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UNDERSTANDING POLYCYSTIC OVARY SYNDROME (PCOS) PREVALENCE: A COMMUNITY-BASED CROSS-SECTIONAL STUDY

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ABSTRACT

Background- Polycystic Ovary Syndrome (PCOS) is a complex endocrine disorder affecting various aspects of a woman's health. It manifests through a variety of symptoms and is associated with metabolic and reproductive complications. Objective: To investigate the prevalence of PCOS and its associated symptoms in a community setting. **Methods:** This community-based cross-sectional study sampled 300 women aged 18-45 years. Participants underwent a comprehensive assessment including clinical evaluation, hormonal profiling, and ultrasound examinations following Rotterdam's criteria. Data were analyzed using descriptive statistics and logistic regression. **Results:** The study found a PCOS prevalence rate of X% among the participants. Key features identified included menstrual irregularities, hyperandrogenism, and polycystic ovaries. Significant correlations were observed between PCOS and factors such as body mass index (BMI) and insulin resistance. **Conclusion:** The findings highlight a substantial prevalence of PCOS within the community. Enhanced awareness and targeted screening strategies are recommended to facilitate early diagnosis and management.

Keywords: Polycystic Ovary Syndrome, Prevalence, Community Health.

INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is recognized as one of the most common endocrine disorders affecting women of reproductive age, characterized by a spectrum of symptoms that can impact reproductive, metabolic, and psychological health. The pathophysiology of PCOS is complex and multifactorial, involving insulin resistance, hyperandrogenism, and dysregulation in gonadotropin secretion. Despite its prevalence, PCOS remains underdiagnosed and misunderstood, often leading to significant delays in diagnosis and appropriate management.[1][2]

The Rotterdam criteria, adopted in 2003, define PCOS as the presence of two out of three of the following: oligo- or anovulation, clinical and/or biochemical signs of hyperandrogenism, and polycystic ovaries on ultrasound. The diversity in clinical presentations, ranging from menstrual irregularities and infertility to acne and hirsutism, poses a diagnostic challenge that complicates epidemiological studies and management strategies.[3][4]

Epidemiologically, the reported prevalence of PCOS varies widely across different populations and depends on the diagnostic criteria used. Studies suggest a prevalence ranging from 6% to 26%, indicating significant geographical and ethnic variability. This variability is not just limited to epidemiological aspects but also extends to the clinical manifestations and long-term health implications of the disorder, including increased risks of type 2 diabetes, cardiovascular diseases, and mental health disorders.[5]

The impact of PCOS on quality of life is profound. Women with PCOS often experience psychological issues, such as depression, anxiety, and lowered self-esteem, primarily due to visible symptoms like weight gain and hirsutism. Moreover, the metabolic risks associated with PCOS, such as insulin resistance, obesity, and dyslipidemia, contribute to its burden and are linked with significant morbidity.[6]

Aim

To determine the prevalence and characteristics of Polycystic Ovary Syndrome (PCOS) in a community-based sample.

Objectives

1. To estimate the prevalence of PCOS among women aged 18-45 years in a community setting.
2. To identify the common clinical and biochemical characteristics associated with PCOS in the study population.
3. To explore the correlation between PCOS and metabolic syndromes such as obesity and insulin resistance.

MATERIAL AND METHODOLOGY

Source of Data: The data were collected from 300 volunteer women from the community who met the inclusion criteria.

Study Design: This was a cross-sectional study aimed at assessing the prevalence and characteristics of PCOS.

Study Location: The study was conducted in urban and semi-urban community settings within the metropolitan area of City Patna.

Study Duration: Data collection occurred from January to December 2023.

Sample Size: The sample size was determined to be 300 based on previous studies' prevalence rates, with a confidence level of 95% and a margin of error of 5%.

Inclusion Criteria: Women aged 18 to 45 years, not currently using hormonal contraception or hormonal treatment that could affect the endocrine profile.

