Prevalence, Risk Factors, and Clinical Features of Acne Vulgaris: An Observational Study in Secondary Care Hospital

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ABSTRACT

Acne is a common skin disorders that troubles and impacts most teenagers and young adults. The objective of this study is to investigate the prevalence, assess risk factors, and analyze the clinical profile of patients presenting with dermatoses, with a particular emphasis on acne vulgaris, in a district general hospital in India. A prospective observational study was conducted on 150 patients diagnosed with acne vulgaris attended the outpatient dermatology department to the district general hospital for six months, reviewing clinical records for demographic data, risk factors, clinical presentation, treatment modalities and acne outcome. Inclusion and exclusion criteria were employed, raw data were analyzed manually. Out of 150 patients, females (53.33%) outnumbered males (46.67%). A high incidence of acne among the population is seen, with the most affected age group being 16-20 years (55.3%). Acne is found more often in those with abnormal menstrual cycles (55%). Sunlight exposure regularly and fewer hours of sleep are linked with acne. Higher incidence is seen in urban groups, and a diet high in glycemic and dairy intake has a high correlation with acne. Polycystic ovarian disease (PCOD), thyroid issues, hormonal imbalance, and polycystic ovary syndrome (PCOS) were prevalent. Increased incidence of acne is found among students and workers between the ages of 25-30 who work in construction and agriculture. Statistically significant association is found between gender and topical corticosteroid usage. Acne is prevalent in adolescents and young adults, particularly females, due to unhealthy diet, hormonal irregularities, inadequate sleep, and misuse of topical corticosteroids.

INTRODUCTION

Acne vulgaris is a long-standing inflammatory pilosebaceous unit disorder. The pilosebaceous unit consists of the hair follicle and its associated sebaceous (oil) gland. It manifests clinically as a range of lesions such as comedones (open and closed), inflammatory papules, pustules, nodules, and, in fulminant disease, cysts [1]. Pilosebaceous units are most heavily concentrated in seborrheic areas particularly the face, upper chest, shoulders, and back which explains the typical anatomical distribution of the acne lesions [2]. While traditionally thought of as a teenage condition, acne vulgaris is increasingly being seen as chronic in nature and lasting well into adulthood. It may occur in either sex, with a broad clinical range from mild comedonal acne to harsh, scarring nodulocystic disease. The course of the disease usually is relapsing-remitting and, in many instances, is modulated by internal hormonal changes [2]. The acne vulgaris pathogenesis is four-factorial with four main processes: overproduction of sebum, hyperproliferation of keratinocytes, inflammation, and colonization by bacteria, especially cutibacterium acnes (formerly propionibacterium acnes). All these processes are linked and play a role in the development and evolution of acne lesions. Acne vulgaris is one of the most prevalent dermatological diseases globally, occurring in an estimated 85% of the population in the age group 12 to 24 years. In the global burden of disease (GBD) study 2010, acne was the eighth most common disease globally with significant morbidity in the age group of 15 to 49 years [2]. Its prevalence in both developed and developing countries highlights its role as a worldwide public health issue.

The classification and clinical diagnosis of acne vulgaris is most saliently based on morphology and distribution of les on s on the ski n, the patient s' documents, and the exclusion of other differential diagnoses. A stepwise and structured approach to diagnosis would consist of face to face consultations, the clinical classification of lesions, assigning a grade for the severity of the condition, and in most instances, a detailed case history, and in other instances, age-appropriate screens for hormones and lab work. Acne vulgaris presents in a variety of clinical forms, each with distinct morphological characteristics, severity levels, and treatment implications. The condition is generally classified according to the presence or absence of inflammation, the nature of lesions, and the severity of clinical symptoms. A clear understanding of the different types of acne is essential for accurate diagnosis and effective management. Acne vulgaris is a multifactorial disease with contributions from genetic, hormonal, environmental, and lifestyle factors. Understanding these risk factors is essential for both prevention and targeted treatment. Drugs such as corticosteroids, androgens, lithium, phenytoin, and isoniazid have been implicated in acneiform eruptions. These forms often lack comedones and are more monomorphic in nature [3].

Several notable studies have contributed to the evolving understanding of acne vulgaris and its associated risk factors. Kligman et al. (1972) reported that prolonged use of comedogenic cosmetic products could lead to a specific type of acne known as acne

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cosmetica [4]. In another study, Lucky et al. (1994) compared the circulating level of androgens and acne severity in adolescent girls to gain insight into the hormonal factors involved in acne pathogenesis [5]. S. Zahra Ghodsi et al. (2009) conducted a community based, cross sectional study to assess the severity and prevalence of acne among adolescents [6]. Recently, Lahiry et al. (2020) carried out a clinical study in India reporting the abuse of topical corticosteroids among dermatology outpatients and its possible contribution to acne aggravation [7].

