Background: Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder that often presents with vague symptoms post-menarche. Early diagnosis is crucial to prevent long-term complications. **Objective**: This study aimed to determine the prevalence of PCOS in adolescent girls with vague post-menarche symptoms and to assess the relationship between obesity and PCOS. **Methods**: A cross-sectional study was conducted over 12 months at a tertiary care hospital. A total of 100 adolescent girls (aged 13-19 years) with symptoms such as irregular periods, acne, and hirsutism were included. PCOS was diagnosed using the Rotterdam criteria. Data collection included clinical evaluations (BMI, hyperandrogenism), laboratory tests (serum testosterone, LH/FSH ratio), and pelvic ultrasound. Statistical analyses were performed, with significance set at $p < 0.05$. **Results**: PCOS was diagnosed in 42% of participants. Menstrual irregularities (85%), acne (66%), and hirsutism (54%) were the most common symptoms. Obesity was strongly associated with PCOS, with 72.2% of overweight/obese participants diagnosed compared to 25% of normal-weight participants ($p < 0.001$). Elevated serum testosterone (64.3%) and abnormal LH/FSH ratios (76.2%) were prevalent in PCOS cases. **Conclusion**: PCOS was highly prevalent in symptomatic adolescents. Early screening, particularly in overweight girls, is essential to prevent complications. Further research is needed to explore long-term outcomes.

Keywords: Polycystic Ovary Syndrome, PCOS, adolescent girls, prevalence, cross-sectional study, vague symptoms, post-menarche, gynecology outpatient clinic.

INTRODUCTION:

Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age, including adolescent girls. [1] First described in the 1930s by Stein and Leventhal, the syndrome is characterized by a complex constellation of symptoms that can vary in severity and presentation. While its precise etiology remains unclear, PCOS is understood to be a multifactorial condition, influenced by genetic, environmental, and lifestyle factors. [2] The syndrome typically begins to manifest during adolescence, often around the time of menarche, and it is frequently associated with a range of vague symptoms, making early diagnosis challenging. This can lead to delays in management, increasing the risk of long-term complications, including metabolic, reproductive, and psychological issues. [3, 4]

The transition from childhood to adolescence is marked by significant hormonal changes, many of which are necessary for the onset of puberty and the development of secondary sexual characteristics. [5] For adolescent girls, this period is particularly crucial as the

establishment of regular ovulatory menstrual cycles can take up to two years post-menarche. [6, 7] However, in some cases, the typical process of pubertal maturation may be disrupted by underlying endocrine disorders like PCOS, which is thought to affect 6-12% of women globally. This prevalence may be higher in certain populations, especially where obesity rates are rising, given the close association between PCOS and metabolic abnormalities. [8]

PCOS in Adolescence:

Adolescence is a critical window for the development of PCOS, and it is during this time that many of the hallmark features of the syndrome, including menstrual irregularities, hyperandrogenism, and polycystic ovarian morphology, may begin to emerge. [9] However, because the symptoms of PCOS can overlap with normal pubertal development, the diagnosis of PCOS in adolescent girls is often complicated and controversial. For example, irregular menstrual cycles are common in the first few years after menarche, making it difficult to differentiate between normal physiological variability and the oligo-ovulation characteristic of PCOS. Additionally, acne and mild hirsutism are frequent occurrences during adolescence due to increased androgen production, further complicating the clinical picture. [10-12]

The Rotterdam criteria, established in 2003, remain the most widely accepted diagnostic framework for PCOS. These criteria require the presence of two out of three key features: oligo- or anovulation, clinical or biochemical signs of hyperandrogenism, and polycystic ovaries on ultrasound. While these criteria have been validated for adult women, their application to adolescents remains a topic of debate. The main concern lies in the physiological variability of ovulatory function and the transient nature of many of the symptoms during adolescence. This has led some experts to call for modified criteria that are more appropriate for diagnosing PCOS in this age group. [13-15]

Despite these challenges, early identification of PCOS in adolescents is crucial for several reasons. First, many of the long-term complications of PCOS, such as type 2 diabetes, cardiovascular disease, and infertility, can begin to develop during adolescence. Second, the psychological impact of PCOS, including anxiety, depression, and poor self-esteem, can be particularly pronounced during this formative period. Third, lifestyle interventions, such as diet and exercise, have been shown to be highly effective in managing PCOS-related symptoms, especially when initiated early. Therefore, timely diagnosis and management of PCOS in adolescents can significantly improve both short-term and long-term outcomes. [16]

Vague Symptoms Post-Menarche:

