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RESEARCH ARTICLE

Comparative Survey Study on Prevalence of Polycystic Ovary Disease Among Urban (Pune) and Rural (Purandar) College Girls

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Abstract

Polycystic ovarian disease (PCOD) exhibits notable differences in prevalence and risk factors between urban- and rural-based populations, which has an impact on adolescent and reproductive health in India. This study sought to investigate and compare the prevalence, demographic characteristics, risk factors, symptom profiles, and healthcare access associated with PCOD in college girls in urban and rural settings. This comparative cross-sectional study was conducted with 1,104 urban and rural female college students in Maharashtra and indicated that the prevalence of PCOD among urban girls (10.6%) was significantly greater compared to rural girls (6.7%). Although urban and rural girls were nearly equal with respect to age and sample size, urban girls had higher knowledge of PCOD, had more experience with healthcare providers, experienced more stress, and had a higher prevalence of clinical symptoms such as irregular periods and hyperandrogenism, even though urban girls had a higher prevalence of obesity (59.7%) compared to rural girls (5.3%). A family history of PCOD was a strong predictor in both urban and rural girls, with urban girls having notably better access to medical care. These findings highlight the need for distinct intervention strategies such as awareness promotions, stress-reducing interventions, and healthcare access to address risks and barriers to healthcare in each population subgroup.

ARTICLE INFO

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Introduction

Polycystic ovary disease (PCOD) and polycystic ovary syndrome (PCOS) are related but have distinct medical conditions. PCOS, initially reported by Stein and Leventhal in 1935, is a complicated endocrine condition distinguished by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology.[1,2] PCOD is commonly defined as cystic ovarian morphology that does not always correspond to the whole clinical spectrum associated with PCOS.[3,4] PCOS diagnostic criteria include recommendations from the NIH, Rotterdam, and Androgen Excess Society, which have a significant impact on prevalence estimations.[5,6]

PCOS impacts around 6 to 13% of women of reproductive age worldwide, while the prevalence of PCOD differs significantly based on the population and the criteria used for diagnosis.[7,8] In India, the prevalence of PCOS is estimated

to be between 8.4 and 22.5% in urban regions, while data from rural areas remains scarce.[9-11] Women in urban areas exhibit a greater prevalence of PCOD, likely due to the impact of lifestyle, environmental, and socioeconomic factors.[12,13]

PCOD presents considerable long-term health consequences that go beyond reproductive issues. Women diagnosed with PCOD are at a heightened risk for various health issues, including metabolic syndrome, type 2 diabetes, cardiovascular disease, endometrial cancer, and psychological disorders such as depression and anxiety.[4,14,15] Identifying issues early in adolescence and young adulthood is vital, given that around 70% of cases go undiagnosed within this demographic.[10,16] Young women in college are a vital group for intervention, as changes in lifestyle and proactive management can greatly decrease the risk of long-term complications.[17,18] Nonetheless, awareness continues to be limited, especially among rural populations, which poses challenges for prompt diagnosis and treatment. [19,20] Despite a rise, most PCOS studies in India are regional, cross-sectional, or hospital-based, making national quantitative data unavailable.[3,12] This study seeks to analyze the prevalence and risk profiles of PCOD among college girls in urban Pune and rural Purandar, Maharashtra, with the goal of guiding targeted interventions.

Materials and Methods

Study Settings and Design

A cross-sectional survey was conducted from August 2024 to July 2025 to evaluate the prevalence of both physiological and psychological PCOD diagnoses, risk factors for PCOD symptoms, types of symptoms, and health service utilization among college-age females in rural and urban areas of Pune district, Maharashtra, India. The rural cohort consisted of 554 women from the Purandar region, specifically from Waghire College Saswad, residing in village environments. In contrast, the urban cohort included 550 women from Annasaheb Magar College and Pharmacy College, Hadapsar, primarily enrolled in institutions within Pune city and situated in Pune.

