Original Research Article

Study of clinical characteristics of women with polycystic ovarian syndrome

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ABSTRACT

Background: Polycystic ovarian syndrome (PCOS) is one of the most common endocrinal disorders of the reproductive age group causing anovulation, infertility incidence being 8.7-17.8%. It is associated with obesity, insulin resistance, dyslipidaemia and metabolic syndrome. This study was aimed to study the different clinical characteristics of women diagnosed with PCOS, attending a tertiary care hospital outpatient department.

Methods: This was a hospital-based cross-sectional observational study of 200 patients with PCOS meeting the revised Rotterdam criteria from January 2018-June 2019 excluding pregnant and women with other systemic disorders. A detailed history and examination done, data collected regarding menstrual complaints, features of hyperandrogenism, hirsutism, acne, oily skin and Acanthosis Nigricans (AN) was documented. All data were statistically analyzed and compared using the chi-square or fissures' exact test. p-value <0.05 considered significant.

Results: A total of 200 patients with PCOS were included in the study, of which 41% were obese, 18% lean. The mean age was 24.44±5.62 years. Menstrual complaints were present in 88% -oligomenorrhea (49%) being the most common. 59% had hirsutism,38% of severe grade. Acanthosis nigricans was present in 33% of the patients. Correlation between hirsutism and alopecia, waist to hip ratio (WHR); acanthosis and WHR were statistically significant.

Conclusions: PCOS is an ill-defined symptom complex where ethnicity plays a vital role, hence creating a greater need to know the characteristics of the syndrome in different populations and ethnicity. All women presenting with oligomenorrhea or other menstrual complaint should be investigated for PCOS and treated accordingly. The syndrome usually occurs with multiple characters. Though obesity is common in PCOS, non-obese are also at risk. The prevalence of AN and Hirsutism in PCOS were comparable. This mandates a need to increase awareness regarding the syndrome in the general population.

Keywords: Acanthosis Nigricans, Hirsuitism, Polycystic ovarian syndrome

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is a heterogeneous anovulatory endocrine disorder in women of reproductive age group, also one of the common diagnosis in patients with infertility. A symptom complex first described in 1935 by Irving Stein and Leventhal which was due to anovulation.[1] Hence the name Stein - Leventhal syndrome for this condition. Chronic anovulation and hyperandrogenic features being the hallmark, condition is often associated with obesity, insulin resistance, dyslipidaemia and hence the metabolic syndrome. Association between glucose intolerance and

hyperandrogenism was first reported by Archard and Thiers in 1921.[2]

The syndrome is characterised by triad of oligo- or anovulation, hirsutism and obesity. Patients also present with amenorrhoea most commonly secondary amenorrhoea, infertility-primary or secondary, acne, alopecia, seborrhoea, dyslipidaemia and insulin resistance, hence more likely to experience co-morbid physical and psychological conditions such as diabetes, heart disease, endometrial cancer and also depression and anxiety.

Exact prevalence of PCOS is not known, estimated prevalence of PCOS worldwide is found to be 5-10%.[3] Recent study shows prevalence of PCOS ranging from 8.7 to 17.8% in women of reproductive age group, thus showing an increasing trend.[4]

A prospective study by Nidhi et al showed a prevalence of 9.13% in Indian adolescent girls of age group 15-18 years.[5] Studies on Indian women have shown that insulin receptor abnormalities are more in Indian women than in white women with PCOS.[6]

PCOS is a consequence of chronic anovulation, hence it is inaccurate to state that PCOS the most common "cause" of anovulation. The development of polycystic ovaries has been a puzzle to endocrinologists and gynaecologists worldwide for a long period of time, also defining the syndrome complex is proven to be difficult. After many years of study and research the syndrome has been defined by Rotterdam criteria, revised in 2003 which are:

- Oligo- and/or anovulation
- Clinical and/or biochemical signs of hyperandrogenism
- Polycystic ovaries on ultrasonography and exclusion of other causes.[7] 2 of the 3 criteria if present is diagnostic of PCOS. Recent International evidence-based guidelines for the assessment and management of polycystic ovary syndrome (PCOS) revised in 2018.[8]

PCOS is a long-term condition which manifests across the lifespan morphological changes of which might be seen even in patients without any clinical manifestations, however prevalence of different clinical features in women with PCOS is not clearly known.