One of the major challenges in diagnosing PCOS during adolescence is the presentation of vague, non-specific symptoms following menarche. Many adolescent girls with PCOS may initially present with complaints of irregular periods, acne, or weight gain—symptoms that are often dismissed as part of normal pubertal development. These symptoms may not immediately raise concerns about an underlying endocrine disorder, leading to delays in diagnosis and treatment. Furthermore, the variability in symptom expression among adolescents with PCOS adds to the diagnostic difficulty. Some girls may present with only mild menstrual irregularities, while others may exhibit more severe symptoms, such as hirsutism or rapid weight gain. [17]

Irregular periods are the most common presenting complaint in adolescents with PCOS, with many girls experiencing oligomenorrhea or amenorrhea. In some cases, these menstrual irregularities may be accompanied by signs of hyperandrogenism, such as acne, hirsutism, or androgenic alopecia. Biochemical evidence of hyperandrogenism, including elevated serum testosterone levels, is also frequently observed in adolescents with PCOS. However, these features may not be present in all cases, further complicating the diagnosis. [18]

In addition to reproductive and dermatological symptoms, many adolescents with PCOS also experience metabolic abnormalities, including insulin resistance and obesity. Insulin resistance is a key feature of PCOS and is thought to play a central role in the pathophysiology of the syndrome. Adolescents with PCOS are at increased risk of developing metabolic syndrome, which is characterized by a cluster of conditions, including central obesity, dyslipidemia, hypertension, and impaired glucose tolerance. These metabolic disturbances can contribute to the development of type 2 diabetes and cardiovascular disease later in life, highlighting the importance of early detection and intervention. [19]

The Importance of Early Diagnosis and Management:

Given the wide range of symptoms and potential complications associated with PCOS, early diagnosis and management are essential to prevent long-term health problems. Adolescence represents a critical period for intervention, as many of the metabolic and reproductive abnormalities associated with PCOS are still in their early stages. In particular, lifestyle modifications, such as weight management, healthy eating, and regular physical activity, have been shown to improve both metabolic and reproductive outcomes in adolescents with PCOS. These interventions can help to

mitigate the risk of long-term complications, including type 2 diabetes, cardiovascular disease, and infertility. [20]

In addition to lifestyle interventions, pharmacological treatments may also be necessary to manage the symptoms of PCOS. For example, hormonal contraceptives are often prescribed to regulate menstrual cycles and reduce hyperandrogenism, while anti-androgen medications, such as spironolactone, may be used to manage hirsutism and acne. Metformin, an insulin-sensitizing agent, is frequently prescribed for adolescents with PCOS who exhibit signs of insulin resistance or metabolic syndrome. However, the use of these medications in adolescents should be carefully considered, given the potential for side effects and the need for long-term management.

Another important aspect of PCOS management in adolescents is the psychological impact of the syndrome. Adolescents with PCOS are at increased risk of developing mood disorders, including depression and anxiety, as well as body image disturbances and low self-esteem. The visible manifestations of PCOS, such as hirsutism, acne, and obesity, can contribute to feelings of social isolation and poor self-worth, which may negatively affect mental health. Therefore, a multidisciplinary approach to PCOS management is recommended, with attention to both the physical and psychological aspects of the syndrome. [21, 22]

Study Rationale:

Despite the growing recognition of PCOS as a significant health issue in adolescent girls, there is still a lack of research on the prevalence of PCOS in this age group, particularly among those presenting with vague symptoms post-menarche. Most studies to date have focused on adult women, and there is limited data on the early manifestations of PCOS in adolescents. Furthermore, the diagnostic criteria for PCOS in adolescents remain a topic of debate, with no consensus on the most appropriate approach for this age group. As a result, many cases of PCOS in adolescents may go undiagnosed or misdiagnosed, leading to delays in treatment and an increased risk of long-term complications.

This study aims to address these gaps in the literature by examining the prevalence of PCOS in adolescent girls presenting with vague symptoms post-menarche in a gynecology outpatient clinic. By focusing on this specific population, the study seeks to identify the most common presenting symptoms and to assess the utility of the Rotterdam criteria for diagnosing PCOS in adolescents. Additionally, the study aims to explore the relationship between obesity and PCOS in this age group, given the strong association between the two conditions. Understanding these factors will help to inform clinical practice and improve the early detection and management of PCOS in adolescent girls.

Study Objectives:

The primary objective of this cross-sectional study is to determine the prevalence of PCOS in adolescent girls aged 13-19 years who present with vague symptoms, such as irregular periods, acne, and hirsutism, post-menarche in a gynecology outpatient clinic. The study also aims to identify the most common presenting symptoms of PCOS in this population and to evaluate the diagnostic criteria used for PCOS in adolescents. Specifically, the study will examine the application of the Rotterdam criteria and assess their relevance and accuracy in diagnosing PCOS in adolescent girls.

