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DEMOGRAPHIC AND HORMONAL PROFILE OF ACNE IN ADOLESCENCE AND POST ADOLESCENCE.

Dermatology

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ABSTRACT

Background: Acne vulgaris is one of the most common skin diseases affecting majority of the teens and reaching its pinnacle during adulthood. In some severe cases, it leads to pronounced skin deformity which adversely dampen the self-esteem of the affected which can eventually lead to depression and even suicides. Usually this disease invariably diminishes in twenties but in some cases, it might even persist in thirties, forties and beyond. Majority of females suffer from mild to moderate acne at some stage of life. Androgens cause enlargement and overstimulation of the sebaceous glands in people with acne and this leads to overproduction of sebum coupled with sluggish exfoliation process leads to blocked pores and development of acne, so the present study conducted with objectives to compare hormonal levels of serum testosterone, LH, FSH among patients with and without Acne and to compare the hormonal levels in different categories of acne among study participants.

KEYWORDS

Acne, Adolescence, Serum FSH, LH, Serum Testosterone.

INTRODUCTION

Acne vulgaris is a common disorder of the pilosebaceous unit. It's prevalence in adolescence is estimated to be 70-87% (1).It is one of the most common dermatoses seen in clinical practice. It commonly affects adolescents and young adults and is characterized by open and closed comedones, erythematous papules and pustules, and in severe cases nodules, deep pustules, and pseudocysts (2). Important pathogenic factors include androgenic stimulation of the sebaceous glands, hyperkeratinization and obstruction of the sebaceous follicles as a result of abnormal keratinization of the infundibular epithelium and microbial colonization of the pilosebaceous unit by Propionibacterium acnes and subsequent perifollicular inflammation (3). Acne can be categorized according to its severity into minor, mild, moderate and severe using the Global Acne assessment (GEA) scale (4).

Acne is a common feature in the course of endocrine diseases characterized by raised levels of androgens. On the other hand raised androgen levels in women with acne have been repeatedly demonstrated in many studies. The skin is a typical target tissue for androgens and testosterone, a major androgen in human blood that stimulate many metabolic processes in the endothelium of sebaceous gland (5). Androgens cause enlargement and overstimulation of the sebaceous glands in people with acne and this leads to overproduction of sebum coupled with sluggish exfoliation process leads to blocked pores and development of acne.It is still not clear how the hormonal stimulation is related to the clinical expression and the course of the disease (6). Increased level of serum testosterone and decreased level of SHBG have been shown in patients with acne (7) and the role of anti-androgen therapy in acne is still under research (8).

OBJECTIVES

1. To study the demographic profile of acne.
2. To compare the hormonal levels of serum testosterone, LH,FSH among patients with and without Acne.
3. To compare the hormonal levels in different categories of acne among study participants.

METHODOLOGY

Study Design: A comparative hospital based study

Study Setting: OPD of Department of Dermatology & Venereology in Alluri Sitarama Raju Academy of Medical Sciences, Eluru.

Study Duration: April 2015 to March 2016

Sampling technique: Convenient sampling

Sample Size: Cases and controls were chosen in 1: 2 ratio after matching of age and gender. The total number of cases-100 and controls -200.

Study Population: Patients attending OPD of Dermatology & Venereology

Inclusion Criteria for cases:

1. Patients age group 10 years to 45 years with acne , clinically diagnosed as acne vulgaris.
2. Patients who were willing to participate in the study.

Exclusion Criteria for cases:

1. Patients age <10 years.
2. Patients who were not willing to participate in the study.
3. Pregnant females and lactating mothers, patients treated with oral contraceptive pills and anti-androgens and patients on medication known to affect androgen action or metabolism.

Inclusion criteria for controls: 1. Included age matched eumenorrhoeic healthy females with no acne and males with no acne. 2. Those who are willing to participate in the study.

Study tools: A predesigned and pretested semi structured questionnaire consisting of sociodemographic details, location of acne, duration of acne etc. Laboratory assessment of serum testosterone, FSH, LH were done under the trained staff and standardized techniques by using Fully Automated Bidirectionally Interphased Chemi Luminescent Immunoassay. For menstruating women mid mensrtraul cycle was considered for carrying out blood investigations. For testosterone early morning samples were taken.

Ethical Considerations: Informed consent was taken from all the study participants before administering the questionnaire and before collecting blood samples.

Statistical Analysis: Data was entered in Microsoft Excel sheet. Analysis was done by using SPSS (version 17). Qualitative data was represented in percentages. Quantitative data was represented as means & standard deviation. Independent sample t test was used to compare between means of the two study groups. For non-normal distribution, Mann whitney U test has been used. A P value of ≤ 0.05 was considered statistically significant.

RESULTS

A total of 300 study participants were included in which 100 were cases and 200 were controls.