This study was aimed to study the different clinical characteristics in women diagnosed with PCOS attending a tertiary care hospital OPD.

METHODS

This is a cross-sectional observational hospital-based study which includes 200 women with PCOS attending gynecology outpatient department (OPD), endocrinology OPD, and infertility clinic at Justice KS Hegde Charitable Hospital, Mangalore between January 2018 to June 2019.

Inclusion criteria

- Non-pregnant women diagnosed as PCOS using revised Rotterdam criteria 2003.[7]

Exclusion criteria

- Pregnancy
- Systemic disease (liver, kidney, heart or other systemic diseases).

Work up of patients

Women with diagnosed PCOS were selected after fulfilling the selection criteria were counselled about the study and informed written consent obtained from the patients/ legally acceptable representative.

A detailed history was obtained regarding the demographic profile, menstrual history, obstetric history, history of hormonal supplementation, medication for lowering blood pressure, blood lipids and blood glucose.

Menstrual history was obtained in detail. Secondary amenorrhoea defined as the absence of menstrual cycles for >6 months. Oligomenorrhea defined as a delay in menstruation for 35 days to 6 months. Family history of diabetes mellitus, hypertension in first- and second-degree relatives, menstrual disorders, hirsutism, and early baldness in male relatives (father and/or brothers).

Patients were examined for clinical features of hyperandrogenism like acne, oily skin, hirsutism.

Modified Ferriman-Gallwey (FG) score was used for evaluating and quantifying hirsutism in women in nine body areas (upper lip, chin, chest, upper arm, upper and lower abdomen, upper and lower back and thighs). Hair growth was rated from 0 (no growth) to 4 (extensive growth) in each of these nine areas. A total score of $>/=8$ is indicative of androgen excess. Maximum score 36. Severity of hirsutism graded as follows: <8- normal, 8-15- mild, ≥15 - severe.[9]

Insulin resistance was assessed clinically by the presence/absence of acanthosis nigricans which are dark patches of skin with a velvety texture present over the skin folds.

Height (cm) was measured with the patient standing erect against a wall, barefooted. Weight (kg) was weighed on a weighing scale barefooted with light clothing.

Obesity was assessed based on body mass index (BMI), cut-off values for Asian Indians are:<18.5 underweight, 18.5-22.9 normal, 23-24.9 overweight, >25 obese, calculated as BMI (kg/m^2) = weight (kg)/ height(m^2).[10]

Waist circumference (cm)- Waist was measured to the nearest cm with a tape measure at the smallest horizontal girth between the costal margins and the iliac crest at minimal respiration.[11]

Hip circumference (cm)- Hip circumference was taken as the greatest circumference at the level of greater trochanters (the widest portion of the hip) on both sides.[11]

Body fat distribution was assessed by the waist to hip girth ratio (WHR). WHR <0.81-normal.[12]

Statistical analysis

Statistical software SPSS version 17 was used to analyze the collected data. Categorical variables were presented by proportions/ percentages.

Association between categorical variables was tested by using chi-square/fisher's exact test. A p-value of less than 0.05 was considered to be significant.

RESULTS

A total of 200 patients who met the revised Rotterdam criteria were included in the study. Table 1 shows the general characteristics of the study population. The mean age among the study population was found to be 24.44±5.62 years.

Table 1: General characteristics of the study population.

