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PCOS: CLINICAL PICTURE OF PCOS PATIENTS IN A PERI URBAN TERTIARY CARE HOSPITAL OF CENTRAL INDIA

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Abstract
Polycystic ovary syndrome (PCOS) is one of the commonest hormonal disorder among women of reproductive age group. Given the importance of PCOS on reproductive health as well as increased risk of other comorbid conditions, the present study was carried out to investigate the clinical profile of women with PCOS in a tertiary care hospital and medical college in peri urban area of central India. **Methodology:** The current retrospective cohort study describes the clinical presentation of 130 women with PCOS attending the gynaecological Outdoor Patient Department of the institute in 6 months span i.e. October 2019- March 2020, diagnosed using Rotterdam's criteria. **Results**: PCOS is disease of early reproductive age group, with >70% women belonging to 21-30 Years (mean age 24.2 Years). The clinical features were menstrual irregularities (92.3%), signs of hyperandrogenism (64%) and weight gain of >10% in last 6 months (38%). 96.2% patients had USG finding suggestive of PCOS. Normoandrogenic PCOS was the commonest phenotype of PCOS (49.2%), followed by classical PCOS (42.3%). **Conclusion:** Because of diverse clinical presentation, women with PCOS may present in gynaecology, dermatology, or endocrinology OPD. The sequalae of PCOS reaches beyond reproductive health, with an increased risk of cardiovascular disease and type 2 DM, awareness regarding PCOS is important for early diagnosis and to prevent its sequalae.

Keywords--PCOS, Clinical Profile, India

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INTRODUCTION

Polycystic ovary syndrome (PCOS) is one of the most common hormonal disorders among women of reproductive age.It is a multifaceted disease with a spectrum of manifestations affecting not only women of childbearing age, but also adolescents and postmenopausal women(1). The exact prevalence of PCOS is not known as the syndrome is not defined precisely.Prevalence of PCOS is highly variable ranging from 5% to 22% globally(2–4).Studies done in South India and Maharashtra, prevalence of PCOS (by Rotterdam's criteria) were reported as 6% and 22.5%(5–8).

PCOS was first reported by Stein and Leventhal in 1935, described as symptoms complex with amenorrhea, hirsutism, and enlarged ovaries with multiple cysts(9).Clinicians now have these three sets of criteria (Table l) to choose from, though the Rotterdam criteria8 are found to be more preferred. The National Institutes of Health (NIH) Evidence-based Methodology Workshop in 2012 published the final report13 which stated that the following specific phenotypes (Table 2) should be reported explicitly in all research studies.

Table 1. Diagnostic criteria for polycystic ovarian syndrome (PCOS)

National Institutes of Health (NIH) 1990(10)	Rotterdam 2003(11)	AE-PCOS Society 2006(12)	NIH 2012/International PCOS Guidelines 2018(13)
Hyperandrogenism Chronic Anovulation	Hyperandrogenism Oligo-and/or anovulation Polycystic ovaries	Hyperandrogenism Ovarian dysfunction	Hyperandrogenism Oligo-and/or anovulation Polycystic ovaries
—Both criteria needed	—2 of 3 criteria needed	—Both criteria needed	—2 of 3 criteria needed

Rotterdam's criteria for diagnosis of PCOS is one of the commonly used criteria. For diagnosis two of the following three criteria shall be met (14).

- Oligo-ovulation or anovulation
- Clinical ground and/or biochemical signs of hyperandrogenisim (with the exclusion of other causes of androgen excess like cushings syndrome, confenital hyperplasis, thyroid abnormalities, androgen-sreening tumour and hyper prolactinemia);
- Polycystic ovaries (PCO) detected on ultrasound i.e. presence of 12 or more follicles in each ovary (with one ovary sufficient for diagnosis) ,easuring 2-9 mm in diameter or increase ovarian volume >10 ml.

Table 2. Phenotypes of polycystic ovary syndrome as per the Rotterdam criteria(14)

Frank or classic polycystic	All the three - chronic anovulation, polycystic ovaries and hyperandrogenism
Classic non-cystic	Anovulation, hyperandrogenism with normal ovaries
Non-classic ovulatory	Regular menses, polycystic ovaries and hyperandrogenism
Non-classic mild or normo-androgenic	Anovulation, polycystic ovaries with normal androgens

Polycystic ovary syndrome causes irregular menstrual cycles, excessive body or facial hair and polycystic ovaries as its main symptoms. Polycystic means "many cysts," and PCOS often causes clusters of small, pearl-sized cysts in the ovaries. The cysts are fluid-filled and contain immature eggs. Women with PCOS produce slightly higher amounts of male hormones known as androgens, which contribute to some of the symptoms of the condition.

