VOLUME - 14, ISSUE - 06, JUNE - 2025 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

General Medicine

POLYCYSTIC OVARIAN SYNDROME (PCOS) AND CARDIOMETABOLIC SYNDROME: A CROSS-SECTIONAL ANALYSIS FROM BIKANER REGION

Dr. Ramanand*	Resident, Dept Of General Medicine, S P Medical College, Bikaner, India *Corresponding Author
Dr. Anita Sharma	Associate Professor, Department Of Gynecology And Obstetrics, S.P. Medical College And PBM Hospital, Bikaner
Dr. Rohitash Kularia	Professor, Department Of Internal Medicine, S.P. Medical College And PBM Hospital, Bikaner
Dr. Aditya Kularia	MBBS, Pandit Deendayal Upadhyaya Medical College (PDU), Churu, India

ABSTRACT

Background: Polycystic Ovarian Syndrome (PCOS) is a prevalent endocrine disorder among women of reproductive age, strongly associated with insulin resistance, obesity, dyslipidemia, and other features of cardiometabolic syndrome (CMS). Understanding this association is essential in regions like Bikaner, where lifestyle and healthcare access may influence the phenotype. **Objective:** To evaluate the clinical, biochemical, and cardiometabolic profiles of 100 women with PCOS attending PBM Hospital, Bikaner. **Methods:** A cross-sectional observational study was conducted among 100 women aged 18–40 years, diagnosed with PCOS based on Rotterdam criteria. Detailed clinical assessment, anthropometry, hormonal profiling, lipid profile, glucose tolerance, and blood pressure were recorded. CMS was diagnosed based on modified NCEP-ATP III guidelines. **Results:** Among 100 women, the prevalence of cardiometabolic syndrome was 42%. Obesity (BMI >25 kg/m²) was seen in 58%, insulin resistance (HOMA-IR >2.5) in 66%, and dyslipidemia in 71%. Elevated triglycerides and low HDL were the most common lipid abnormalities. Acanthosis nigricans, hirsutism, and menstrual irregularities were strongly associated with insulin resistance and central obesity. There was a statistically significant correlation between HOMA-IR and both waist circumference ($p<0.001$) and fasting glucose ($p=0.02$). **Conclusion:** A substantial proportion of PCOS patients in Bikaner exhibit features of cardiometabolic syndrome. Early screening and targeted interventions are warranted to prevent long-term cardiovascular and metabolic complications.

KEYWORDS : Polycystic ovary syndrome, Cardiometabolic syndrome, Insulin resistance, Obesity, Dyslipidemia, HOMA-IR

INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is a complex endocrine disorder affecting 6–10% of women globally, with a higher incidence in South Asia due to genetic and environmental influences [1,2]. It is characterized by ovulatory dysfunction, hyperandrogenism, and polycystic ovarian morphology. Importantly, PCOS is not merely a reproductive disorder—it carries a substantial burden of metabolic disturbances, particularly insulin resistance, central obesity, dyslipidemia, and hypertension [3–5].

The overlap between PCOS and cardiometabolic syndrome (CMS) is significant. CMS, defined by a cluster of cardiovascular risk factors, is a known precursor for type 2 diabetes mellitus and cardiovascular disease (CVD) [6]. The pro-inflammatory and hyperinsulinemic milieu in PCOS patients predisposes them to endothelial dysfunction and atherogenesis [7].

In regions like Bikaner (Rajasthan), where sedentary lifestyle, high carbohydrate diets, and limited healthcare access prevail, the metabolic profile of PCOS patients can be particularly severe. Despite this, region-specific data remains scarce.

This study aims to evaluate the clinical and biochemical features of PCOS and their association with CMS in patients from PBM Hospital, Bikaner.

MATERIALS AND METHODS

Study Design And Setting

A cross-sectional observational study was conducted over 12 months (2024–2025) at PBM Hospital, Bikaner—a tertiary care center serving urban and rural Rajasthan.