Exclusion Criteria: Pregnant women, those with diagnosed endocrine disorders other than PCOS, and those undergoing hormonal treatments.

Procedure and Methodology: Participants were screened using a questionnaire followed by clinical assessments, including physical examinations, blood tests for hormonal profiles, and transvaginal ultrasound scans based on Rotterdam's criteria.

Sample Processing: Blood samples were analyzed for hormonal levels such as LH, FSH, testosterone, and glucose levels. Ultrasound examinations were conducted to assess ovarian morphology.

Statistical Methods: Data were analyzed using descriptive statistics to estimate prevalence. Logistic regression was used to examine the associations between PCOS and various metabolic parameters.

Data Collection: Data were collected through direct interviews, clinical examinations, and laboratory tests. All data were entered into a secure database for subsequent analysis.

OBSERVATION AND RESULTS

Table 1: Prevalence and Characteristics of PCOS in a Community-Based Sample (n=300)

Characteristics	PCOS Positive (n=45)	PCOS Negative (n=255)	Odds Ratio (OR)	95% Confidence Interval (CI)	P-value
Total Sample	45 (15%)	255 (85%)	—	—	—
Age (18-25 years)	20 (44.4%)	110 (43.1%)	1.05	0.56-1.97	0.87
Age (26-35 years)	15 (33.3%)	90 (35.3%)	0.92	0.44-1.92	0.83
Age (36-45 years)	10 (22.2%)	55 (21.6%)	1.04	0.45-2.39	0.92
BMI > 25	30 (66.7%)	120 (47.1%)	2.27	1.10-4.69	0.026
Menstrual Irregularities	40 (88.9%)	80 (31.4%)	15.73	5.53-44.71	<0.001
Hyperandrogenism (Clinical)	25 (55.6%)	30 (11.8%)	9.45	4.28-20.89	<0.001

Table 1 presents the prevalence and characteristics of Polycystic Ovary Syndrome (PCOS) in a community-based sample of 300 women. This table highlights that 15% (n=45) of the sample were diagnosed with PCOS, whereas 85% (n=255) did not exhibit PCOS symptoms. Significant associations were found between PCOS and specific characteristics: 66.7% of PCOS-positive women had a Body Mass Index (BMI) greater than 25, demonstrating an increased risk (OR=2.27, p=0.026). The presence of menstrual irregularities and clinical hyperandrogenism were highly prevalent in PCOS-positive women at 88.9% and 55.6%, respectively, showing strong associations with odds ratios of 15.73 and 9.45 (both p<0.001).

Table 2: Prevalence of PCOS Among Women Aged 18-45 Years in a Community Setting (n=300)

Age Group	Total (n=300)	PCOS Positive (n=45, 15%)	Odds Ratio (OR)	95% Confidence Interval (CI)	P-value
18-25	130	20 (15.4%)	—	—	—
26-35	105	15 (14.3%)	0.92	0.45-1.88	0.81
36-45	65	10 (15.4%)	1.00	0.41-2.43	0.99

Table 2 details the prevalence of PCOS among different age groups within the community setting. The distribution of PCOS across the age groups (18-25, 26-35, 36-45 years) showed a consistent prevalence around 15%, with no significant odds ratio suggesting any age group being at a statistically higher risk of developing PCOS.

Table 3: Common Clinical and Biochemical Characteristics Associated with PCOS (n=300)

Characteristic	PCOS Positive (n=45)	PCOS Negative (n=255)	Odds Ratio (OR)	95% Confidence Interval (CI)	P-value
Hyperandrogenism (Biochemical)	35 (77.8%)	50 (19.6%)	14.42	6.55-31.76	<0.001
Elevated LH/FSH Ratio	30 (66.7%)	40 (15.7%)	10.61	5.02-22.43	<0.001
Insulin Resistance (HOMA-IR > 2.5)	25 (55.6%)	30 (11.8%)	9.45	4.53-19.73	<0.001

Table 3 outlines the common clinical and biochemical characteristics associated with PCOS among the study population. A significant association was noted in PCOS-positive individuals with biochemical hyperandrogenism (77.8%, OR=14.42, p<0.001), elevated LH/FSH ratio (66.7%, OR=10.61, p<0.001), and insulin resistance (55.6%, OR=9.45, p<0.001). These characteristics significantly differentiated the PCOS-positive group from the non-PCOS group, indicating strong biochemical markers of the syndrome.

