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Acne as a Clinical Manifestation of Polycystic Ovary Syndrome among Women in Tripoli, Libya

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Acne as a Clinical Manifestation of Polycystic Ovary Syndrome among Women in Tripoli, Libya

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ABSTRACT

Background: Polycystic Ovary Syndrome (PCOS) is a prevalent endocrine disorder among women of reproductive age, commonly associated with hyperandrogenism, menstrual irregularities, and dermatological manifestations such as acne.

Objective: This study aimed to investigate the prevalence of acne among women with PCOS and explore its association with hormonal imbalance in among some women from Tripoli, Libya..

Methods: A cross-sectional study was conducted among 100 women attending outpatient clinics in hospitals in Tripoli, Libya. Data were collected using a structured questionnaire administered through face-to-face interviews, focusing on demographic characteristics, PCOS-related symptoms, family history, and awareness of hormonal factors.

Results: The majority of participants were aged 20–29 years (68%). Acne during the menstrual cycle was reported by 75% of respondents, while 78% experienced irregular menstrual periods, and 87% reported unusual hair loss. A family history of PCOS was present in 72% of participants, and 66% had been previously diagnosed with polycystic ovaries. Awareness of PCOS was moderate, with 60% recognizing the role of androgen excess.

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Conclusion: The findings demonstrate a strong association between PCOS and acne among Libyan women, highlighting the need for improved awareness, early diagnosis, and targeted management strategies to address both reproductive and dermatological outcomes.

Keywords: Acne, PCOS, hyperandrogenism, hirsutism ،insulin resistance, chronic anovulation, menstrual irregularities.

حب الشباب كأحد المظاهر السريرية لمتلازمة تكيس المبايض لدى النساء في طرابلس، ليبيا

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الملخص

الخلفية: متلازمة تكيس المبايض اضطراب هرموني شائع بين النساء في سن الإنجاب، ويرتبط عادةً بفرط الأندروجينية، واضطرابات الدورة الشهرية، وأعراض جلدية كحب الشباب، هدفت هذه الدراسة إلى التحقق من مدى انتشار حب الشباب بين النساء المصابات بمتلازمة تكيس المبايض، واستكشاف علاقته باختلال التوازن الهرموني لدى بعض النساء من طرابلس، ليبيا.

الطرق: أُجريت دراسة مقطعية شملت 100 امرأة يراجعن عيادات خارجية في مستشفيات طرابلس، ليبيا. جُمعت البيانات باستخدام استبيان مُنظّم، أُجري من خلال مقابلات

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شخصية، مع التركيز على الخصائص الديموغرافية، وأعراض متلازمة تكيس المبايض، والتاريخ العائلي، والوعي بالعوامل الهرمونية.

النتائج: كانت غالبية المشاركات تتراوح أعمارهن بين 20 و29 عامًا (68%). أفادت 75% من المشاركات بظهور حب الشباب خلال الدورة الشهرية، بينما عانت 78% منهن من عدم انتظام الدورة الشهرية، وأبلغت 87% عن تساقط شعر غير طبيعي. وُجد تاريخ عائلي لمتلازمة تكيس المبايض لدى 72% من المشاركات، وشُخّصت 66% منهن سابقًا بتكيس المبايض. كان الوعي بمتلازمة تكيس المبايض متوسطًا، حيث أدركت 60% من المشاركات دور زيادة الأندروجين.

الخلاصة: تُظهر النتائج وجود ارتباط قوي بين متلازمة تكيس المبايض وحب الشباب لدى النساء الليبيات، مما يُبرز الحاجة إلى تحسين الوعي، والتشخيص المبكر، واستراتيجيات إدارة مُوجّهة لمعالجة كلٍ من النتائج الإنجابية والجلدية.

الكلمات المفتاحية: حب الشباب، متلازمة تكيس المبايض، فرط الأندروجينية، الشعرانية، مقاومة الأنسولين، انقطاع الإباضة المزمن، اضطرابات الدورة الشهرية.

