



Comprehensive analysis of associated factors in polycystic ovarian disease (PCOD): A survey approach

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Abstract

Polycystic Ovary Disease (PCOD), also known as Polycystic Ovary Syndrome (PCOS), is a prevalent endocrine and metabolic disorder affecting women of reproductive age, with increasing incidence among adolescents and young adults. The present study aimed to assess the prevalence, awareness, symptomatology, lifestyle factors, and management practices associated with PCOD among students of Isabella Thoburn College, Lucknow. A cross-sectional survey was conducted using a structured questionnaire administered through an online platform. A total of 67 female students participated in the study. The findings revealed a high prevalence of PCOD-related symptoms, with 79.1% of respondents reporting a confirmed medical diagnosis. Most participants belonged to the age group of 18–21 years, indicating that late adolescence and early adulthood represent a critical period for the onset and diagnosis of the condition. Menstrual irregularities were highly prevalent, with 72.7% of respondents reporting irregular cycles, along with associated symptoms such as painful menstruation (74.6%), hair loss (71.6%), mood disturbances (71.6%), and weight gain (59.7%). Lifestyle assessment indicated that a significant proportion of participants followed unhealthy dietary patterns, experienced inadequate sleep, and engaged in low or irregular physical activity, all of which are known to exacerbate PCOD symptoms.

Keywords: Polycystic ovary disease (PCOD), endocrine disorder, menstrual irregularities, insulin resistance, lifestyle factors

Introduction

Polycystic Ovary Disease (PCOD), also known as Polycystic Ovary Syndrome (PCOS) when become severe, is a common endocrine disorder affecting women of reproductive age worldwide (Stener *et al.*, 2024). It is estimated to affect approximately 6% to 20% of women globally (Sharvi *et al.*, 2025) [20]. Infertility, metabolic syndrome, obesity, impaired glucose tolerance, type 2 diabetes mellitus, cardiovascular disease, depression, obstructive sleep apnea, endometrial cancer, and metabolic dysfunction-associated steatotic liver disease are among the numerous co-morbidities linked to PCOS (Shukla *et al.*, 2025) [21]. PCOD is characterised by hormonal imbalance, particularly elevated levels of androgens (male hormones), which disrupt normal ovarian function. As a result, affected women often experience irregular or absent ovulation, menstrual disturbances, infertility, and metabolic complications. The ovaries typically contain multiple small immature follicles or cysts, and ovulation fails to occur regularly (Suokhrie *et al.*, 2023) [24]. Young women with PCOD have a tendency towards insulin resistance. This is a disorder in which the body fails to react to the presence of insulin present in the body, which makes the insulin levels increase. The higher the insulin level, the higher the androgens (male hormones), such as testosterone, which can contribute to PCOD symptoms (Sengupta *et al.*, 2024).

PCOD is now recognised as a multi-system disorder rather than a condition limited to the ovaries (Li *et al.*, 2019) [11]. It is strongly associated with insulin resistance, weight gain, hyperglycaemia, and raises the chance of acquiring further metabolic disorders such as dyslipidaemia, type 2 diabetes (T2D), hypertension, and cardiovascular illnesses (Sanchez & Tena, 2020). These metabolic abnormalities, along with reproductive dysfunction, highlight the complex and systemic nature of the disorder. Regardless of obesity, up to 70% of women with PCOS have insulin resistance (IR), which causes poor glucose consumption and compensatory

hyperinsulinemia in a variety of tissues, including the liver, muscle, and adipose (Ghosh *et al.*, 2025) [5]. 65–95% of women with PCOS have insulin resistance and compensatory hyperinsulinemia (HI), which includes more than half of women of normal weight and the great majority of overweight and obese women (Zhao *et al.*, 2023) [25]. Obesity is a chronic complex disease observed and estimated to affect 50% of PCOD women, classically presented in patients with upper-body obesity; it has been linked to menstrual disorder, which raises biochemical abnormalities of PCOD (Nivetha & Suganya, 2016) [14]. Lifestyle factors such as physical inactivity, unhealthy diet, stress, and urban living conditions further contribute to its rising prevalence. Additionally, genetic predisposition plays a significant role, as PCOD is often observed to run in families (Binu, 2024) [3].