Inclusion Criteria

- Women aged 18–40 years
- Diagnosed with PCOS as per **Rotterdam criteria** (2003): at least two of the following:
- Oligo/anovulation
- Hyperandrogenism (clinical/biochemical)
- Polycystic ovaries on ultrasound

Exclusion Criteria

- Known diabetes mellitus or CVD
- Thyroid dysfunction
- Cushing's syndrome
- Hyperprolactinemia

Sample Size

100 consecutive eligible PCOS patients attending the endocrinology and gynecology OPD.

Data Collection

- **Anthropometry:** BMI, waist circumference, blood pressure
- **Clinical Features:** Hirsutism (Ferriman–Gallwey score >8), acanthosis nigricans, acne, menstrual pattern

- **Biochemical Investigations:**
- Fasting blood glucose
- 2-hour OGTT
- Lipid profile (Total cholesterol, HDL, LDL, TG)
- Serum insulin
- HOMA-IR calculated: [Fasting insulin (μU/mL) × Fasting glucose (mg/dL)]/405

Definition Of CMS

Based on **modified NCEP-ATP III criteria**, CMS was diagnosed if three or more of the following were present:

- Waist circumference >80 cm
- TG ≥150 mg/dL
- HDL <50 mg/dL
- BP ≥130/85 mmHg
- Fasting glucose ≥100 mg/dL

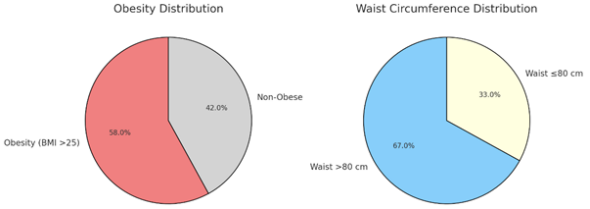
Statistical Analysis

Data were analyzed using SPSS v25. Descriptive statistics, Chi-square test, Pearson correlation, and logistic regression were applied. $p<0.05$ was considered statistically significant.

RESULTS

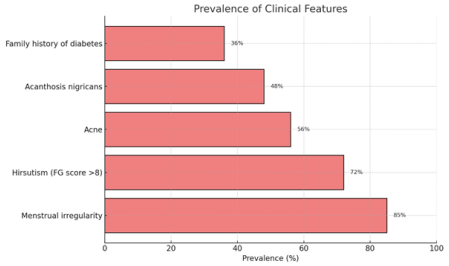
Demographic Profile

- **Mean Age:** 26.4 ± 4.8 years
- **Mean BMI:** 26.3 ± 3.9 kg/m²
- **Obesity (BMI >25):** 58%
- **Waist Circumference >80 cm:** 67%



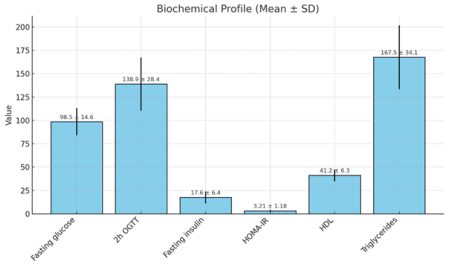
Clinical Features

Clinical Parameter	Prevalence (%)
Menstrual irregularity	85
Hirsutism (FG score >8)	72
Acne	56
Acanthosis nigricans	48
Family history of diabetes	36



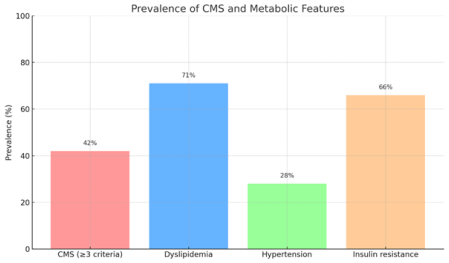
Biochemical Profile

Biochemical Marker	Mean ± SD
Fasting glucose (mg/dL)	98.5 ± 14.6
2h OGTT (mg/dL)	138.9 ± 28.4
Fasting insulin (μU/mL)	17.6 ± 6.4
HOMA-IR	3.21 ± 1.18
HDL (mg/dL)	41.2 ± 6.3
Triglycerides (mg/dL)	167.5 ± 34.1



