

A Study on Prevalence of PCOS in Acne Patients

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Abstract :

Background:

Acne Vulgaris is one of the most frequent dermatological conditions (disorder of pilosebaceous units) encountered in our day to day practice .

Many recent studies reported that there is association between acne & underlying systemic endocrine disorders often with polycystic ovarian syndrome.

Materials & Methods – In this prospective observational study which was carried out in Department of Dermatology, Kurnool medical college.

Total of 50 female patients of age group 18-35 years clinically diagnosed as acne vulgaris not on hormonal contraceptives & antiandrogen therapy for atleast 3 months prior to study .Each participant in study was evaluated by detailed medical history , cutaneous examination ,ultrasound abdomen & pelvis ,hormonal assays. Rotterdam criteria 2003 was used to assess PCOS .

Results: The final study had included 50 women with acne. The most common type of lesion observed in our study was comedone (62%). The proportion of women with Grade I, Grade II, Grade III, Grade IV were 48%,32%,24% & 16% respectively. The prevalence of PCOS among acne patients in our study was 26%. PCOS had shown significant association with acne. The factors which have shown statistically significant association were higher waist circumference, hirsutism, acanthosis nigricans. Other associations are high BMI.

Conclusion: PCOS is a common disorder among people with acne vulgaris. Presence of obesity, hirsutism, acanthosis nigricans are risk factors. Early diagnosis & treatment can avoid possible complications.

Key words: Acne Vulgaris ,PCOS

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I. Introduction

Acne Vulgaris is one of most common dermatological conditions affecting adolescents & young adults (it may present at any age).

It is a multifactorial chronic, self- limiting, inflammatory disease of pilosebaceous unit presenting with pleomorphic lesions like comedones, erythematous papules & pustules, nodules, cysts or pseudocysts & leads to scarring in few of them.¹

- It occurs in all races worldwide, affecting 90 % of people sometimes or other in their life.²

- Age of onset is at puberty or few months earlier (16 -19 years male & 14 – 17 yrs female), may present even in thirties.¹

Pathophysiology:

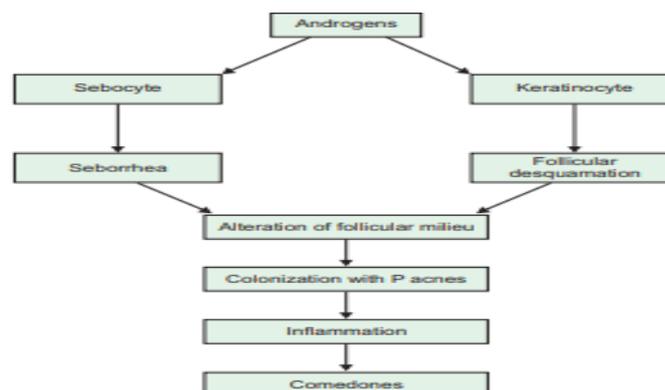


Fig 1 : Etiopathogenesis of acne ³

Severity of skin involvement varies from minimal involvement of disfiguring & highly inflammatory presentations along with complications such as hyperpigmentation, scarring & negative psychosocial effects.

- Apart from being a dermatological condition, it is now known to be linked to a variety of systemic disorders, particularly endocrine disorders such as PCOS.^{4,5,6}

-PCOS is common endocrinopathy among women of reproductive age (15 -45 yrs). Pathogenesis involves several hormonal pathways that culminate in metabolic, reproductive & cardiovascular effects^{7,8}

-The characteristic features of PCOS are hyperandrogenism & hyperinsulinemia causing systemic longterm implications.

- Excess of androgens cause wide range of symptoms such as acne, hirsutism, insulin resistance, obesity & CVS disease.

-A high index of suspicion for PCOS in women with adult onset and accompanying symptoms suggestive of hypogonadism has been suggested by several authors.^{4,9}

-However number of studies on this subject among Indian population is less. Hence we conducted this study with aim of finding prevalence & determinants of PCOS among patients presenting with acne vulgaris.

II. Materials and Methods

This study was a prospective observational study conducted among 50 patients who presented to out patient Department of DVL,Kurnool medical college ,Kurnool ,during period of 6 months i.e.,August 2021 to January 2022.

Study design: Prospective open label observational study

Study Location: Department of Dermatology,Venereology and Leprosy, Kurnool medical college Kurnool,Andhra Pradesh.

Study Duration: August 2021 to January 2022.

Sample size: 50 patients

50 patients who present to Dermatology OPD with features suggesting of acne vulgaris after clinical examination were taken. Patients in our study sample were recruited by prospective sampling into study.

Inclusion criteria: Patients of age between 18 to 35 yrs of age & clinically diagnosed as acne, non pregnant women, who agreed to be a part of study. Informed consent was obtained from all participants of study & confidentiality of patients was maintained .

