International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 5, May 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.5.2025.3

Original Research

Characteristics and impact of polycystic ovarian syndrome on the fertility of women attending outpatient department of Obstetrics and Gynecology

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Received date: 22 March 2025 Acceptance date: 10 April 2025 Published: 01 May, 2025

ABSTRACT

Aim: The present study aimed to assess thecharacteristics and impact of polycystic ovarian syndrome onthe fertility of women attending outpatient department of obstetrics and gynecology.

Materials and methods: The prospective cross-sectional investigation was conducted at the department of obstetrics and gynaecology. The selection criteria were followed to identify a total of 80 PCOS patients as the study population. All participants were administered a structured questionnaire. The questionnaire consisted of the following components: knowledge assessment, anthropometric assessment and clinical history. The menstrual history included irregularity and the presence of oligomenorrhea after two years of menarche, as well as an assessment of hirsutism/androgen production (specifically, skin problems and hair distribution). SPSS software is employed to conduct data analysis.

Results : The age group of 21-25 years comprised the majority of the patients (46.25%). The average age of the patients was approximately 23.94 years. The mean BMI of the patients was approximately 24.89 kg/m², with 38.7% of them being overweight. Ultrasonography detected PCOS in approximately all individuals. All patients underwent FLP. Hirsutism was observed in 68.7% of the 80 patients with PCOS who participated in our study. 13.7% of the patients exhibited androgenic features, including acne, 11.2% of the patients exhibited acanthosis nigricans, and 6.25% of the patients exhibited androgenic alopecia. The prevalence of metabolic syndrome in our study was 15.0%. Menstrual irregularity was the most prevalent complaint in this investigation. Spearman's correlation between a variety of clinical and laboratory parameters demonstrated a positive correlation between testosterone and body mass index (BMI).

Conclusion: Oligomenorrhea was the most prevalent manifestation. Women who are obese and have polycystic ovary syndrome (PCOS) experience more severe ovulatory dysfunction and require additional attention to ensure that they are appropriately managed. Early diagnosis is crucial for the implementation of lifestyle modifications that will prevent metabolic and reproductive complications.

Keywords: Body mass index, Hirsutism, Obese, Polycystic ovary syndrome

INTRODUCTION

Polycystic ovary syndrome (PCOS) is a hormonal disorder that is prevalent among women of reproductive age. Several studies have demonstrated that insulin resistance is present in lean women with PCOS, and that overweight PCOS subjects are more adversely affected than those with the same BMI who do not have PCOS.[1]The risk factors for type 2 diabetes mellitus, osteoarthritis, cardiovascular disease, sleep apnoea, breast and uterine cancer, and reproductive system disorders are all strongly correlated with the increasing average BMI and propensity to central adiposity.[2,3]

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Insulin resistance, impaired gonadotropin dynamics, and androgen excess are among the key features of PCOS, although the primary underlying defect remains unknown.[4] In women with secondary amenorrhoea, the prevalence of PCOS can be as high as 30%, 40% in women with infertility, 75% in women with oligomenorrhea, and 90% in women with hirsutism.[5] PCOS is a prevalent endocrine disorder that clinicians encounter in women of reproductive age, impacting 5% to 10% of the general population.[6]PCOS may initially manifest during adolescence; however, the prevalence of PCOS in this age group remains unknown due to the absence of established diagnostic criteria.[7]

The most prevalent cause of ovulatory infertility is polycystic ovary syndrome. Women should be advised of the significance of maintaining a healthy weight (BMI<30 kg/m2) and the optimal timing of family initiation, as increased BMI and age can also contribute to infertility. The fertility of women experiences a substantial decrease when their body mass index (BMI) exceeds 30 to 32 kg/m2.[8] It is recommended that an intensive lifestyle program be implemented to resolve weight loss without the use of any pharmacological treatment for the initial six months. A significant portion of the population, specifically women with polycystic ovary syndrome (PCOS), would likely benefit from consistent physical activity. Both directly and indirectly, exercise enhances insulin sensitivity by facilitating weight management and influencing muscle metabolism.[9]

The treatment of polycystic ovary syndrome (PCOS) must prioritise the normalisation of hyperandrogenism and anovulation. The prevention and treatment of impaired glucose tolerance (IGT) and type 2 diabetes mellitus are primarily concerned with the reduction of metabolic complications.Pharmacological intervention or, preferably, lifestyle modification can be employed to accomplish this. Total weight loss and the reduction of a significant quantity of abdominal fat are critical treatment strategies. The reduction in circulating insulin is the cause of the reproductive and metabolic benefits that accompany weight loss. The use of insulin-sensitizing medications, such as metformin and the thiazolidinedione, has shown promising metabolic and clinical results in the initial phase.[10]The consistent documentation of the beneficial effects of weight loss on the clinical and biochemical manifestations of PCOS is also noteworthy.

