Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: www.saspublishers.com

OPEN ACCESS

Biochemistry

Prevalence of Polycystic Ovary Syndrome in Women with Acne: A study in a tertiary care private hospital, Mymensingh, Bangladesh

Dr. Nahida Islam[1*], Dr. Mohammad Imdadul Hoque Shakil[2]

[1]Associate Professor, Community Based medical college Bangladesh (CBMCB), Mymensingh, Bangladesh
[2]Orthopaedic Consultant, Upazilla Health Complex (UHC), Mymensingh Sadar, Mymensingh, Bangladesh

***Corresponding author:** Dr. Nahida Islam
| **Received:** 17.05.2019 | **Accepted:** 26.05.2019 | **Published:** 30.05.2019
DOI: 10.36347/sjams.2019.v07i05.070

Abstract **Original Research Article**

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder and is the leading cause of hyperandrogenemia in women. Acne vulgaris is also a common cutaneous manifestation of hyperandrogenism. We conducted a cross-sectional study in the department of Dermatology, Community Based Medical College Bangladesh (CBMCB), Mymensingh, Bangladesh during the period from January 2018 to December 2018. Our aim was to determine the prevalence of PCOS in patients with acne and its associated factors with regard to the clinical and paraclinical findings. During study period, a total of 1612 patients were admitted in the hospital. Among them 102 patients were with Acne with a prevalence rate of 6.32%. Among acne group 83 (82%) were women and 19 were male. A total of 83 women, 54(65.06) suffered with polycystic ovary syndrome (PCOS) disorder and 19(34.94) without polycystic ovary syndrome (non-PCOS) disorder were included in the study. So, eighty three (83) women patients with acne were selected in the study as study subjects. A clinical examination was followed by a laboratory examination, including hormone profile and ovarian sonography. Confirmation of Pnon-COS was based on the diagnostic criteria of the National Institute of Health (NIH) and the sonographic findings. The subjects were 16-39 years old. PCOS was diagnosed in 41 (49.39%) patients by sonography methods, while, 54(65.06%) patients were diagnosed as PCOS cases based on the NIH criteria. In this study obesity was 25.27% in the PCOS group and in 27.85% in the non-PCOS group. The prevalence of hirsutism was also bit similar among women with and without PCOS (58.53% vs. 55.73%). Menstrual disturbance was seen higher in women with PCOS (71.52%), which was statistically significant (p=0.001) PCOS versus non-PCOS had profiles of prolactin (20.86±10.50 ng/ml vs. 18.75±8.65 ng/ml), testosterone (0.82±0.55 pg/ml) vs (0.99±0.99pg/ml), dehydroepiandrosterone levels (2.84±2.12µg/dl vs. 1.99±1.25) and which were not statistically different (p>0.05). The luteinizing hormone to follicular stimulating hormone ratio were (2.42 ±2.11) vs 1.45± 1.24 and was statistically significantly (p=0.01). According to the findings of this study, PCOS is a common disorder among women with acne. Although PCOS was expected to correspond with a specific hormonal profile, our study showed that most of the PCOS patients had normal levels of tested hormones. Therefore, we recommend that sonographic evaluation be one of the core examinations in the diagnosis of PCOS in women having acne.

Key words: Acne, Hyperandrogenism, Polycystic Ovarian Syndrome, Sonography.

INTRODUCTION

Acne is a common manifestation of hyperandrogenemia. Numerous factors contribute to the development of acne. Androgenic stimulation of sebaceous glands is one of the important factors in its development [1].The amount of excess sebum production correlates with the severity of acne. Increased sensitivity to androgenic hormones has also been reported to be a contributing factor [2] .The enzyme 5-alpha reductase converts testosterone to the more potent androgen dihydrotestosterone within the sebaceous glands. Current studies indicate the influence of neuropeptides and congenital factors in the development of acne [2]. Acne by itself is a serious cosmetic disorder, but it could also be a sign of an underlying disease [3]. In females, the most common cause of hyperandrogenemia is the polycystic ovary syndrome (PCOS), which affects 5-10% of this population [4]. One of the important etiologic factors of acne is the increased activity of sebaceous glands, which are androgen-dependent. Increasing the level of androgenic products by decreasing sex hormone binding globulin (SHBG), plays a key role in the pathogenesis of acne [2, 5]. The etiology of PCOS is not clearly understood. There is, however, a fair amount of