Study Participants

The study comprised 1104 women aged 16 to 31 (mean age: 19.95 ± 6.9 years; rural: 19.7 ± 4.8 years, urban: 20.2 ± 8.96 years). Both groups were close in age, with 42 to 49% of women aged 18 to 22 and 30 to 43% under 18. Demographic comparability enhances urban-rural analysis and reduces age-appropriate bias covariance.[21] Like the reproductive age criterion for PCOS, the sample was mostly teenagers and young adults.[5,22] Urban and rural women came from varying socioeconomic backgrounds and towns and cities. Survey Information includes the following points for data collection.

Data Collection Tool and Variables

Data were collected using a comprehensive, structured questionnaire developed to measure the following variables:

Demographic Information

Age, education, family history of PCOS, geographical location (urban and/or rural).

Menstrual Health

Age at menarche, any irregularities in menstrual cycles, and presence of irregular cycles.

PCOS Awareness

Knowledge of PCOS, awareness of the symptoms of PCOS.

Clinical Symptoms

Symptoms recalled and self-reported by the participant, including acne, hirsutism, pelvic pain, mood changes, and weight changes.

Lifestyle Habits

Frequency of exercise, dietary choices, hours of sleep, use of substances (smoking and alcohol).

Medical History

Previous diagnosis of PCOS, previous visits with a gynecologist, and treatments used.

Anthropometry

Body mass index (BMI) was calculated using self-reported or measured height and weight, which clas-

sified participants into underweight, normal weight, overweight, and obese according to WHO cutoffs.

Diagnostic Criteria and Definitions

The diagnosis of PCOD was established through self-reporting of a formal medical assessment conducted by a healthcare professional, utilizing established criteria for evaluation. Menstrual irregularity was characterized by cycles shorter than 21 days, longer than 35 days, or exhibiting variability. The categories for BMI follow the standards set by the World Health Organization: underweight is defined as less than 18.5 kg/m², normal weight ranges from 18.5 to 24.9 kg/m², overweight is classified as 25 to 29.9 kg/m², and obesity is identified as 30 kg/m² or greater (World Health Organization, 2025).

Inclusion Criteria

Inclusion criteria were female gender, college enrolment, and signed informed consent. Non-PCOS chronic illnesses, pregnancy, and refusal to consent were exclusion criteria.

Statistical Analysis

Descriptive statistics were used to summarize participant characteristics and the prevalence of each of the groups. Chi-square tests were used to assess whether there were significant differences in the urban and rural groups on categorical variables such as PCOD prevalence, presence of symptoms, and access to health care. Logistic regression models were used to identify predictors of PCOD within the two groups and across both populations, along with odds ratios (OR) and 95% confidence intervals (CI). Significance was set at $p < 0.05$; data analyses were performed using Excel.

Ethical Considerations

An institutional administration and ethics committee approved the study before its commencement. Participants provided informed consent, and confidentiality was maintained throughout the study.

Results

The study sample comprised 1104 women, with 554 from rural areas and 550 from urban areas. The diagnosis rate was 10.6% (n = 59) in the urban group, surpassing the rural group's rate of 6.7% (n = 37). The mean ages were 20.2 ± 8.96 years for the urban cohort and 19.7 ± 4.8 years for the rural cohort.

Prevalence of PCOS in Urban and Rural Locations

The prevalence of PCOD in urban girls was approximately 20% greater than that observed in their rural counterparts. In urban areas, 10.6% of women reported a diagnosis of PCOD, whereas 8.8% of women in rural areas reported the same condition. Urban subjects demonstrated a greater relative prevalence (10.6% compared to 8.8%).

Demographics and Population Characteristics

The rural group (n = 554) and the urban group (n = 550) had comparable sample sizes and mean ages (rural: 19.7 ± 4.8 years; urban: 20.2 ± 8.96 years), thereby reducing potential age-related confounding factors. The urban participants predominantly hailed from Pune city, while the rural participants represented diverse village communities across Maharashtra. The age distribution patterns were comparable, with around 42 to 49% of participants aged 18 to 22 years and 30 to 43% under 18 years in both cohorts.

PCOD Awareness and Knowledge Gaps

Awareness of PCOD varied among groups, with 47.6% of urban women demonstrating awareness compared to 40.4% of rural women. Nonetheless, nearly 50% of urban women and approximately 60% of rural women continued to lack awareness of the disorder.

Lifestyle factors and risk profiles as shown in Figure 1.

