

## Original Research Article

# Study of cutaneous manifestations in patients with polycystic ovarian syndrome attending a tertiary care centre

Chinmai Yerram, Garimella Venkateswara Rao\*, Krishna Rajesh Kilaru

Department of Dermatology, Venereology, Leprosy, N.R.I. Medical College and General Hospital, Mangalagiri, Guntur, Andhra Pradesh, India

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### \*Correspondence:

Dr. Garimella Venkateswara Rao,  
E-mail: drgvrao55@yahoo.com

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### ABSTRACT

**Background:** Polycystic ovary syndrome (PCOS) is a multisystem metabolic disorder, which has a significant impact on the quality of life as well as fertility.<sup>1,2</sup> Acne, hirsutism, androgenetic alopecia, acanthosis nigricans, seborrhea are commonly associated with cutaneous manifestations of PCOS. To identify cutaneous manifestations, their incidence and frequency in patients with PCOS in different age groups.

**Methods:** An institutional based prospective study. Seventy PCOS patients attending out-patient departments of DVL and Obstetrics and Gynaecology, NRI Medical College and General Hospital, Guntur, fulfilling the inclusion criteria were included in the study and examined for the presence of cutaneous manifestations in the two year study period between January 2017 and December 2018.

**Results:** In the present study, 70 patients with PCOS were taken up and the commonest age group affected was 21-25 years (42.8%). Positive family history of PCOS was observed in 12.8%. The commonest cutaneous manifestation was acne vulgaris (57.14 %). Obesity was present in 47.14% of the patients and all of them were found to have striae. Hirsutism was observed in 47.14% of the total patients studied and the majority of them had terminal hair in the chin region and upper lip. Acanthosis nigricans was present in 34.28%, seborrhoea in 21.42% and acrochordons in 17.14% of the patients. Of the 70 patients, 15.7% were overweight and 47.14% were obesity.

**Conclusions:** The cutaneous manifestations of PCOS reserves major role in its management by Dermatologist. Recognizing PCOS in women presenting with hyperandrogenism offers a significant opportunity to begin a life-long conversation about prevention and treatment of a condition that has a multi-system impact on affected women.

**Keywords:** Polycystic ovarian syndrome, Cutaneous manifestations

### INTRODUCTION

Polycystic ovary syndrome (PCOS) is a hormonal disorder common among women of reproductive age and has a significant impact on the quality of life as well as fertility.<sup>1,2</sup> Acne, hirsutism, androgenetic alopecia, acanthosis nigricans and seborrhea are the commonly associated cutaneous manifestations of PCOS. Cutaneous manifestations are noted in 60% of the patients with polycystic ovarian disease. The exact cause of PCOS is

unknown. Factors that might play a role include are excess insulin, low grade inflammation that stimulates polycystic ovaries to produce androgens and hereditary and are the root causes of various manifestations which form the essential clinical markers for the early diagnosis and proper management of this condition.

Polycystic ovarian disease (PCOD) has been associated with various metabolic disorders and is now known as polycystic ovarian syndrome (PCOS). Patients may

develop obesity, insulin resistance, acanthosis nigricans, Type 2 diabetes, lipid abnormalities, hypertension, non-alcoholic liver disease and obstructive sleep apnoea.<sup>3</sup> It is associated with psychological impairments like depression, mood disorders and metabolic derangements, mainly insulin resistance and compensatory hyperinsulinemia which is recognized as a significant factor responsible for altered androgen production and metabolism.<sup>4</sup>

In upto 10% of reproductively aged women, PCOS is one of the frequently associated endocrine disorder.<sup>5</sup> The clinical scenario in PCOS patients may change over time, from hirsutism as a teenager to infertility in young adults requiring different specialists along the way. It is essential, therefore that those caring for these patients understand not only the management issues pertinent to their specialty but also appreciate the other potential health risks in these women. The definition of PCOS created an increased interest, which should be further directed to improve individualized clinical approaches and consequently therapeutic strategies.<sup>6</sup>

The present study was intended to determine the incidence and prevalence of cutaneous manifestations associated with PCOS, as there is a lack of significant data. It also further helps the treating physician to take appropriate measures in diagnosing, providing adequate treatment and it also details about the pattern of dermatologic manifestations of the polycystic ovarian syndrome in females attending the NRI General Hospital, Chinakakani, Guntur, Andhra Pradesh.

To identify the common cutaneous manifestations in patients with polycystic ovary syndrome (PCOS), incidence of different cutaneous manifestations in PCOS patients and frequency of various cutaneous manifestations in different age groups.