The present study was designed to assess the characteristics and impact of polycystic ovarian syndrome on the fertility of women attending outpatient department of obstetrics and gynecology.

MATERIALS AND METHODS

After obtaining clearance from ethical committee, this prospective cross-sectional study was conducted at department of obstetrics and gynecology.The selection criteria were followed to identify a total of 80 PCOS patients as the study population. Prior to enrolment in the investigation, each participant provided written informed consent. The history, clinical examination, and investigation were conducted on all study participants.

PCOS was defined by Rotterdam's criteria having presence of any two of the three features:

- Oligo/amenorrhea: Absence of menstruation for 45days or more and/or less than 8 menses per year.
- Clinical hyperandrogenism: Modified Ferriman andGallway (mFG) score of 8 or higher.
- Polycystic ovaries: Presence of more than 10 cysts,2-8 mm in diameter, usually combined withincreased
- ovarian volume of more than 10 cm3, andan echo-dense stroma in pelvic ultrasound scan

Inclusion criteria

The gynaecology outpatient department (OPD) was visited by women who were diagnosed with PCOS in the reproductive age (15-35) group.

Exclusion criteria

Normal females without PCOS.
Pregnant.
Age >35 or <15 years.
Patients with symptomaticdiseases (liver, kidney, heart or other symptomaticdiseases).

Methodology

All participants were administered a structured questionnaire. The questionnaire consisted of the following components: knowledge assessment, anthropometric assessment, and clinical history. The menstrual history included irregularity and the presence of oligomenorrhea after two years of menarche, as well as an assessment of hirsutism/androgen production (specifically, skin problems and hair distribution).

Evidence of ovulatory dysfunction was demonstrated by menstrual intervals that were persistently less than 21 days or more than 45 days 2 or more years after menarche, as well as consecutive menstrual intervals of more than 90 days, 2 years after menstrual onset. Evidence of androgen excess was demonstrated by persistent acne that was unresponsive to topical therapy, moderate to severe hirsutism, and persistent elevations in serum total and/or free testosterone.

The following hormonal estimation was conducted by collecting blood samples between 08:00 and 10:00 h after an overnight fast:

Prolactin to rule out hyperprolactinemia
TSH to rule out hypothyroidism
17-hydroxyprogesterone to rule out 21-hydroxylasedeficiency (CAH)
LH, FSH, 17-OHP, DHEA-sulfate, Androstenedione.

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RESULTS 80 patients were recruited for the study.

Table 1: demographic profile of study population

		N (80)	Percentage(%)
Age group	15-20	20	25
	21-25	37	46.25
	26-30	9	11.25
	31-35	14	17.5
Religion	Hindu	65	81.2
	Muslim	11	13.7
	Christian	4	5.0
Education	Degree	25	31.2
	High school	41	51.2
	Primary school	14	17.5
Socio economic status	Lower	11	13.7
	Middle	60	75.0
	Upper	9	11.2
BMI (kg/m^2)	<18.5 (underweight)	11	13.7
	18.5-24.9 (normal)	25	31.2
	25-29.9 (overweight)	31	38.7
	30-34.9 (obese)	13	16.2

PCOS patients' demographic profiles are illustrated in Table 1. The age group of 21-25 years comprised the majority of the patients (46.25%). The average age of the patients is approximately 23.94 years. The mean BMI of the patients was approximately 24.89 kg/m^2, with 38.7% of them being overweight and 81.2% of them being Hindu by religion.

Table 2: clinical profile of study populations

		N (80)	Percentage (%)
Sign of hyperandrogenism	Hirsutism	55	68.7
	Acne	11	13.7
	Acanthosis nigricans	9	11.2
	Androgenic alopecia	5	6.25
Waist circumference (WC) (cm)	≤88	65	81.2
	≥88	15	18.7
Manifestations of ovarian dysfunction	Oligomenorrhea	44	55.0
	Secondary amenorrhea	6	7.5
	Ultrasound polycystic ovaries	70	87.5
Associated conditions blood pressure (mmHg)	<120/80	71	88.7
	≥120/80	9	11.2
Dyslipidemia (mg/dl)	Total cholesterol ≥ 200	16	20.0
	HDL <50	10	12.5
	TG >150	10	12.5
	Metabolic syndrome	12	15.0
	Diabetes mellitus	7	8.75
	Impaired blood sugars	25	31.2

The clinical profile of 80 patients with polycystic ovary syndrome is illustrated in Table 2. Ultrasonography detected PCOS in approximately all individuals. All patients underwent FLP. Hirsutism was observed in 68.7% of the 80 patients with PCOS who participated in our study. 13.7% of the patients exhibited androgenic features, including acne, 11.2% of the patients exhibited acanthosis nigricans, and 6.25% of the patients exhibited androgenic alopecia.