INTRODUCATION

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age and represents a leading cause of hyperandrogenism and ovulatory dysfunction worldwide. It is characterized by a heterogeneous clinical presentation involving reproductive, metabolic, and dermatological abnormalities [Azziz R. et.al. 2016, Witchel SF. et.al 2019]. Although the exact etiology of PCOS remains incompletely understood, current evidence suggests that the syndrome results from a complex interaction between genetic predisposition, epigenetic influences, environmental exposures, and lifestyle factors. These mechanisms contribute to disturbances in the hypothalamic–pituitary–ovarian (HPO) axis and ovarian steroidogenesis, ultimately leading to hormonal imbalance and ovarian dysfunction [Liu YN. et.al 2022, Crespo RP. 2018].

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The prevalence of PCOS is estimated to range between 5% and 20% among women of reproductive age, depending on the diagnostic criteria used and the population studied [Azziz R. et.al. 2016,]. The most widely accepted diagnostic criteria are those established by the Rotterdam consensus, which define PCOS by the presence of at least two of the following three features: oligo- or anovulation, clinical or biochemical hyperandrogenism, and polycystic ovarian morphology on ultrasound, after exclusion of other related disorders [The Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. 2004]. Hormonal dysregulation plays a key role in the pathophysiology of PCOS, particularly an increased luteinizing hormone (LH) to follicle-stimulating hormone (FSH) ratio that stimulates excessive androgen production by ovarian theca cells. This androgen excess disrupts normal follicular development and contributes to the clinical manifestations of hyperandrogenism [Azziz R. 2018].

In addition to reproductive dysfunction, insulin resistance and compensatory hyperinsulinemia are considered central features in many women with PCOS. Insulin resistance enhances ovarian androgen production and decreases hepatic synthesis of sex hormone-binding globulin (SHBG), thereby increasing circulating free androgens [Zhao H. et.al. 2023]. These metabolic disturbances also predispose affected women to several long-term health complications, including type 2 diabetes mellitus, metabolic syndrome, cardiovascular disease, infertility, and pregnancy-related complications [Yao K. et.al. 2017, Legro RS. 2013].

Cutaneous manifestations are common in women with PCOS and are largely related to hyperandrogenism. These dermatological features include acne, hirsutism, androgenic alopecia, and seborrhea, which may serve as visible indicators of underlying endocrine abnormalities [Laus M. et.al. 2017, Grandier S. et.al. 2019, Keen MA. Et.al. 2017, Schmidt TH. Et.al. 2013]. Among these manifestations, acne vulgaris is one of the most frequent and psychologically distressing conditions, particularly in adolescents and young women. Acne in PCOS is primarily mediated by elevated androgen levels, especially testosterone and dihydrotestosterone, which stimulate sebaceous gland activity, increase sebum

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production, and promote follicular hyperkeratinization, leading to inflammatory acne lesions [Oge LK. et.al. 2019, Grandier S. et.al. 2019]. Moreover, insulin resistance may further exacerbate acne by stimulating ovarian and adrenal androgen synthesis [Zhao H. et.al. 2023].

Several studies have investigated the relationship between acne and PCOS in different populations. Zandi et al. reported that a considerable proportion of women presenting with moderate-to-severe acne were diagnosed with PCOS, highlighting acne as a potential clinical marker of the syndrome [Zandi S. et.al. 2016]. Similarly, Shareef et al. demonstrated a significant prevalence of PCOS among women with acne vulgaris, particularly among those with additional features such as hirsutism, menstrual irregularities, and increased body mass index [Sharef A. et.al. 2018]. Conversely, some studies have reported weaker associations between acne severity and PCOS, suggesting that acne alone may not be a definitive predictor of the syndrome but should prompt further clinical evaluation when accompanied by other signs of hyperandrogenism [Bliede K. et.al. 2020].

In Libya, available epidemiological data regarding PCOS remain limited but indicate that the disorder represents an important health concern among women of reproductive age. Previous studies conducted in Libyan populations have reported varying prevalence rates and have highlighted menstrual irregularities, infertility, and metabolic disturbances as common clinical features [Najem FI. et.al 2008, Abdalla H. et.al. 2024]. However, limited research has specifically addressed the dermatological manifestations of PCOS, particularly acne, and their clinical significance in the early detection of the syndrome.

Given the high prevalence of acne among young women and its potential association with underlying endocrine disorders, understanding the relationship between acne and PCOS is of considerable clinical importance. Early identification of PCOS in women presenting with dermatological symptoms may facilitate timely diagnosis, appropriate metabolic screening, and effective multidisciplinary management. Therefore, further investigation of the association between acne and PCOS, particularly within the

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Libyan population, is essential to improve awareness, early detection, and long-term health outcomes.