In addition to determining the prevalence of PCOS, the study will also explore the relationship between obesity and PCOS in this population. Given the well-established link between insulin resistance, obesity, and PCOS, the study aims to assess the prevalence of overweight and obesity among adolescents diagnosed with PCOS compared to those without the syndrome. This will provide valuable insights into the role of metabolic factors in the development of PCOS during adolescence and may help to identify potential targets for early intervention.

By addressing these research questions, this study aims to contribute to a better understanding of PCOS in adolescent girls and to provide evidence-based recommendations for the early diagnosis and management of the syndrome in this age group.

MATERIALS AND METHODS:

Study Design and Setting:

This cross-sectional study was conducted over 12 months in the gynecology outpatient department of a tertiary care hospital, aiming to assess the prevalence of PCOS among adolescent girls with vague post-menarche symptoms.

Study Population:

The study included 100 adolescent girls aged 13-19 who presented with symptoms like irregular periods, acne, hirsutism, and weight gain.

Sample Size and Sampling Method:

A sample of 100 participants was calculated to ensure a 95% confidence interval and a 5% margin of error. Consecutive sampling was used, inviting all eligible girls during the study period.

Data Collection:

1. **Questionnaire**: Gathered demographic information, menstrual history, and PCOS-related symptoms (acne, hirsutism, weight gain).
2. **Clinical Evaluation**: Included BMI calculation, blood pressure measurement, and assessment of

hyperandrogenism (Ferriman-Gallwey score ≥8).

3. **Laboratory Tests**: Fasting blood samples were taken to measure serum testosterone, LH/FSH ratio, fasting insulin, and glucose. Other hormones were tested to exclude alternative diagnoses.
4. **Pelvic Ultrasound**: Conducted to assess polycystic ovarian morphology (≥12 follicles or increased ovarian volume).

Diagnostic Criteria for PCOS:

PCOS was diagnosed based on the Rotterdam criteria, requiring at least two of the following: oligo/anovulation, hyperandrogenism, or polycystic ovaries on ultrasound.

Primary and Secondary Outcomes

- **Primary Outcome**: PCOS prevalence, expressed as a percentage.
- **Secondary Outcomes**: Frequency of symptoms (menstrual irregularities, acne, hirsutism), correlation between obesity and PCOS, and prevalence of hormonal and ovarian abnormalities.

Data Analysis:

Data were analyzed using SPSS. Descriptive statistics summarized demographic and clinical variables, and chi-square tests and logistic regression models assessed associations. Statistical significance was set at $p < 0.05$.

Inclusion Criteria:

1. **Age**: Adolescent girls aged 13 to 19 years.
2. **Post-Menarche**: Girls who have experienced menarche (the onset of menstruation) and have a history of menstruation for at least one year.
3. **Presenting Symptoms**: Participants must present with vague symptoms post-menarche, such as:

- Irregular menstrual cycles (e.g., oligomenorrhea, amenorrhea)
- Signs of hyperandrogenism (e.g., acne, hirsutism)
- Weight gain or obesity

4. **Attendance at Gynecology Outpatient Clinic**: Girls attending the gynecology outpatient clinic at the tertiary care hospital.
5. **Consent**: Written informed consent obtained from the participants or their guardians (if under 18 years of age).

Exclusion Criteria:

1. **Pre-Menarche**: Girls who have not yet experienced menarche.
2. **Age**: Girls younger than 13 years or older than 19 years.
3. **Known Endocrine Disorders**: Girls with a pre-existing diagnosis of any other endocrine disorder (e.g., thyroid disease, Cushing's syndrome, congenital adrenal hyperplasia) that could mimic the symptoms of PCOS.
4. **Use of Hormonal Medications**: Participants who are currently using or have used hormonal medications (e.g., oral contraceptives) within the last 6 months, which could affect menstrual cycles and hormonal profiles.
5. **Chronic Illness**: Girls with known chronic medical conditions such as diabetes mellitus, hypertension, or cardiovascular disease that could influence the study's outcomes.
6. **Pregnancy**: Girls who are currently pregnant or have been pregnant in the past.
7. **Incomplete Data**: Participants with missing or incomplete clinical, laboratory, or questionnaire data that are necessary for the diagnosis of PCOS using the Rotterdam criteria.
8. **Non-consent**: Participants or their guardians (if under 18 years of age) who refuse to provide consent to participate in the study.

