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Study of Cutaneous Manifestations in Patients with Polycystic Ovarian Syndrome Attending a Tertiary Care Centre

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ABSTRACT

Background: Polycystic ovary syndrome (PCOS) is a common reproductive, metabolic, and psychological condition affecting up to 18% of women. It often manifests with dermatological symptoms, which may provide early diagnostic clues. Understanding the frequency and characteristics of these cutaneous manifestations is essential for effective management. **Objective:** To determine the frequency of cutaneous manifestations associated with PCOS. **Materials and Methods:** This descriptive cross-sectional study was conducted in the Department of Dermatology, CMH Multan, from June to December 2024. A total of 219 adult non-pregnant females aged 18–40 years, fulfilling the Rotterdam-2003 diagnostic criteria for PCOS, were enrolled through non-probability consecutive sampling. Participants with other endocrine disorders or hormonal disturbances were excluded. Clinical and anthropometric data, including BMI and cutaneous manifestations (hirsutism, acne, androgenic alopecia, seborrhea, acanthosis nigricans, and skin tags), were recorded. Data were analyzed using SPSS v26, with a Chi-Square test applied for significance. **Results:** The mean age of participants was 24.15 ± 7.10 years, and the mean BMI was 25.84 ± 6.00 kg/m². Hirsutism (93.26%) was the most prevalent manifestation, followed by androgenic alopecia (91.80%), seborrhea (89.40%), and acne (85.60%). Acanthosis nigricans and skin tags were present in 56.30% and 33.20%, respectively. Obese participants exhibited significantly higher rates of hirsutism compared to non-obese participants (82.5% vs. 39.7%, p<0.0001). **Conclusion:** Cutaneous manifestations are frequent in PCOS, with obesity significantly exacerbating hirsutism. Early dermatological assessment can aid in timely diagnosis and management of PCOS.

INTRODUCTION

Polycystic ovarian syndrome (PCOS), a reproductive, metabolic, and psychological condition that impacts across the lifespan and affects up to 18% women. The cause is complex, and includes genetic and epigenetic susceptibility, hypothalamic and ovarian dysfunction, excess androgen exposure, insulin resistance, and adiposity-related mechanisms. Diagnosis is recommended based on the 2003 Rotterdam criteria and confirmed with two of three criteria: hyperandrogenism (clinical or biochemical), irregular cycles, and polycystic ovarian morphology. The diagnostic criteria generate four phenotypes, and clinical features are heterogeneous, with manifestations typically arising in childhood and then evolving across adolescent and adult life. The four phenotypes consistently range from the most severe (phenotype A) to the least severe (phenotype D) along an axis of metabolic and ovarian dysfunction [1,2,3].

Polycystic ovary syndrome (PCOS) is an important and highly prevalent obesity-related comorbidity, that develops in girls and women who are genetically predisposed to its development. The association between PCOS and certain dermatological disorders is a very intricate interconnecting network comprising many factors, such as inflammation, genetics, and hormonal. PCOS presents with a wide spectrum of common dermatological manifestations, such as hirsutism, acne, seborrheic dermatitis, and androgenetic alopecia[4,5,6].

In a study, out of two hundred thirty-two of these patients with the diagnosis of PCOS, a total of 208 females with PCOS had mean age 24.15 ± 7.10 years, mean BMI 25.84 ± 6.00 kg/m^2. The most common cutaneous manifestation of PCOS among the patients in this study were hirsutism (93.26%) followed by androgenic alopecia (91.80%), then seborrhea

(89.40%), acne (85.60%), acanthosis nigricans (56.30%), and skin tag (33.20%)[7].

Similarly, in another study a total 100 patients with features of PCOS presenting with cutaneous manifestations were recorded and diagnosis of PCOS was made using Rotterdam's criteria. hirsutism (85%) was the most common finding followed by acne (73%), seborrhea (50%), androgenetic alopecia (36%), acanthosis nigricans (29%) and acrochordons (9%)[8].

The cutaneous manifestations of PCOS reserves major role in its management by dermatologist. In results of a study on 70 patients with PCOS were taken up and it was revealed that 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. 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[9,10].

Despite the well-established association between PCOS and dermatological conditions, there may be variations in the prevalence and clinical presentation of skin manifestations across different populations and settings. So this study can provide detailed insights into local epidemiology and clinical profile of dermatological features, contributing to medical education and awareness among healthcare providers about the multifaceted nature of PCOS.

Objective

To determine the frequency of cutaneous manifestations associated with PCOS.

MATERIAL & METHODS

Descriptive Cross Sectional Study was conducted in Department of Dermatology, CMH Multan from June 2024 to December 2024 after taking approval from institutional ethical review committee and informed consent from individual participants. Sample size is calculated for the study by using Open-epi online formula for population proportion. Taking hypothesized % frequency of outcome factor in the population as 17.14%[9] was **219.** Adult non-pregnant female subjects of reproductive age (new as well as known cases), aged 18 – 40 years, fulfilling Rotterdam-2003 diagnostic criteria of PCOS were included in the study through Non-probability consecutive sampling. Patient having known diseases or drug therapy that can lead to hormonal disturbances such as hyperprolactinemia and those unwilling to participate or suffering from other endocrine disorders (hypothyroidism, hyperprolactinemia, congenital adrenal hyperplasia) were excluded. After thorough medical history and relevant clinical examination, patient characteristics like age, height, weight, BMI, skin menifestations acne, striae, hirsutism, androgenic alopecia, acanthosis nigricans, seborrhoea, acrochordons) were noted on proforma. SPSS version 26 was utilized for data analysis. Quantitative Variables such as Age, Height, Weight and BMI was presented as mean ± SD. While Qualitative Variables such as family history of PCOS, obesity and cutaneous manifestations of PCOS are presented as frequency and percentages. Data was stratified on age, BMI, family history of disease, and obesity. Post-stratification Chi-square test was applied and p-value <.05 is taken as significant.