Physical Activity Patterns

Engagement in physical activity. Physical inactivity was prevalent in both groups, with 51.4% of rural participants and 46.2% of urban participants indicating that they never engaged in exercise (Figure 1).

Stress and Mental Health

Stress refers to a psychological and physiological response to perceived challenges or threats, often

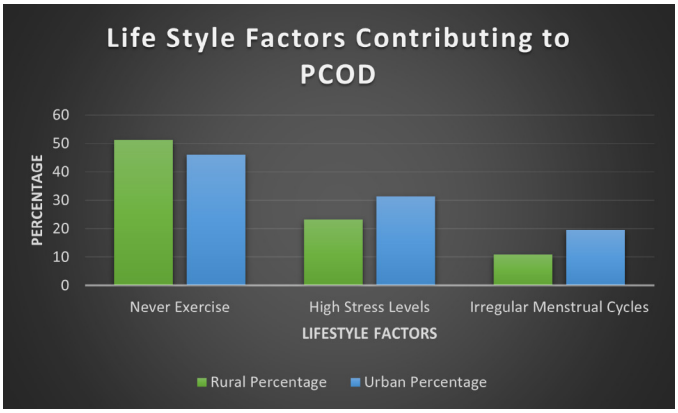

Figure 1: Lifestyle factors contributing to PCOD

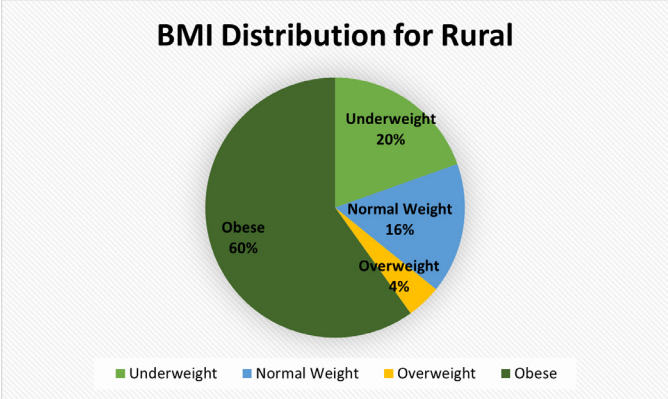

Figure 2: BMI distribution for rural

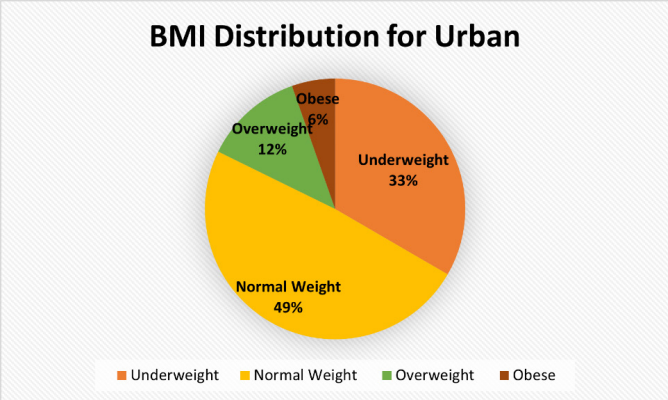

Figure 3: BMI distribution for urban

resulting in various emotional and physical effects. About 23.3% of rural participants and 31.5% of urban participants reported high stress levels.

Body Mass Index Distribution: A Striking Paradox

Body mass index (BMI) (Figure 2). In the urban cohort, 32.9% were classified as underweight, 48.2% as normal weight, 12.2% as overweight, and 5.3% as obese (Table 1). In the rural cohort, 59.7% of participants were identified as obese (BMI ≥ 30), whereas only 5.3% of the urban cohort fell into this category (Table 2). In contrast, 48.2% of urban women were classified as having a normal weight, whereas only 16.2% of rural women fell into this category (Figure 3).

Menstrual Health and Symptomatology

Urban women exhibited a higher prevalence of irregular menstrual cycles (19.5%) compared to rural women (11.0%). Mood swings were the most commonly reported symptom in both groups, exceeding 50% prevalence. Urban women exhibited greater incidences of excessive hair loss (33.1% compared to 19.1%) and irregular menstrual cycles (31.3 *versus* 21.8%) relative to their rural counterparts.