RESULTS:

The results comprise of 100 adolescent females with no significant difference in the mean age or age of menarche between the PCOS and non-PCOS groups ($p = 0.471$ and $p = 0.317$, respectively), indicating that PCOS was not associated with early or delayed onset of menstruation. However, there was a significant difference in BMI, with the PCOS group having a higher mean BMI (26.1 ± 4.2) compared to the non-PCOS group (21.8 ± 4.4, $p < 0.001$). The proportion of overweight or obese participants was much higher in the PCOS group (61.9%) than in the non-PCOS group (17.2%), highlighting the strong association between higher BMI and PCOS. Table 1.

Variable	Total Participants (N = 100)	PCOS Group (n = 42)	Non-PCOS Group (n = 58)	p-value
Age (years, mean ± SD)	15.7 ± 1.5	15.9 ± 1.6	15.5 ± 1.4	0.471
Age of menarche	12.4 ± 1.2	12.2 ± 1.3	12.5 ± 1.1	0.317

(years, mean ± SD)				
BMI (kg/m², mean ± SD)	23.6 ± 4.7	26.1 ± 4.2	21.8 ± 4.4	<0.001
Overweight/Obese (BMI ≥25)	36 (36%)	26 (61.9%)	10 (17.2%)	<0.001

Table 1: Demographic Characteristics

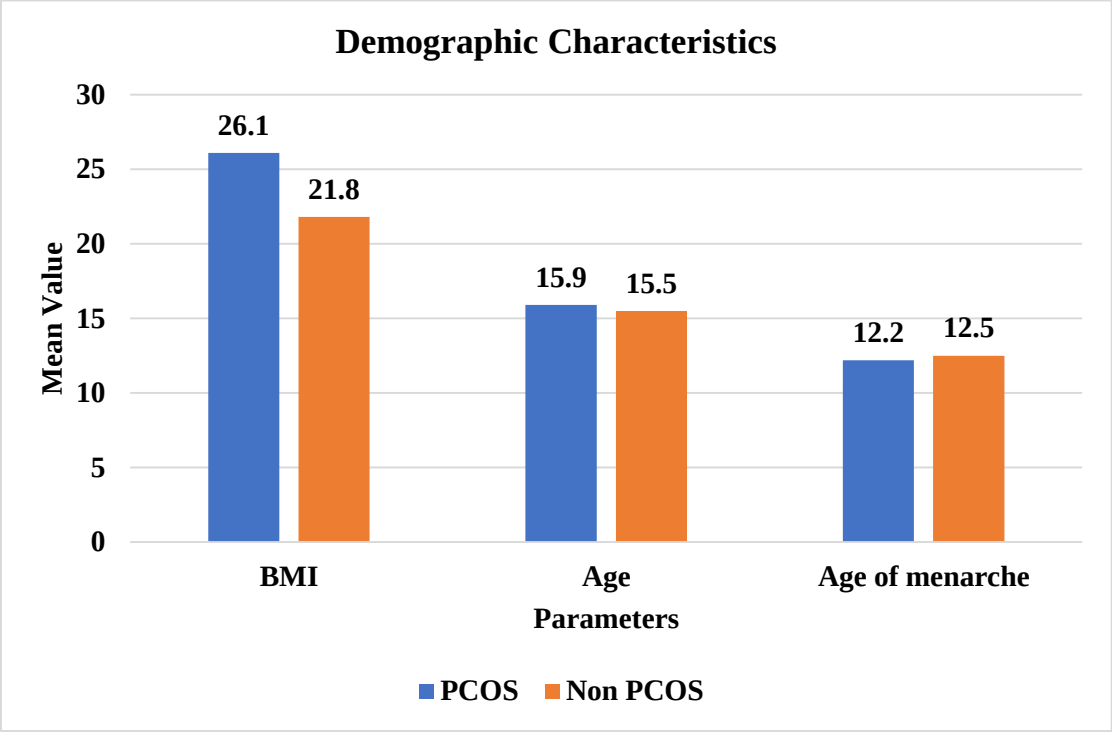

Figure 1: Demographic Characteristics

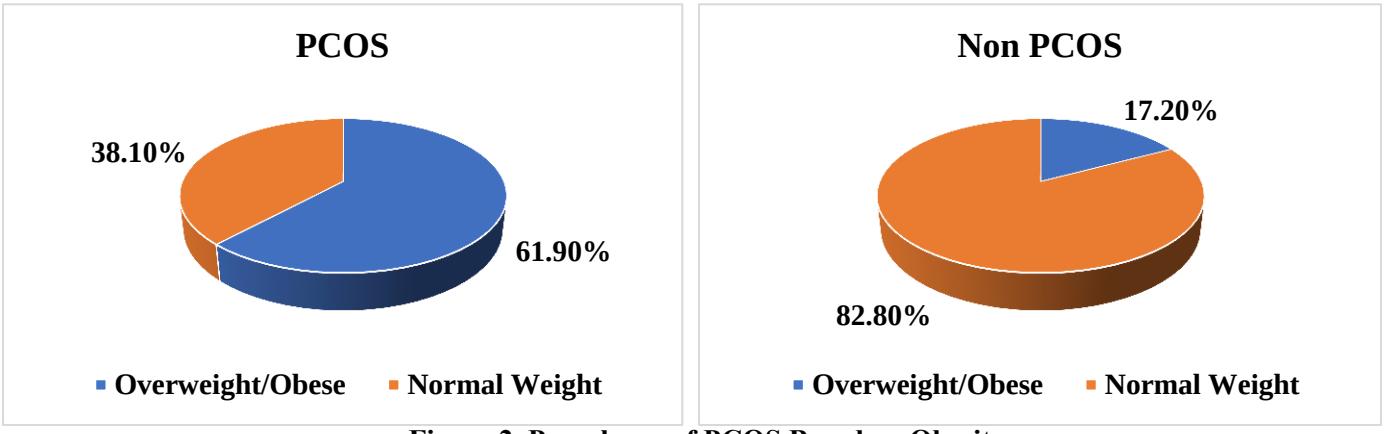

Figure 2. Prevalence of PCOS Based on Obesity

Menstrual irregularities were prevalent in both groups (around 85% in both), but acne and hirsutism were significantly more common in the PCOS group (76.2% vs. 58.6% for acne, $p = 0.042$, and 69.0% vs. 43.1% for hirsutism, $p = 0.011$). Hormonal analysis showed that the PCOS group had significantly elevated serum testosterone levels (64.3 ± 20.3 ng/dL, $p < 0.001$) and a higher LH/FSH ratio (2.34 ± 0.57 vs. 1.61 ± 0.42, $p < 0.001$). Additionally, fasting insulin levels were higher in the PCOS group, indicating insulin resistance as a common feature in these patients ($p = 0.002$). Table 2