METHDOLOGY

Study Design

A cross-sectional study was conducted among 100 non-pregnant women attending outpatient clinics of Al-jalaa, Abou-Saleem Polyclinic, Al-Amal clinic, and Obagi clinic to study the clinical manifestation associated with PCOS patients'

Data collection:

Data were collected in the period of 9/12/2024 -9/1/2025. Participants were divided into five age groups (< 19, 20-29, 30-39, 40-49, and 50-59years old) who have been diagnosed with PCOS and have acne.

A structured questionnaire-based survey was used to collect data. The questionnaire consisted of seven sections: the participants' demographic profile,

Data were collected using a structured questionnaire administered through face-to-face interviews, focusing on demographic characteristics, PCOS-related symptoms, family history, and awareness of hormonal factors.

Data were analyzed using SPSS v. 25, and Microsoft excel 2013.

Results

Demographic Characteristics:

Age Distribution of Participants:

The study included n= 100 participants, aged between 17 and 54 years, with a mean age of 26.9 ± 7.8 years. The 20–29 age groups was the most represented (68%), followed by the 30–39 age group at 14%, while age groups over 40 years constituted a small percentage of the sample.

Table 1: Frequency Distribution of Ages by Age Group

Age Group (year)	Frequency	Percentage
< 19	12	12.0%
20-29	68	68.0%
30-39	14	14.0%

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40-49	**4**	**4.0%**
50-59	**2**	**2.0%**
Total	**100**	**100.0%**

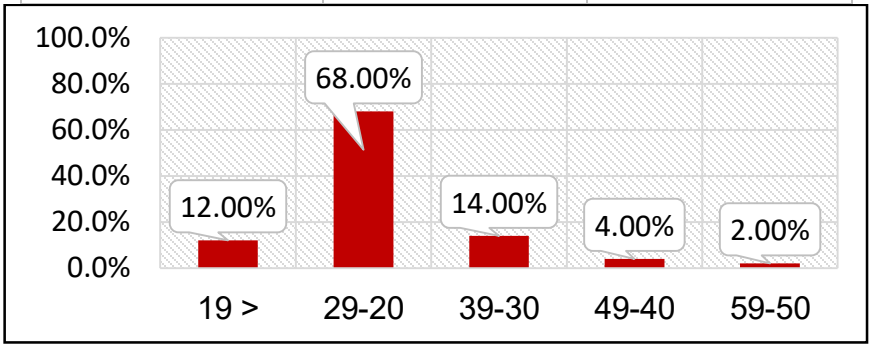

Figure 1: Frequency Distribution of Ages by Age Group

4.1.2 Weight Distribution of Participants

The weight of the participants ranged between 40 and 100 kg, with an average weight of 70.1 ± 12.3 kg. The highest percentage was concentrated in the 70–79 kg weight category (34%), followed by the 60–69 kg category (30%). The distribution of weights across different weight groups is presented in Table 2.

Table 2: Frequency Distribution of Weights by Weight Group

Weight Group (kg)	Frequency	Percentage
40 – 49 kg	**6**	**6%**
50-59 kg	**12**	**12%**
60-69 kg	**30**	**30%**
70-79 kg	**34**	**34%**
80-89 kg	**14**	**14%**
90-100 kg	**4**	**4%**
Total	**100**	**100%**

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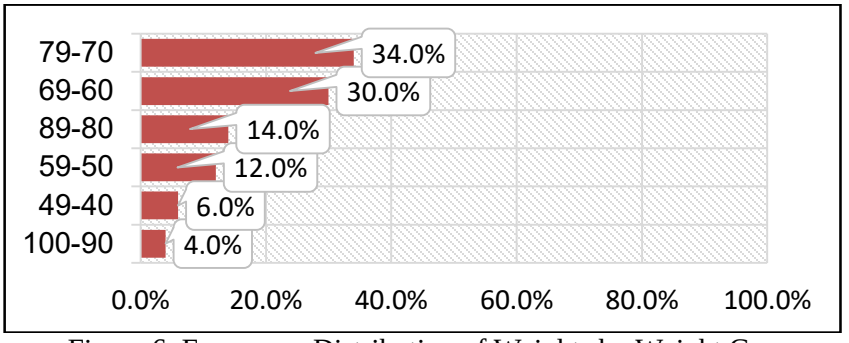

Figure 6: Frequency Distribution of Weights by Weight Group

4.1.3 Marital Status of Participants

Regarding marital status, the majority of participants were unmarried (59%), while the percentage of married women was 35% and divorced women was 6%.

