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An Observational Study of Exacerbating Factors And Psychological Impact Of Acne Vulgaris In 100 Medical Students

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Abstract
Introduction*: Acne vulgaris is a chronic inflammatory disease of pilosebaceous unit. Acne is estimated to affect 9.4% of the global population; making it the eighth most prevalent disease worldwide. It is a common adolescent problem, affecting more than 85% of teenagers. This study is an attempt to elaborate demographic details, exacerbating factors and psychological effect of acne among medical students.*
Methods*: This cross-sectional observational study was conducted among undergraduate students of a medical college in west India. A detailed history of age, sex, personal and marital history, type of skin, aggravating factors (diet, stress, seborrhea, sweating, solar radiation, cosmetics, premenstrual flare) and psychological effects of acne (anxiety, anger, shame, embarrassment, lack of confidence and impaired social contact) were noted.*
Results: *Mean age was 23.4 years. 69 cases were females and 31 were males. Season was the most common factor associated (60%) followed by stress (44%). In personality changes shame was the most common factor associated (46%), followed by anxiety (40%), then lack of confidence (37%).*
Conclusion*: Acne is a very common disorder among adolescents. Majority of the patients experience psychological symptoms associated with acne of which shame and anxiety are common. Seasonal changes, stress and seborrhoea are frequent exacerbating factors. These factors need to be explained to the patient as a part of counseling along with therapy for overall better outcome.*
Key Words: *Acne vulgaris, Medical students, Psychological impact*

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I. Introduction

Acne vulgaris is a chronic inflammatory disease of pilosebaceous unit. The clinical features of acne include seborrhoea (excess grease), non-inflammatory lesions (open and closed comedones), inflammatory lesions (papules and pustules), and various degrees of scarring. The distribution of acne corresponds to the highest density of pilosebaceous units (face, neck, upper chest, shoulders, and back). Nodules and cysts comprise severe nodulocystic acne.[1]

Acne is estimated to affect 9.4% of the global population; making it the eighth most prevalent disease worldwide.[2] It is a common adolescent problem, affecting more than 85 percent of teenagers. Moreover, adolescence is a time of physical, emotional, and social development. Although some consider acne to be merely a cosmetic problem, it may have significant and enduring emotional and psychological effects. Acne can negatively impact mood, self-esteem, and interpersonal relationships and may lead to depression and suicidal ideation. Hence, it is important to treat acne properly to reduce these symptoms. Various predisposing conditions have been described previously, which exacerbate acne. Certain myths are also prevalent among teenagers related to causative factors of acne. This study is an attempt to elaborate demographic details, exacerbating factors and psychological effect of acne among medical students.

II. Materials And Methods

This cross-sectional observational study was conducted among undergraduate students of a medical college in west India. Institute Ethics Committee clearance was obtained before the start of study. Written and informed consent was obtained from all medical students enrolled. Medical students belonging to the age group of 18-30 years including both males and females, with pre-existing or recently developed acne who were willing to participate in the study and who signed the informed consent form were included. A detailed history of age, sex, personal and marital history, type of skin, aggravating factors (diet, stress, seborrhea, sweating, solar

radiation, cosmetics, premenstrual flare) and psychological effects of acne (anxiety, anger, shame, embarrassment, lack of confidence and impaired social contact) were noted based on a questionnaire. Categorical data were assessed in the form of absolute numbers and percentages. Quantitative data was assessed by calculating range and measures of central tendency such as mean and standard deviation.

III. Results

A total of 100 students studying in a medical college, who were suffering from acne were enrolled in the study. 20 students belonged to the age group of < 20 years, 63 students belonged to the age group of 20-25 years and 17 patients were more than 25 years of age. Mean age was 23.4 years. Out of all the cases, 69 were females and 31 were males. Majority of the students (78%) belonged to urban areas and 22% belonged to rural areas. Majority of the students (88%) had oily skin, 2% had dry skin and 10% of the students reported with normal skin.

Out of 100 students, 93% had one or other exacerbating factor whereas 7% reported no exacerbating factor associated with acne. Season was the most common factor associated (overall, 60%) followed by stress (44%), production of excess sebum (41%), sweating (40%), solar radiation (38%), diet (33%), premenstrual flare (6%) and drugs (8%).

Personality changes and psychological symptoms were found associated in 92% of the patients. 8% patients reported no such factors associated. Shame was the most common factor associated (46%), followed by anxiety (40%), then lack of confidence (37%), anger (36%) and embarrassment (28%).

History of consuming non-vegetarian diet was noted in 24% patients. History of smoking was noted in 9% cases. Alcohol consumption was present in 8% cases. Of the 100 patients, 11% took oral treatment for acne and 14% took topical treatment before being included in this study.

Systemic diseases were found associated in 13% patients whereas 87% patients had no such association. All the 13 patients were females and were diagnosed cases of polycystic ovarian syndrome.