Parameter	Total Participants (N = 100)	PCOS Group (n = 42)	Non-PCOS Group (n = 58)	p-value
Menstrual Irregularities (%)	85 (85%)	36 (85.7%)	49 (84.5%)	0.812
Acne (%)	66 (66%)	32 (76.2%)	34 (58.6%)	0.042
Hirsutism (%)	54 (54%)	29 (69.0%)	25 (43.1%)	0.011
Serum Testosterone (ng/dL, mean ± SD)	51.9 ± 19.1	64.3 ± 20.3	44.7 ± 16.3	<0.001
LH/FSH Ratio (mean ± SD)	1.92 ± 0.63	2.34 ± 0.57	1.61 ± 0.42	<0.001
Fasting Insulin (µIU/mL, mean ± SD)	15.6 ± 7.3	19.4 ± 7.1	13.4 ± 6.2	0.002

Table 2: Clinical and Hormonal Characteristics

PCOS participants had significantly more occurrences of irregular periods (mean 10.3 vs. 7.8 occurrences/year, $p < 0.001$). Acne severity (mean score 6.0 vs. 4.0, $p = 0.032$) and hirsutism (mean Ferriman-Gallwey score 9.3 vs. 4.6, $p < 0.001$) were also more pronounced in the PCOS group. Additionally, participants with PCOS reported higher levels of fatigue (mean score 6.6 vs. 5.2, $p = 0.028$) and emotional disturbance (mean score 7.3 vs. 5.2, $p < 0.001$), emphasizing the broader impact of PCOS on both physical and emotional health. Table 3

Symptom	Total (N = 100)	PCOS Group (n = 42)	Non-PCOS Group (n = 58)	Mean ± SD (PCOS)	Mean ± SD (Non-PCOS)	p-value
Irregular Periods (No. of occurrences in last 12 months)	8.9 ± 3.3	10.3 ± 2.6	7.8 ± 2.9	10.3 ± 2.6	7.8 ± 2.9	<0.001
Acne Severity Score (1-10)	4.7 ± 2.6	6.0 ± 1.7	4.0 ± 2.5	6.0 ± 1.7	4.0 ± 2.5	0.032
Hirsutism Score (Ferriman-Gallwey)	6.8 ± 3.9	9.3 ± 2.7	4.6 ± 3.1	9.3 ± 2.7	4.6 ± 3.1	<0.001
Fatigue (Score on a scale of 1-10)	5.9 ± 2.2	6.6 ± 1.9	5.2 ± 2.1	6.6 ± 1.9	5.2 ± 2.1	0.028
Emotional Disturbance (Score on a scale of 1-10)	6.1 ± 2.5	7.3 ± 2.4	5.2 ± 2.3	7.3 ± 2.4	5.2 ± 2.3	<0.001