Exclusion criteria: patients who are pregnant or lactating, taking hormonal therapy & suffering from chronic disease, like Hypertension, Diabetes mellitus, Cardiovascular disease.

Procedural methodology:

-Each participant evaluated by complete medical history

-History of onset of acne (age before or after 25 years)

-Family history of persistent acne, recent or frequent use of cosmetics, drugs history (topical steroids, systemic drug therapy or use of contraceptive), menstrual history ,marital status & history of infertility.

-Dermatological examination was done by inspection with magnifying lens . Type of lesions whether non inflammatory or inflammatory ,distribution of lesions was assessed , assessment of acne severity & grading into mild ,moderate ,severe was done by Global acne grading system.

- Androgenetic alopecia, acanthosis nigricans & hirsutism were noted which are features of hyperandrogenism

-Waist circumference & BMI are assessed for all patients

- Hormonal assays.(in patients who are affordable).

USG abdomen & pelvis done for all patients using Rotterdam criteria 2003 ^{7,10} that fulfil sufficient specificity & sensitivity to define PCOS.

Data analysis: Data was analyzed by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables.

Presence of PCOS was taken as a primary outcome variable.

The association between explanatory variables & categorical outcomes was assessed by cross tabulation & comparison of percentages. Chi square test was used to test statistical significance. P value < 0.05 is considered statistically significant.

Data analysis was done by software SPSS 21.0.

III. Results

A total of 50 women were included in our study. Among the study population, major proportion of participants were between 21-25 years (44%),followed by 26- 30 years age (28%), followed by >30 years (20%),and less than 20 years is (8%).

56% of participants were married, 44% of participants were unmarried.

Irregular menstrual cycle was noted in 36% of participants.

As per WHO criteria, only 12 % of participants had BMI (< 25) in normal weight range. The proportion of women who are overweight (25-30) were 52 %. 36% of participants were obese (30%). In the study waist circumference was low (<88 cms) in 48% of participants & high (> 88 cms) in 52 % of participants. The proportion of women having various degrees of hirsutism was 62 %. Alopecia present in 64% of study population & absent in 36% of participants.

The proportion of patients with Acanthosis nigricans was 52 % in the study population.

Table 1 : Characteristics of study population (N=50)

PARAMETER	NUMBER	PERCENTAGE
AGE GROUP		
UPTO 20	4	8.00%
21-25	22	44.00%
26-30	14	28.00%
>30 YEARS	10	20.00%
MARITAL STATUS		
MARRIED	28	56.00%
UNMARRIED	22	44.00%
MENSTRUAL CYCLE		
REGULAR	32	64.00%
IRREGULAR	18	36.00%
BMI		
BELOW 25	6	12.00%
25-30	26	52.00%
>30	18	36.00%
WAIST CIRCUMFERENCE		
HIGH (> 88 CMS)	26	52.00%
LOW (88 CMS)	24	48.00%
HIRSUTISM		
PRESENT	31	62.00%
ABSENT	19	31.00%
ALOPECIA		
PRESENT	32	64.00%
ABSENT	18	36.00%
ACANTHOSIS NIGRICANS		
PRESENT	26	52.00%
ABSENT	24	48.00%

The most common type of lesion observed in our study participants was comedone , observed in 62% . Other lesions were papule seen in 54% of study participants, pustule in 36% of study participants, Nodules & cysts were seen in 32 % of participants, Mixed (> 2 types of lesions) is seen in 56% of patients. The proportion of participants with Grade I, Grade II, Grade III, Grade IV were 48 %,32%,24% & 16 % respectively.

Table 2 : Acne characteristics in study population (N=50)

ACNE CHARACTERISTICS	NUMBER	%
TYPE OF LESION		
COMEDONE	31	62.00%
PAPULE	27	54.00%
PUSTULE	18	36.00%
NODULE	16	32.00%
MIXED (>2 TYPES OF LESIONS)	28	56.00%
SEVERITY OF ACNE (AS PER GAGS)		
GRADE -I	24	48.00%
GRADE -II	12	32.00%
GRADE -III	10	24.00%
GRADE -IV	4	16.00%

Table 3 : Prevalence Of PCOS in Study Population (N=50)

PCOS	NUMBER	PERCENTAGE (%)
PRESENT	13	26%
ABSENT	37	74%

The proportion of participants having PCOS was 26% in current study.

