

Assessment of determinants of polycystic ovarian syndrome in women in reproductive age group attending tertiary healthcare facility in southern Maharashtra

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Abstract

Introduction: Pathophysiology of PCOS reveals excessive ovarian and/or adrenal androgen secretion results in hyperandrogenism and is associated clinical manifestations ranging from hirsutism, acne, male-pattern baldness to irregular menses, infertility. This study aims at assessing the prevalence and clinical presentations of PCOS among women of the reproductive age group attending the OPD of a tertiary care centre.

Materials and Methods: The study was carried women of reproductive age group (15-45yrs) attending Obstetrics and Gynaecology OPD of a tertiary care hospital presenting with relevant symptoms from July 2015 to July 2017.

Results: In the present study, the average age of participant was 22.47 + 3.44 years, we also found that menstrual abnormalities were observed among all the study participants followed by skin discolouration (32.4%). Average BMI in kg/m² was 22.22 + 2.22.

Conclusions: PCOS in a common disorder among young women. Menstrual problems are the commonest reason for gynecological OPD consultation among adolescent girls. Evaluation of bleeding problems in adolescents is justified, before considering them as normal physiological transition.

Keywords: Polycystic ovarian syndrome (PCOS), Menstrual abnormalities, Hyperandrogenism in women, Reproductive age women, Infertility.

Introduction

The spectrum of polycystic ovary syndrome (PCOS) is characterized by hyperandrogenism, ovulatory dysfunction and polycystic ovaries (PCO). Pathophysiology reveals excessive ovarian and/or adrenal androgen secretion results in hyperandrogenism and is associated clinical manifestations such as hirsutism, acne and male-pattern baldness. Ovulatory dysfunction may include chronic anovulation and is associated with menstrual disturbances and infertility.¹ PCO is characterized by an increased number of small antral follicles with arrested development and a hypertrophied theca cell layer.² In addition to hirsutism, irregular menses, and infertility, women with PCOS display a number of metabolic abnormalities including hyperinsulinemia, insulin resistance, dyslipidemia, and obesity.³ All these features are components of the metabolic syndrome, and women with PCOS are therefore at risk of developing type 2 diabetes (T2DM) which, in turn, puts them at increased risk of developing cardiovascular disease (CVD).³

This study aims at assessing the prevalence of women of the 15-30yrs age group attending the OPD of a tertiary care centre, suffering from PCOS & studying the various clinical aspects of this syndrome in them to determine the gravity of the problem.

Materials and Methods

The study was carried women of reproductive age group (15-45yrs) attending Obstetrics and Gynaecology OPD of a tertiary care hospital presenting with relevant symptoms from July 2015 to July 2017. According to some previous studies done in this direction the prevalence of 10% was considered for calculating the sample size for the study. The sample size was calculated at 95% confidence level and with relative precision of 20%. It was then adjusted for finite population and a 10% non response rate was accounted. The sample size calculated for this study was 480 patients. In all 500 patients were studied over the study period of 2 years. Women in the reproductive age group (15-45yrs) who have consented and women who had attained menarche at least more than 2 years before the study women who have come to seek treatment from Obstetrics and Gynaecology OPD of Krishna hospital for menstrual complaints (irregular menses/oligomenorrhea) signs or symptoms of hyperandrogenemia or ∴ abdominal USG showing at least 12 follicles (2-9 mm in diameter) arranged peripherally around a dense core of ovarian stroma or scattered throughout an increased amount of stroma in at least 1 ovary and diagnosed as PCOS according to rotterdam 2003 criteria were included in the study.⁴

Women not in the reproductive age group women within 2 years of attaining menarche women who are pregnant women having any major systemic illness,

congenital adrenal hyperplasia, hyperprolactinemia, acromegaly, functional hypothalamic amenorrhea, and patients receiving drugs for any other systemic illness (except hypothyroidism) were excluded from the study.