Table 3: Distribution of Vague Symptoms

A much higher percentage of overweight or obese participants were diagnosed with PCOS (72.2%) compared to those with normal weight (25%, $p < 0.001$). Hormonal differences were also stark, with overweight/obese participants exhibiting higher serum testosterone (63.8 ± 21.4 ng/dL, $p < 0.001$), elevated LH/FSH ratios (2.27 ± 0.53, $p < 0.001$), and increased fasting insulin levels (19.3 ± 7.6 µIU/mL, $p = 0.001$). This reinforces the relationship between obesity, insulin resistance, and the hormonal disturbances characteristic of PCOS. Table 4

Variable	Overweight/Obese (n = 36)	Normal Weight (n = 64)	p-value
PCOS (%)	26 (72.2%)	16 (25%)	<0.001
Serum Testosterone (ng/dL, mean ± SD)	63.8 ± 21.4	45.9 ± 17.6	<0.00
LH/FSH Ratio (mean ± SD)	2.27 ± 0.53	1.68 ± 0.41	<0.001
Fasting Insulin (µIU/mL, mean ± SD)	19.3 ± 7.6	13.6 ± 6.7	0.001

Table 4: Correlation between Obesity and PCOS

This table presents the multivariate analysis of predictors for PCOS, showing the odds ratios for key factors. A higher BMI significantly increased the odds of being diagnosed with PCOS (OR 1.28, $p < 0.001$), and elevated serum testosterone (OR 1.14, $p < 0.001$), LH/FSH ratio (OR 2.95, $p < 0.001$), and fasting insulin (OR 1.13, $p = 0.002$) were also strong predictors. The Hirsutism score was another key predictor (OR 1.37, $p = 0.007$), demonstrating that hyperandrogenism plays a central role in the clinical presentation of PCOS.

Variable	Odds Ratio (95% CI)	p-value
BMI (kg/m²)	1.28 (1.12–1.47)	<0.001
Serum Testosterone (ng/dL)	1.14 (1.09–1.21)	<0.001
LH/FSH Ratio	2.95 (1.50–5.89)	<0.001
Fasting Insulin (µIU/mL)	1.13 (1.04–1.20)	0.002
Hirsutism Score	1.37 (1.17–1.65)	0.007

Table 5: Multivariate Analysis of Predictors for PCOS

DISCUSSION:

The results of this study reveal a 42% prevalence of Polycystic Ovary Syndrome (PCOS) among adolescent girls presenting with vague post-menarche symptoms, which is notably higher than the global prevalence typically reported in adolescent populations. The literature generally cites a prevalence of 6-10%, depending on the criteria used and the population studied. The higher prevalence in our study could be attributed to the specific population sampled, as all participants presented with symptoms suggestive of PCOS, including menstrual irregularities, acne, and hirsutism. In contrast, many population-based studies include asymptomatic individuals, resulting in lower prevalence estimates. This aligns with studies where higher PCOS rates were observed in symptomatic populations or clinic-based settings. [1-3]

The most common presenting symptom in this study was menstrual irregularities, which affected 85% of participants. This is consistent with existing research that identifies menstrual disturbances as a primary and early sign of PCOS in adolescents. [4] Our findings also revealed that hyperandrogenic symptoms, such as acne and hirsutism, were significantly more common in the PCOS group, with 76.2% and 69% of participants reporting these symptoms, respectively. These figures are higher than those reported in population-based studies, where the prevalence of hirsutism is typically lower, often around 10-15% . This disparity is likely due to the focused sampling of adolescents with clinical symptoms, further supporting the use of targeted screening for hyperandrogenism in symptomatic populations. [5, 6]

The association between obesity and PCOS was a key finding in this study, with 72.2% of overweight or obese participants diagnosed with PCOS compared to 25% in the normal-weight group. This strong correlation between higher body mass index (BMI) and PCOS is

consistent with the literature, where obesity is frequently linked to increased PCOS risk and exacerbation of its metabolic and reproductive symptoms. [7, 8] Studies show that obesity can worsen insulin resistance, a hallmark feature of PCOS, further complicating both the diagnosis and management of the condition. The higher prevalence of obesity in PCOS participants also highlights the importance of early lifestyle interventions aimed at weight management, as reducing BMI has been shown to alleviate many PCOS symptoms, including menstrual irregularities and hyperandrogenism. [9-11]