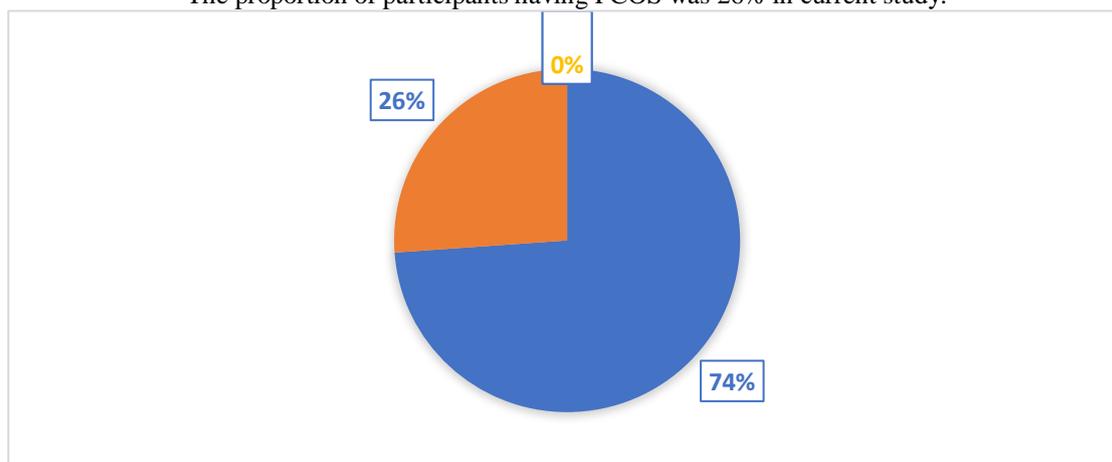


Table 4 :Factors Affecting PCOS in Study Population (N=50)

PARAMETER	PCOS (13)	NO PCOS (37)	Chisquare value	P value
Age group				
Upto 20	3 (23.07%)	1 (2.70%)	5.925	0.115
21-25	4(30.76%)	18(48.64%)		
w26-30	4(30.76%)	10(27.02%)		
Above 30	2(5.40%)	8(21.62%)		
Marital status				
Married	6(46.15%)	22(59.4%)	0.691	0.40
Unmarried	7(53.8%)	15(40.54%)		
Menstrual cycle				
Regular	8(61.5%)	24(64.8%)	0.046	0.82
Irregular	5(38.4%)	13(35.15%)		
BMI				
Below 25	1 (7.69%)	5(13.51%)	8.4866	0.014
25-30	3 (23.07%)	23(62.16%)		
Above 30	9 (69.23%)	9(24.32%)		
Waist circumference				
>88 cms	9(69.23%)	11(29.72%)	6.2543	0.012
<88 cms	4(30.76%)	26(70.27%)		
Hirsutism				
Present	10(79.92%)	21(56.75%)	1.66	0.19
Absent	3(23.07%)	16(43.24%)		
Alopecia				
Present	9(69.2%)	23(62.16%)	0.2086	0.647
Absent	14(37.83%)	4(30.07%)		
Acanthosis nigricans				
Present	19(51.3%)	11(84.61%)	4.43	0.035
Absent	18(48.64%)	2(15.38%)		
Severity of acne				
Mild	22(59.45%)	2(15.38%)	10.2391	0.016
Moderate	8(21.62%)	4(30.76%)		
Severe	6(16.21%)	4(30.76%)		
Very severe	1(2.70%)	3(23.07%)		

Among 13 participants with PCOS 3 people (23.07%) belong to age group of less than 20 years ,4 people (30.76%) were between 21-25 years age group, 4 people (30.76%) were between 26-30 years ,2 people (5.40 %) . Among people without PCOS 1 (2.70%) participant within 20 years of age ,18 people(48.69%) are between 21-25 years ,10 people (27.02%) are between 26-30 years ,8 people (21.62 %) are >30 years.

Among 13 participants with PCOS 6 (46.5 %) were married ,7 (53.8%) were unmarried. The difference in proportion of PCOS group& marital status was statistically not significant (p value 0.45)

Among 13 people with PCOS group 8 people (61.5%) had regular menstrual cycle, 5 people (38.4%) had irregular menstrual cycles. Among 37 people without PCOS 24 (64.8%) had regular menstrual cycles & 13 (35.8%) had irregular menstrual cycles . The difference in proportion of PCOS group & menstrual cycle status was statistically not significant (p value = 0.82).

Among 13 people with PCOS group 1 patient (7 .69%) had BMI less than 25,3 patients (23.07%) had BMI between 25-30. 9 patients (69.23%) had BMI greater than 30. Among 37 people without PCOS

5 people (13.51%) had BMI <25. 23 people (62.16%) had BMI between 25-30. 9 people (24.32%) had BMI >30. Chisquare was 8.486 & p value was 0.14.

Among participants with PCOS group 4 participants (30.76%) had low (>88 cms), and 9 participants (69.23%) had high (<88 cms) waist circumference. Among women without PCOS 26 (70.27%) had low waist circumference & 11 people (29.72%) had high waist circumference. chi square value is 6.25, p value is 0.012 which is statistically significant.

