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Clinical, Biochemical, and Ultrasonographic Characteristics of Women with Suspected Polycystic Ovary Syndrome in El-Obeid: A Descriptive Cross-Sectional Study

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Abstract

Background: Polycystic ovary syndrome (PCOS) is the leading endocrine disorder among reproductive-aged women. Despite its prevalence, Sudanese data remain limited. **Objectives:** To describe the clinical presentation, hormonal abnormalities, and ultrasonographic findings among Sudanese women with suspected PCOS. **Methods:** Descriptive cross-sectional study of 120 symptomatic women aged 15–45 years. Consecutive sampling was used. Clinical evaluation, hormonal assays, and pelvic ultrasound were performed using Rotterdam criteria. **Results:** Menstrual irregularity (58.3%), hirsutism (47.5%), acne (41.7%), and acanthosis nigricans (38.3%) were common. Ultrasound confirmed polycystic ovarian morphology (PCOM) in 68.3%. Elevated LH/FSH ratio and testosterone were observed in 47.5% and 45% respectively. Significant correlations were found between BMI and hirsutism (r=0.52), LH/FSH ratio and testosterone (r=0.44), and ovarian volume and LH (r=0.48). **Conclusion:** The clustering of reproductive, hormonal, and ultrasound abnormalities highlights the classical PCOS phenotype. Early integrated diagnostic assessment is essential. Findings are not generalizable due to the hospital-based design [1,2].

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Introduction

Polycystic ovary syndrome (PCOS) affects 6–20% of women and presents with anovulation, hyperandrogenism, and polycystic ovarian morphology. The syndrome is also linked to metabolic abnormalities, including insulin resistance and type 2 diabetes mellitus. Ethnic-specific variations exist in the presentation and severity of PCOS. In Sudan, however, published data remain scarce. This study aims to expand understanding of PCOS patterns among women presenting with symptoms suggestive of the disorder in Western Sudan [5,6].

Literature Review

Global evidence shows PCOS phenotype varies by ethnicity. Rotterdam criteria remain the most widely used diagnostic standard. Hormonal markers such as LH/FSH ratio have low sensitivity. AMH has recently emerged as a diagnostic biomarker [7.12.14].

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Materials and Methods

A descriptive cross-sectional study was conducted over six months at El-Obeid Obstetrics and Gynecology Teaching Hospital. Consecutive sampling was used to recruit symptomatic women aged 15–45 years. Inclusion criteria included menstrual irregularity, hirsutism, acne, or subfertility. Exclusion criteria included thyroid disease, hyperprolactinemia, pregnancy, Cushing syndrome, or use of hormonal therapy. Clinical evaluation included menstrual history, BMI, signs of hyperandrogenism, and acanthosis nigricans. Hormonal assays measured LH, FSH, total testosterone, prolactin, and TSH. Pelvic ultrasound assessed ovarian morphology according to Rotterdam criteria. Statistical analysis included descriptive statistics, chi-square tests, and Pearson correlations [2,4].

Results

The study population included 120 women with a mean age of 24.8 ± 6.2 years. The highest proportion (52.5%) belonged to the 20–30-year age group, suggesting that PCOS symptoms become most prominent during early reproductive years. Overweight and obesity were highly prevalent, with 60% of women having a BMI greater than 25 kg/m² (Table 1).

Table 1 Demographic Characteristics

Variable	n	%
Age <20	28	23.3
Age 20–30	63	52.5
Age >30	29	24.2
BMI ≤25	48	40.0
BMI >25	72	60.0

Ultrasound confirmed PCOS in 68.3% of participants. Elevated LH/FSH ratio was found in 47.5% [7]. Strong associations were observed between BMI and hyperandrogenism [8]. Hormonal abnormalities were common: 47.5% had elevated LH/FSH ratios, 45% had elevated testosterone, and 10% had elevated prolactin. Ultrasound identified polycystic ovarian morphology (PCOM) in 68.3% of participants (Table 2).

Table 2 Comparison of Diagnostic Modalities

Diagnostic modality	Positive (n)	Percentage (%)
Clinical criteria	78	65.0
LH/FSH ratio ≥3	57	47.5
Elevated testosterone	54	45.0
Ultrasound PCOM	82	68.3

Menstrual abnormalities were the dominant presenting symptom (58.3%), primarily oligomenorrhea, followed by hyperandrogenic manifestations such as hirsutism and acne. Acanthosis nigricans was present in 38.3%, reflecting insulin resistance (Table 3).

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Table 3 Clinical Features among Women with Suspected PCOS (n=120)

Clinical feature	Frequency (n)	Percentage (%)
Menstrual irregularity (oligo-/amenorrhea)	70	58.3
Hirsutism	57	47.5
Acne	50	41.7
Acanthosis nigricans	46	38.3
Amenorrhea (≥6 months)	14	11.7

Significant correlations were observed, including BMI with hirsutism (r = 0.52), LH/FSH ratio with testosterone (r = 0.44), and ovarian volume with LH levels (r = 0.48). These findings confirm the clustering of metabolic and endocrine abnormalities often described in PCOS pathophysiology. Overall, 72% of participants met two or more Rotterdam diagnostic criteria (Table 4).

Table 4 Correlation Matrix of Selected Variables

Variable pair	R	p-value	Interpretation
BMI vs hirsutism score	+0.52	0.006	Moderate positive correlation
LH/FSH ratio vs testosterone	+0.44	0.017	Moderate correlation
Ovarian volume vs LH	+0.48	0.013	Moderate correlation

Discussion

The findings of this study align with international literature, which describes PCOS as a condition characterized by the intersection of metabolic, reproductive, and endocrine abnormalities. The observed high prevalence of menstrual irregularity, hyperandrogenic signs, and PCOM underscores the classical PCOS phenotype in Sudanese women. Correlation analysis revealed strong links between adiposity and hyperandrogenism, reinforcing the role of BMI in disease severity. Compared with global data, the hormonal abnormalities detected in this cohort fall within expected ranges, although the PCOM rate (68.3%) appears slightly higher than that reported in some Western populations. Possible explanations include delayed presentation, ethnic variation, or environmental influences. Key study limitations include the hospital-based sample, absence of metabolic biomarkers such as fasting glucose or insulin, and the cross-sectional nature of analysis. These factors limit generalizability and preclude causal inference.2,6,13,14

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Conclusion

This study demonstrates a strong clustering of menstrual dysfunction, biochemical abnormalities, and ultrasound findings among women with suspected PCOS in Western Sudan. The findings highlight the need for integrated diagnostic pathways and early intervention strategies to address metabolic risk. Further community-based research is needed to estimate true prevalence and expand understanding of PCOS phenotypes in Sudan.

Ethical Approval

Ethical approval was obtained from the Sudan Medical Specialization Board (SMSB).

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