Table 1: Distribution of study participants based on socio demographic details

Variable	Sub category	Cases (N) 100	Controls (N) 200	Total (N) 300
Gender	Male	35 (29.17%)	85 (70.83%)	120 (100%)
	Female	65 (36.12%)	115 (63.88%)	180 (100%)
Age group	10-19 yrs	30 (35.29%)	55 (64.70%)	85 (100%)
	20-25 yrs	35 (30.43%)	80 (69.56%)	115 (100%)
	>25 yrs	35 (35%)	65 (65%)	100 (100%)
Education	Illiterates	45 (39.13%)	70(60.86%)	115 (100%)
	Literates	55 (29.72%)	130 (70.2%)	185 (100%)
Socioeconomic status	Class I	0 (0%)	0 (0%)	0 (0%)
	Class II	10 (28.57%)	25 (71.42%)	35 (100%)
	Class III	25 (38.71%)	45 (64.28%)	70 (100%)
	Class IV	40 (36.36%)	70 (63.63%)	110 (100%)
	Class V	25 (29.41%)	60 (70.58%)	85 (100%)

Out of 300 study participants 180 were females and 120 were males. Most of the study participants (115) were in the age group 20-25 years. Majority (185) of the study participants were literates. Most of the study participants belongs to class IV socio economic status.

Among cases the most common location of acne was on the face (64%) followed by back, arm, chest etc, (36%).

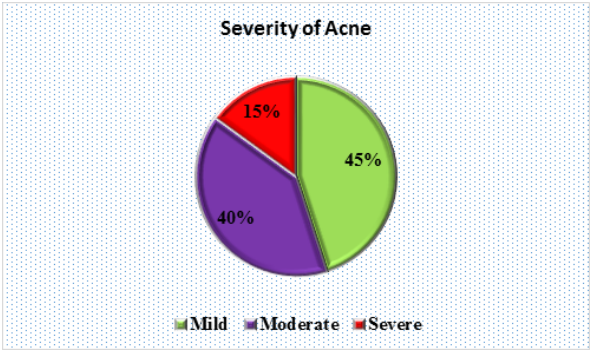

Figure 1: Distribution of study participants based on Severity of Acne in cases(N=100)

In the present study 45% of study participants were suffering with mild acne, 40% suffered with moderate acne and 15% suffered with severe acne.

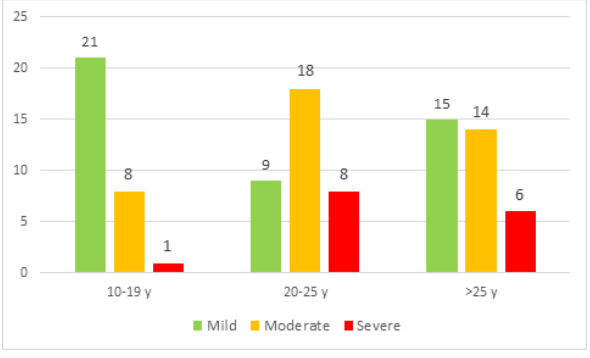

Figure 2: Distribution of study participants based on age group vs severity of acne in Cases

In the present study the mean age of presentation of acne was 22±4.73 years. Further looking for age distribution ,21study participants were suffering with mild acne in the age group 10-19 years where as 15 study participants suffered with mild acne in the age group >25 years.8 study participants had moderate acne in the age group 10-19 years while 6 study participants had severe acne in the age group >25 years.

Table 2: Comparison of mean serum testosterone hormonal levels in cases and controls

Severity of Acne	Cases		Controls		P Value
	Mean(nmol/L)	SD	Mean(nmol/L)	SD	
Mild	16.4	12.81	14.1	9.52	> 0.05
Moderate	24.0	17.70	16.1	9.61	< 0.001*
Severe	38.1	22.53	15.6	8.43	< 0.001*

*** Significant**

In this study higher levels of serum testosterone hormones was seen among cases than controls in mild ,moderate and severe acne, but the difference between mean values of serum testosterone between cases and controls was found to be statistically significant in moderate and severe cases.

Table 3: Mean serum testosterone, FSH & LH hormonal levels in cases and controls Vs Gender

Variable	subcategory	Female Mean+_SD	Male Mean+_SD	P value
Serum Testosterone levels	Cases	1.4 ± 0.11	27.2± 14.21	<0.05
	Controls	1.1 ± 0.30	16 .4 ± 9.23	<0.05
	P value	<0.05	<0.05	
Serum FSH levels	Cases	25.4±3.84	5.3±0.52	<0.05
	Controls	24.2±4.65	4.9±0.56	<0.05
	P value	>0.05	>0.05	
Serum LH levels	Cases	24.96±10.78	6.2±0.63	<0.05
	Controls	25.06±11.62	5.8±0.57	<0.05
	P value	>0.05	>0.05	

In our study higher mean serum testosterone values were observed among males compared to females and the difference was found to be statistically significant. Serum testosterone levels were higher among cases than controls in both genders and it was found to be statistically significant. Higher serum FSH, LH levels were observed among both genders in cases when compared to controls but it was found to be statistically not significant.