Early diagnosis of PCOS is important as it has been linked to an increased risk for developing several medical conditions including insulin resistance, type 2 diabetes, high cholesterol, high blood pressure and heart disease. PCOS is an emerging health problem during adolescence therefore promotion of healthy lifestyles and early interventions are required to prevent future morbidities.

Given the importance of PCOS on reproductive health as well as increased risk of other comorbid conditions, the present study was carried out to investigate the clinical profile of women with PCOS in a tertiary care hospital and medical college in peri urban area of central India.

MATERIAL & METHODOLOGY

The current retrospective cohort study describes the clinicalpresentation of 130 women with PCOS attending the gynaecological Outdoor Patient Department of the institute in 6 months span i.e. October 2019- March 2020, diagnosed using Rotterdam's criteria.

Inclusion criteria: Women (married or unmarried) in reproductive age group i.e. 15-49 Years 0f age were included.
Exclusion criteria:

- Pregnant women
- Women with other causes of menstrual irregularities i.e. hypothyroidism and hyper prolactinemia.
- Women with other causes of hyperandrogenisim i.e. congenital adrenal hyperplasia, androgen secreting tumours, cushing syndrome etc.
- Women on medications i.e. corticosteroids, oral contraceptives etc.

Informed consent was obtained from each patient and ethical committee clearance was taken. Detailed history, clinical and anthropological examination was done. For every patient, detailed menstrual history regarding age of menarche, menstrual cycle was noted. Each patient was questioned about H/O diabetes / hypertension / drug intake. Family history like similar complaint in mother/ siblings, and the family H/O diabetes and hypertension was also taken.

All patients were healthy with a spontaneous onset of puberty and normal sexual development. None of them received medication known to affect carbohydrate metabolism and plasma sex steroids for at least 3 months before the study. Weight was measured using the same conventional digital scale with a precision of 100 g, and height was measured with the same standard measuring tape. For case presentation in the outpatient department, the SNAPPS technique was used, as it has distinct advantage for conventional case presentation(15).

Amenorrhea was defined as absence of cycles in the past 6 months and Oligomenorrhea as menses >35 days. Infertility was assessed only in married patients and was defined as failure of spontaneous pregnancy after one year of active married life.

All patients were subjected to ultrasonography for polycystic ovarian morphology and ovarian volume. As Trans Vaginal Sonography (TVS) is more sensitive, all the women were subjected to TVS except unmarried women, where Trans Abdominal Sonography was done(16). The following parameters were evaluated echo graphically: 1. Presence, number and disposition of follicles in each ovary, 2. Ovarian volume, and 3. Endometrial thickness.

BMI: Obesity and overweight were defined according to WHO criteria modified for Indian Population.(17) Underweight <18.5, Normal/ Lean 18.6-22.9, Overweight 23-24.9 and Obese >25.

Importance was given to search for Hirsutus /Acanthuses Nigerians / Acne. Hirsutus was used as a parameter for clinical hyperandrogenism.Hirsutus was graded as per Ferriman-Gallway scoring system(18). Clinical hyperandrogenism was diagnosed if the FG score was 8 or greater or the patient had moderate to severe acne, defined by the presence of inflammatory lesions and their extension.

The data was extracted from the case record forms and was entered in the excel sheet. The frequency tables were made with the help of Microsoft excel.

RESULTS & DISCUSSION

During the study period of 6 months, 130 patients were diagnosed based on Rotterdam's criteria.

1. Age Distribution

When age distribution of PCOS patients was analysed, maximum number of patients were in the age group 21-25 years (43.8%), followed by 27.7% in 26-30 years age group. Only 15.1% patients were above 30 years of age (Table 3). The age of the patients was in 16-37 years range with mean age of 24.2 Years. The minimum age of onset of menarche was 9 years and maximum as 15 years. Average of menarche was 12.5 Years.