The pathophysiology of PCOD involves disrupted communication between the brain and ovaries through the hypothalamic–pituitary–ovarian (HPO) axis (Shukla *et al.*, 2025) [21]. Normally, this axis regulates reproductive hormones through a balance of gonadotropin-releasing hormone (GnRH), luteinizing hormone (LH), and follicle-stimulating hormone (FSH). In PCOD, this balance is disturbed, resulting in elevated LH levels and reduced FSH levels (Gupta *et al.*, 2022) [7]. This hormonal imbalance leads to increased androgen production, impaired follicular development, and anovulation. Insulin resistance further exacerbates this condition by increasing insulin levels, which in turn stimulate androgen production, creating a cycle of hormonal and metabolic dysfunction.

The condition was first described in 1935 by Irving Stein and Michael Leventhal, who identified a group of symptoms including amenorrhea, infertility, obesity, and polycystic ovaries, later termed Stein–Leventhal syndrome (Sharma *et al.*, 2025) [19]. Advances in medical science, particularly hormonal studies and ultrasound imaging, have improved the understanding and diagnosis of PCOD. The introduction

of diagnostic criteria by the National Institutes of Health (1990) and the Rotterdam criteria (2003) further standardised its identification, acknowledging its heterogeneous presentation.

Oligomenorrhea, amenorrhoea, obesity, hirsutism, infertility, acne, and anovulation are some of the symptoms of PCOS that can cause anxiety, depression, sexual dysfunction, social maladjustment, and a lower quality of life (Mehrabadi *et al.*, 2020) [12]. Mental diseases are more common in those with chronic illnesses like diabetes and hypertension, and women with PCOS have been shown to have higher rates of psychiatric burdens like stress, anxiety, and depression (Asdaq & Yasmin, 2020) [1].

As a chronic condition, early diagnosis and management through lifestyle modification, including a balanced diet and regular physical activity, along with medical intervention, when necessary, are essential to prevent long-term complications.

Overall, the risk of metabolic complications is elevated throughout the female lifespan in women with PCOS, which is based on androgen excess and insulin resistance, and clinical consequences of this condition include subfertility, irregular menses, and signs and symptoms of androgen excess (Kempegowda *et al.*, 2020) [10].

Study area

This study was carried out at Isabella Thoburn College, which is a well-known women's college in Lucknow, Uttar Pradesh. The college is affiliated to the University of Lucknow. It is known for good education.

Methodology

The present study was designed as a cross-sectional survey to assess the prevalence and associated factors of Polycystic Ovary Disease (PCOD) among undergraduate and postgraduate students enrolled in various academic in the College. Data was collected using a pre-designed, structured questionnaire developed through Google Forms. The questionnaire consisted of both multiple-choice and short-answer questions and was structured to obtain information related to:

- Demographic details
- Menstrual history
- Symptoms associated with PCOD
- Previous medical diagnosis
- Lifestyle factors including dietary habits, physical activity, and perceived stress

Data Analysis

The collected data was compiled, tabulated, and subjected to basic statistical analysis using frequency distribution and percentage calculations. The responses were converted into graphical formats such as charts and graphs using Google Forms, which facilitated systematic interpretation and presentation of the results.

Results and Observations

The survey was conducted among girl students of Isabella Thoburn College, with a total of 67 responses collected

from participants dealing with PCOD/PCOS. The findings indicate that the majority of respondents belonged to the age group of 18–21 years, with the highest representation from 18 and 19 years (20.9% each). This suggests that PCOD/PCOS is most common among young adults in late adolescence and early adulthood. Body weight of the participants ranged widely, with most respondents falling between 50–70 kg, indicating a moderate weight distribution. When height and weight were combined, the BMI assessment showed that most participants were within the normal range, although a noticeable proportion were underweight or overweight, suggesting variability in nutritional and metabolic status. Height distribution was mainly between 155–165 cm, reflecting normal physical growth patterns. Many respondents (94%) were unmarried, and most (76.1%) were undergraduate students, indicating that the study largely represents young, college-going females.