Operational Definitions: The definition of PCOS, in 1990, when it was first described by National Institute of Health (NIH) included hyperandrogenism and ovulatory dysfunction but did not include polycystic ovarian morphology on ultrasonography as a necessary criterion for diagnosis. Much later, in the year 2004, the rotterdam criterion was formulated by the PCOS consensus workshop group, (Rotterdam ESHRE/ASRM-sponsored PCOS consensus workshop group) according to which PCOS was defined as presence of any two of the three features: oligo/amenorrhea, clinical and/or biochemical hyperandrogenism, and polycystic ovaries.⁴

Oligo/amenorrhea: absence of menstruation for 45 days or more and/or ≤ 8 menses per year.

Clinical Hyperandrogenism: Modified ferriman and gallway (mFG) score of 6 or higher. Using mF-G, some researchers reported a value as low as 3, which was abnormal. However, other investigators have used the 95th percentile of controls as the upper normal limit, which corresponds to an mF-G score of 6–8 in the population studied. We used an mF-G score of 6 as the upper normal limit in accordance with a study in South Asia by Chen et al⁵ because there are no studies defining the criteria for Hirsutism in Indian girls.

Biochemical Hyperandrogenism: Serum testosterone level of >76 ng/dl in the absence of other causes of hyperandrogenism.

Polycystic Ovaries: Presence of >10 cysts, 2–8 mm in diameter, usually combined with increased ovarian volume of >10 cm, and an echo-dense stroma in pelvic ultrasound scan.

The data was collected using standard case record proforma and entered in MS Excel spread sheet and was analysed using STATA-MP version 13. Data is summarized using descriptive statistics in present study. Continuous data is presented in form of Mean \pm SD whereas categorical data is presented in form of frequency and percentage. Analysis of variance (ANOVA) has been used to check difference in mean values between more than two groups. Post Hoc test is applied for multiple comparisons. Throughout the result significance level is set at 5%.

Observations and Results

The present study was conducted among women in reproductive age group attending outpatient department under department of obstetrics and gynecology, at a tertiary healthcare center in southern Maharashtra. From the present study, we observed that average age in years was $22.47 + 3.44$ and in a range of 16 to 32 years. Majority of study participants belonged to age group

21-25 years (60%), followed by participants of age less than 20 years (Table 1). Average age at menarche in years was $13.52 + 1.28$ and in a range of 11 to 17 years. We also found that in majority of cases (82.5%), age at menarche was less than 15 years. Majority of study participants were unmarried (86%), and were having no relevant family history in context of thyroid disorders (91.4%). From the present study we observed that marital status and relevant family history was found to have significant association with occurrence of PCOS (Table 1). Upon eliciting their lifestyle pattern, we reported that majority of study participants were having sedentary lifestyle (75%), no habit of regular exercising (95.4%), and had mixed pattern of diet (61%). Though the findings were not found statistically significant (Table 1).

We recorded various modes of presentations of PCOS among our study participants, found that menstrual abnormalities were observed among all the study participants followed by skin discolouration (32.4%), weight gain (21%), acne (13.4%), excessive hair loss (13.2%), infertility (5%). 21% study participants had a known history of thyroid disorders. Presence of skin discolouration, hirsutism and infertility among cases of PCOS was found to be statistically significant (Table 2). We also recorded anthropometric measurements of our study participants. Average height in cm was $152.2 + 4.51$ and in a range of 142 to 161 cm whereas Average Weight in kg was $55.87 + 8.31$ and in a range of 32 to 72 kg. We calculated their BMI using above values. Average BMI in kg/m² was $22.22 + 2.22$ and in a range of 17.4 to 27.8 kg/m². Average WHR was $0.8 + 0.04$ and in a range of 0.66 to 0.87. Presence of BMI above 25 and occurrence of PCOS was found to be statistically significant in our study (Table 3). In present study majority 41.17% had phenotype 4, followed by 36.47% had phenotype 1, followed by 15.29% had type 2 and 7.05% had type 3 (Table 4). This study found total 85 cases of clinically diagnosed PCOS, while only in 73 cases we found polycystic pattern in ovaries when confirmed using ultrasonography. The mean modified Ferriman-Galeway score was $6.32+3.33$ in a range of 2 to 30. Majority 94.85 had score <8 and only 5.2% had >8 (Table 5).