## METHODS

It is a descriptive cross sectional study. 70 PCOS patients attending out-patient departments of DVL, Obstetrics and Gynaecology, NRI Medical College and General Hospital, Guntur, fulfilling the criteria were included in the study and examined for the presence of cutaneous manifestations in the two year study period between January 2017 and December 2018. Non-pregnant women of reproductive age group fulfilling the Rotterdam 2003 diagnostic criteria of PCOS and patients who are willing to give informed consent formed the inclusion criteria while pregnant women patients with any other endocrine disorder and women who were not willing to give consent were excluded from the study. Institutional ethics committee approval was obtained.

Data was collected after obtaining informed written consent from the patient. A detailed history with special importance to menstrual history, clinical examination findings and any investigations did previously for the

diagnosis of PCOS was recorded. To diagnose PCOS in our study, patients pelvic ultrasonography was done, and a blood sample sent for random blood sugar (RBS) and hormonal assay for free testosterone, dehydroepiandrosterone (DHEAs), LH: FSH (leutinising hormone and follicle stimulating hormone) ratio and thyroid profile where ever necessary. Results were analyzed statistically using percentages.

## RESULTS

It is an institutional based prospective observational study. Data collected from 70 patients, who were ultrasound diagnosed cases of polycystic ovarian syndrome were included in the present study. Thirty patients were in the age group of 21-25 years (42.8%) which forms the majority group. 36 are unmarried and 34 patients were married. Majority of the patients were students 26 (37.14%). Nine patients (12.8%) had a positive family history of PCOS and 61 cases do not have a family history suggestive of PCOS.

**Table 1: Distribution pattern according to age (n=70).**

| Age group (in years) | No. of patients | %    |
|----------------------|-----------------|------|
| 10-15                | 2               | 2.85 |
| 16-20                | 15              | 21.4 |
| 21-25                | 30              | 42.8 |
| 26-30                | 15              | 21.4 |
| 31-35                | 5               | 7.14 |
| >35                  | 3               | 4.28 |

**Table 2: various cutaneous manifestations among PCOS patients (n=70).**

| S. no. | Cutaneous manifestations | No. of cases | %     |
|--------|--------------------------|--------------|-------|
| 1      | Acne vulgaris            | 40           | 57.14 |
| 2      | Striae                   | 34           | 48.56 |
| 3      | Hirsutism                | 33           | 47.14 |
| 4      | Obesity                  | 33           | 47.14 |
| 5      | Acanthosis nigricans     | 24           | 34.28 |
| 6      | Seborrhea                | 15           | 21.42 |
| 7      | Acrochordons             | 12           | 17.14 |

Among the 70 cases of PCOS, the most commonly observed cutaneous manifestation was acne vulgaris (57.1%), followed by striae (48.56%), hirsutism and obesity (47.1%) each, acanthosis nigricans (34.28%), seborrhea (21.4%) and acrochordons (17.14%).

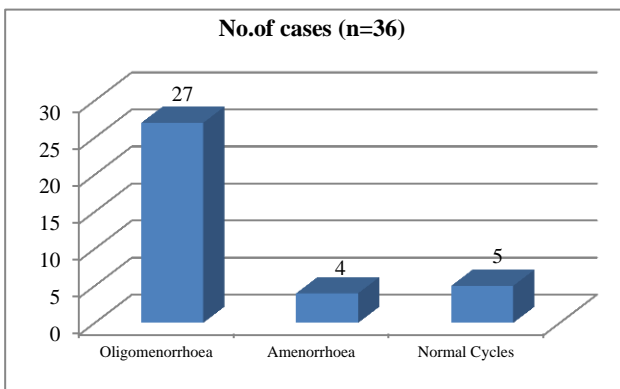
In the present study Of 70 patients, acne vulgaris was observed in 40 cases (57.1%) of which 34 patients (85%) had grade II acne vulgaris which is the predominant type. Striae were seen in 34 patients (48.56%). All the obese patients were found to have striae and were predominantly distributed over the lower abdomen, outer aspect of thighs and buttocks. 33 patients (47.14%) presented with hirsutism of which majority of the patients

had involvement over upper lip and chin. 33 patients (47.14%) were obese and, 11 patients (15.7%) were overweight.

Acanthosis nigricans was recorded in 24 cases (34.28%), 15 patients (21.4%) were found to have seborrhea and 12 patients (17.14%) presented with acrochordons.