A comprehensive understanding of the risk factors, potential complications, and appropriate management strategies for acne is essential to reduce recurrence and enhance patient outcomes. Acne is a common skin disorders that impacts most teenagers and young adults. The area, however, is poorly researched, especially when it comes impact on different ethnic communities that live around here. There has, however, advanced research on the topic elsewhere and it is incomprehensible that this area is still lacking such important research. Therefore, the objective of this study is to investigate the prevalence, assess risk factors, and analyze the clinical profile of patients presenting with dermatoses, with a particular emphasis on acne vulgaris.

METHODS AND MATERIAL

2.1 Study Design

The present research was a prospective, observational cross-sectional study done at the outpatient dermatology department of a district general hospital in the state of Maharashtra, for six months, from October 2024 to March 2025. Informed consent was taken from all participants before recruiting them. The patient's information was kept strictly confidential, with all data used exclusively for academic and research purposes.

2.2 Population and Criteria

The study period was six months, during which data were collected from patients who were diagnosed with acne. The allocated time was sufficient for the retrieval of a representative variety of patients for the different dermatoses for acne and to analyze its clinical profiles and risk factors. A written consent form in the local language was acquired before the subjects participated in the study. The patient received information regarding the study's objective, and the data confidentiality was effectively maintained.

Patients who were visited the outpatient dermatology department at district general hospital, Amravati, and were of either sex (male or female), aged below 35 years. Additionally, only those individuals who were willing to participate and had signed the informed consent form were included. Relevant cases were chosen from a larger cohort of drug-induced acne patients and then detailed examined to elaborate on the clinical profile and risk aspects of dermatoses, acne included. Patients were not willing to participate or failed to provide informed consent. The participants with acne due to isotretinoin were left out of the study so as to pay attention to the other types of acne and dermatoses types and to preserve the focus and relevance of the results.

2.3 Data Collection, Management and Analysis

The data relevant to the study has been collected from treatment charts/case sheets, physical examinations, developmental assessment findings, and the patient or patient's caregiver interview by using patient data collection form. Data were collected using a pre-designed and validated questionnaire, which was structured in the form of a Google Form. The questionnaire included both open-ended and multiple-choice questions to gather; demographic data (age, gender, residence, occupation), medical and social history (comorbidities, lifestyle habits) and clinical data (type, site and severity, causes) and treatment details. Data obtained were organized and analyzed using Microsoft Excel and interpreted using descriptive and inferential statistics.

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RESULTS AND DISCUSSION

The current study provides critical insight into the epidemiology, risk factors, and clinical management of acne vulgaris among patients attending district general hospital, Amravati. A 4805 patients were attended to outpatient dermatology department, a total of 150 patients were diagnosed with acne, which had been enrolled in this study. The prevalence rate of 31.21 per 1,000 individuals was observed, that highlights trouble and the substantial burden of acne on the local population.

3.1 Socio-Demographic Characteristics

In terms of patients age distribution, among population of 150 individuals across different age groups with percentages was observed that females account for 80 (53.33%), while males constitute 70 (46.67%). Among the 150 patients, the greatest prevalence of acne was occurred in the 16–20 years, followed closely by 21–25 groups. Age group and gender did not have statistically significant relation. This result supported with the findings of previous studies by Geeta Sharma, regarding between age group and acne occurrence. This study confirms acne vulgaris as a multifactorial condition with highest prevalence among adolescents and young adults [8], [9].

3.2 Age group with Grade

Grade 2 acne was most prevalent (56.7%), followed by grade 1 (31.3%), grade 3 (11.3%), and grade 4 (0.7%). A significant association was observed between acne grade and age group. The significant correlation between acne grade and age reflects disease progression with age and hormonal peak [1]. The dominance of grade 2 acne aligns with moderate severity being the most reported in clinical settings [10]. The Table 1 illustrates the distribution of patients according to age group and the corresponding grade of acne severity.

