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To Study the Clinical and Epidemiological Characteristics and Hormonal Profile of Adult Females with Acne Vulgaris

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ABSTRACT

BACKGROUND: Due to the strong impact of environmental variables on the frequency and severity of these lesions, acne vulgaris (AV), a widespread chronic inflammatory skin disease, is regarded as one of the diseases of civilization. The ailment impacts approximately 9.4% of the global populace. Although it commonly occurs during adolescence, it can happen at any age between 11 and 30. AV is more common in late adolescence, between 15 and 18 years old, when puberty is most likely to have started. It is thought to impact up to 100% of young people and 80% of adults in this age range. The dermatosis often manifests in the second decade of life, gets milder with aging, and eventually goes away at the end of the second or start of the third decade. Nonetheless, there are instances in which the illness has continued into the third and even the fourth decade of life. The purpose of this study was to analyze the patients' pre-treatment hormonal profiles and the post-treatment selected hormonal parameters. Examining the relationship between a few hormonal markers and the severity of acne before to treatment was the first goal.

AIM: The aim of this is to study clinical and epidemiological characteristics and the hormonal profile of adult females with acne.

MATERIAL AND METHOD: This cross-sectional study involved adult female patients over 25 who came to the hospital's outpatient dermatology department with signs and symptoms of acne vulgaris. Using a successive sample technique, 100 patients—50 cases and 50 controls—were gathered for the investigation. Every study participant gave their informed consent. Following a thorough medical history and physical examination, notes were made regarding the patient's habits, location of acne lesions and other skin lesions, associated diseases, and the relationship between acne flare-ups and the menstrual cycle. Age, height, body weight, and regularity of menstruation were all inquired about from the patients.

RESULTS: For this investigation, a total of 120 female patients who were older than 25 were chosen. Just 100 of them consented to take part in the research. Ten patients (10%) experienced late-onset acne, while thirty patients (30%) had persistent acne. Twelve patients (12%) had skin types that were normal. There were 23 (23%) and 5 (5%) patients with oily and dry skin, respectively. The study population's mean (SD) level of LH was 3.44 (1.37) IU/L. Three patients (3%) had decreased FSH levels and five individuals (5%) had increased LH levels. Every patient had normal DHEAS and prolactin levels. Five patients (5%) exhibited high levels of LH:FSH.

CONCLUSION: In dermatological practice, acne is one of the most prevalent skin conditions and the most straightforward to diagnose. We only discovered disturbed values in a small number of patients who also exhibited clinical indications of hyperandrogenism in the situations when hormonal screening was done. Even in cases when there are normal levels of androgen in the serum, hormonal therapy can be quite effective in treating female acne. More research examining how women with aberrant androgenic parameters respond to anti-androgen medication with those with normal androgenic parameters may provide a deeper understanding of the function androgens play in acne in women.

KEYWORDS: Acne Vulgaris, Hyperandrogenism, Laboratory Markers, Profile, Hormonal Factors, Contraception and Treatment

INTRODUCTION:

Acne vulgaris (AV) is a skin condition characterized by inflammation of the sebaceous glands and appearance of comedones, papules, pustules, nodules, and cysts.[1] It's a long-term skin disorder that can get worse due to keloids, post-inflammatory hyperpigmentation, and scarring. Dermatologists and internists alike

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commonly see patients with acne, a prevalent skin condition. Research has indicated that acne vulgaris is more common in women and may run in families, even though men are more likely to have severe cases.[2] It is uncommon in children under the age of ten and in individuals over the age of fifty, but more prevalent in teenagers and young adults.[3] Over 80% of young individuals are thought to be affected by acne vulgaris, which results in over 14 million medical visits annually.[4,5]

Propionibacterium acnes is the common cause of acne vulgaris, a skin disorder that is common in young adults and adolescents. It can last throughout adulthood.[6] Similarly, even neonates and children can have acne.[7] Excessive sebum production is a hallmark of the condition. Individuals suffering from acne vulgaris may exhibit a variety of skin lesions, such as comedons, papules, pustules, or mixed patterns, and in certain cases, their scars may be visible.[8] Hormones and inflammatory mediators are two of the many elements that contribute to the pathophysiology of acne. One significant androgen that targets the skin is testosterone.[9] Acne has also been linked to sebaceous hypersensitivity to androgens, according to reports. Additionally, androgens contribute to the development of hyperkeratinization. Hirsutism can also be brought on by hyperandrogenism.[10]