evidence indicating the influence of genetic factors. The occurrence of this syndrome clusters in families and a high prevalence in first-degree relatives, about five to six times higher than in the general population, may indicate its genetic basis [6]. PCOS is the most common endocrine disorder among women during their reproductive period. The diagnosis of PCOS is usually confirmed by certain clinical findings including menstrual disturbances, hyperandrogenism, and an increase in the level of androgenic products from ovaries [3]. The cutaneous manifestations of increased androgenic hormones are hirsutism, acne, seborrhea, alopecia, obesity, and acanthosis nigricans. On the basis of the NIH meeting in 2003, any two of the three are sufficient to confirm the diagnosis of PCOS: (1) specific morphology of polycystic ovaries in ultrasonogaphy findings, (2) hyperandrogenism (biochemical or clinical), and (3) oligo- or amenorrhoea [6]. Seirafi *et al.*[7] showed that the prevalence of PCOS in women with acne was about 40%. Walton *et al.* [8] reported that in 5.5% of the acne cases, PCO could be observed. However, they did not report the prevalence of the syndrome, but only focused on PCO. As they mentioned, there was a controversy in the prevalence of PCOS among patients with acne. Also, the association of clinical manifestations and paraclinical findings was not explored in detail.

Objectives

General Objective

To determine the prevalence of PCOS in patients with acne in selected hospital

Specific Objective

To determine associated factors of PCOS in regards to the clinical and paraclinical findings in women

METHODOLOGY AND MATERIALS

A total of 83 women with a mean age of 24.56±5.7, 54(65.06%) suffered with polycystic ovary syndrome (PCOS) disorder and 19(34.94) without polycystic ovary syndrome (non-PCOS) disorder were included in the study. So, eighty three (83) women patients with acne were selected in the study as study subjects. A clinical examination was followed by a laboratory examination, including hormone profile and ovarian sonography. Confirmation of Pnon-COS was based on the diagnostic criteria of the National Institute of Health (NIH) and the sonographic findings. The subjects were 16-39 years old. PCOS was diagnosed in 41 (49.39%) patients by sonography methods, while, 54(65.065) patients were diagnosed as PCOS cases based on the NIH criteria. Pregnant women and those who received oral contraceptives were excluded from the study. All the eligible subjects were informed about the objective of the study and they then signed the informed consents. Medical history was taken and physical examination was performed on all patients, to register their demographic data and menstrual-related characteristics during the last two years. Oligomenorrhea (menstrual cycle more than 40 days) and amenorrhea (having no menstrual cycle for at least 12 months) were regarded as menstrual disturbances. Anthropometric indices including weight and height were measured using the standard methods. Overweight was defined as BMI >25 kg/m^2. With regard to paraclinical evaluations, pelvic sonography in the early follicular phase (days 5-9 of the menstrual cycle) was carried out by same sonographist in all cases. Polycystic ovaries were diagnosed for those having 12 or more follicles in either ovary (2-9 mm in diameter) accompanied with an increase in the ovarian density. Hormonal assessment included serum levels of prolactin, luteinizing hormone (LH), follicle-stimulating hormone (FSH), testosterone, and dehydroepiandrosterone (DHEA), by using the radioimmunoassay method (DIAPLUS, USA). Finally, PCOS was diagnosed by the NIH diagnostic criteria. All the data were statistically analyzed by SPSS version 11.5. The categorical variables were examined by chi-square and the means were compared by t student test among two groups. The level of significance was considered as $p<0.05$.