3.3 Duration of acne

The study included 150 patients, and the age group with the highest number of cases was 16–20 years old (55.3%), followed by 21–25 years old (31.3%), 10–15 years old (8.7%), and senior age groups 26–30 years old (4%) and 31–35 years old (0.7%). Most patients had acne for 6 months with the highest frequency occurring in the 16–20 and 21–25 age groups (Table 2). This was followed by 3 months duration, again most common in the 16–20 and 21–25 categories. A significant number of patients also reported acne lasting more than one year, especially in the 16–20 age groups, suggesting a tendency toward chronicity during late adolescence. Comparatively, younger adolescents 10–15 years were more likely to present with recent onset of acne. Conversely, 16- to 20-year-old patients not only had the highest total prevalence of acne but also constituted the largest percentage in almost all duration categories, reflecting both increased incidence and longer disease duration. These findings are consistent with previous literature indicating that acne vulgaris is most prevalent and persistent during late adolescence and early adulthood due to increased androgen activity and sebaceous gland responsiveness during this period [1], [2]. The Table 1 shows the correlation between different age groups and the duration of action observed among the study population.

3.4 Menstrual History

Among 80 females, 44 reported irregular menstruation. Acne was more prevalent among those with irregular cycles (55%), indicating a potential hormonal link. Several patients were clinically diagnosed with polycystic ovarian disease (PCOD), thyroid disorders, or hormonal disturbances, which are known to influence the pathogenesis of acne. The female predominance reflects possible hormonal influences, especially given the high number of cases with irregular menstrual cycles and PCOD. Menstrual irregularities and PCOD emerged as significant contributors, emphasizing the endocrine link in female patients [5], [11]. Table 2 shows the association between different age groups and menstrual cycle characteristics among the study subjects.

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3.5 Skin Type

Oily skin type was the most prevalent, particularly in the 16–20 age groups. Oily skin, present in 66.7% of patients, is a known contributor to comedone formation due to excess sebum. In our study, oily skin type was significantly associated with the occurrence of acne vulgaris, particularly among adolescents and young adults aged 13 to 25 years, consistent with previous findings that link excess sebum production to increase the risk of comedone formation and inflammation due to cutibacterium acne proliferation [12]-[14]. Table 2 is given the distribution of patients according to skin type across different age group.

3.6 Sunlight exposure and sleep time

Most patients (65.3%) reported regular sunlight exposure, mostly in ages 16-25. Younger individuals are more likely to be outdoors, exposing skin to UV and environmental pollutants, aggravating acne. Sun protection should be included in acne education, especially for outdoor-active adolescents and young adults. The previous study discussed about how excessive sun exposure can exacerbate acne condition among adolscents [15]. Table 2 provides comparative analysis of sun exposure patterns among different age groups. Patients reporting <6 hours of sleep were more prone to moderate and severe acne, especially in the 16–25 age group. Majority of patients aged 16–25 had 6–7 hours of sleep. Only 7 patients had 10 hours. Most less than 6 hours belonged to the 16–20 age groups. Shorter sleep durations were common among teens and young adults, aligning with lifestyle and stress. Poor sleep hygiene may contribute to acne flare-ups. Sleep should be addressed in acne counselling. The findings also suggest that sleep deprivation, seen predominantly in students, may increase acne severity possibly due to stress and hormonal disruption [16]. Table 2 is given the relationship between sleep duration and age groups.

3.7 Region

The acne prevalence is significantly higher in urban populations compared to rural ones, across both genders and all age groups (Table 2). This may be attributed to urban lifestyle factors such as increased exposure to pollution, dietary habits, stress, and cosmetic use. The peak incidence in the 16–20 age groups for both males and females suggests a strong correlation with hormonal changes during adolescence, consistent with existing dermatological literature [17], [18].

3.8 Diet type

Out of 150 subjects, only 48 followed a normal diet. The rest consumed high-glycemic foods, dairy, fried foods, or non-vegetarian diets, often in combination. A diet high in dairy and high-glycemic products appeared strongly associated with acne prevalence. Individuals consuming combinations of high glycemic and dairy products were more likely to suffer from moderate to severe acne. The results underscore the role of dietary habits in exacerbating acne. Diet played a notable role. High-glycemic foods, dairy, and fried food have been implicated in acne pathogenesis through insulin and insulin-like growth factor 1 (IGF-1) mediated mechanisms [19]. Our results support this theory. Table 3 summarizes the dietary habits of patients.

3.9 Medication History

The analysis of medication history among the study participants shows certain medication may contribute to the development or worsening of acne. Previous studies show the role of medication in influencing inflammatory pathways in acne including hormonal and psychotropic drugs [8], [12]. The past medication history of patients is mentioned in Fig. 1.