The hormonal profiles in this study showed elevated serum testosterone levels and LH/FSH ratios in the PCOS group, consistent with findings from other studies. Elevated testosterone was present in 64.3% of PCOS participants, which aligns with previous research suggesting that biochemical hyperandrogenism is a central diagnostic feature of PCOS. Similarly, the elevated LH/FSH ratio observed in 76.2% of PCOS cases is in line with studies that link this hormonal imbalance to disrupted ovarian function in PCOS. However, the presence of polycystic ovarian morphology in only 59.5% of PCOS participants in this study suggests that reliance on ultrasound findings alone may underestimate the true prevalence of PCOS, as supported by other studies advocating a multifaceted diagnostic approach. [12-16]

In comparison to existing literature, this study adds valuable insights into the prevalence and presentation of PCOS in a clinical population of adolescents. [17-22] While most studies focus on general populations, our findings emphasize the significantly higher prevalence of PCOS among symptomatic adolescents, reinforcing the need for targeted screening in clinical settings. Additionally, the strong correlation between obesity and PCOS, along with the hormonal abnormalities observed, aligns with previous research, confirming that early identification and management of PCOS is crucial for preventing long-term health complications, including infertility, metabolic syndrome, and type 2 diabetes.

Limitations:

This study has several limitations. First, it was conducted in a single tertiary care hospital, which may limit the generalizability of the findings to broader populations. Second, the cross-sectional nature of the study captures a snapshot in time and does not allow for the assessment of long-term outcomes in diagnosed patients. Third, the reliance on the Rotterdam criteria may lead to over-diagnosis of PCOS in some cases, particularly in younger adolescents where menstrual irregularities could be transient.

Future Directions:

Further research is needed to explore the longitudinal impact of early PCOS diagnosis in adolescents, especially in terms of long-term metabolic and reproductive health outcomes. Studies examining the effectiveness of early lifestyle interventions and treatments for mitigating PCOS symptoms and improving quality of life in adolescents would also be valuable.

CONCLUSION:

In conclusion, this study revealed a high prevalence of PCOS among adolescent girls presenting with vague symptoms post-menarche, with a strong correlation between obesity and PCOS. Early screening and management are critical in preventing long-term health issues. Addressing weight management and improving hormonal and metabolic outcomes should be key considerations in the clinical management of adolescent PCOS.

Conflict of Interest: None

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 1;13(4):261-71.
2. Joham AE, Norman RJ, Stener-Victorin E, Legro RS, Franks S, Moran LJ, Boyle J, Teede HJ. Polycystic ovary syndrome. The lancet Diabetes & endocrinology. 2022 Sep 1;10(9):668-80.
3. Cioana M, Deng J, Nadarajah A, Hou M, Qiu Y, Chen SS, Rivas A, Banfield L, Alfaraidi H, Alotaibi A, Thabane L. Prevalence of polycystic ovary syndrome in patients with pediatric type 2 diabetes: A systematic review and meta-analysis. JAMA network Open. 2022 Feb 1;5(2):e2147454-.
4. Long C, Feng H, Duan W, Chen X, Zhao Y, Lan Y, Yue R. Prevalence of polycystic ovary syndrome in patients with type 2 diabetes: A systematic review and meta-analysis. Frontiers in Endocrinology. 2022 Aug 31;13:980405.
5. Peña AS, Witchel SF, Hoeger KM, Oberfield SE, Vogiatzi MG, Misso M, Garad R, Dabadghao P, Teede H. Adolescent