RESULTS

Eighty three (83) women with the mean age of 24.56±5.7 years were analyzed. Obesity (BMI ≥25) was detected in 20 (27.3%), hirsutism in 64(54.2%), and menstrual disturbance in 44 (37.3%) of the subjects. They reported that the acne lesions appeared when they were 17.4±5.8 years old. The most affected body areas were the face, thorax, and back, respectively. On the basis of ovarian sonography, polycystic ovaries were diagnosed in 41 (49.39%) of the cases. According to the NIH diagnosis criteria, 54(65.06%) of them were diagnosed with PCOS. Background characteristics of the study participants were illustrated in Table 1. In this study obesity was 25.27% in the PCOS group and in 27.85% in the non-PCOS group. The prevalence of hirsutism was also bit similar among women with and without PCOS (58.53% vs. 55.73%). Menstrual disturbance was seen higher in women with PCOS (71.52%), which was statistically significant (p=0.001). PCOS versus non-PCOS had profiles of prolactin (20.86±10.50 ng/ml vs. 18.75±8.65 ng/ml), testosterone (0.82±0.55 pg/ml) vs (0.99±0.99pg/ml), dehydroepiandrosterone levels (2.84±2.12µg/dl vs. 1.99±1.25) and which were not statistically different (p>0.05). The luteinizing hormone to follicular stimulating hormone ratio were (2.42 ±2.11) vs 1.45± 1.24 and was statistically significantly (p=0.01).

Table-I: Age distribution of the study participants. (n=83)

Age in years	Study subjects		Total (%)
	PCOS group N (%)	Non-PCOS group N (%)	
15-25	24(45.28)	19 (65.61)	10 (18.2)
25-35	16 (30.18)	8 (27.58)	21 (38.2)
≥35	13 (24.52)	2 (6.89)	24 (43.6)
Mean	24.56±5.7		
Range	14		40

Table-I1: Comparison of clinical features of acne patients diagnosed as PCOS and non-PCOS (n=83)

Factors	PCOS N=54	Non-PCOS N=29	p-value
Obesity	25.27%	27.85%	
Hirsutism	58.53%	55.73%	* p≤0.05
Menstrual irregularities*	71.52%	21.24%	

Table-III: Comparison of mean serum hormone levels in patients with acne diagnosed as PCOS and non-PCOS.

Serum hormone	PCOS N=54	Non-PCOS N=29	p-value
Prolactin (ng/ml)	20.86±10.50	18.75±8.65	*p≤0.05
Testosterone (pg/ml)	0.82±0.55	0.99±0.99	
DHEA (µg/dl)	2.84±2.12	1.99±1.25	
LH/FSH ratio*	2.42 ±2.11	1.45± 1.24	

DHEA=Dehydroepiandrosterone,

DISCUSSION

PCOS is the most common female endocrinopathy, affecting 5-10% of the female population. Overproduction of the ovarian androgens usually leads to a heterogeneous range of symptoms including hirsutism, acne, insulin resistance, obesity, and cardiovascular disease. The frequency of PCOS in the general population is expected to be around 5%[4], which indicates that acne patients are about ten times more prone to having PCOS than the general population. On the basis of the findings, PCOS was diagnosed in about 65.06% of the patients suffering from acne. In the study of Peserico *et al.*[10] on 119 women with acne (excluding those with obesity, hirsutism, and menstrual disturbance) and 35 normal women as control group, PCOS was diagnosed in 45.4% of the cases while it was detected only in 17.1% of the controls. In our study, we estimated the prevalence of PCOS to be around 65% in women, which is compatible to the previous reports. Such findings indicated that PCOS is a common disorder in patients with acne and it could be completely free of symptoms of hirsutism and obesity. In a study on 90 women, over 17 years of age, with acne, hirsutism was documented in 19 (21%) subjects, elevated levels of at least one androgen in 73 (81%) subjects, menstrual disturbances were reported by 43 (48%) women, and polycystic ovaries were found in 45 (50%) women. The authors indicated that the severity of acne manifestation in adult women is not determined by androgen production [11]. Similarly, we also found no significant differences between PCOS and the normal group regarding the levels of prolactin, testosterone, and dehydroepiandrosterone. Only the LH/FSH ratio was a significant factor when comparing two groups, which indicated that such a factor was the prominent hormonal disturbance in PCOS. Findings from other studies [4,10,12], also showed a higher prevalence of polycystic ovaries and PCOS in acne patients as compared with the control group. Bunker *et al.*[12] reported that 83% of women with acne had polycystic ovaries as compared to 19% in the control group. Those with polycystic ovaries mostly had a normal medical examination in both the clinical and endocrinological findings. These findings were supported by Timpatanapong *et al.*[3] who reported PCOS in 37.3% of patients with acne and none in the control group. Thirty-nine percent of the acne patients suffered from abnormal menstruation. Finally, they reported no statistically significant difference in LH, FSH, or sex hormone binding globulin of patients with acne in comparison with the control group [3]. In Walton's study, among 36 females with acne only two patients had polycystic ovaries[8]. Seven patients had irregular menses and none had evidence of hirsutism. The authors reported that the severity of acne highly correlated with the androgenic hormone. Their findings differed from what we found in our study, which could be due to highly selected samples. They excluded those patients with severe acne. In another