Healthcare Access and Utilization Patterns

A significant disparity in healthcare access was observed. Approximately 17.8% of urban women reported consulting gynecologists, whereas the rate among rural women was significantly lower, at about 2% (Table 3). The prevalence of homeopathic treatments among urban women was 20.6%, compared to 5.4% among rural women. In contrast, the use of allopathic treatments was 10.0% in urban women and 3.2% in rural women. Usage of period-tracking apps was 7.8% among urban participants and 5.4% among rural participants (Figure 4).

Risk Factor Analysis and Predictive Modelling

Family history of PCOD or similar disorders was noted in 10.9% of urban women and 10.0% of rural women, suggesting similar genetic predisposition across the groups. Logistic regression analysis indicated that family history significantly predicts PCOD diagnosis, with rural women exhibiting higher odds ratios (OR = 7.4) than urban women (OR =

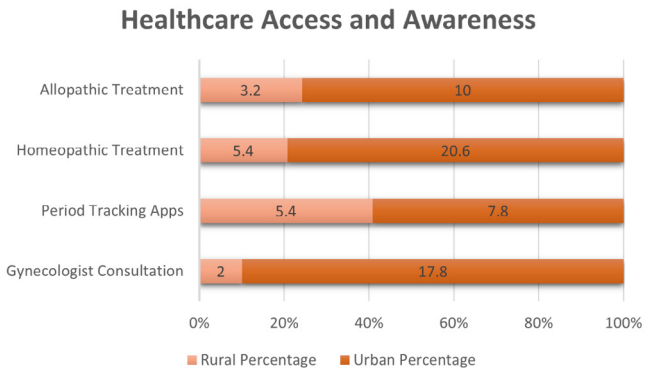

Figure 4: Healthcare access and awareness among the surveyed population

2.49). Urban risk factors encompassed irregular cycles, elevated stress levels, and earlier symptom identification, while rural profiles were marked by increased obesity, restricted healthcare access, and diminished awareness.

Statistical Significance and Clinical Implications

The comparison of urban and rural cohorts revealed statistically significant differences in the rates of PCOD diagnosis, BMI distribution, menstrual irregularities, stress levels, and awareness ($p < 0.05$). Conversely, the differences in family history were not statistically significant ($p > 0.05$). Summary metrics and confidence intervals are provided in Table 4.

Table 1: BMI for surveyed urban population

BMI category	*Urban percentage*	*Urban count*
Underweight (<18.5)	32.9	181
Normal Weight (18.5–24.9)	48.2	265
Overweight (25–29.9)	12.2	67
Obese (≥30)	5.3	29

Table 2: BMI for surveyed rural population

BMI category	*Rural percentage*	*Rural count*
Underweight (<18.5)	19.5	108
Normal Weight (18.5–24.9)	16.2	90
Overweight (25–29.9)	4.3	24
Obese (≥30)	59.7	331

Discussion

The present study indicates that the prevalence of PCOD is greater among urban college women compared to their rural counterparts, aligning with previous research that highlights a higher burden of PCOS/PCOD in urban populations both in India and globally.[10,13,24] The approximately 20% higher relative prevalence among urban participants indicates that urbanization, along with its related lifestyle and environmental changes, plays a role in elevating reproductive and metabolic risk.[8,19]

Urban girls exhibited elevated diagnosis rates and increased menstrual irregularities; however, BMI data indicated a paradoxically greater prevalence of obesity within the rural cohort. This contrasts with numerous studies indicating that urban women exhibit higher obesity rates. It suggests that in this context, factors such as dietary transition, agricultural mechanization, and local food environments may contribute to obesity in rural communities, whereas urban participants may experience advantages from improved access to nutritional information and healthcare.[15,25-29] The correlation between elevated stress, menstrual irregularities, and PCOD is consistent with research that associates obesity, insulin resistance, and hyperandrogenism with PCOS in urban populations (Figure 5).[3-34]

The significant disparities in awareness and healthcare utilization, especially within the rural population, indicate structural barriers that may lead to underdiagnosis and delayed treatment. The significantly reduced rate of gynecological consultations and the limited use of formal treatments and digital health tools among rural participants reflect previous findings regarding restricted access and under-recognition in non-urban areas.[7,10,24,35-37] The findings indicate the necessity for context-specific interventions, including mobile clinics, telemedicine, and college-based screening and education.