Table 3: Frequency Distribution of Participants by Marital Status

Marital Status	Frequency	Percentage
Married	35	35.0%
Divorced	6	6.0%
Unmarried	59	59.0%
Total	100	100.0%

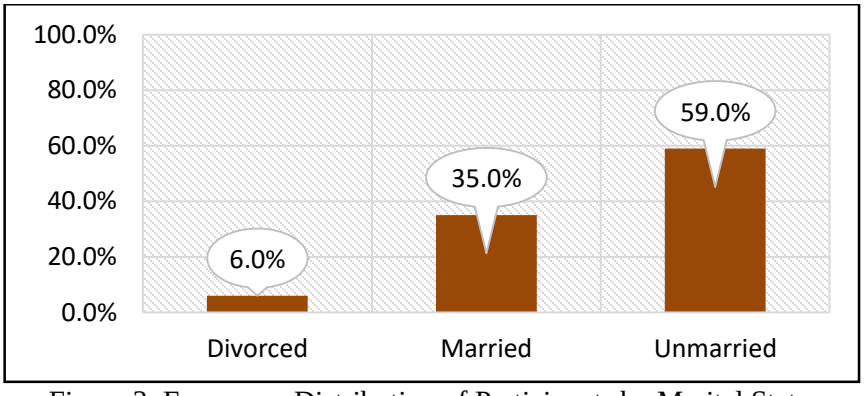

Figure 3: Frequency Distribution of Participants by Marital Status

4.2 Prevalence of PCOS Symptoms The majority of respondents reported experiencing symptoms commonly associated with PCOS. The most prevalent symptom was unusual hair loss (87%), followed

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by irregular periods (78%). A substantial proportion of participants (75%) reported experiencing acne problems, specifically during their periods, indicating a high prevalence of acne among women with PCOS in this sample. Other notable symptoms included prolonged periods (64%), increased hair growth in unwanted places (63%), and difficulty losing weight (63%). A smaller percentage reported a complete absence of periods (23%).

Table 4: Prevalence of Self-Reported PCOS Symptoms

Symptom	Yes (%)	No (%)
Do you suffer from irregular periods?	78%	22%
Have you noticed an increase in hair growth in unwanted places?	63%	37%
Do you have acne problems during your period?	75%	25%
Do you have prolonged periods (more than 7 days)?	64%	36%
Do you have a complete absence of periods (not at all)?	23%	67%
Do you have partial menstrual absences (no more than 28 days)?	48%	52%
Do you have unusual hair loss?	87%	13%
Do you have abnormal and persistent weight gain?	61%	39%
Do you have difficulty losing weight?	63%	37%

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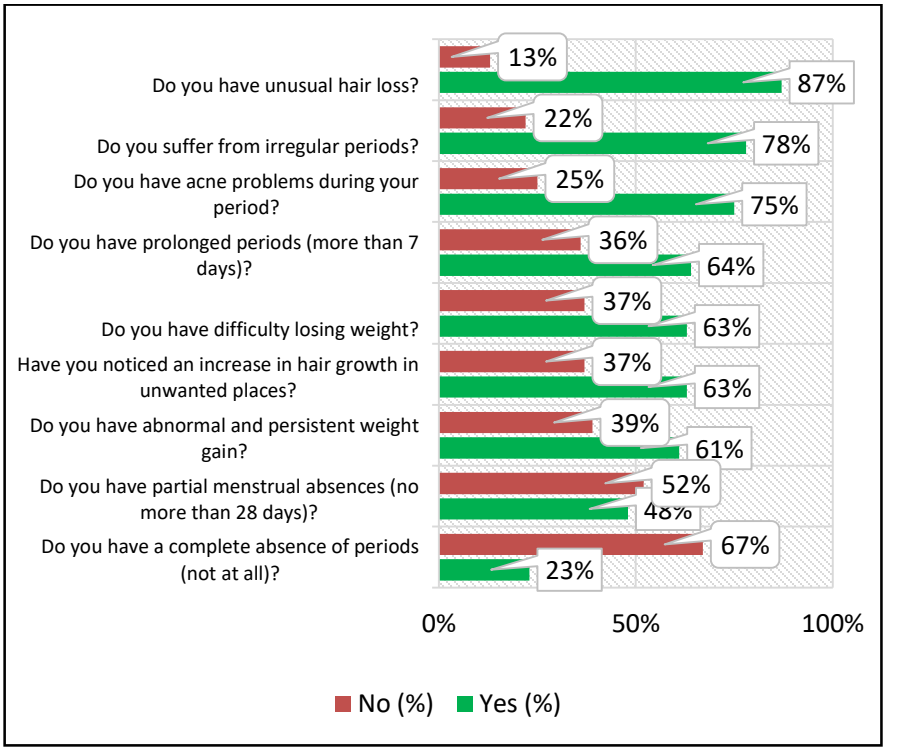