**Table 3: BMI values among PCOS patients (n=70).**

| S. no. | BMI value (kg/m <sup>2</sup> ) | No. of cases | %     |
|--------|--------------------------------|--------------|-------|
| 1      | <18.5                          | 1            | 1.42  |
| 2      | 18.5–22.9                      | 25           | 35.71 |
| 3      | 23–24.9                        | 11           | 15.71 |
| 4      | >25                            | 33           | 47.14 |



**Figure 1: Menstrual irregularities in unmarried women.**

**Table 4: Gynecological abnormalities in married women (n=34).**

| Condition             | No. of cases | %     |
|-----------------------|--------------|-------|
| Oligomenorrhoea       | 30           | 88.23 |
| Amenorrhoea           | 2            | 5.8   |
| Menorrhagia           | 2            | 5.8   |
| Spontaneous abortions | 5            | 14.7  |
| Infertility           | 18           | 52.9  |

Of 36 unmarried women, majority of the unmarried women, 75% presented with oligomenorrhoea, 11% presented with amenorrhoea and 13.8% had normal menstrual cycles.

Of the 34 married women, 88.23% presented with oligomenorrhoea, 5.8% of patients with amenorrhoea and menorrhagia each. Spontaneous abortions were seen in 14.7% of the patients and infertility among 52.9% of the patients.

In the present study out of 70 cases of PCOS, eight patients had Hypothyroidism, one patient was Hypertensive and, one patient had type II Diabetes mellitus.

**DISCUSSION**

Polycystic ovary syndrome is an ovulatory disorder which is becoming an emerging problem that needs careful assessment, timely intervention, and appropriate treatment. The incidence of the disease is on rise due to the life style changes and increasing diagnostic modalities. Cutaneous manifestations in Polycystic ovarian syndrome most of the times serve as a mirror for underlying disease process, and they may be the first expression of disease.

In this study, a total of 70 patients with the polycystic ovarian syndrome and cutaneous manifestations were included. Majority of the patients (42.8%) were in the age group of 21-25 years similar to study by Shareef et al where majority of patients (46.6%) were in the age group of 21-25 years.<sup>7</sup> This data suggest that polycystic ovarian syndrome is more common in the reproductive age group.

Polycystic ovaries have been found in girls as young as six years old. It is difficult to diagnose the disease before puberty as patients with PCOS are usually diagnosed only after seeking help for irregular menstrual cycles or skin changes that take place at this time, though the disease may be genetically determined, additional triggering factors like insulin and IGF-1 activity that occur during puberty are necessary for expression of disease mainly after puberty.

In the present study, significant proportion, that is 36 patients (51.42%) of study participants were unmarried. These findings are comparable to a study done by Shareef et al which shows 66.6% of the study population is unmarried.<sup>7</sup>

The same study by Shareef et al also had also shown no statistically significant association of polycystic ovarian syndrome with age, marital status, and regularity of the menstrual cycle.<sup>7</sup>

In the present study of 70 patients, only nine patients (12.8%) had a positive family history of the polycystic ovarian syndrome. In research by Jayaram et al and a study by Singh et al positive family history of the polycystic ovarian syndrome was seen in 5.7% of the patients.<sup>8,9</sup>

Acne vulgaris in polycystic ovarian syndrome patients is usually more severe, and it is resistant to the conventional treatment modalities. In the present study, Acne vulgaris was observed in 40 cases (57.1%) of the patients out of 70 cases of the polycystic ovarian syndrome. Similar observations were seen in a study done by Jain et al, where acne vulgaris was found in 59.5% of the study group.<sup>10</sup>

The present study with 40 cases of acne vulgaris has 34 patients (85%) with grade II acne vulgaris followed by

grade III acne vulgaris (10%) and least number of patients with grade I and IV acne vulgaris (2.5%) each.

Acne vulgaris seen in polycystic ovarian syndrome is usually more severe in presentation with nodule and cyst formation and sometimes accompanied by scarring and usually resistant to conventional treatment.

In the present study, the type of acne noted was more commonly mild to moderate in severity with comedones, papules, pustules but less commonly observed are nodules and scarring. Present study results are consistent with a study done by Singh et al in which acne vulgaris was seen in 64.3% of the polycystic ovarian syndrome patients, of which majority had mild to moderate acne.<sup>9</sup>

34 patients (48.56%) had striae. Most of the patients had striae distributed over the lower abdomen, buttocks and outer aspects of thighs. All patients who were obese displayed striae which indicates that striae, and obesity are related to each other and among them, most of the individuals had striae alba and only a few of them presented with striae rubra.