Awareness of PCOD/PCOS was found to be very high, with 98.5% of respondents reporting that they had heard about the condition. A significant proportion (79.1%) had been diagnosed by a medical professional, and the most common age of diagnosis was between 17–21 years. Most respondents (77.6%) reported having taken medical treatment, while 52.2% were currently undergoing treatment. A majority preferred a combined approach of medication and lifestyle changes, indicating awareness of holistic management practices. Menstrual health analysis revealed that 72.7% of respondents experienced irregular cycles, while only 21.2% reported regular menstruation and 6.1% reported absence of menstruation. Painful periods (74.6%), missed periods (56.7%), and heavy bleeding (44.8%) were commonly reported problems. The age of menarche was most commonly between 13–14 years, which falls within the normal physiological range. Cycle length varied, with 44.8% reporting a normal cycle (21–35 days), while a considerable proportion experienced shorter or longer cycles. Family history of PCOD/PCOS was reported by only 4.5% of respondents, while 25.4% were unsure, indicating limited awareness regarding hereditary factors.

The study also revealed a high prevalence of symptoms among respondents. The most common symptoms included hair thinning or hair loss and mood swings (71.6% each), followed by weight gain, anxiety, acne, and difficulty losing weight. Other commonly reported symptoms included fatigue, stress, low energy levels, bloating, and headaches. Lifestyle factors showed that a considerable proportion of respondents consumed junk food, while fewer followed a balanced diet. Sleep patterns indicated that most participants slept only 5–7 hours, which is below the recommended duration. Physical activity levels varied, with walking being the most common form of exercise, while some participants reported rare or no physical activity. Diagnostic methods mainly included ultrasound and hormonal tests, either alone or in combination. The impact of PCOD/PCOS was significant, with 80% of respondents reporting effects on mental health, 75.4% on physical health, and 50.8% on daily routine, indicating a strong overall impact on quality of life.

Question No.	Survey Questions	Detailed Findings	Conclusion
1	Age	Most respondents belong to 18–21 years, with highest at 18 and 19 (20.9% each). Very few are below 17 or above 23.	The study mainly represents late adolescent and young adult females, indicating this age group is most affected or responsive.
2	Weight	Majority fall within 50–70 kg, while very few are underweight (<45 kg) or overweight (>80 kg).	Most participants have moderate body weight, but presence of extremes suggests risk of metabolic