Figure 4: Prevalence of Self-Reported PCOS Symptoms

4.3 Family History and Diagnosis of PCOS A significant percentage of respondents reported a family history of PCOS (72%). Additionally, 66% of respondents indicated they had been previously diagnosed with polycystic ovaries

Table 5: Family History and Previous Diagnosis of PCOS

Question	Yes (%)	No (%)
Do you have a family history of PCOS?	**72%**	**28%**
Have you been previously diagnosed with polycystic ovaries?	**66%**	**34%**

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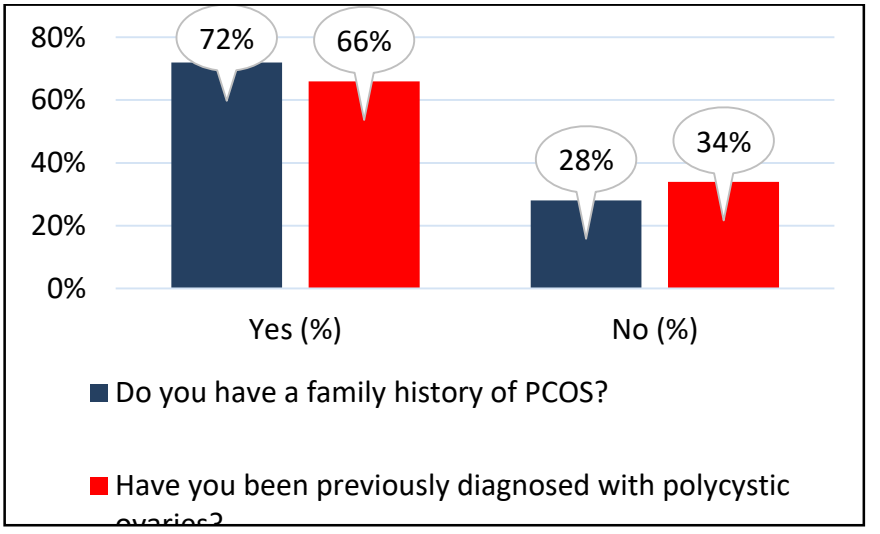

Figure 5: Family History and Previous Diagnosis of PCOS

4.4 Awareness of PCOS and Related Terms Awareness of PCOS and related terms varied among respondents. While 63% had heard of PCOS, a higher percentage (68%) was aware of the male hormone androgen. A significant proportion of respondents (60%) were aware that increased androgen levels are a characteristic of PCOS, which is relevant considering the potential link between androgens and acne. Knowledge about specific aspects of PCOS, such as the presence of multiple small ovarian cysts (74%), was moderate. Only 55% knew that scalp hair loss is a symptom of PCOS.