Table 1: Distribution of study participants according to their demographic characteristics and lifestyle patterns

S. No.	Variable	Frequency	P-value (if any)
1.	Age group	<20	130 (26%)
		21-25	302 (60.4%)
		>25	68 (13.6%)
2.	Age at menarche	<15	411 (82.2%)
		>15	89 (17.8%)
3.	Marital status	Married	69 (13.8%)
		Unmarried	431 (86.2%)
4.	Relevant family history	Yes	43 (8.6%)
		No	457 (91.4%)
5.	Lifestyle pattern	Sedentary	375 (75%)
		Non-sedentary	125 (25%)
6.	Regular exercise	Yes	23 (4.6%)
		No	477 (95.4%)
7.	Diet pattern	Mixed	305 (61%)
		Vegetarian	195 (39%)

Table 2: Distribution of study participants according to their clinical features at presentation

S. No.	Variables	Frequency	P-value (if any)
1.	Menstrual abnormalities	Yes	500 (100%)
		No	0
2.	Hirsutism	Yes	29 (5.8%)
		No	471 (94.2%)
3.	Acne	Yes	67 (13.4%)
		No	433 (86.6%)
4.	Infertility	Yes	25 (5%)
		No	44 (8.8%)
		Not applicable	431 (86.2%)
5.	Excessive hair loss	Yes	66 (13.2%)
		No	434 (86.8%)
6.	Weight gain	Yes	106 (21.1%)
		No	394 (78.8%)
7.	Skin discolouration	Yes	163 (32.6%)
		No	337 (67.4%)
8.	Known history of Thyroid disorders	Yes	105 (21%)
		No	395 (79%)

Table 3: Distribution of cases according to their anthropometric findings

S. No.	Variable	Frequency	P-value (if any)
1.	Height	<150	189 (37.8%)
		> 150	311 (62.2%)
2.	Weight	<50	99 (19.8%)
		>50	401 (80.2%)
3.	BMI	<25	448 (89.6%)
		>25	52 (10.4%)
4.	WHR	<0,8	204 (40.8%)
		>0.8	296 (59.2%)

Table 4: Distribution of cases according to investigations and diagnosis (PCOS cases, n=85)

Phenotype	Frequency	Percentage
Type 1	31	36.47%
Type 2	12	15.29%
Type 3	6	7.05%
Type 4	35	41.17%
Total	85	100%

Table 5: Distribution of cases according to investigations and diagnosis

S. No.	Variables	Frequency	P-value (if any)
1	Diagnosed as a PCOD clinically	Yes	85 (17%)
		No	415 (83%)
2	Polycystic pattern seen on USG	Yes	73 (14.6%)
		No	427 (85.4%)
3	mFG score	<8	474 (94.8%)
		>8	26 (5.2%)

Discussion

The present study was conducted among women of reproductive age group (early) (15-30 years), to study clinical presentation of PCOS and associated clinical features. In the present study average age was 22.47+3.44 years in range of 16 to 32 years. Majority 60.4% were in age group of 21 to 25 years, 26% were <20 years and only 13.6% were >25 years. In present study mean age at menarche was 13.52+ 1.28 years in a range of 11 to 17 years. Majority 82.2% attained menarche at age <15 years and 17.8% >15 years. Comparison of findings from other similar studies is given in table 6. Majority 86.2% were unmarried and 13.8% were married. Swetha Balaji et al⁶ showed that all of the cases were unmarried (100%). In the present study, all females had menstrual problems. Only 5.8% complained of hirsutism rest 94.2% were normal. 13.4% had acne problems and 86.6% were normal. Only 69 females were married, out of them 5% i.e 25 females had infertility. Study by Jayshree J et al⁷ in their study found that 2% had infertility. 13.2% complaint of excessive hair loss, while 21.2% of the females complaint of weight gain. Skin discoloration was seen among 32.6% females. Clinical features like menstrual abnormalities, hirsutism, infertility, and weight gain and skin discoloration were statistically

significant. Mean mFG score was 6.32+3.33 in a range of 2 to 30. Majority 94.85 had score <8 and only 5.2% had >8 (p=0.0001).