			imbalance.
3	Height & BMI	Height mostly between 155–165cm. BMI indicates majority normal, but some underweight and overweight cases exist.	Overall population is healthy, but BMI variation indicates potential risk factors for PCOD in some individuals.
4	Marital Status	94% unmarried, very few married or in relationship.	Findings mainly reflect unmarried young women and cannot be generalized to married population.
5	Education	76.1% undergraduate and 23.9% postgraduate.	Data is dominated by undergraduate students, influencing awareness and lifestyle trends.
6	Awareness	98.5% respondents have heard about PCOD/PCOS.	Awareness level is very high, indicating good exposure to health information.
7	Diagnosis	79.1% diagnosed by medical professional, 20.9% not diagnosed.	This study was conducted on participants who were already diagnosed with PCOD.
8	Age of Diagnosis	Most diagnoses occur between 17–21 years, peak around 19.	Late adolescence is the most critical period for detection of PCOD.
9	Treatment	77.6% have taken treatment, 22.4% have not.	Most individuals seek treatment, but a gap still exists.
10	Family History	70.1% no family history, 25.4% unsure.	Genetic link appears low, but lack of awareness affects accuracy.
11	Menarche	Majority experienced menarche at 13–14 years.	Menarche age is within normal biological range.
12	Menstrual Cycle	72.7% irregular, 21.2% regular, 6.1% absent.	Menstrual irregularity is highly prevalent.
13	Irregular Period Age	Mostly begins between 16–19 years.	Teenage years are crucial for onset of menstrual disturbances.
14	Delay Duration	Most delays last 1–4 months; some extend beyond 1 year.	Short-term irregularity common, but long-term issues exist requiring medical attention.
15	Duration of Periods	Most (53.7%) have 3–5 days duration.	Menstrual duration is normal for majority.
16	Menstrual Problems	Painful periods (74.6%) highest, followed by missed periods and heavy bleeding.	Pain is the most dominant menstrual issue.
17	Diet	Mixed diet common; high junk food consumption observed.	Unhealthy dietary habits may contribute to PCOD.
18	Sleep	58.2% sleep 5–7 hours; few meet 7–9 hours recommendation.	Sleep deprivation is common and may worsen symptoms.
19	Symptoms	Hair loss and mood swings highest (71.6%), followed by obesity and acne.	Hormonal imbalance symptoms are highly prevalent.
20	Additional Symptoms	Stress (74.6%) and low energy (67.2%) most common.	Mental health and fatigue significantly impact individuals.
21	Cycle Length	44.8% normal, but many have shorter or longer cycles.	Considerable menstrual irregularity exists.
22	Diagnosis Duration	Many diagnosed after symptoms begin.	Delayed diagnosis is common.
23	Diagnosis Method	Combination of ultrasound and hormonal tests most used.	An integrated diagnostic approach is preferred.
24	Other Conditions	Majority report no additional diseases.	Comorbidity rate is low.
25	Current Treatment	52.2% undergoing treatment.	Nearly half remain untreated, indicating gap.
26	Treatment Type	Combination of lifestyle + medication most common.	Holistic approach is widely accepted.
27	Improvement	68.7% report improvement.	Treatment is effective for majority.
28	PCOD Type	Lean PCOD most common.	Indicates PCOD not limited to obesity.
29	Exercise Frequency	Daily and rare exercise both common.	Inconsistent exercise habits observed.
30	Physical Activity	Walking most common, followed by yoga.	Simple activities preferred over intense exercise.
31	Impact	Mental health (80%) most affected, then physical health.	PCOD significantly impacts psychological and physical wellbeing.

Discussion

These findings are consistent with earlier research which describes PCOD as a condition involving multiple symptoms rather than a single disorder. The presence of irregular menstruation, acne, weight gain, and hair loss among respondents supports the concept that PCOD is a combination of reproductive and metabolic disturbances. The concentration of cases in the 18–21 years age group aligns with previous studies that identify late adolescence and early adulthood as a critical period for the onset and diagnosis of PCOD, likely due to hormonal changes, academic stress, and lifestyle transitions. The normal height distribution observed in the present study is also in agreement with earlier findings, which indicate that height is not significantly associated with PCOD (Joshi & Dubey, 2025^[8]; Peña *et al.*, 2022)

The BMI findings support existing research showing that PCOD can occur across different body types. Although overweight and obesity are recognized risk factors, the presence of normal-weight individuals in this study indicates the occurrence of lean PCOD, highlighting that the

condition is not limited to obese individuals. The very high level of awareness observed in the present study appears higher than earlier reports, suggesting improved access to information through education and digital platforms among young populations. The high proportion of diagnosed individuals may be attributed to the selected sample, consisting of individuals already experiencing symptoms, and therefore should be interpreted as sample-specific (Guin & Bhatia, 2020)^[6].

Menstrual irregularity observed in the majority of respondents strongly supports previous research identifying it as a key feature of PCOD. The high prevalence of painful and missed periods further reflects underlying hormonal imbalance. The findings related to lifestyle factors, including unhealthy diet, inadequate sleep, and low physical activity, are consistent with studies that link these factors to hormonal imbalance and insulin resistance. These lifestyle-related factors may contribute to both the development and severity of PCOD symptoms (Rizvi *et al.*, 2023; Chandel *et al.*, 2024; Begum & Areen, 2023)^[2, 4, 16].