Table 6: Awareness of PCOS and Associated Hormonal Factors

Question	Yes (%)	No (%)
Have you heard the term polycystic ovary syndrome (PCOS)?	**63%**	**37%**
Have you heard of the male hormone androgen?	**68%**	**32%**
Did you know that in PCOS there is an increase in androgen hormone?	**60%**	**40%**
Did you know that PCOS patients have multiple small ovarian cysts?	**74%**	**26%**
Did you know that more scalp hair loss than usual is one of the symptoms of PCOS?	**55%**	**45%**

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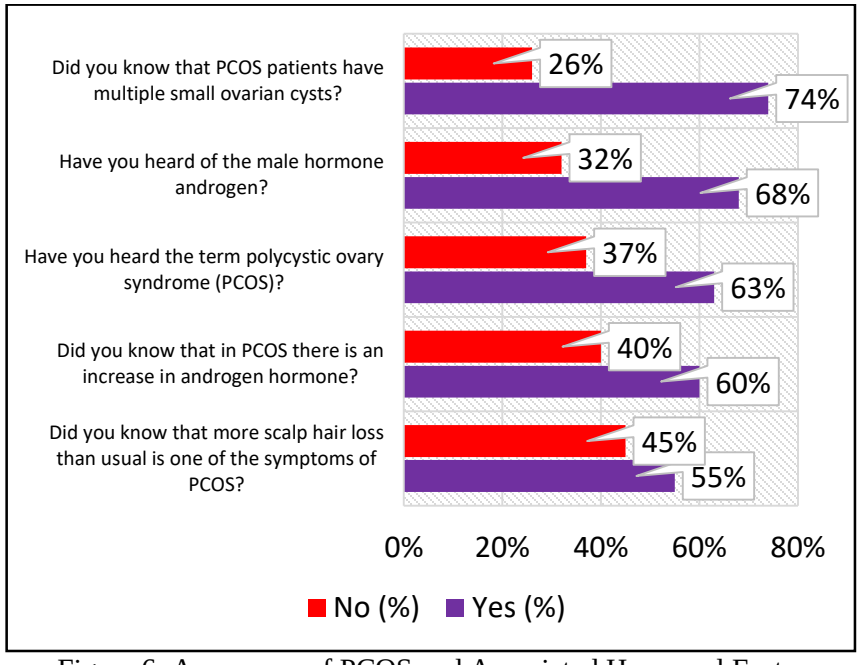

Figure 6: Awareness of PCOS and Associated Hormonal Factors

4.5 Treatment Patterns for PCOS A majority of respondents (68%) reported being prescribed treatment based on their results, while 32% had not received any treatment. This suggests that a large proportion of women with PCOS in this sample are seeking and receiving medical care. Given the high prevalence of acne (75%) and the awareness of increased androgens (60%), it is likely that at least some of these treatments address acne management, although the specific therapies employed and their effectiveness requires further investigation.

Table 7: Prescription of Treatment for PCOS

Question	Yes (%)	No (%)
Have you been prescribed any treatment based on the results?	**68%**	**32%**

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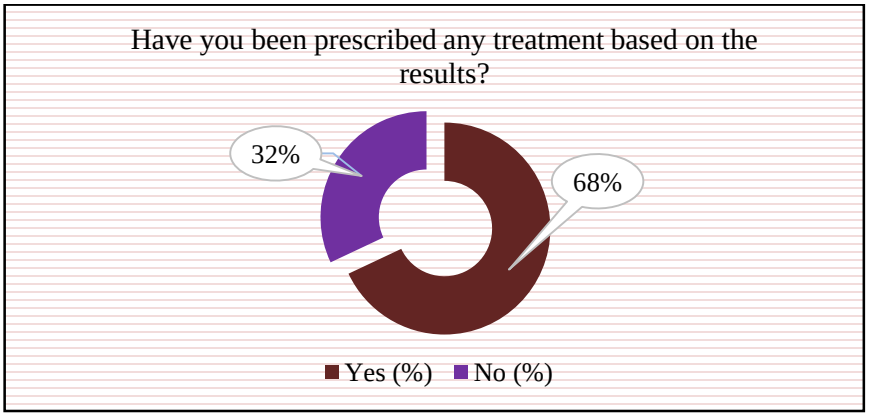

Figure 7: Prescription of Treatment for PCOS

5. DISCUSSION

The current study examined the prevalence and clinical profile of acne among women diagnosed with polycystic ovary syndrome (PCOS) in Tripoli, Libya, and found that acne was reported by 75% of participants. This prevalence aligns with existing evidence demonstrating that acne is one of the most frequent dermatological manifestations in women with PCOS, reflecting the underlying hormonal and metabolic disturbances characteristic of the syndrome [Pourahmad B. et.al. 2025, Ramezani T.F. et.al. 2021]. Acne in PCOS is largely attributed to hyperandrogenism, which stimulates sebaceous gland activity and keratinocyte proliferation, resulting in persistent and sometimes treatment-resistant lesions.

