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Prevalence Of Skin Manifestations In Patients With Polycystic Ovarian Syndrome

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Abstract

Objective: This study aimed to determine the prevalence of cutaneous manifestations in PCOS patients.
Method: This cross-sectional study was conducted in the dermatology department, Combined Military Hospital, Peshawar, from 1st January 2021 to 30th June 2021. After obtaining ethical approval from the hospital's ethical and research committee, a total of 50 patients aged 15 to 45 years were included in the study fulfilling the inclusion criteria. Written informed consent was taken from each patient. All patients underwent general physical, systemic and dermatological examination. Venous blood sampling was done after overnight fasting for hormonal assays (TSH, LH, FSH, prolactin and testosterone), glucose, and lipid levels. An ultrasound scan was done for the detection of ovarian cysts.
Results: Mean age was 26.96 years ± 5.42 SD. The mean BMI was 26.04 Kg/m^2 ± 5.10 SD. Mean FSH and LH levels were 6.86 IU/L ± 5.41 SD and 12.11 IU/L ± 8.75 SD respectively. Among them, 88% were married, 36% had menstrual irregularities and 72% had infertility. Hirsutism, acne, acanthosis nigricans, and androgenic alopecia were noted in 72%, 54%, 42%, and 20% of the patients respectively.
Conclusion: Cutaneous manifestations can play an important role in the diagnosis of PCOS and also contribute an important portion of the symptoms experienced by patients suffering from PCOS.
Keywords: PCOS, Skin manifestations, Hyperandrogenism, Hirsutism, Acne.

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1. Introduction

PCOS (polycystic ovarian syndrome), commonly known as Stein–Leventhal syndrome, affects 5 to 10% of women of reproductive age.[1] It is the most frequent heterogeneous disorder, characterized by hyperandrogenism, and reproductive, and metabolic dysfunction.[2] Hyperandrogenism is one of the most important clinical findings, with a variety of symptoms and manifestations. It is a multisystem disorder that affects fertility and quality of life.[2] Hyperandrogenism, oligo or -anovulation, and polycystic ovarian morphology are used to diagnose PCOs. PCOs have four phenotypes.[3]

- Presence of hyperandrogenism, polycystic ovary, and oligomenorrhea
- Hyperandrogenism and oligomenorrhea
- Oligomenorrhea with polycystic ovary
- Hyperandrogenism and polycystic ovary

Acanthosis nigricans, acrochordons, striae, xanthoma, Demodex folliculorum; pyoderma gangrenosum, acne, and hidradenitis suppurativa (PASH) syndrome are all linked to polycystic ovarian syndrome.[4] Obesity; seborrhea, alopecia, hirsutism, and acne (also known as the SAHA syndrome); insulin resistance, and the risk of Type 2 diabetes are all linked to it.[5] Two cases of mucosal pigmentation suggestive of Peutz-Jegher syndrome have also been documented in literature to be linked to PCOS.[6]

Aside from the dermatological features, women with PCOs have metabolic and reproductive abnormalities as well, which predispose them to infertility and endometrial malignancies demanding early detection and treatment.[7] This study is aimed to determine the prevalence of cutaneous manifestations associated with PCOs. Due to the limited availability of local data here, this study will provide the base for future researchers for their proper understanding of the cutaneous changes associated with PCOs.

2. Materials & Methods

This cross-sectional study was conducted in the Department of Dermatology Combined Military Hospital, Peshawar, from 1st January 2021 to 30th June 2021 after obtaining ethical approval from the hospital's ethical and research committee (ERB No.0063/21). The

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sample size was calculated using the Gowri BV et al study with a 90% prevalence of cutaneous manifestations in polycystic ovarian syndrome by taking a 95% confidence interval and 8% margin of error.[8] After taking a written informed consent, 50 PCO patients aged 15 to 45 years were enrolled in the study. PCOS was diagnosed based on 2003 consensus criteria adopted in Rotterdam when two of the following three criteria would be present.[9]

- Oligoovulation (the menstrual cycle duration of more than 45 days) and/or anovulation.
- Clinical signs of hyperandrogenism and biochemical evidence of hyperandrogenemia
- Evidence of polycystic ovaries on ultrasonography i.e., ≥ 12 follicles in each ovary measuring 2 to 9 mm in diameter and/or increase in ovarian volume (>10ml).