Face, chest, upper pubic triangle areas usually respond to the high amount of androgens. In polycystic ovarian syndrome, due to hyper-androgenemia vellous hair over face, chest, upper pubic triangle, and also other sites are converted to terminal hair. In the present study, 47.1% of patients showed hirsutism and majority of the patients had involvement over upper lip and chin. In research by Jayaram et al and a study done by Singh et al 41.4% of polycystic ovarian syndrome patients displayed hirsutism.<sup>8,9</sup>

Variable results have been reported from different studies with 28 to 62.5% of the women with polycystic ovarian syndrome having hirsutism.<sup>11,12</sup> Prevalence of hirsutism in various studies is in the range of 50–76% among PCOS patients which is much higher than the 5% prevalence estimated for women of reproductive age in the general population.<sup>13-17</sup>

In the present study of 70 cases of the polycystic ovarian syndrome, 47.14% were obese, and 15.7% were overweight. In research by Jayaram et al and another study by Singh et al 54% of the patients were obese which is comparable with the present study.<sup>8,9</sup> Other studies by Legro and Liou et al have shown a wider variation from 39% to 73% of women with polycystic ovarian syndrome being obese.<sup>12,18</sup>

Acanthosis nigricans is the result of the influence of hyperinsulinemia on keratinocytes. Of the 70 cases included in the study, 24 patients (34.28%) presented with acanthosis nigricans. Almost all the patients of acanthosis nigricans had involvement of neck in common.

A study by Jain et al has shown the prevalence of acanthosis to be 35.3% in the polycystic ovarian

syndrome patients, which is comparable to the present study.<sup>10</sup> Another study by Singh et al has shown the presence of acanthosis nigricans in 47.1% of patients with the polycystic ovarian syndrome.<sup>9</sup>

In the present study, 15 patients (21.4%) were found to have Seborrhea where as in a study by Jain et al seborrhea was observed in 41.9% of the patients.<sup>10</sup> Polycystic ovary syndrome patients may also present with seborrhea which is a common disorder among women with inflammatory acne which is minimally responsive to conventional line of treatment. Acrochordons are noted in 12 patients (17.14%). In a study by Jain et al acrochordons was seen in 11.8% of the patients which almost comes close to the present study.<sup>10</sup>

In the present study, 92.8% of cases were recorded to have menstrual irregularities and in a study by Ramanand et al menstrual irregularities were seen in 100% of the polycystic ovarian syndrome women.<sup>19</sup> In the present study, of 70 cases of the polycystic ovarian syndrome, 81.4% of the cases were found to have oligomenorrhea. Amenorrhoea was seen in 8.5% of the cases and menorrhagia was seen in 2.8% of the individuals. Percentage of individuals who presented with normal menstrual cycles is only 7.14%, and all of them are unmarried. In a study by Sirmans et al, menstrual disturbances commonly observed in polycystic ovarian syndrome include oligomenorrhea, amenorrhea and prolonged erratic menstrual bleeding.<sup>20</sup> However, 30% of women with polycystic ovarian syndrome will have normal menses. Approximately 85% to 90% of women with oligomenorrhea have polycystic ovarian syndrome while 30% to 40% of women with amenorrhoea will have polycystic ovarian syndrome.<sup>20</sup> Infertility was seen in 25.7% of our patients and similar results regarding infertility were seen in a study by Singh et al (27.6%) where as a study by Ramanand et al has shown it to be 21% and a study by Jain et al. has shown it to be 33%.<sup>9,10,19</sup>

In the present study, out of 70 cases of the polycystic ovarian syndrome, eight patients (11.4%) had hypothyroidism, one patient (1.42%) had type II diabetes mellitus, and one patient (1.42%) had hypertension. Ramanand et al reported 13.3% of women had hypothyroidism, study results of which are consistent with the present study.<sup>19</sup> Either subclinical hypothyroidism or autoimmune thyroiditis characterize thyroid dysfunction in the polycystic ovarian syndrome. Both are involved in latent progression to hypothyroidism.

A review on the emerging relationship between thyroid disorders and the polycystic ovarian syndrome by Singla et al states that the prevalence of subclinical hypothyroidism or thyroid autoimmunity is increased in women with the polycystic ovarian syndrome.<sup>21</sup> Cibula et al observed that prevalence of type II diabetes mellitus and cardiovascular disease was significantly higher in Polycystic ovarian syndrome.<sup>22</sup>

## CONCLUSION

One of the most frequent endocrine disorders encountered in women of reproductive age is PCOS and can be conglomerate of multiple long-term health risks and substantial psychological impact. The cutaneous manifestations of PCOS reserves major role in its management by dermatologist. The incidence of acne vulgaris, hirsutism, striae, obesity, acanthosis nigricans are seen in higher incidence in PCOS patients, confirming the results of previous studies. Recognizing polycystic ovary syndrome in women presenting with oligo-ovulation and hyperandrogenism offers a significant opportunity to begin a life-long conversation about prevention and treatment of a condition that has a multi-system impact on affected women.

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