Among 13 participants with PCOS 10 people (76.9%) had hirsutism & 3 people (23.07%) without hirsutism. Among people without PCOS 21 people (56.75%) had hirsutism & 16 people (43.24%) are without hirsutism. P value is 0.19 which is statistically not significant.

Among people with PCOS 9 people (69.2 %) had hairfall & 4 people (30.7%) were without hairfall. Among participants without PCOS 23 people (62.16 %) had hairfall & 14 people (37.8%) had no hairfall. p value is 0.647. which is statistically not significant.

Among participants with PCOS 11 people (84.61 %) had acanthosis nigricans & among participants without PCOS 19 people (51.3%) are without acanthosis nigricans .p value is 0.035 which is statistically significant.

The PCOS group had 2 (15.38 %) people suffering Grade I acne ,4 people (30.76%) with Grade II acne, 4 (30.76%) with Grade III acne ,3 people (23.07%) with Grade IV acne. Among people without PCOS 22 people (59.45%) are with Grade I acne , 8 people (21.62%) with Grade II ,6 people are with Grade III acne ,1 participant was suffering from Grade IV acne . p value is 0.016 which is statistically significant.

Hormonal analysis was carried out in few patients due to economical constraints, among them few patients showed altered LH / FSH ratio & serum free testosterone was found to be normal.



Fig 2 : Grade III Acne



Fig 3 : Hirsutism



Fig 4: USG pelvis showing peripherally arranged follicles -PCOS

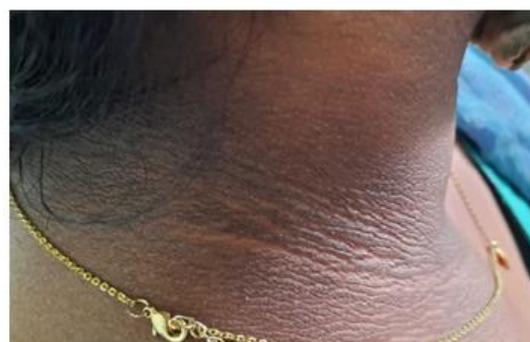


Fig 5: Acanthosis nigricans

IV. Discussion

Acne vulgaris is a multifactorial chronic, self-limiting ,inflammatory disease of pilosebaceous unit presenting with pleomorphic lesions like comedones, erythematous papules & pustules ,nodules ,cysts or pseudocysts & leads to scarring in few of them.

It usually affects adolescents but can affect any age .

Lesions are located predominantly on face, neck, chest & back in places with more follicles.

The main pathogenic factors of acne are seborrhea, hyperproliferation of follicles, hyperandrogenism, Propionibacterium acnes colonization & inflammation.¹

The most common cause of hyperandrogenism among women of reproductive age group is PCOS.

The present study was conducted to explore the association of Acne vulgaris with PCOS, considering the increasing reports of systemic endocrine defects.

The present study includes 50 women from 18-35 years of age. Other studies have reported women of similar age reporting with acne and PCOS. It has been reported that prevalence of polycystic ovaries is more common younger than 35 years.

Majority of women in the present study belong to 21-25 years of age 44%. 36 % had irregular menses, 36 % had BMI above 30. Comedone is most common lesion present among study population i.e., 62%.

52% of patients had high waist circumference >88cms & 48 % had low waist circumference.

Among study population 62% patients had hirsutism.

64% of patients had hairfall (alopecia).

Among study population 52% of patients had acanthosis nigricans.

The proportion of women having PCOS was 26% in our present study. (21.89 – 39.58 %).

PCOS had shown no significant association with age of women, marital status & menstrual irregularities.

The factors which have shown statistically significant association were high BMI, high waist circumference, acanthosis nigricans, severity of acne.

Zandi et al. in 2010 carried a study in Iran on 118 acne patients 60.2 % were diagnosed as PCOS. 54% patients had hirsutism & menstrual disturbances were present in 37%.^{7,8}

Begum et al. conducted a study among 40 patients of which 11 had PCOS (27.5%) & 3.3% in control group.^{7,11}

Raja et al. in 2018 carried a study in Tamilnadu among 100 patients of which 30 % had PCOS.⁴

Maluki et al. reported prevalence of PCOS among 51.2 % of patients & 6.2% of healthy control group had PCOS.^{7,12}

Hence presence of obesity, high waist circumference and other cutaneous markers of hyperandrogenism should raise suspicion of PCOS among people with acne.

These women shall be subjected to further appropriate diagnostic tests to diagnose PCOS early to prevent long term physical & psychological consequences.

Conflicts of interest -None declared

Funding : No funding sources

V. Conclusion

PCOS is a common disorder among people with acne vulgaris. Presence of obesity, hirsutism, acanthosis nigricans are risk factors. Early diagnosis & treatment can avoid possible complications.

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