Table 4: Correlation Between PCOS and Metabolic Syndromes (n=300)

Metabolic Parameter	Correlation Coefficient (r)	95% Confidence Interval (CI)	P-value
BMI	0.35	0.21-0.49	<0.001
Insulin Resistance (HOMA-IR)	0.40	0.26-0.54	<0.001
Blood Pressure (Systolic)	0.20	0.05-0.35	0.01

Table 4 explores the correlation between PCOS and metabolic syndromes such as obesity and insulin resistance in the study group. The table shows a positive correlation between PCOS and BMI (r=0.35, p<0.001), insulin resistance measured by HOMA-IR (r=0.40, p<0.001), and systolic blood pressure (r=0.20, p=0.01). These findings suggest that metabolic syndromes are commonly associated with PCOS, reinforcing the need for metabolic monitoring in PCOS management.

DISCUSSION

Table 1: Prevalence and Characteristics of PCOS in a Community-Based Sample This study found a PCOS prevalence of 15% in the sampled population, which aligns with the reported prevalence rates of 6% to 26% in literature, reflecting variability due to diagnostic criteria and population heterogeneity Karkera S *et al.*(2023).[7] Age-specific prevalence did not show significant differences, suggesting that PCOS affects women uniformly across the reproductive age span, similar to findings by Shrivastava S *et al.*(2023).[8] However, the substantial associations between PCOS, BMI > 25, menstrual irregularities, and clinical hyperandrogenism underscore common phenotypic traits of PCOS as seen in other studies Hatoum S *et al.*(2023)[9], where obesity and symptoms of hyperandrogenism are identified as key diagnostic markers of the syndrome.

Table 2: Prevalence of PCOS Among Women Aged 18-45 Years in a Community Setting The consistency in PCOS prevalence across age groups observed in this study mirrors the findings from Attia GM *et al.*(2023),[10] which suggest that PCOS's impact is pervasive across all adult age groups. The absence of significant odds ratios across age groups emphasizes the need for uniform screening protocols across all reproductive ages, as recommended by the Rotterdam criteria Lejman-Larysz K *et al.*(2023).[11]

Table 3: Common Clinical and Biochemical Characteristics Associated with PCOS The strong association between PCOS and biochemical markers such as hyperandrogenism, elevated LH/FSH ratio, and insulin resistance noted in this study highlights the importance of these biochemical markers in diagnosing PCOS, corroborated by the international consensus on PCOS Zaitoun B *et al.*(2023).[12] These findings align with research indicating that hyperandrogenism is a core feature of PCOS and often aids in differentiating PCOS from other ovulatory disorders Bonakdaran S *et al.*(2023).[13] The elevated LH/FSH ratio and insulin resistance further support the syndromic nature of PCOS involving both reproductive and metabolic abnormalities Sarawad SS.(2023).[14]

Table 4: Correlation Between PCOS and Metabolic Syndromes This study's findings of strong correlations between PCOS and indices of metabolic syndrome such as BMI, insulin resistance, and systolic blood pressure extend the existing evidence that PCOS is not only a reproductive disorder but also a metabolic one. The correlation coefficients are consistent with those reported by Zhang M *et al.*(2023),[15] highlighting the metabolic risks associated with PCOS. These results suggest that women with PCOS are at a higher risk of developing conditions like type 2 diabetes and cardiovascular diseases, which necessitates a broader approach in managing PCOS, incorporating both gynecological and metabolic healthcare strategies Patel-Sanchez N *et al.*(2023).[16]

CONCLUSION

This community-based cross-sectional study offers a comprehensive assessment of the prevalence and characteristics of Polycystic Ovary Syndrome (PCOS) among women aged 18-45 years. The study's findings indicate a PCOS prevalence of 15%, aligning with global epidemiological data that suggests a broad range of prevalence due to varied diagnostic criteria and population diversity.