3.10 Site of Acne

The findings revealed that the face was the most commonly affected site, with 30% of the total cases (Fig. 2). Within the facial region, the cheeks were involved in 25% of patients, followed closely by the forehead, which accounted for 23%. The chin was affected in 3% of cases, while no cases were observed with isolated acne on the nose among extra-facial sites; the back was the most frequently involved,

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contributing to 11% of the total cases. The chest was affected in 5%, the neck in 2%, and the shoulder in 1% of patients. The results clearly indicate that acne predominantly affects the facial region, particularly the cheeks and forehead, which together comprise nearly half of all acne presentations (48%). This suggests a high density of sebaceous glands and increased exposure to environmental factors may contribute to acne formation in these areas. The previous studies indicated that the lesion of acne commonly affects the face followed by back and chest [20]. As presented in Fig. 2 the distribution of acne across various sites of body was examined.

3.11 Indication of Topical Corticosteroid Use

Based on the data, the use of topical corticosteroid for acne and post acne hyper pigmentation was observed in both males and females, indicating no significant gender difference in therapeutic use; however, females showed slightly higher usage for cosmetic purpose like fair skin tone compared to males. Topical steroid use was widespread, possibly indicating self-medication or incorrect prescriptions, a known aggravator of steroid-induced acneiform eruptions

[21], [22]. In previous studies where females were more likely to use topical corticosteroid and it highlighted the role of over-the-counter availability and lack of awareness as a key factor in a driving misuse [7]. Table 4 represents the indications for use of topical corticosteroids.

3.12 Gender with Medical History

All 37 patients with significant medical histories were female. Polycystic ovarian disease (PCOD), thyroid issues, hormonal imbalance, and polycystic ovary syndrome (PCOS) were prevalent. Acne in females is often linked with underlying endocrine/metabolic conditions, absent in males. In female patients with moderate to severe acne, endocrine evaluation is need for holistic treatment. The female predominance reflects possible hormonal influences, especially given the high number of cases with irregular menstrual cycles and PCOD. Menstrual irregularities and PCOD emerged as significant contributors, emphasizing the endocrine link in female patients [5], [11]. Table 4 represents the correlation between gender and medical history.

Table 1: Socio-demographic characteristics

Age Group	10 to 15	16 to 20	21 to 25	26 to 30	31 to 35	Grand Total
Gender distribution						
Female n (%)	7 (4.67)	43 (28.67)	25 (16.67)	4 (2.67)	1 (0.67)	80 (53.33)
Male n (%)	6 (4)	40 (26.67)	22 (14.67)	2 (1.33)	-	70 (46.67)
Total	13 (8.67)	83 (55.33)	47 (31.33)	6 (4)	1 (0.67)	150 (100)
Mean	Mode	Median	Chi-Square (χ^2)	df	*p-value*	Significance (α)
19.59±3.66	18	19.24	1.3961	4	0.845	0.05
Age group with Grade						
Grade 1	9	26	9	2	1	47 (31.30)
Grade 2	4	48	31	2	-	85 (56.70)
Grade 3	-	9	6	2	-	17 (11.30)
Grade 4	-	-	1	-	-	1 (0.7)
Total	13	83	47	6	1	150 (100)

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Table 2: Different Factors Associated Acne

Age Group	10 to 15	16 to 20	21 to 25	26 to 30	31 to 35	Grand Total
Duration of acne						
15 days	1	-	-	1	1	3 (2)
1 month	-	3	2	-	-	5 (3.33)
2 month	-	10	-	-	-	10 (6.66)
3 month	5	16	10	1	-	32 (21.33)
6 months	4	22	19	1	-	46 (30.66)
1 yr	1	15	13	1	-	30 (20)
>1 yr	2	17	3	2	-	24 (16)
Total	13	83	47	6	1	150 (100)
Age group with menstrual history						
Irregular	6	21	15	2	-	44 (55)
Regular	1	22	10	2	1	36 (45)
Total	7	43	25	4	1	80 (100)
Skin type						
Dry	3	11	3	-	-	17 (11.3)
Mix type	-	7	8	-	-	15 (10)
Normal	3	7	7	-	1	18 (12)
Oily	7	58	29	6	-	100 (66.7)
Total	13	83	47	6	1	150 (100)
Sunlight exposure						
No	6	28	12	3	1	50 (33.33)
Sometimes	-	1	1	-	-	2 (1.33)
Yes	7	54	34	3	-	98 (65.33)
Total	13	83	47	6	1	150 (100)
Sleep time in hours						
5 hrs	7	6	1	1	-	15 (10)
6 hrs	30	24	4	3	1	62 (41.33)
7 hrs	27	11	3	1	-	42 (28)
8 hrs	11	2	4	1	-	18 (12)
9 hrs	4	1	1	-	-	6 (4)
10 hrs	4	3	-	-	-	7 (4.66)
Total	83	47	13	6	1	150 (100)
Age group with Region						
Rural	8	-	5	3	-	22
Urban	62	6	35	19	2	128
Total	70 (46.66)	6 (4)	40 (26.66)	22 (14.66)	2 (1.33)	150 (100)