Oligomenorrhea was defined as having less than nine cycles each year or a menstrual cycle lasting less than 45 days.[9] Amenorrhea was defined as the absence of menstruation for three consecutive months during the last year.Acne was described as the presence of comedones, papules, pustules, nodules, and cysts on the face, neck, upper trunk, and upper arms. The severity of acne was assessed according to the GAGS scores.[10] Ludwig´s classification was used to assess androgenic alopecia.[11] Hirsutism was defined as the excessive facial or body terminal hairs in women in a male-like pattern, and severity was assessed based on a modified Ferriman Gallway (F-G) score.[12] A total MFG score of at least 8 was denoted as hirsutism. Infertility was described as the inability to conceive after being married for more than one year and remaining in the same relationship.[13] Acanthosis nigricans was defined as a chronic skin condition characterized by velvety thickening and hyperpigmentation involving the neck, major flexures, and acral parts.[14] Data was collected on a standard questionnaire taken during the face-to-face interview including demographic profile, gynaecological, reproductive, and drug history. BMI was taken in Kg/m^2. Follicular stimulating hormones (FSH), Luteinizing hormones (LH), prolactin, and testosterone levels were taken on the second day of menstruation after overnight fasting. In addition to the level of the hormones, fasting blood glucose fasting lipid profile, and TSH level were also done. All the patients underwent an ultrasonography scan for the diagnosis of PCOS. Patients having more than 12 follicles of 2 to 9 mm in each ovary and/or an increase in ovarian volume (>10 ml) were labelled as having polycystic ovaries. Patients having thyroid disease, pituitary, hypothalamus, or adrenal diseases, age less than 15 years, and patients taking any hormonal medications, lipid-lowering drugs, or hypoglycemic drugs were excluded from the study. Data were entered into and analyzed by SPSS version 22.0. For numerical variables, mean and standard deviation were calculated while frequency and percentages were calculated for categorical variables. For the comparison of categorical variables, the chi-square test was applied while for comparison of numerical variables, the Student t-test was applied. The statistical significance level was considered as $p \leq 0.05$.

3. Results

The study included a total of 50 female patients. The mean age was 26.96 years, with a standard deviation of 5.42 years. Five patients (10%) were under the age of 18 years, and 45 patients (90%) were between the ages of 18 and 40 years. The average BMI was 26.04 kg/m2 with a standard deviation of 5.10 kg/m2.

Table 1: Characteristics of patients (Anthropometric and Hormonal)

Characteristics	Value
Age	26.96 years ± 5.42 SD
Body mass index (BMI)	26.04 Kg/m^2 ± 5.10 SD
FSH	6.86 IU/L ± 5.41 SD
LH	12.11 IU/L ± 8.75 SD
Testosterone	2.82 nmol/L ± 2.83 SD

Two patients (4%) were underweight, with a BMI of less than 18 kg/m2, 21 patients (42%) had a BMI of 18.1-25 kg/m2, 21 patients (42%) were overweight and had a BMI of 25.1 to 30 kg/m2, and 6 patients (12%) were obese, with a BMI of more than 30 kg/m2. Twenty patients (40%) had a regular menstrual cycle, while thirty patients (60%) had an irregular menstrual cycle. Six patients (12%) were unmarried, while 44 (88%) of the patients were married. Thirty-two patients (72.72 %) of married women had infertility, whereas the remaining

12 patients (27.28 %) did not have any issues with fertility.

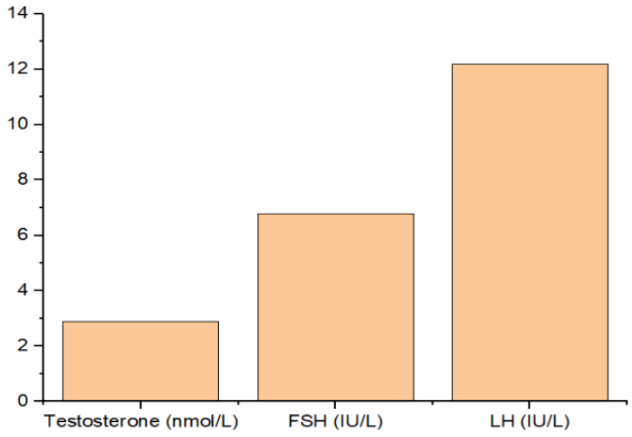

Figure 1: Mean sex hormone level

Ten infertile women (31.25 %) reported primary infertility, whereas 22 women (68.75 %) reported secondary infertility.

In 40 cases, ultrasonographic evidence for PCOS was established (80%). There was a statistically significant association between age and BMI, hirsutism and acne, and acanthosis nigrican with age and BMI (Table #3).

Dermatological manifestations such as hirsutism, acne, acanthosis nigrican, and alopecia were noted in 72%, 54%, 32%, and 20% of the patients respectively. (Fig #2)

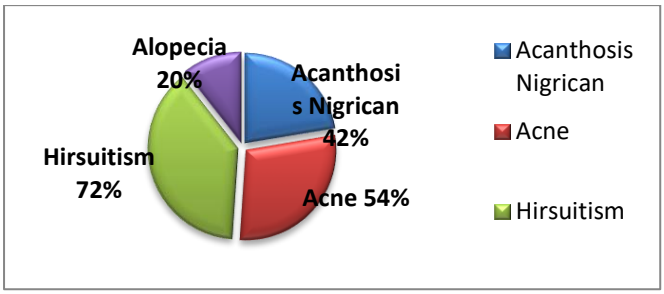

Figure 2: Dermatological manifestations in PCOS

The severity of the disease was then used to classify the dermatological manifestations. (See Table #2.)