Characteristic		Number of subjects	Percentage
Age in years	15 and below	6	3.0%
	16 - 20	49	24.5%
	21-25	67	33.5%
	26-30	46	23.0%
	31-35	28	14.0%
	36-40	4	2.0%
Marital status	Married	93	46.5%
	Unmarried	107	53.5%
Parity	Nulliparous	65	69.9%
	Multiparous	28	39.1%
Infertility	Primary	45	48.4%
	Secondary	28	30.1%
	No fertility issues	20	21.5%

Table 2: BMI of the study population.

BMI range (kg/m^2)	Number of subjects	Percentage
<18.5	30	15%
18.5-22.9	50	25%
23-24.9	38	19%
≥25	82	41%

Table 2 shows BMI of the study population- 30 (15%) were lean (BMI ≤18.5 kg/m^2). Even though PCOS is common in obese patients, in this study they were 82 (41%) obese (BMI ≥25 kg/m^2).
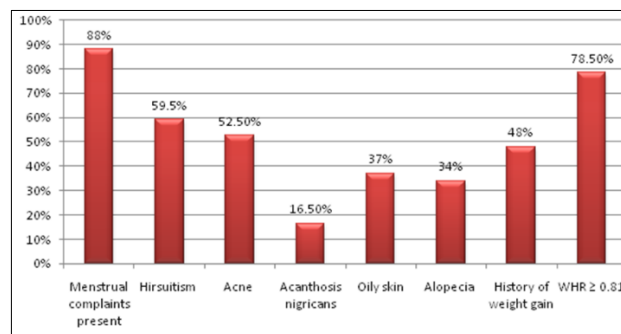

Figure 1: Clinical characteristics in the study population.

Table 3 and Figure 1 shows prevalence of various clinical characteristics in the study population.

Hirsutism was present in 118 (59%) patients which accounts for of the study population. 53 (45%) had mild hirsutism and 44 (38%) had severe hirsutism.

Table 3 depicts various cutaneous manifestation of the study population.

Table 3: Cutaneous manifestation in study population.

Clinical characteristic	Present	Absent	p-value
Acne	81 (68.6%)	37 (31.4%)	0.000*
AN	22 (18.6%)	96 (81.4%)	0.327
Oily skin	49 (41.5%)	69 (58.5%)	0.112
Alopecia	47 (39.8%)	71 (60.2%)	0.037*
Menstrual complaints	97 (82.2%)	21 (17.8%)	0.002*
WHR	99 (83.9)	19 (16.1%)	0.026*

Table 4: Correlation^a of hirsutism (n=118) with different clinical characteristics.

Clinical characteristic	Present	Absent	p-value
Acne	81 (68.6%)	37 (31.4%)	0.000*
AN	22 (18.6%)	96 (81.4%)	0.327
Oily skin	49 (41.5%)	69 (58.5%)	0.112
Alopecia	47 (39.8%)	71 (60.2%)	0.037*
Menstrual complaints	97 (82.2%)	21 (17.8%)	0.002*
WHR	99 (83.9)	19 (16.1%)	0.026*

a-chi-square test, *significant p-value.

Of the 118 patients who had hirsutism 81 (68.6%) had acne, 22 (18.6%) had acanthosis, 49 (41.5%) had oily skin, 47(39.8%), 97 (82.2%) had menstrual complaints,

and 99 (83.9%) had WHR ≥0.81. Correlation with acne, alopecia, menstrual complaints, and WHR was found to be significant (Table 4).

Table 5: Correlation[a] of acanthosis Nigricans (n=33) with different clinical characteristics.

Clinical characteristic	Present	Absent	p value
Acne	17 (51.5%)	16 (48.5%)	0.901
Hirsutism	22 (66.7%)	11 (33.3%)	0.327
Oily skin	14 (42.4%)	19 (57.6%)	0.480
Alopecia	15 (45.5%)	18 (54.5%)	0.128
Menstrual complaints	29 (87.9%)	4 (12.1%)	0.981
WHR	31 (93.9%)	1 (6.1%)	0.018[*]

a-chi-square test, *significant p-value.