In order to treat the symptoms of acne illness, it is crucial to consider the correlation between acne and other hyperandrogenism-related symptoms as well as the potential therapeutic benefits of anti-androgens. Since these people frequently have diabetes and cardiovascular disorders, therapy can help avert these issues. One significant clinical indicator of polycystic ovarian syndrome (PCOS) is hyperandrogenism. PCO has been linked to abnormalities in the metabolism of estrogen and androgens.[11] All PCOS subjects should be considered at risk of atherosclerosis.[12] Propionibacterium acne growth, aberrant follicular keratinization, elevated sebum production, and inflammation are all factors in the pathophysiology of acne. Propionibacterium may have the function of obstructing follicles, which triggers an inflammatory response. The back, chest, and face are where the lesions are usually found.[9] Patients, particularly women, may experience cosmetic concerns when acne vulgaris affects the face. Patients with acne who receive inadequate treatment or no treatment at all may experience negative effects on their quality of life.[13]

In addition to over-the-counter remedies, prescription medications are now available for the treatment of acne. Anti-androgens may be used early in patients who are resistant to first therapy because of the function that androgen plays in the pathophysiology of acne vulgaris.[14] Serum androgen levels should always be measured in acne vulgaris patients. This is especially crucial in patients with severe, treatment-resistant, or late-onset acne vulgaris. Anti-androgens may be used in the treatment of patients who fit this description if their serum androgen levels are consistently elevated. The goal of the study was to measure the serum androgen levels in adult female patients with acne vulgaris and to establish a relationship between these levels and the severity of the condition in adult female patients visiting a tertiary hospital's dermatology clinic. The most prevalent clinical symptoms in females with hyperandrogenemia are referred to as hyperandrogenism. The most notable symptoms associated with this condition include androgenic alopecia, hirsutism, oily skin, acne, and android obesity. Counseling and treating female patients may benefit from an understanding of the relationship between hormonal changes and clinical characteristics.

MATERIAL AND METHODS

This cross-sectional study involved adult female patients over 25 who came to the hospital's outpatient dermatology department with signs and symptoms of acne vulgaris. Using a successive sample technique, 100 patients—50 cases and 50 controls—were gathered for the investigation. Every study participant gave their informed consent. Following a thorough medical history and physical examination, notes were made regarding the patient's habits, location of acne lesions and other skin lesions, associated diseases, and the relationship between acne flare-ups and the menstrual cycle. Age, height, body weight, and regularity of menstruation were all inquired about from the patients. Additionally, each participant provided information on their eating habits, such as consuming fatty and sweaty meals or milk and

fish, as well as information on their history of acne, hirsutism, androgenetic alopecia, and whether they had family members with the condition.

Inclusion Criteria

patients with clinically diagnosed active acne vulgaris (seborrhea and any or all of the other signs of acne such as comedones, papules, pustules, nodules, and scarring involving the face, chest, and back).

Exclusion Criteria:

- Pregnant women and lactating mothers.
- Participants who had received oral contraceptive pills (OCPs), anti-androgens, systemic antibiotics, and oral retinoids within three months prior to the study.
- Participants who had received topical antibiotics, benzoyl peroxide, tretinoin, adapalene, tazarotene, and topical or systemic corticosteroids within one month prior to the study.
- Participants who had received medications known to affect androgen action or metabolism such as phenytoin, cimetidine, spironolactone, cyproterone, and finasteride.
- Participants who had received medications that cause acne such as lithium, isoniazid, vitamin B2, B6 or B12, and cetuximab.

Inclusion criteria of the controls

Age-matched, consenting women without acne vulgaris who are not taking oral contraceptives or medications that alter testosterone metabolism. The biodata, medical and medication history, and the history of acne and its features were gathered by questionnaires.

The subjects were tested in well-lit conditions. To rate the severity of the acne, the Global Acne Grading System (GAGS) was employed. By analyzing the type of lesions (comedones, papules, pustules, and nodules) and their anatomical location (forehead, cheeks, nose, chin, chest, and back), it is possible to evaluate the severity of acne. 0 represents none, 1–18 represents mild, 19–30 represents moderate, 31–38 represents severe, and more than 38 is very severe.[15]

Sample Collection Criteria

Five milliliters of venous blood were drawn from the antecubital vein, and the separated serum was kept at -20°C until the assay. The time of the serum sample collection during the menstrual cycle was not required. An enzyme-linked immunosorbent assay was used to evaluate the levels of the three androgens in the serum: testosterone, DHEAS, and androstenedione (ELISA).