Prevalence Of CMS And Metabolic Features

- **CMS (≥3 criteria):** 42%
- **Dyslipidemia:** 71%
- **Hypertension:** 28%
- **Insulin resistance (HOMA-IR >2.5):** 66%



Statistical Associations

- **HOMA-IR Significantly Correlated With:**
- Waist circumference ($r=0.49$, $p<0.001$)
- Fasting glucose ($r=0.32$, $p=0.02$)
- Triglycerides ($r=0.30$, $p=0.03$)

DISCUSSION

This study highlights the high prevalence of cardiometabolic syndrome (42%) among women with PCOS in the Bikaner region, aligning with prior Indian studies [8–10]. The strong association between insulin resistance, central obesity, and dyslipidemia underlines the metabolic complexity of PCOS.

Our findings reinforce that BMI alone underestimates cardiometabolic risk in Indian women—waist circumference and HOMA-IR are more reflective of visceral adiposity and insulin sensitivity [11].

Dyslipidemia, particularly elevated TG and low HDL, was observed in 71%-consistent with the characteristic atherogenic lipid profile in PCOS [12,13]. These abnormalities contribute to increased lifetime cardiovascular risk [14].

Menstrual irregularities and hyperandrogenic features were frequent, but it was the metabolic markers that predicted CMS, echoing the phenotypic diversity described in the Rotterdam classification [2,15].

The high prevalence of insulin resistance (66%) in this cohort calls for early metabolic screening in all PCOS patients, particularly in resource-limited areas where diagnosis is often delayed.

CONCLUSION

This cross-sectional study from PBM Hospital, Bikaner, reveals a significant metabolic burden in PCOS patients, with 42% fulfilling criteria for cardiometabolic syndrome. The findings underscore the need for early screening of insulin resistance and dyslipidemia and implementation of region-specific lifestyle interventions.

Ethical Clearance

Approved by the Institutional Ethics Committee, S.P. Medical College, Bikaner.

Conflict Of Interest

None declared.

Funding

No external funding was received for this study.

REFERENCES

1. Azziz R, et al. The prevalence and features of the polycystic ovary syndrome in an unselected population. J Clin Endocrinol Metab. 2004;89(6):2745–2749.
2. Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. Revised 2003 consensus on diagnostic criteria. Hum Reprod. 2004;19(1): 41–47.
3. Teede HJ, et al. Management of PCOS: A position statement. Med J Aust. 2011;195(6):S65–S112.
4. Legro RS, et al. Prevalence and predictors of metabolic syndrome in PCOS. J Clin Endocrinol Metab. 2005;90(4):1929–1935.
5. Ehrmann DA. Metabolic dysfunction in PCOS. Endocr Rev. 2005;26(3): 322–338.
6. Alberti KG, et al. Harmonizing the metabolic syndrome. Circulation. 2009;120(16):1640–1645.
7. Dunaif A. Insulin resistance in PCOS: A key therapeutic target. Fertil Steril. 2006;86(Suppl 1):S18–S22.
8. Bhattacharya SM, et al. Metabolic syndrome in PCOS women. J Obstet Gynaecol India. 2011;61(6):594–598.
9. Kalra B, et al. Insulin resistance and metabolic syndrome in PCOS. Indian J Clin Biochem. 2006;21(1):111–114.
10. Madhwal A, et al. Insulin resistance in Indian PCOS patients. J Assoc Physicians India. 2008;56:875–879.
11. Misra A, et al. Waist circumference and action cut-points. Nutrition. 2006;22(5):482–491.
12. Wild RA, et al. Dyslipidemia in PCOS. Endocr Pract. 2000;6(1):15–21.
13. Apridonidze T, et al. Prevalence of metabolic syndrome in PCOS. J Clin Endocrinol Metab. 2005;90(4):1929–1935.
14. Moran LJ, et al. Cardiovascular risk in PCOS. J Clin Endocrinol Metab. 2010;95(2):817–825.
15. Dumesic DA, et al. Scientific statement on PCOS. Endocr Rev. 2015;36 (5):487–525.