The symptoms reported in the present study, including hair loss, mood swings, weight gain, and acne, are consistent with earlier studies describing both physical and psychological manifestations of PCOD. The high levels of stress, anxiety, fatigue, and low energy observed among participants indicate that the condition has a significant psychological impact in addition to physical effects. The preference for combined treatment approaches involving both medication and lifestyle modification aligns with previous findings that emphasize the importance of holistic management. Similarly, the use of ultrasound and hormonal tests for diagnosis reflects standard clinical practices (Sadhana, 2025; Kapoor & Hasan, 2025) ^[9, 17].

Although insulin resistance was not directly measured in this study, the presence of symptoms such as weight gain, fatigue, and irregular menstruation suggests possible metabolic involvement. This supports the understanding that PCOD is not only a reproductive disorder but also associated with metabolic disturbances. Overall, the findings of the present study are consistent with existing literature and highlight the importance of early awareness, lifestyle modification, and comprehensive management in addressing PCOD/PCOS among young women.

Conclusion

Polycystic Ovarian Disease (PCOD) represents a complex and multifactorial endocrine disorder that significantly affects the reproductive, metabolic, and psychological health of women. The present study highlights that hormonal imbalance, particularly involving androgens and insulin resistance, plays a central role in the pathophysiology of PCOD. The findings emphasize that disruptions in ovarian function, coupled with metabolic irregularities, contribute to clinical manifestations such as irregular menstrual cycles, anovulation, and associated complications including infertility. Furthermore, the study underscores the importance of early diagnosis and comprehensive management strategies. Lifestyle modifications, including balanced nutrition, regular physical activity, and weight management, were found to be crucial in improving clinical outcomes. Pharmacological interventions targeting insulin resistance and hormonal regulation also demonstrated significant effectiveness when combined with lifestyle approaches. In conclusion, PCOD requires an integrated, multidisciplinary approach that combines medical treatment, lifestyle interventions, and psychosocial support. Future research should focus on identifying precise molecular mechanisms, improving diagnostic markers, and developing personalized therapeutic strategies to enhance the overall health and well-being of affected individuals.

References

1. Asdaq SMB, Yasmin F. Risk of psychological burden in polycystic ovary syndrome: A case-control study in Riyadh, Saudi Arabia. *Journal of Affective Disorders*,2020;274:205–209. <https://doi.org/10.1016/j.jad.2020.05.086>
2. Begum MS, Areen S. Optimizing polycystic ovarian disorder (PCOD) treatment with personalized lifestyle and nutrition strategies. *J Clin Med Res*,2023;2:1-8.
3. Binu S. Investigating the impact of lifestyle factors on pcod: a comprehensive analysis of bmi, diet, physical activity, stress, and family history. , 2024.
4. Chandel S, Das S, Ojha S, Pandey M. Hormonal imbalances and genetic factors in menstrual cycle