IV. Discussion

Acne vulgaris is a chronic inflammatory disease of pilosebaceous unit. The clinical lesions present as non-inflammatory open and closed comedones, papules, pustules or nodules with varying degree of inflammation and depth. In this study we included 100 medical students with mild, moderate to severe acne and took detailed history of age, sex, personal and marital history, type of skin, aggravating factors (diet, stress, seborrhea, sweating, solar radiation, cosmetics, premenstrual flare) and psychological effects of acne (anxiety, anger, shame, embarrassment, lack of confidence and impaired social contact).

In our study, mean age of patients was 23.4 years. Bloch[3] observed that the peak age of involvement amongst boys was eighteen years and in girls was seventeen years. W.J Cunliffe[4] reported nearly same age group of occurrence of acne. Similar observations were also seen in a study by Agarwal et al (2011) in which mean age was 18.95 years and 14-26 years was the common age group for most of the acne patients. Epstein[5] also observed that highest incidence of acne is seen in age group of sixteen to twenty years. Yahya[6] in Nigeria reported mean age of 16 years in 539 students aged 11–19 years. Due to geographical and racial differences, different studies report slightly variable observations. In our study, 69% of the patients were females and 31% were males. Bloch and Hamilton (1964) observed higher incidence and more severity of acne in males as compared to females. This may be due to more androgens secretion in males.

In the present study, majority of the patients (78%) belonged to urban areas and 22% belonged to rural areas. This is in accordance with a study by Campbell and Strassman who stated that acne is aggravated by modern lifestyles. This may also be due to more concern to get treated in urban areas.[7]

In our study, majority of the patients (88%) had oily skin, 10% had normal skin and 2% of the patients had dry skin. Pochi PE, Strauss JS observed oily skin in acne patients and suggested its correlation with excess sebum production.[8] Rate of sebum production in different individuals is highly variable, and its explanation is not fully understood. Men usually have high sebum production due to higher testosterone levels, but sebum production also increases in women during ovulation, likely due to increased progesterone.[9] Sebum productions also varies with individual skin and the time of year.

In our study, 93% of the patients had one or other exacerbating factor whereas 7% reported no exacerbating factor associated with acne.

Season was the most common factor associated (overall, 60%). Out of these 60% patients, summer as an exacerbating factor was noted in 47% patients and monsoon in 30% patients. Several studies have reported increased sebum production during the spring, summer and in more humid climates.[10,11] Sardana et al reported that in majority of patients acne worsened during summer.[12] In another study, although most of the patients (55.5%) reported no seasonal variation, 42.7% of the patients had exacerbation of acne in summer and 1.8% in winter. Khunger and Kumar in their study observed that summer season was aggravating factor in 36.7% of the

patients.[13]

Keyton FE (1966) reported that stress is an important factor responsible for exacerbating acne. In our study, in 44% of the patients stress was present as an exacerbating factor. Goulden et al., reported that acne flare with stress was observed in 71% of their patients.[14] Khunger and Kumar reported stress as an aggravating factor in 25.7% of patients. Acne may be aggravated by stress or may itself cause stress.

In present study, 40% patients reported exacerbation with acne. William M,Cunliffe JA also reported that sweating exacerbates acne due to hydration of pilosebaceous follicle.

Solar radiation exacerbated the acne in 38% of our cases. Sunlight is usually beneficial for acne although ultraviolet A therapy and psoralen may sometimes precipitate or aggravate acne. Engel et al. reported that sun exposure has positive association with exacerbation of acne.[15]Another study conducted by Khunger and Kumar stated that sunlight exposure was associated with aggravation in 93(33.2%) patients.

The role of diet as aggravating factor in etiopathogenesis of acne has been controversial. Rasmussen & Smith in 1983 reported that there was association between acne and diet. Cordain et al. reported that high glycemic diets may be a significant contributor to acne in Western countries.[16] It was postulated that glycemic load and glycemic index of whole diet may affect the pathogenesis of acne vulgaris. Diet based on products with high glycemic index lead to hyperinsulinemia. Elevated insulin level induces the secretion of androgens and results in an increased production of sebum, which in turn has a fundamental role in pathogenesis of acne.

In another study, 47.3% patients could attribute their exacerbation of acne to intake of different types of food items.[17] Findings of our study are comparable with it. In our study, diet was observed to exacerbate acne in 33% of the patients. Out of these, spicy food, milk products and chocolates were seen to be common culprits. It is believed that insulin-like growth factor 1 (IGF-1) is the constituent of milk that probably stimulates pilosebaceous unit. This factor also stimulates 5α-reductase in gonads and adrenal glands, induces androgen synthesis, causes androgen receptor signal transduction, lipogenesis and sebocytes proliferation. It increases sensitivity of adrenal gland to adrenocorticotropic hormone and thereby induces the expression and activity of enzymes involved in adrenal androgens biosynthesis.[18] It stimulates the production of androgens by ovaries and testicles and also inhibits synthesis of sex hormone binding globulin (SHBG) in liver, which increases bioavailability of androgens.

In a study, significant changes in severity of acne were observed among patients after a single ingestion of chocolate. This led to the hypothesis that chocolate can exacerbate acne. However there is less information about the type of chocolate consumed and percentage of cocoa in them, which can influence results.