Diet was mixed type in 61% females and 39% were vegetarian. Only 4.6% females did regular exercise. Majority 75% had sedentary lifestyle, 25% did moderate work. Only 8.6% showed relevant family history Nitin Joseph et al⁸ in their study showed that 7.4% had positive family history. Study by Hussein B et al⁹ showed that 11.3% had relevant family history. Mean height was 152.2+4.51 in a range of 142 to 161 cm. majority 62.2% had height >150 cm. Majority 80.2% had weight >50kgs and mean weight was 55.87+8.31 and in a range of 32 to 72kg. (p=0.005). Mean BMI was 22.22+2.22 in a range of 17.4 to 27.8 kg/m². Majority 89.6% had BMI <25 and only 10.4% had BMI >25 (p=0.002). Mean WHR was 0.8 +0.04 in a range of 0.55 to 0.87. Majority 59.2% had WHR >0.8 and 40.8% had WHR <0.8. Only 14.6% showed PCOS pattern on USG.17% were diagnosed as PCOS and 83% were non PCOS. 21% had abnormal thyroid values. In present study majority 41.17% had phenotype 4, followed by 36.47% had phenotype 1, followed by 15.29% had type 2 and 7.05% had type 3. Table number 6 shows comparison of findings from the present study with other similar studies.

Table 6: Comparison of findings from the present study and various similar studies

S. No.	Variables	Present study	Other studies
1	Mean age	22.47+ 3.44 years	Joshi B et al ¹⁰ - 18.15 +2.4 years Rathod A et al ¹¹ - 10 - 19years
2	Age at menarche	13.52+ 1.28years	Joshi B et al ¹⁰ - 13.22+1.3 Rathod A et al ¹¹ - 16 years (65%)
3	Menstrual irregularities	100%	Rathod A et al ¹¹ - 84.88% Nitin Joseph et al ⁸ - 87.2%
4	Hirsutism	5.8%	Joshi B et al ¹⁰ - 13.7% Jayshree J et al ⁷ - 5% Sanchez N et al ¹² - 7%
5	Acne	13.4%	Jayshree J et al ⁷ - 33.5% Sanchez N et al ¹² - 21%
6	Skin color changes	32.6%	Nitin Joseph et al ⁸ - 28.2% Swetha Balaji et al ⁶ - 23% Sanchez N et al ¹² - 87 32%
7	Weight gain	21.2%	Radha P et al ¹³ - 12% (rural girls) & 52% (urban girls)
8	BMI	22.22+2.22 kg/m ²	Joshi B et al ¹⁰ - 19.38+3.7 kg/m ² Lakshmi KS et al ¹⁴ - 28+7.
9	History of thyroid disorder	21%	Rathod A et al ¹¹ - only 1%

			Swetha Balaji et al ⁶ - 25 cases
10	Polycystic changes on USG	14.6%	Joshi B et al ¹⁰ - 22.5% Swetha Balaji et al ⁶ - 63%
11	Clinically diagnosed PCOD	17%	Jayshree J et al ⁷ - 85.6% Sanchez N et al ¹² - 87.6%

Conclusion

From the observations in the present study, it can be concluded that PCOS is a common disorder among young women. Menstrual problems are the commonest reason for gynecological OPD consultation among adolescent girls. Evaluation of bleeding problems in adolescents is justified, before considering them as normal physiological transition. Childhood obesity, sedentary lifestyle, lack of exercises, and popularity of junk food in adolescence are responsible for the increasing PCOS incidence in adolescent girls and is challenge for gynecologists treating them. Adolescent girls with menorrhagia need to be evaluated thoroughly earlier rather than later with the onset of symptoms, so that effective management can be started, and anemia with its consequences can be prevented. Health education classes to create awareness regarding adolescent gynecological problems with the help of menstrual calendar should be conducted regularly in school and colleges. Avoidance of junk food, healthy life style, yoga, etc. must be encouraged in adolescent girls. It must be a part of the school health program. Therefore, periodic screening is required particularly for those with positive family history of PCOS. This will enable early diagnosis of this condition so as to facilitate prompt referral and management to prevent long-term complications. Lifestyle modification for weight reduction and dietary modification along with counseling services for addressing emotional problems should support other management options. Hence, a multidisciplinary approach involving professionals is required to manage young women with this endocrine disorder. Early diagnosis of PCOS and its prompt treatment will help the girls to improve quality of life and prevent further health hazards.

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