In the study by Alakananda et al the mean age was 23.5 Years and mean age of menarche was 11.95 years(19). In the study by Ramanand et al mean age was 22.05 years and the mean age of menarche was 13.7 years (20). Other studies from India have reported mean age of PCOS patients ranging from 21.6 years to 25.8 years (21,22). In a study by Joshi et al mean age was found to be 24 years in PCOS patients from Nepal (23).

Table 3. Demographic & clinical presentation PCOS patients

Variable		Frequency (n=130)	Percentage (%)
			130
Age distribution	<20 Years	16	12.3
	21-25	57	43.8
	26-30	36	27.7
	31-35	16	12.3
	>35	5	3.8
Marriage	Married	80	61.5
	Unmarried	50	38.5
BMI (kg/mt^2)	<18.5	10	7.7
	18.5-22.9	24	18.5
	23-24.9	32	24.6
	>25	64	49.2
Menstrual Complains	Oligomenorrhea	109	83.8
	Amenorrhoea	10	7.7
	Menorrhagia	8	6.2
	Regular cycle	10	7.7
Dermatological features of PCOS	Acne	82	63.1
	Hirsutism	56	43.1
	Acanthosis Nigricans	34	26.2

Mean age in our study as well other studies are comparable, indicating that PCOS is a disease of the young age. PCOS is believed to be result from maladaptation of the adreache, during pubertal development.

2. Menstrual complains

In the current study, the most common menstrual complain in PCOS is oligomenorrhoea occurring in 109 of 130 patients (83.8%). 10 (7.7%) patients did not presented any menstrual complain. Sharma S et al, 89% PCOS patients complained of oligomenorrhoea (21). According to Sangabathula et al, oligomenorrhea was presenting complaint in 87% PCOS patients, while 6% had regular cycle (22). In a study by Joshi et al menstrual irregularities was observed in 83% PCOS women, while the remaining patients had normal menses (23). Oligomenorrhea was reported in 91% PCOS women by Alakanada et al and in 65% by Ramanand et al (19,20).

Oligomenorrhoea was found to be the most common menstrual irregularity as well as most common chief complain of patients with PCOS in our and most other studies. Anovulation is the pathognomic feature of PCOS and results in irregular menstrual cycles. Therefore, persistent menstrual irregularities (resulting from anovulation) seem to be highly predictive surrogate marker of PCOS.

3. Obstetrical Profile

Out 130 cases of PCOS included in the present study 80 were married. Of this 80, 56 (70%) presented with infertility. In the study Sangabathula et al reported infertility in 59.5% of PCOS married women (22). A high infertility rate was reported by byAlakananda et al 86% of married PCOS patients (19), which may be due very small sample size. Joshi et al (23) and Ramanad et al (20) reported infertility in 45% & 43% respectively in married PCOS patients.

Among the married PCOS patient's infertility is one of the main presenting complain, which might be primary as well as secondary infertility. The prevalence of infertility might be even more as many times, patients have already completed their family and are trying to conceive.

4. Family history

In the current study, history of menstrual irregularities was present in 36% PCOS patient, while history of Diabetes Mellitus and Hypertension was present in 30% & 27.7% respectively. Positive family history of PCOS is seldom elicited as 2-3 decades back PCOS was seldom documented. In the study by Alakananda et al, 50% PCOS patients gave family history of PCOS in either mother or siblings. DM and hypertension were present in 37% and 20% respectively(19). Sangabathula et al reported positive family history of menstrual irregularities, DM and Hypertension in 16%, 16% & 8% respectively(22).

5. Dermatological features of PCOS

Acne was the commonest dermatological feature of PCOS patients, with a prevalence of 63%. Other features of hyperandrogenism present were Hirsutus (43%) and Acanthosis nigricans (26%). In the study of PCOS patients by Sangabathula et al the most common manifestation of hyperandrogenism was Hirsutus in 52% patients, followed by acanthosis nigricans (16%) and acne (12%)(22). Alakanada et al reported results similar to the current study, with acne being the commonest feature (73%), followed by Hirsutus (68%) and acanthosis nigricans (32%)(19).

Manifestations of Hyperandrogenism were reported in more than 2/3rdPCOS patients and is one of the diagnostic criteria for PCOS. PCOS women may present with male pattern hair growth. Hirsutism is a common disorder resulting from androgen activity specified in women. The cause of hirsutism in most women is

PCOS. While presence of acanthosis nigricans appears to be a sign of insulin resistance.