Table 2. Classification of Dermatological manifestation based on severity (n=50)

S No	Dermatological manifestations	Classification based on the severity	
1	**Hirsuitism 72%**	Mild (8 - 15)	63.8%
		Moderate(15- 24)	30.5%
		Severe (24- 36)	5.7%
2	**Acne 54%**	Mild	51.8%
		Moderate	29.6%
		Severe	11.1%
		Very Severe	7.4%
4	**Alopecia 20%**	Stage I	80%
		Stage II	20%
5	**Acanthosis Nigrican**		42%

Table 3: Correlation Matrix

	1	2	3	4	5	6	7	8	9
1. BMI	1								
2. Age	.35 .01	1							
3. Hirsutism	-.24 .08	-.03 .79	1						
4. Acne	.20 .16	.15 .29	.31 .02	1					
5. A. nigrican	-.63 .00	-.29 .03	.17 .23	-.10 .45	1				
6. Alopecia	-.15 .28	-.08 .56	.08 .53	.16 .26	.18 .20	1			
7. Testosterone	-.32 .05	-.28 .09	.23 .16	.06 .70	.19 .23	.01 .95	1		
8. FSH	-.01 .90	-.12 .45	.11 .48	.06 .69	.19 .22	.08 .58	.20 .25	1	
9. LH	**.03** **.81**	**.01** **.94**	**.27** **.07**	**.02** **.87**	**.07** **.63**	**.14** **.38**	**.29** **.09**	**.41** **.01**	**1**

4. Discussion

PCOS is a prevalent endocrine disorder that causes biochemical and hormonal imbalances, as well as negative aesthetic, metabolic, reproductive, and psychological effects, all of which lead to a decrease in health-related quality of life (HRQoL).[15] The Rotterdam Criteria 2003 were used in this study to diagnose PCOS, which includes oligo or-anovulation (OA), hyperandrogenism (HA), and polycystic ovarian morphology while other causes such as congenital adrenal hyperplasia, Cushing syndrome, androgen-secreting tumors, hyperprolactinemia, and hypothalamic anovulation were ruled out.[9] More than 80% of physicians use this criterion for PCOS diagnosis, and more than 40% of physicians believe that HA is one of the fundamental pillars for PCOS diagnosis.Hirsutism, acne vulgaris, and alopecia are all symptoms of HA.[16]

PCOS is the most common cause of hirsutism in women.[17] In our study, the prevalence of hirsutism was 72%. Among these patients, 63.8%, 30.5%, and 5.7% patients were suffering from mild, moderate, and severe hirsutism. In the general population, the prevalence of hirsutism is 4 TO 11% however in patients with PCOS its prevalence is 65 to 75 %.[18,19] Chhabra S et al concluded in their study that 70% of the hirsutism patients were suffering from PCOS, [20] which is consistent with the results of our study. Bliede K et al reported an 84% prevalence of hirsutism in PCOS in their study.[21]

The activity of the sebaceous glands is higher in the face than in other areas of the skin, so acne tends to start there. Even though acne on the neck, chest, and upper back affects 50% of hyperandrogenic women.[16,22] It is 1.6 times more common in patients with PCOS than in the general population.[23] Acne was found to be prevalent in 54% of the people in our study. Patients with mild acne accounted for 51.8 %, while those with moderate acne made up 29.6%. Ramezani Tehrani F et al conducted a systematic review and meta-analysis of 60 papers involving 240,213 PCOS patients and discovered that the occurrence of acne ranged from 43% to 59%, which is similar to our findings.[23] Chanyachailert P et al.[24] identified PCOS in 48.3 per cent of acne cases. Previous researchers have discovered a 57% prevalence of acne in patients with PCOS, which is fairly consistent with our research.[22]

Acanthosis nigrican is considered to be the dermatological manifestation of insulin resistance and PCOS is associated with insulin resistance and acanthosis nigricans (AN).[25] The prevalence of AN in this study was 42% which is more than one-third of the study population. According to previous studies, almost one-third one-t of PCOS patients suffer from AN, which is consistent with our findings.[26] Charnvises K et al concluded a 39.7% prevalence of AN in their study which is consistent with the results of our study.[27]

Androgenic alopecia (AGA) is considered to be the hyperandrogenic manifestation of PCOS. In literature from the past, the prevalence ranged from 31% to 34% in patients with PCOS,[28-29] which is somewhat higher than the prevalence of AGA (20%) in our study. However, similar results were concluded by Quinn M, et al.[30]

5. Conclusion

The phenotypic profile of PCOS includes dermatological symptoms. They play an essential role in PCOS diagnosis and can have long-term aesthetic and psychological consequences on the patient's quality of life and social well-being. Patients should be advised on their prognosis, long-term management options, and lifestyle changes.

CONFLICTS OF INTEREST- None

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Contributions:

T.N - Conception of study
T.N, A.A.K, S.K - Experimentation/Study Conduction
D.K - Analysis/Interpretation/Discussion
S.K, A.N, D.K - Manuscript Writing
A.N, S.S.M - Critical Review
S.S.M – Facilitation and Material analysis

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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