Amongst females 6% reported premenstrual flare up. This was in accordance with a study conducted by Khunger and Kumar who observed premenstrual flare in only 11.7% of patients. This was in contrast to Goulden et al. who reported premenstrual flare in 84.8% of patients. The explanation may lie in the fact that premenstrual flare is hydration- induced cyclical narrowing of pilosebaceous orifice between 16 and 20 day of menstrual cycle. Progesterone and estrogen have pro and anti inflammatory effects, and alteration of these hormones may be the other explanation.[19] In persistent acne, patients have lesions on most days and experience a premenstrual flare. Cunliffe WJ, Cotterill JA in 1975 reported that premenstrual flare up was seen in about 60-70% of the females due to hydration of pilosebaceous follicle.

The well known causative drugs of acne are corticosteroids, anabolic steroids, antiepileptics, antipsychotics, antitubercular drugs, antidepressants, antineoplastics, etc.[20] In our study, 8% patients reported aggravation of acne after applying topical steroids. No other drugs were reported as an exacerbating factor. Steroids have been associated with the causation of acne by inducing hyperproliferation of upper portion of pilosebaceous unit. Khunger and Kumar also observed that there was no significant aggravation with drug usage in their patients, except for the use of topical steroids which precipitated acne in all the patients applying it (11.8%).

Personality changes and psychological symptoms were found associated in 92% of the patients. 8% patients reported no such factors associated. Shame was the most common factor associated (46%) followed by anxiety (40%), lack of confidence (37%), anger (36%) and embarrassment (28%). Several studies have reported increased levels of anger and anxiety in acne patients compared with the controls, whereas others have postulated impaired self- image. Acne severity is directly related to degree of anxiety and extent of impaired self- image.[21] More than a cosmetic problem, acne affects every aspect of patient's life: social, vocational, and academic. Patients with severe acne have higher unemployment rates and worse academic functioning compared to those without acne.[21] The quality of life also worsens with the severity of acne. The impact of acne on quality of life is more appreciable among young adults due to social and occupational functioning.[22] In a study it was observed that there was no difference in impact of acne between boys and girls and both genders were equally

concerned about their acne.[104]

Increase in insulin/IGF- 1 signaling has been implicated in aggravation of acne.[23] A study by Schäfer et al. revealed higher prevalence of acne in smokers compared to non-smokers. A linear correlation between severity of acne and the number of cigarettes smoked was postulated.[24] Similar results were observed in a recent study by Chuh et al.[25] Whereas, Mills et al. observed an inverse correlation between acne and smoking. [26] A study detected post-adolescent acne prevalence of 18.5% and it was particularly frequent in smokers. Post adolescent acne is described as mild to moderate acne, mainly inflammatory, which is localized on chin, lower jaw and neck. Among smokers, (atypical) post-adolescent acne (APAA) represents a peculiar form, which could be considered a true "smoker's acne," or "smoker's face" as described by other authors.[27]

No studies have correlated alcohol or non-vegetarian diet to be in direct causal relationship with acne. Alcoholism may be a confounding factor due to its increased consumption in stress related to acne.

Acne may present as a part of systemic syndromes such as: congenital adrenal hyperplasia; seborrhoea-acne-hirsutism-androgenetic alopecia syndrome; polycystic ovary syndrome; hyperandrogenaemia, insulin resistance, and acanthosis nigricans syndrome; Apert syndrome; synovitis-acne-pustulosis-hyperostosis-osteitis syndrome; pyogenic arthritis, pyoderma gangrenosum, and acne syndrome; metabolic syndromes; and Behçet's syndrome. These syndromes must be excluded in patients with severe and recalcitrant acne.

In our study, 13 females had polycystic ovarian syndrome. PCOS is a heterogeneous disorder with multiple etiologies. The key pathophysiologic components in PCOS include androgen excess, abnormal gonadotropin hormone dynamics and insulin resistance.

Gowri *et al*. studied the incidence and prevalence of cutaneous manifestations in 40 patients with PCOS. In their study, of all the cutaneous manifestations, acne had the highest incidence (67.5%), followed by hirsutism (62.5%), then seborrhea (52.5%), androgenetic alopecia (AGA) (30%), acanthosis nigricans (22.5%), and acrochordons (10%).[28] An Indian study revealed that postadolescent male patients with acne are more prone to have high mean fasting plasma glucose levels, high prevalence of insulin resistance, and high mean systolic blood pressure (SBP) and Diastolic blood pressure (DBP) as compared to controls. More severe grades of acne correspond to higher body weight. Prevalence of insulin resistance and metabolic syndrome does not vary significantly with acne severity. Insulin resistance may present as prediabetes, or may develop type 2 diabetes mellitus in future. These patients need to be followed up to keep a check on development of any condition associated with insulin resistance.

To conclude, acne is a very common disorder among adolescents and has many factors associated with it. Majority of the patients experience psychological symptoms associated with acne of which shame and anxiety are common. Seasonal changes, stress and seborrhoea are frequent exacerbating factors. These factors need to be explained to the patient as a part of counseling along with therapy for overall better outcome.

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