6. Obesity in PCOS

In the study maximum patients 49.2% belonged to obsess group according to their BMI and minimum 7.7 were underweight (BMI <18.5 kg/mt^2). 43.1% of PCOS patients had either normal or overweight (18.5 to 24.9 kg/mt^2). The average BMI came out to be 28.7. 78% of obese women in the study gave a history of >10% weight gain in the last 6 months.

Various studies have shown prevalence of obesity among PCOS ranging from 42% to 62.5%. Sangabathula et al reported mean BMI as 34.3. While Joshi et al & Alakananda et al reported BMI as 27.4 & 25.5 respectively (19–22).

Asian Indians have higher percentage body fat, abdominal adiposity at lower or similar BMI levels as compared to white Caucasians. Asian Indians are more predisposed to develop insulin resistance and cardiovascular risk factors at lower levels of BMI as compared to other ethnic groups. PCOS and its relationship with obesity is well established and can be supported well by the findings in our as well as other studies. Though in different studies the cut off BMI used to define obesity were different majority of PCOS women fell into overweight category with few in lean category. Central obesity was seen in most of the cases.

7. Component of PCOS

Out of the three components in Rotterdam criteria for PCOS, the most found in the present study was features of PCOS on USG in 125 of 130 (96.2%), followed by features of chronic anovulation in 120 (92.3%) patients. Features of hyperandrogenism was seen in 63.8% PCOS patients.

Table 4. Presence of Rotterdam Criteria in PCOS women in %

Rotterdam criteria of PCOS	Present Study (n=130)	Sangabathula et al (22) (n=100)	Sharma et al (21) (n=82)	Alakananda et al (19) (n=66)
Chronic anovulation	92.3	94	89	92
Hyperandrogenism	63.8	52	39	71
USG s/o PCO	96.2	96	84	89

Table 5. Phenotypes of PCOS in %

Phenotype of PCOS	Present study	Sharma et al (21)	Moghetti et al (24)	Alakananda et al(19)	Kar et al (25)
Oligomenorrhoea with polycystic ovaries (P+O)	49.2	61	48	21	22.2
Oligomenorrhoea with hirsutus (H +O)	3.8	16	4	5.3	11.2
Hirsutus with polycystic ovaries (H +P)	4.6	11	6	15.3	1.0
Classical triad (H+P+O)	42.3	12	42	69.4	65.6

On USG, commonest finding was presence of Polycystic Ovaries in nearly half of the patients (47.7%), followed by presence of both Polycystic ovaries and increased ovarian volume in 29.2% patients. Increased ovarian volume consistent with PCOS diagnostic criteria was seen in 19.2% patients.

Most of the studies conducted among PCOS women have shown USG suggestive of PCO and oligomenorrhoea as the commonest 2 Rotterdam diagnostic criteria present as given in table 2. Thus, in these studies according to the combination of these features, classical triad having all three features and normoandrogenic type are the 2 most common phenotype of PCOS. However, there percentage varied from 12-69.4% for classical triad and 21-61% for normoandrogenic type PCOS. In majority of the studies, Ovulatory type of PCOS (H+P) was least common(19,21,24,25).

8. Limitation of the study

- As the study has been carried out in the obstetrics & gynecology OPD, the patients presenting with menstrual irregularities may be higher than any other complaints and compared to other department OPDs i.e. dermatology and endocrine OPD.
- As the study duration was short, long term health implications of the PCOS have not been studied.

CONCLUSION

PCOS is the commonest endocrinopathy with varying clinical manifestation, most commonly affecting the young women reproductive age group. The commonest presenting complaints in the current study was oligomenorrhea and commonest phenotype was normoandrogenic, followed closely by classical triad. Though, obesity is common in PCOS, non-obese women are also at risk of PCOS. History of recent weight gain (>10% in 6 months) was one of the common finding among obese PCOS women. Because of diversity of in clinical presentation, PCOS women may present to a gynecologist, endocrinologist or a dermatologist. The sequalae of PCOS reaches beyond reproductive health, with an increased risk of cardiovascular disease and type 2 DM, awareness regarding PCOS is important for early diagnosis and to prevent its sequalae. In rural areas, Anganwadi workers are also involved in adolescent health care along with child health and AWWs may be sensitized about menstrual problems among women, specially PCOS(26).

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