study, 35 white women with adult onset acne and hirsutism were compared with 35 white women with adult acne without hirsutism; PCOS was reported in 57.1% and 28.6%, respectively. The authors concluded that patients presenting with adult-onset acne and hirsutism had a higher risk of PCOS [7].

Limitations of the study

This was a cross-sectional study in a single centre with a small sample size. So, the study results may not reflect the scenarios of the whole country.

CONCLUSION & RECOMMENDATION

The results of this study indicate that, the polycystic ovarian syndrome (PCOS) is a common disorder in Iranian women with acne and not necessarily associated with clinical signs and symptoms such as obesity or hirsutism. Menstrual disorder and LH/FSH ratio were the most important predictors of PCOS in women with acne. We would like to recommend for conducting more study regarding this issue to know more about the prevalence of PCOS in patients with acne.

REFERENCES

1. Essah PA, Wickham III EP, Nunley JR, Nestler JE. Dermatology of androgen-related disorders. Clinics in dermatology. 2006 Jul 1;24(4):289-98.
2. Shaw JC. Acne: Effect of hormones on pathogenesis and management. *Am J Clin Dermatol.* 2002; 3: 571-8.
3. Timpatanapong P, Rojanasakul A. Hormonal profiles and prevalence of polycystic ovary syndrome in women with acne. The Journal of dermatology. 1997 Apr;24(4):223-9.
4. Archer JS, Chang RJ. Hirsutism and acne in polycystic ovary syndrome. Best Practice & Research Clinical Obstetrics & Gynaecology. 2004 Oct 1;18(5):737-54.
5. Burton JL, Cunliffe WJ, STAFFORD I, SHUSTER S. The prevalence of acne vulgaris in adolescence. British Journal of Dermatology. 1971 Aug;85(2):119-26.
6. Homburg R. Polycystic ovary syndrome. Best Practice & Research Clinical Obstetrics & Gynaecology. 2008 Apr 1;22(2):261-74.
7. Seirafi H, Farnaghi F, Vasheghani-Farahani A, Alirezaie NS, Esfahanian F, Firooz A, Ghodsi SZ. Assessment of androgens in women with adult-onset acne. International journal of dermatology. 2007 Nov;46(11):1188-91.
8. Walton S, Cunliffe WJ, Keczkes K, Early AS, McGarrigle HH, Katz M, Reese RA. Clinical, ultrasound and hormonal markers of androgenicity in acne vulgaris. British Journal of Dermatology. 1995 Aug;133(2):249-53.
9. Iurassich S, Trotta C, Palagiano A, Pace L. Correlations between acne and polycystic ovary. A study of 60 cases. Minerva ginecologica. 2001 Apr;53(2):107-11.
10. Peserico A, Angeloni G, Bertoli P, Marini A, Piva G, Panciera A, Suma V. Prevalence of polycystic ovaries in women with acne. Archives of dermatological research. 1989 Jan 1;281(7):502-3.
11. Cibula D, Hill M, Vohradnikova O, Kuzel D, Fanta M, Zivny J. The role of androgens in determining acne severity in adult women. British Journal of Dermatology. 2000 Aug;143(2):399-404.
12. Bunker CB, NEWTON JA, Conway GS, Jacobs HS, Greaves MW, DOWD PM. The hormonal profile of women with acne and polycystic ovaries. Clinical and experimental dermatology. 1991 Nov;16(6):420-3.