Family history was identified as a significant predictor of PCOD in both groups, exhibiting a notably high odds ratio among rural women. This finding underscores the substantial genetic influences that are shaped by environmental and lifestyle factors.[18,38] The clustering of irregular cycles, elevated stress levels, and increased health-seeking behavior among urban women, in contrast to obesity and

Table 3: Healthcare access and awareness among surveyed population

Health dimension	*Rural value*	*Urban value*	*Scale maximum*	*Rural normalized score*	*Urban normalized score*	*Health impact*
Pcod diagnosis rate	8.8	10.6	15	58.7	70.7	Negative
Pcod awareness	40.4	47.6	60	67.3	79.3	Positive
Obesity rate	59.7	5.3	70	85.3	7.6	Negative
High stress	23.3	31.5	40	58.3	78.8	Negative
Healthcare access	2	17.8	20	10	89	Positive
Never exercise	51.4	46.2	60	85.7	77	Negative
Irregular cycles	11	19.5	25	44	78	Negative

Table 4: PCOD prevalence comparisonw

Parameter	*Rural value*	*Urban value*	*Difference urban-rural*	*Relative change percent*	*Rural 95% CI*	*Urban 95% CI*	*Statistical significance*
PCOD diagnosis rate (%)	8.8	10.6	1.8	20.5	6.5–11.2	8.2–13	$p < 0.05$
PCOD awareness (%)	40.4	47.6	7.2	17.8	36.4–44.4	43.5–51.7	$p < 0.01$
Family history (%)	10.6	10.9	0.3	2.8	8.1–13.1	8.4–13.4	$p > 0.05$

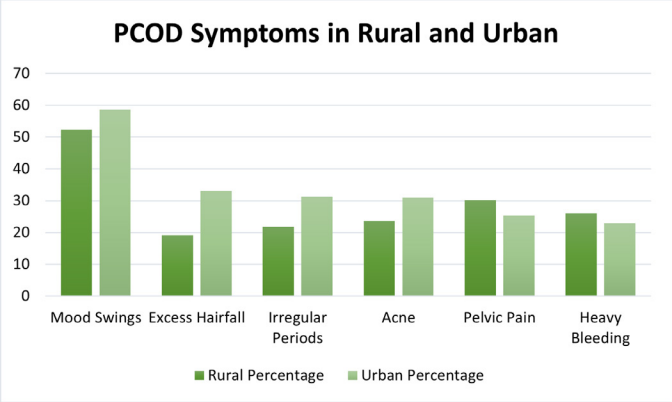

Figure 5: Comparative account of PCOD symptoms in rural and urban

restricted access faced by rural women, highlights the variability in risk profiles by setting, indicating that a singular uniform strategy is insufficient.[20,24]

The statistically significant differences in prevalence, BMI, symptoms, stress, awareness, and healthcare access between urban and rural cohorts highlight the necessity for targeted public health policies. Interventions must integrate lifestyle modification, mental health support, reproductive health services, and health literacy enhancement, with content and delivery tailored to urban and rural contexts, to mitigate the burden of PCOD and address urban-rural disparities.[17,18]

Conclusion

This study emphasises significant disparities between rural and urban areas regarding the prevalence of PCOD, associated lifestyle risks, awareness, and the use of healthcare services among young women in Maharashtra. Women in urban areas experience a significant prevalence of health issues linked to obesity and stress, whereas those in rural regions encounter difficulties related to under-recognition and restricted access to healthcare services and resources. To tackle the notable differences in PCOD prevalence and its effects between urban and rural areas, it is essential to implement focused interventions. These should encompass health education, enhancements to healthcare delivery systems, and strategies that encourage a healthy lifestyle, all tailored to the specific circumstances of each community. The implementation of thorough, population-focused strategies is essential for tackling the

reproductive and metabolic impacts of PCOD and for promoting fairness in women's health results among the varied communities in India.

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