Table 4: Comparison of mean serum FSH hormonal levels in cases and controlsvs type of Acne Females (N=180).

Severity of Acne	Cases		Controls		Pvalue
	Mean(mIU/ml)	SD	Mean(mIU/ml)	SD	
Mild	24.6	5.23	23.2	5.10	> 0.05
Moderate	25.2	6.26	25.6	6.11	> 0.05
Severe	26.4	5.45	25.8	5.21	> 0.05

Out of 180 females, 65 were cases and 115 were controls. There was no significant difference of mean serum FSH hormonal values among cases & controls.

Table 5: Comparison of mean serum LH hormonal levels in cases and controls(Females N=180)

Severity of Acne	Cases		Controls		Pvalue
	Mean(mIU/ml)	SD	Mean(mIU/ml)	SD	
Mild	24.24	12.3	24.60	11.23	>0.05
Moderate	25.46	11.6	25.82	10.84	>0.05
Severe	25.02	10.24	24.76	9.81	>0.05

There is no statistically significant difference among the mean values of serum LH in cases and controls.

DISCUSSION

Mild acne includes whiteheads (closed clogged pores) and blackheads (clogged pores that are open at the skin surface and more easily noticeable). Moderate or severe inflammatory acne includes whiteheads and blackheads plus papules (reddened areas that are elevated above the skin surface) and areas of pustules (pimples—small bumps on the skin that contain visible fluid) (9).

In the present study a total of 100 cases and 200 controls were included. **Acne distribution**: Among the participants 45% were suffering with mild acne, 40% suffered with moderate acne and 15% suffered with severe acne. Similar findings were observed in a study done by Reena Kumari Sharma et al (10) who found that mild ance as major group.

These findings were not consistent with other reports in adult female groups (6, 11). While in a study, Borgia *et al.*, showed minor acne as major group (5). A study performed in Bangladesh showed moderate acne as major group (8).

Location: Among cases the most common location of acne was on the face (64%) followed by back, arm, chest etc, (36%). Our study findings were consistent with study done by Yousif Baha'addin Ahmed in Erbil city Iraq (12) who found that the 63.3% of study participants had involvement of the acne on the face. Two different types of AOA are known: persistent acne and late-onset acne. Persistent acne affects 82% of patients and is characterized by continuation of acne from adolescence to adultlife (13).

Affected Age Group: During adolescence, acne vulgaris is more common in males than in females. Acne vulgaris may be present during the first few weeks and months of life, this neonatal acne tends to resolve spontaneously. However, Adolescent acne usually begins with the onset of puberty, when the gonads begin to produce and release more androgens (9).

In the present study, mean age of presentation of acne was 22±4.73 years. This finding is similar to a study conducted by Borgia *et al.*,(6). In a study on correlation between endocrinological parameters and acne severity in adult women above 17 years of age, the mean age of presentation was 24 years. Rehman *et al.*,(8). In a study performed in Bangladesh on association of serum testosterone with acne vulgaris in women, the mean age of presentation was 22.43 years.7 However, the mean age of presentation was 22.1 years in a report from Iran (14).

Serum testosterone hormone: In this study higher levels of serum testosterone hormone was seen among cases than controls. Similar findings were found in the study done by Yousif Baha'addin Ahmed in Erbil city Iraq (12) and Ewadh M in Malaysia (5). Elevated serum testosterone can be attributed to the locally produced androgens and testosterone (15). An essential role for androgens in stimulating sebum production is supported by several lines of evidence. For example, the development of acne in the prepubertal period has been associated with elevated serum levels of DHEAS, a precursor for testosterone (16) (17).The main androgens that interact with the androgen receptor are testosterone and DHT. Androgen receptors are found in the basal layer of the sebaceous gland and the outer root sheath keratinocytes of the hair follicle (16) (17). Another factor which will contribute to the above biochemical change is that when the sebaceous gland produces sebum and this enhances the skin regeneration rate (as well as the death rate of existing skin cells). The increased number of dead skin cells gets deposited in the hair follicles of the skin (the skin also produces more oil and becomes sticky, thus aiding the depositing process). This also attracts bacteria. This leads to the skin openings getting clogged and as a result, pimples are formed (18). And this entire exercise gets started due to an increase in the production of hormones. Thus it is referred to as hormonal acne.

Serum FSH & LH hormones: In our study the levels of serum FSH & LH hormones were similar in both cases than controls. Similar findings were found in the study done by Yousif Baha'addin Ahmed in Erbil city Iraq (12). In all women or children with acne the possibility of a hyperandrogenic state should be considered. The presence of irregular menses and hirsutism increases the likelihood of finding clinically significant hyperandrogenism.(15).

CONCLUSION

The study showed presence of significant association between serum testosterone levels with acne vulgaris, which is a great cause of psychological and cosmetic problem in young adults. Higher levels of these hormones mandates treatment which lowers the level of these hormones which can reduce different forms of acne, particularly which are resistant and refractory to other non hormonal modalities of treatment.

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