Comparable findings have been reported in North African populations. In a recent study conducted in Tunisia, Ben Abdessalem et al. [Ben Abdessalem H. et.al. 2024] found that over 65% of patients presenting with acne had PCOS, and these individuals exhibited significantly higher rates of nodular acne, hirsutism, and biochemical hyperandrogenism compared to those with isolated acne. These results support the notion that acne in the context of PCOS may represent a clinically distinct phenotype with systemic hormonal involvement rather than isolated dermatological pathology.

The integration of global evidence further strengthens these findings. Pourahmad et al. [Pourahmad B. et.al. 2025] conducted a

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systematic review and meta-analysis involving 95 studies and reported a pooled acne prevalence of approximately 49% among women with PCOS. The rate varied by geographic region and diagnostic criteria, but reaffirmed that acne is among the most common comorbid features of PCOS worldwide. Similarly, [Ramezani Tehrani et. al. 2024] observed that women with PCOS exhibit a significantly higher prevalence of acne than age-matched controls without PCOS, using both NIH and Rotterdam diagnostic criteria. Together, these reports underscore that while prevalence estimates differ across studies, the association between PCOS and acne is both consistent and clinically meaningful.

The present study also revealed concurrent features of hyperandrogenism, including hirsutism, alopecia, and menstrual irregularities, further implicating systemic androgen excess in the studied population. These clinical characteristics are consistent with previous regional research, which has noted that women with PCOS often experience a constellation of signs related to androgen imbalance [Ben Abdessalem H. et.al. 2024, Ramezani Tehrani et. al. 2024]. Additionally, the metabolic aspects of PCOS, particularly insulin resistance and obesity, may exacerbate acne severity by further amplifying androgen production and disrupting follicular homeostasis [Damoulaki E. et.al 2025]. Although BMI was not directly calculated in this study, the high proportion of participants reporting difficulties with weight management suggests a possible link between metabolic dysregulation and clinical presentation.

From a clinical perspective, the high frequency of acne among women with PCOS emphasizes the importance of early recognition and multidisciplinary care. Dermatologists, gynecologists, and endocrinologists should collaborate in evaluating acne patients, particularly when accompanied by menstrual irregularities and other signs of hyperandrogenism. Timely diagnosis of PCOS may facilitate comprehensive management strategies that address both reproductive and metabolic health; thereby reducing long-term risks such as type 2 DM and cardiovascular disease.

Despite these contributions, this study has limitations that warrant consideration. The cross-sectional design precludes causal inference, and reliance on self-reported symptoms rather than

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standardized clinical grading may have introduced reporting bias. Furthermore, the absence of hormonal assays and imaging limits the ability to confirm biochemical hyperandrogenism and polycystic ovarian morphology. Future research should incorporate objective diagnostic measures, including serum androgen levels and ultrasound assessment, in addition to standardized acne severity grading scales.

Conclusion:

The study found that most participants with PCOS were young, unmarried women in their twenties. Common symptoms included hair loss (87%), irregular menstruation (78%), and period-related acne (75%). A family history of PCOS was reported by 72%, and 66% had been previously diagnosed with polycystic ovaries. The findings demonstrate a strong association between PCOS and acne. While overall awareness of PCOS was moderate, knowledge of hormonal involvement was limited, with only 60% understanding the role of androgens. Healthcare engagement was relatively high, with 68% of participants seeking medical care.

In conclusion, the findings confirm that acne is a prevalent and clinically significant manifestation of PCOS in Libyan women, consistent with regional and global evidence. Recognition of acne as part of the PCOS spectrum may enhance early diagnosis and improve patient outcomes through integrated, patient-centered care.

REFERENCES:

Abdallal H, Osman N, Morgham A. Prevalence of polycystic ovary syndrome in fourth-year medical students at the University of Tripoli. Alq J Med App Sci. 2021;4(1):151–154.

Azziz R, Carmina E, Chen Z, Dunaif A, Laven JSE, Legro RS, et al. Polycystic ovary syndrome. Nat Rev Dis Primers. 2016;2:16057.