Significant findings from the study include a strong association between PCOS and several clinical and metabolic markers. Women with PCOS were significantly more likely to exhibit clinical and biochemical hyperandrogenism, menstrual irregularities, and elevated BMI. These factors were found to be highly predictive of the syndrome, affirming their role in the diagnostic process. Furthermore, the study highlighted a robust correlation between PCOS and metabolic syndromes such as insulin resistance and elevated BMI, which supports the argument that PCOS should be viewed not only as a reproductive disorder but also as a metabolic one.

The uniformity of PCOS prevalence across different age groups within this study underscores the need for ongoing vigilance in all reproductive age women, not just a subgroup. This suggests that screening and diagnostic efforts should be equally distributed across all ages within the reproductive lifespan.

In light of these findings, it is imperative that health care strategies encompass both the gynecological and metabolic aspects of PCOS. Early identification and comprehensive management of PCOS can significantly improve quality of life and reduce the risk of long-term complications such as type 2 diabetes and cardiovascular disease.

This study emphasizes the necessity of enhanced awareness and education about PCOS among health care providers and the public. Policy makers and health care systems should consider incorporating regular screening for PCOS symptoms into routine care for women, especially those presenting with menstrual irregularities, obesity, or signs of hyperandrogenism.

LIMITATIONS OF STUDY

1. Cross-Sectional Design: One inherent limitation of this study is its cross-sectional nature, which primarily allows for observation of associations at a single point in time without providing causality or the dynamics of PCOS development over time. Longitudinal studies would be required to understand the progression of PCOS and its long-term impacts on health.

2. Sample Size and Demographics: While the study included a relatively modest sample size of 300 women, this may not be fully representative of the broader population, particularly in terms of ethnic and socioeconomic diversity. The findings

may not generalize to all populations, especially considering that the prevalence and expression of PCOS can vary significantly across different ethnic groups.

3. Diagnostic Criteria: The study utilized the Rotterdam criteria for diagnosing PCOS, which might not capture all cases, as different criteria (like the NIH or Androgen Excess Society criteria) might classify additional individuals as having PCOS. This could lead to underestimation or overestimation of PCOS prevalence based on the diagnostic criteria employed.

4. Self-Reported Data: Some data, particularly related to menstrual irregularities and symptoms of hyperandrogenism, were self-reported, which can introduce recall bias and affect the accuracy of the data. Objective measures or corroborations were not possible for all aspects of the data collected.

5. Exclusion Criteria: The exclusion of women currently on hormonal treatments or with other endocrine disorders could also limit understanding of the broader impacts and interactions between PCOS and these variables. Women in these categories might exhibit different manifestations of the syndrome, potentially skewing prevalence rates and characteristic features.

6. Lack of Detailed Metabolic Assessment: Although the study identified correlations with metabolic syndromes, the lack of comprehensive metabolic profiling (including detailed lipid profiles, glucose tolerance tests, and more granular insulin sensitivity measurements) limits understanding of the full metabolic implications associated with PCOS.

7. Geographical Limitation: The study was conducted within a specific urban and semi-urban area, which may not reflect the prevalence and characteristics of PCOS in rural or different urban contexts, potentially affecting the external validity of the findings.

8. Hormonal and Biochemical Measures: The variability in laboratory methods for hormonal and biochemical measures across different centers and the timing of sample collections (e.g., phase of menstrual cycle) could influence the consistency and reliability of the diagnostic markers used for PCOS.

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