RESULTS

Total 219 adult non-pregnant females aged 18–40 years, diagnosed with PCOS using Rotterdam-2003 criteria were included in the study. The majority were in the 21–25-year age group, with mean age of 24.15 ± 7.10 years. Mean BMI of the participants was 25.84 ± 6.00 kg/m². Family history of PCOS was present in 12.8%.

Cutaneous Manifestations among study participants showed that Hirsutism (93.26%) the most common finding, reflecting significant hyperandrogenism, Androgenic Alopecia (91.80%) Indicating a high frequency of androgen-related hair loss, Seborrhea (89.40%), Acne (85.60%): One of the most distressing and visible symptoms for patients, Acanthosis Nigricans (56.30%) Indicative of insulin resistance, a key metabolic feature of PCOS and Skin Tags (33.20%): Often associated with obesity and insulin resistance.

The frequency of hirsutism was significantly higher among obese participants (85/103, 82.5%) compared to non-obese participants (46/116, 39.7%). This difference was statistically significant (p<0.0001) based on a Chi-Square test of independence. These findings indicate a strong association between obesity and the presence of hirsutism in PCOS patients.

Table 1

Cutaneous manifestations among study participants with PCOs (n=219)

Cutaneous manifestation	Frequency	Percentage
Hirsutism	204	93.26%
Androgenic Alopecia	201	91.80%
Seborrhea	196	89.40%
Acne	187	85.60%
Acanthosis Nigricans	124	56.30%
Skin Tags	73	33.20%

Table 2

Obesity and hirsutism among study participants with PCOs (n=219)

Obesity	Hirsutism		P-value
	Present	Absent	

Obese	85	18	<0.0001
Non obese	46	70	

DISCUSSION

The present study highlights the high prevalence of cutaneous manifestations among women with polycystic ovary syndrome (PCOS) in a tertiary care setting. Among 219 adult non-pregnant females aged 18–40 years diagnosed with PCOS using the Rotterdam-2003 criteria, the majority were aged between 21–25 years, with a mean age of 24.15 ± 7.10 years and a mean BMI of 25.84 ± 6.00 kg/m². Notably, a family history of PCOS was present in 12.8% of participants, reflecting the genetic predisposition often associated with the syndrome.

Cutaneous findings were frquent, with hirsutism observed in 93.26% of participants, making it the most common manifestation. This aligns with the androgenic pathophysiology of PCOS, where hyperandrogenism leads to excessive male-pattern hair growth. Similar trends have been reported in studies by Sekhan Ak et al, and Artar G et al, where hirsutism is consistently identified as a hallmark feature of PCOS, particularly in patients with obesity and insulin resistance.[11, 12]

Androgenic alopecia, seen in 91.80% of participants, further corroborates the role of hyperandrogenism in androgen-dependent conditions. Seborrhea (89.40%) and acne (85.60%) were also frequent, with acne being one of the most distressing manifestations for patients. Acanthosis nigricans, observed in 56.30% of participants, and skin tags (33.20%) further highlight the metabolic dimension of PCOS, as these findings are commonly linked to insulin resistance.[13]

The association between obesity and hirsutism was particularly striking, with a significantly higher frequency of hirsutism among obese participants (82.5%) compared to non-obese participants (39.7%), a difference that was statistically significant ($p<0.0001$). This finding underscores the interplay between obesity and hyperandrogenism, where obesity exacerbates androgen production and insulin resistance, leading to more severe cutaneous symptoms. Similar observations have been made in studies by Joham AE et al and Kim JJ et al, emphasizing the synergistic effects of obesity and hyperandrogenism in amplifying PCOS-related dermatological manifestations.[14,15]

These findings emphasize the multifaceted nature of PCOS and the need for comprehensive management strategies targeting both hormonal and metabolic derangements. Dermatologists play a crucial role in identifying these manifestations early, which may lead to timely diagnosis and intervention. Furthermore, the significant association between obesity and cutaneous symptoms suggests that weight management should be a cornerstone of PCOS treatment to alleviate dermatological and metabolic complications.

CONCLUSION

Cutaneous manifestations are frequent in PCOS, with obesity significantly exacerbating hirsutism. Early dermatological assessment can aid in timely diagnosis and management of PCOS.

Limitations of the study

- Single-center study limits generalizability to broader populations.
- Self-reported family history may underestimate genetic predisposition.
- Lack of hormonal profiling restricts deeper analysis of androgen levels.

Recommendations

- Multicenter studies with larger, diverse populations are needed.
- Incorporate hormonal and metabolic profiling for a comprehensive understanding.
- Promote awareness among dermatologists for early identification of PCOS-related skin conditions.
- Emphasize weight management and lifestyle interventions in PCOS treatment protocols.

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