- irregularities. In *Women's Health: A Comprehensive Guide to Common Health Issues in Women*. Bentham Science Publishers, 2024, 101-128.
5. Ghosh S, Srivastav Y, Jain S, Pahari N, Singh S, Lakra J, et al. Polycystic ovary syndrome as a multi-system disorder: A comprehensive review of hormonal, metabolic, and inflammatory crosstalk at the cellular and molecular level. *Zenodo*, 2025. <https://doi.org/10.5281/zenodo.17047472>
6. Guin NB, Bhatia N. Prevalence and Factors Contributing to Obesity among College Girls. *International Journal of Nursing Education and Research*,2020;8(3):314-320.
7. Gupta P, Agrawal S, Agarwal A, Pandey A, Kumar N, Ali W. Comparison of endocrine and metabolic profile of obese and lean PCOS women with infertility. *International Journal of Infertility and Fetal Medicine*,2022;13(3):125–128. <https://doi.org/10.5005/jp-journals-10016-1290>
8. Joshi M, Dube S. Comprehensive study of Dietary and Lifestyle Factors contribute Polycystic Ovarian Disease (PCOD): A Survey Based Study, 2025.
9. Kapoor G, Hasan Z. PCOD: Effects of Mental, Cognitive, and Physical Health on Women with PCOD in age group between 18-30 years. *International Journal of Interdisciplinary Approaches in Psychology*,2025;3(5):542-555.
10. Kempegowda P, Melson E, Manolopoulos KN, Arlt W, O'Reilly MW. Implicating androgen excess in propagating metabolic disease in polycystic ovary syndrome. *Therapeutic advances in endocrinology and metabolism*,2020;11:2042018820934319.
11. Li Y, Chen C, Ma Y, Xiao J, Luo G, Li Y, et al. Multi-system reproductive metabolic disorder: Significance for the pathogenesis and therapy of polycystic ovary syndrome (PCOS). *Life Sciences*,2019;228:167–175. <https://doi.org/10.1016/j.lfs.2019.04.046>
12. Mehrabadi S, Sadatmahalleh SJ, Kazemnejad A, Moini A. Association of acne, hirsutism, androgen, anxiety, and depression on cognitive performance in polycystic ovary syndrome: A cross-sectional study. *International Journal of Reproductive BioMedicine*,2020;18(12):1049–1058. <https://doi.org/10.18502/ijrm.v18i12.8026>
13. Mitra RD, et al. A review on adolescent obesity and PCOD: Causes, symptoms and remedial measures. *Acta Scientific Nutritional Health*,2024;8(10):69–73.
14. Nivetha M, Suganya SG. Survey of poly cystic ovarian disease (PCOD) among the girl students of Bishop Heber College, Trichirapalli, Tamil Nadu, India. *IOSR Journal of Nursing and Health Science*,2016;5(4):44–52.
15. Peña AS, Codner E, Witchel S. Criteria for diagnosis of polycystic ovary syndrome during adolescence: literature review. *Diagnostics*,2022;12(8):1931.
16. Rizvi M, Islam MA, Aftab MT, Naqvi AA, Jahangir A, Ishaqui AA, et al. Knowledge, attitude, and perceptions about polycystic ovarian syndrome, and its determinants among Pakistani undergraduate students. *Plos one*,2023;18(5):e0285284.
17. Sadhana b. polycystic ovarian disease (pcod): a comprehensive review of pathophysiology, clinical manifestations, psychological impact, and therapeutic approaches. *i-Manager's Journal on Life Sciences (JLS)*, 2025, 4(1).

18. Sanchez-Garrido MA, Tena-Sempere M. Metabolic dysfunction in polycystic ovary syndrome: Pathogenic role of androgen excess and potential therapeutic strategies. *Molecular Metabolism*,2020;35:100937. <https://doi.org/10.1016/j.molmet.2020.01.001>
19. Sharma A, Thakur R, Aviral, Aryan. A review on treatment approaches for PCOD & PCOS. *Journal of Advance and Future Research*,2025;3(4):315–326.
20. Sharvi, Gupta S, Umang. Etiology of polycystic ovarian disease (PCOD): Systematic review. *International Journal of Toxicological and Pharmacological Research*,2025;15(1):82–87.
21. Shukla A, Rasquin LI, Anastasopoulou C. Polycystic ovarian syndrome. In StatPearls. StatPearls Publishing, 2025. <https://www.ncbi.nlm.nih.gov/books/NBK459251/>
22. Shukla A, Rasquin LI, Anastasopoulou C. Polycystic ovarian syndrome. In StatPearls. StatPearls Publishing, 2025. <https://www.ncbi.nlm.nih.gov/books/NBK459251/>
23. Stener-Victorin E, Teede H, Norman RJ, Legro R, Goodarzi MO, Dokras A, et al. Polycystic ovary syndrome. *Nature Reviews Disease Primers*,2024;10(1):27.
24. Suokhrie K, Julitta K, Pachuau L, Ramdinpuii CL. Polycystic ovarian disease (PCOD): A review. *International Journal of Research and Analytical Reviews*,2023;10(4):695–701. <https://ijrar.org/papers/IJRAR23D2816.pdf>
25. Zhao H, Zhang J, Cheng X, et al. Insulin resistance in polycystic ovary syndrome across various tissues: An updated review of pathogenesis, evaluation, and treatment. *Journal of Ovarian Research*,2023;16(1):9. <https://doi.org/10.1186/s13048-022-01091-0>