Calculations were made to determine the prevalence of anomalies in testosterone, prolactin, luteinizing hormone (LH), follicle-stimulating hormone (FSH), LH: FSH ratio, antimullerian hormone (AMH), and serum insulin. LH: FSH ratio of >2:1 was considered abnormal. Additionally, an ultrasound of the pelvis and abdomen was done to check for any abnormalities.

STATISTICAL ANALYSIS

The Statistical Package for Social Sciences (SPSSTM) version 21.0 was used to analyze the data. Frequency distribution tables were used to display the individuals' clinical and sociodemographic details. For continuous data that were normally distributed, the mean and standard deviation were calculated; for skewed continuous variables, the median and interquartile ranges were calculated. Frequencies and percentages were used to represent categorical variables.

RESULT: -

For this investigation, a total of 120 female patients who were older than 25 were chosen. Just 100 of them consented to take part in the research. Ten patients (10%) experienced late-onset acne, while thirty patients (30%) had persistent acne. Twelve patients (12%) had skin types that were normal. There were 23 (23%) and 5 (5%) patients with oily and dry skin, respectively.

Table 1: Acne characteristics and its correlates in adult female patients

Parameter	Result
Acne type n (%)	
Late-onset	10 (10%)
Persistent	30 (30%)
Skin type n (%)	
Normal	12 (12%)

Oily	23 (23%)
Dry	5 (5%)
Hyperseborrhea n (%)	9 (9%)
Hirsutism n (%)	20 (20%)
Androgenic alopecia n (%)	4 (4%)
Menstrual cycles n (%)	
Regular	32 (32%)
Irregular	11 (11%)
Menstrual flare n (%)	
Yes	34 (34%)
No	12 (12%)
Seasonal variation n (%)	
No	34 (34%)
Summer	12(12%)
Winter	1 (1%)
Stress n (%)	15 (15%)
Habits n (%)	
Oily food consumption	18 (18%)
Dairy food consumption	17 (17%)
Use of cosmetics	10 (10%)
Smoking	3 (3%)
Application of oil	9 (9%)
Manipulation	10 (10%)
Pigmentation n (%)	24 (24%)
Scarring n (%)	31 (31%)

Nine (9%), twenty (20%), and four (4%) patients had hyperseborrhea, hirsutism, and androgenic alopecia, respectively. Of the patients, 11 (11%) had irregular menstrual cycles. Twelve patients (12%) and one patient (1%), respectively, observed seasonal variations linked to acne in the summer and winter. Thirteen (15%) of the patients had a history of stress. According to the reports, 18 (18%) and 17 (17%) patients, respectively, consumed dairy and oily foods. Ten patients (10%), three patients (3%), nine patients (9%), and ten patients (10%) reported using cosmetics, smoking, using oil, and manipulating acne lesions, respectively. Of the patients, 24 (24%) had pigmentation, and 31 (31%) had scarring.

Table 2. Acne Severity Frequency

Acne Severity	Frequency	Percentage
Moderate	50	50
Mild	35	35
Severe	12	12
Very severe	3	3
Total	100	100

The highest frequency of acne was seen in the moderate group.

Table 3: Hormonal profile in adult female patients with acne

Hormonal abnormality	N (%)
Elevated testosterone	8 (8%)
Normal DHEAS	100 (100%)
Normal prolactin level	100 (100%)
Elevated LH level	5 (5%)
Decreased FSH level	3 (3%)

Elevated LH: FSH level	5 (5%)
Elevated AMH level	1 (1%)
Increase in insulin level	8 (8%)

Eight individuals (8%) showed high testosterone levels overall. Among individuals with increased levels, the mean (SD) blood testosterone level was 48.53 (0.66) ng/dl. The study population's mean (SD) level of LH was 3.44 (1.37) IU/L. Three patients (3%) had decreased FSH levels and five individuals (5%) had increased LH levels. Every patient had normal DHEAS and prolactin levels. Five patients (5%) exhibited high levels of LH:FSH. One patient (1%) and eight patients (8%) had elevated AMH and insulin levels, respectively.