Azziz R. Polycystic ovary syndrome. Obstet Gynecol. 2018;132(2):321–336.

Ben Abdessalem F., Ach T., Fetoui N., Marihi E., and Abdelkarim A. Clinical and hormonal characteristics of acne in North

http://www.doi.org/10.62341/istj-vol38-2-gd04

African women with polycystic ovary syndrome: Arch. of Derma. Research. 316; 711: 2024.

Bliede K, Roumia A, Khadam J. Prevalence of Polycystic Ovary Syndrome in Women with Acne Vulgaris. Asian Journal of research in Dermatology Science. 2020;3 (1):5–13.

Crespo RP, Bachega TASS, Mendonça BB, Gomes LG. An update of genetic basis of PCOS pathogenesis. Arch Endocrinol Metab. 2018;62(3):352–361.

Damoulaki E, et al. The association of glucose metabolism disorders and acne in women with polycystic ovary syndrome. In Vivo. 2025;39(4):—.

Gainder S, Sharma B. Update on management of polycystic ovarian syndrome for dermatologists. Indian Dermatol Online J. 2019;10(2):97–105.

Keen MA, Shah IH, Sheikh G. Cutaneous manifestations of polycystic ovary syndrome: A cross-sectional clinical study. Indian Dermatol Online J. 2017;8(2):104–110.

Lause M, Kamboj A, Fernandez Faith E. Dermatologic manifestations of endocrine disorders. Transl Pediatr. 2017;6(4):300–312.

Legro RS, Arslanian SA, Ehrmann DA, Hoeger KM, Murad MH, Pasquali R, et al. Diagnosis and treatment of polycystic ovary syndrome: An Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2013;98(12):4565–4592.

Liu YN, Qin Y, Wu B, Peng H, Li M, Luo H, et al. DNA methylation in polycystic ovary syndrome: Emerging evidence and challenges. Reprod Toxicol. 2022;111:11–19.

Najem FI, Elmehdawi RR, Swalem AM. Clinical and biochemical characteristics of polycystic ovary syndrome in Benghazi, Libya: A retrospective study. Libyan J Med. 2008;3(2):71–74.

Oge LK, Broussard A, Marshall MD. Acne vulgaris: Diagnosis and treatment. Am Fam Physician. 2019;100(8):475–484.

Pourahmad B, Majidnia M, Saniee N, Afraie M, Riyahifar S, Darbandi Z. Prevalence of acne vulgaris among women with polycystic ovary syndrome: A systematic review and meta-analysis. Med J Islam Repub Iran. 2025;39:105.

http://www.doi.org/10.62341/istj-vol38-2-gd04

Ramezani Tehrani F, Amiri M, Behboudi-Gandevani S, Bidhendi Yarandi R, Carmina E. The prevalence of acne in women with polycystic ovary syndrome: A systematic review and meta-analysis. Reprod Biol Endocrinol. 2021;19:1–12.

Schmidt TH, Khanijow K, Cedars MI, et al. Cutaneous findings and systemic associations in women with polycystic ovary syndrome. JAMA Dermatol. 2016;152(4):391–398.

Shareef A, Al-Hamdi K, Al-Zubaidy S. Association of polycystic ovary syndrome with acne vulgaris: Prevalence and severity in a cross-sectional study. J Cosmet Dermatol. 2018;17(5):771–775.

The Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. Fertil Steril. 2004;81(1):19–25.

Witchel SF, Oberfield SE, Peña AS. Polycystic ovary syndrome: Pathophysiology, presentation, and treatment with emphasis on adolescent girls. J Endocr Soc. 2019;3(8):1545–1573.

Yao K, Bian C, Zhao X. Association of polycystic ovary syndrome with metabolic syndrome and gestational diabetes: Aggravated complication of pregnancy. Exp Ther Med. 2017;14(2):1271–1276.

Zandi S, Farajzadeh S, Safari F. Evaluation of polycystic ovary syndrome prevalence in patients with acne vulgaris. Adv Biomed Res. 2016;5:179.

Zhao H, Zhang J, Cheng X, Nie X, He B. Insulin resistance in polycystic ovary syndrome across various tissues: An updated review of pathogenesis, evaluation, and treatment. J Ovarian Res. 2023;16(1):1–17.