Out of the 33 patients with acanthosis, 17 (51.5%) had acne, 22 (66.7%) had hirsutism, 14 (42.4%) had oily skin, 15 (45.5%) had alopecia, 29 (87.9%) had menstrual complaints and 31 (93.9%) had WHR ≥0.81, of which correlation with WHR was statistically significant (Table 5).

DISCUSSION

PCOS is a complex heterogeneous endocrine disorder of reproductive age group women which can be considered as a chronic disease that starts very early in life and persists for a long duration, thus increasing other long-term complications like metabolic syndrome, diabetes mellitus, cardiovascular disorders, endometrial cancer, mood disorders-anxiety and depression. There is an increasing trend in the syndrome complex which creates a need to know the disease and its clinical picture. This study tends to create a step ahead in our community in understanding the clinical picture of PCOS.

A total 200 subjects were included in the study over a period of 18 months and were analyzed. A study by Tabassum K showed that PCOS is an age-related disease and the most common age group in the study was between 15-24years and least in the age group of 35-44 years.[13] A prospective study by Nidhi et al, done in girls aged 15-18 years in a residential college of Andhra Pradesh, South India showed a prevalence of 9.13% in Indian adolescents.[5] In this study, most common age group affected was between 21-25 years (n=67, 33.5%), and the mean age was 24.44±5.62 years.

The prevalence of infertility in PCOS women varies between 70 and 80%.[14] In the study done by Joham et al, the prevalence of infertility in PCOS women was found to be 72%.[15] Infertility in the study population was 78.5% comparable with the other studies. A non-comparative cross-sectional study by Ramanand SJ et al, showed that obese and overweight accounted for 75% versus 60% in this study.[3] The difference may be because of differences

in the ethnicity, culture, lifestyle between the study population. This statistics differs from that of the previous study by Kalra et al, where the percentage of obese, overweight and normal BMI in Indian POCS women (n=65) based on ACOG criteria was 15.38%, 44.61%, and 40%, respectively which might be because of the different cut off values used for calculation of BMI.[16] The cut-off values differ because Asian Indians have a higher percentage of body fat, abdominal adiposity at lower or similar BMI levels in comparison with the white Caucasians.

Distribution of various clinical characteristics in this study was as depicted in Figure 1 showing hirsutism in 59%, acne in 52.5%, acanthosis in 33%, oily skin in 37%, alopecia in 34% comparable with observational study of Majumdhar et al, where the prevalence was 78%, 48%, 30 %, 29%, and 31% respectively.[17] History of weight gain was present in 48% of this study population. Body fat distribution of this study population, which was measured using WHR showed that 78.5% of the study population had WHR ≥0.81.

Menstrual complaints were present in 88% of the study population-oligomenorrhoea being the most common (49%, n=98), followed by irregular cycles and amenorrhea accounting to 15% which were comparable with the other studies.

Hirsutism was present in 59% of the patients with 38% having severe hirsutism (FG score >15) versus a 44% prevalence in a study by Ramanand SJ et al.[3] Hirsutism when correlated with acne, alopecia, WHR, values were statistically significant (Table 5).

Acanthosis Nigricans (AN) was used as a clinical marker of insulin resistance in this study where 33% of them had AN. When correlated 31 of 33 patients with AN had WHR more than 0.81 indicating that body fat distribution might be associated with AN. A study by Schmidt et al, showed that hirsutism and AN were the most reliable markers of PCOS which requires a detailed examination of the skin for diagnosis.[18]

Limitations of this study were the short duration of the study. The study population was the patients seeking medical assistance, not the general population.

CONCLUSION

PCOS is an ill-defined symptom complex where ethnicity plays a vital role, hence creating a greater need to know the characteristics of the syndrome in different populations and ethnicity. All women presenting with oligomenorrhea or other menstrual complaint should be investigated for PCOS and treated accordingly. The syndrome usually occurs with multiple characters. Though obesity is common in PCOS, non-obese are also at risk. The prevalence of AN and Hirsutism in PCOS were comparable. This mandates a need to increase

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