Table 3: Marital and infertility status of study population

		N (80)	Percentage (%)
Marital history	Married	70	87.5
	Unmarried	10	12.5
Fertility status	Parous	15	21.4

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	Nulliparous	55	78.5
Type of infertility	Primary	45	81.8
	secondary	10	18.1
Duration of infertility (year)	0-4	16	20.0
	5-8	21	26.2
	9-12	8	10.0

The marital and parity status of patients is illustrated in Table 3. In our investigation of 80 patients with polycystic ovary syndrome (PCOS), 87.5% were married and 12.5% were unmarried. About 21.4% of married women were parous, while 78.5% were nulliparous. Approximately 81.8% of patients presented with primary infertility, while 18.1% presented with secondary infertility. The average duration of infertility was 5.61 years.

DISCUSSION

In our study, the prevalence of PCOS was 6.11% among gynaecological out-patient consultations. The prevalence of PCOS among adolescents is 9.13% in various regions of India, including Andhra Pradesh.[11]In a study conducted by Metropolis Healthcare Ltd. on 27,411 samples, 17.6% (4,825) were identified as having PCOS. The prevalence of PCOS is 18.62% in North India, 25.88% in East India, 19.88% in West India, and 18% in South India, according to the regional distribution. Consequently, PCOS impacts one in five Indian women.[12]

The mean age of the patients in our study was 23.94 years, with the majority of patients falling within the 21-25 age group (46.2%). Women between the ages of 18 and 25 in North India were found to have a frequency of PCOS of 3.7% in a recent assessment.[13]Muralidhara KD et al [14] conducted a study in which the mean age of PCOS patients was 27±7.1. The discrepancy between the data of this study and the prevalence of PCOS in previous studies may be due to the recruitment process of the research subjects, the small sample size, the age difference, and/or the ethnic background.

Oligomenorrhea is the most prevalent presentation in our investigation. We discovered that 55% of the participants had oligomenorrhea, 37% had regular cycles, and 7.5% had secondary amenorrhoea. Oligomenorrhea was prevalent in hirsute women, affecting approximately 37.1% of infertility patients. Although a higher proportion of overweight and obese patients experienced oligomenorrhea in our study, the disparity between obese and nonobese patients was not statistically significant. In a research conducted by Ramanand SJ et al[15], oligomenorrhea was identified in 65% of patients.

Hirsutism was observed in 68.7% of the 80 patients with PCOS who participated in our study. 13.7% of the patients exhibited androgenic features, including acne, 11.2% of the patients exhibited acanthosis nigricans, and 6.25% of the patients exhibited androgenic alopecia. The waist circumference was greater than 88 cm in 18.7% of the patients, indicating that Indians have a higher prevalence of central obesity, even at low BMI. The blood pressure recording indicated that 11.2% of the participants had a blood pressure of 120/80 mm Hg or higher. Approximately 31.2% of individuals were diagnosed with impaired glucose, while 8.75% were diagnosed with diabetes. Type 2 diabetes was diagnosed in 7.5% of women with PCOS, according to an additional study.[15]

In 20% of the patients, the total cholesterol level was ≥200 mg/dl, while 12.5% of the patients had HDL levels below 50 mg/dl and 12.5% had TG levels above 150 mg/dl. Elevated LH: FSH levels (>2) are considered diagnostic for PCOS by a significant number of researchers. During the second day of the study, the hormonal profile revealed that 27% of the patients had elevated LH, 37% of the patients had an elevated LH:FSH ratio (>2), and 15% of the patients had elevated prolactin. Elevated LH and elevated LH: FSH were significant in the irregular menstrual group.

We discovered that there is a positive correlation between testosterone and BMI, as well as a positive correlation between testosterone and WHR. Each patient was assessed for lipid abnormalities and altered carbohydrates. Muralidhara KD et al[14] conducted a study on 86 PCOS patients, and they discovered that 33% of them had FBS levels exceeding 100 mg%, while 17% reported impaired glucose tolerance. The development of the metabolic syndrome and polycystic ovary syndrome (PCOS) in rotund women may be influenced by the presence of excess insulin and androgens.

In our investigation, metabolic syndrome was prevalent at 15%. Ramanand SJ et al[15] conducted a study that demonstrated that all PCOS subgroups were significantly more associated with metabolic syndrome than the control group ($p<0.05$). The android pattern of fat distribution may be both the cause and the consequence of hyperandrogenism, establishing a vicious cycle of hyperinsulinism, hyperandrogenism, central adiposity, and metabolic abnormalities.

CONCLUSION

Oligomenorrhea was the most prevalent manifestation. Women who are obese and have polycystic ovary syndrome (PCOS) experience more severe ovulatory dysfunction and require additional attention to ensure that they are appropriately managed. Early diagnosis is crucial for the implementation of lifestyle modifications that will prevent metabolic and reproductive complications.

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Dietary modifications, lifestyle modifications, and psychological counselling are crucial for females to prevent long-term complications by reducing weight.

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