DISCUSSION

Because sebaceous gland 5α-reductase type 1 activity is higher in the face than in other locations, acne is a prevalent illness. Overproduction of sebum is a significant factor. Because circulating androgen levels rise as puberty progresses, it is frequently detected during this time.[16] Although there is no evidence of a connection between androgenic and acne in earlier research, numerous studies have found, with varying degrees of success, a relationship between the severity of acne and clinical markers of androgen or androgenic levels.[17] Hormonal therapy is recommended for women with hyperandrogenism, although it is equally effective for women with normal blood androgen levels.[18] In patients with acne, endocrinologic abnormalities are uncommon, but in women, they may be the only clinical indication of excess androgen.[19] This problem may be primarily caused by the pilosebaceous unit's end-organ sensitivity to androgens.

the study of **Zaenglein et al.2012**[20] where it was observed that acne could persist to the third decade and beyond. Clients sometimes seek assistance from other sources, such as beauticians, drug vendors, chemists, and market cream sellers, before presenting to the dermatologist, which could also explain the comparatively high mean age of the participants. A US study by **Collier et al.2008**[2] consisting of 1,013 participants of both genders reported a mean age of 48.0 years which was higher than the mean age in this study. A plausible rationale could stem from their community-based research approach. The most prevalent type of acne observed in this study was moderate acne.

Compared to patients with late-onset acne, there were significantly more patients in our research who had chronic acne. Our observations are in accordance with the study conducted by **Khunger and Kumar 2012**.[21] There were both male and female patients in this study, however the proportion of female patients was higher (82.1% versus 17.9%). Lesions related to acne are more frequently observed on the lower portion of the face in females, particularly the jawline and chin. It's possible that many adult female patients will not have this appearance, though. In our investigation, the most often affected area was the cheeks. The mandibular region was the second most often affected area by acne lesions. About 25% of the individuals had lesions on their chins, while the nose was the least prevalent location for acne lesions. Perioral area was most usually affected in a study from Nepal. 41% of female patients had perioral region involvement, according to reports. 39.7% of patients in the same study had involvement in the upper face. 19.2% of patients had involvement in the neck and trunk.[22]

A study conducted by **Levell et al.1989**[23], titled "Acne is not associated with abnormal plasma androgens" noted that none of the serum androgens except dihydrotestosterone correlated with acne severity. One reason for the discrepancy might be that the research's subjects were 16 years of age and older, whereas the subjects in their study were between the ages of 12 and 24. While androgens are involved in the pathophysiology of acne, additional variables that are becoming more and more significant in determining acne severity include gender, genetics, family history, nutrition, usage of comedogenic cosmetics, emotional stress, and psychological issues. Acne is also thought to be largely caused by sebaceous gland reactivity to androgens in the blood. **Cibula et al.2000**[24] found that the severity of acne was not related to serum androgen levels because their patients with severe acne had lower levels of free testosterone, a finding further corroborated by

Henze et al.1998[25] who also observed that most of their subjects with severe acne had normal serum androgen levels. **George et al.2008**[26], concluded that hormonal therapy was beneficial to both women with hyperandrogenemia and normal androgen levels thus highlighting the importance of hormonal treatment in acne patients irrespective of the serum androgen levels.

Acne in young adult women cannot be seen as a passing sign of puberty; rather, it can be a significant clinical marker of androgen excess syndrome. The study was cross-sectional and involved a limited number of patients from one particular center. Owing to their refusal and inability to pay, not all patients who sought laboratory examinations completed the studies. Confirmation of observations requires larger, multicenter research. Extensive research in this field might clarify the part androgens play in acne vulgaris severity.

CONCLUSION:

In dermatological practice, acne is one of the most prevalent skin conditions and the most straightforward to diagnose. We only discovered disturbed values in a small number of patients who also exhibited clinical indications of hyperandrogenism in the situations when hormonal screening was done. Thus, in addition to hyperandrogenism, additional etiological variables may also play a role in adult acne development. Even in cases when there are normal levels of androgen in the serum, hormonal therapy can be quite effective in treating female acne. More research examining how women with aberrant androgenic parameters respond to anti-androgen medication with those with normal androgenic parameters may provide a deeper understanding of the function androgens play in acne in women. Population-based studies are preferred because they can provide a more accurate picture of the relationship between women's quality of life and blood androgen levels.

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