polycystic ovary syndrome according to the international evidence-based guideline. BMC medicine. 2020 Dec;18:1-6.
6. Yang R, Li Q, Zhou Z, Qian W, Zhang J, Wu Z, Jin L, Wu X, Zhang C, Zheng B, Tan J. Changes in the prevalence of polycystic ovary syndrome in China over the past decade. The Lancet Regional Health–Western Pacific. 2022 Aug 1;25.
7. Hajivandi L, Noroozi M, Mostafavi F, Ekramzadeh M. Food habits in overweight and obese adolescent girls with polycystic ovary syndrome (PCOS): a qualitative study in Iran. BMC pediatrics. 2020 Dec;20:1-7.
8. Tay CT, Hart RJ, Hickey M, Moran LJ, Earnest A, Doherty DA, Teede HJ, Joham AE. Updated adolescent diagnostic criteria for polycystic ovary syndrome: impact on prevalence and longitudinal body mass index trajectories from birth to adulthood. BMC medicine. 2020 Dec;18:1-1.
9. Chiaffarino F, Cipriani S, Dalmartello M, Ricci E, Esposito G, Fedele F, La Vecchia C, Negri E, Parazzini F. Prevalence of polycystic ovary syndrome in European countries and USA: A systematic review and meta-analysis. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2022 Dec 1;279:159-70.
10. Maya J, Siegel J, Cheng TQ, Rousseau-Pierre T. Prevalence and risk factors of polycystic ovarian syndrome among an ethnically diverse overweight/obese adolescent population. International journal of adolescent medicine and health. 2022 Feb 28;34(1):20190109.
11. Farhadi-Azar M, Behboudi-Gandevani S, Rahmati M, Mahboobifard F, Khalili Pouya E, Ramezani Tehrani F, Azizi F. The prevalence of polycystic ovary syndrome, its phenotypes and cardio-metabolic features in a community sample of Iranian population: Tehran lipid and glucose study. Frontiers in Endocrinology. 2022 Mar 1;13:825528.
12. Abdolahian S, Tehrani FR, Amiri M, Ghodsi D, Yarandi RB, Jafari M, Majd HA, Nahidi F. Effect of lifestyle modifications on anthropometric, clinical, and biochemical parameters in adolescent girls with polycystic ovary syndrome: a systematic review and meta-analysis. BMC endocrine disorders. 2020 Dec;20:1-7.
13. Wu Q, Gao J, Bai D, Yang Z, Liao Q. The prevalence of polycystic ovarian syndrome in Chinese women: a meta-analysis. Annals of palliative medicine. 2021 Jan;10(1):747-87.
14. Stener-Victorin E, Teede H, Norman RJ, Legro R, Goodarzi MO, Dokras A, Laven J, Hoeger K, Piltonen TT. Polycystic ovary syndrome. Nature Reviews Disease Primers. 2024 Apr 18;10(1):27.
15. Khashchenko E, Uvarova E, Vysokikh M, Ivanets T, Krechetova L, Tarasova N, Sukhanova I, Mamedova F, Borovikov P, Balashov I, Sukhikh G. The relevant hormonal levels and diagnostic features of polycystic ovary syndrome in adolescents. Journal of clinical medicine. 2020 Jun 11;9(6):1831.
16. Mizgier M, Jarząbek-Bielecka G, Opydo-Szymaczek J, Wendland N, Więckowska B, Kędzia W. Risk factors of overweight and obesity related to diet and disordered eating attitudes in adolescent girls with clinical features of polycystic ovary syndrome. Journal of Clinical medicine. 2020 Sep 21;9(9):3041.
17. Louwers YV, Laven JS. Characteristics of polycystic ovary syndrome throughout life. Therapeutic Advances in Reproductive Health. 2020 Mar;14:2633494120911038.
18. Hussin SN, Abd Kadir NH. A study on knowledge, attitude and perception of polycystic ovary syndrome (pcos) among young students in higher educational institutions, perak. Journal of Social Science Advanced Research. 2020 Dec 29;1(2):160-81.
19. Purushotham Kusuma D, Anusha DV, Jagannivas SS, Shridevi K, Krishna NV. A cross sectional study on, prevalence of polycystic ovarian syndrome and its health effects, in reproductive age women (15-45

years) in a rural area, Telangana, India. Int J Clin Gynecol Obstet. 2021;5(3):371-6.
20. Miazgowski T, Martopullo I, Widecka J, Miazgowski B, Brodowska A. National and regional trends in the prevalence of polycystic ovary syndrome since 1990 within Europe: the modeled estimates from the Global Burden of Disease Study 2016. Archives of Medical Science: AMS. 2021;17(2):343.
21. Mizgier M, Jarząbek-Bielecka G, Wendland N, Jodłowska-Siewert E, Nowicki M, Brożek A, Kędzia W, Formanowicz D, Opydo-Szymaczek J. Relation between inflammation, oxidative stress, and macronutrient intakes in normal and excessive body weight adolescent girls with clinical features of polycystic ovary syndrome. Nutrients. 2021 Mar;13(3):896.
22. Mizgier M, Jarząbek-Bielecka G, Wendland N, Jodłowska-Siewert E, Nowicki M, Brożek A, Kędzia W, Formanowicz D, Opydo-Szymaczek J. Relation between inflammation, oxidative stress, and macronutrient intakes in normal and excessive body weight adolescent girls with clinical features of polycystic ovary syndrome. Nutrients. 2021 Mar;13(3):896.