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3.13 Age group with social history

109 were free from substance use history. Smoking, alcohol, and tobacco were reported by the majority among 16–25 (Table 5). Adolescent substance abuse can result in inflammation, oxidative stress, and poor skin. Smoking and alcohol are not causes, but worsening agents for acne. Lifestyle modification should be encouraged. In previous studies, smokers had more severe grade of acne vulgaris compared to non-smokers (18). An earlier study found no correlation between smoking and the severity of acne [6], [23].
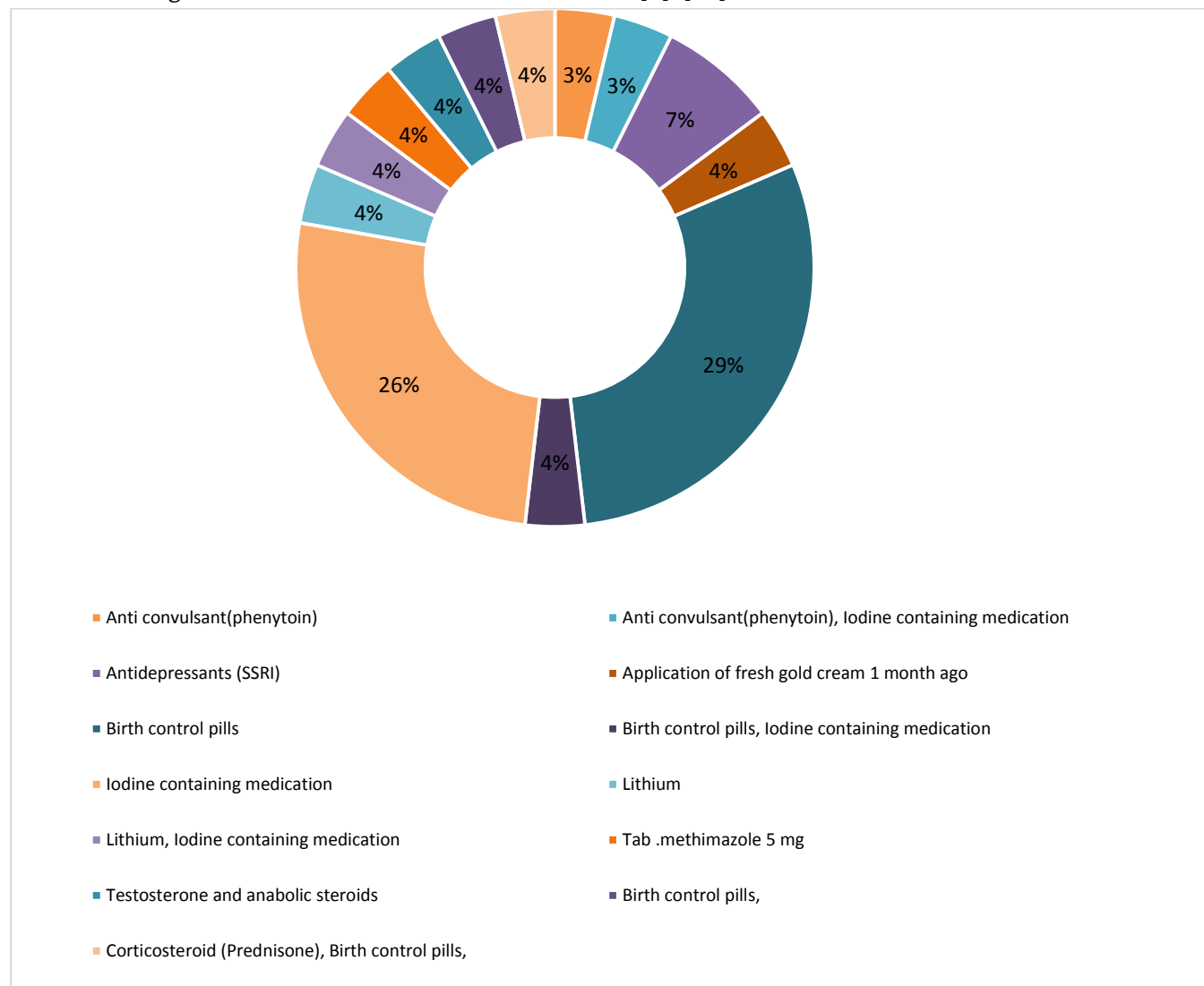

Legend	
■ Anti convulsant(phenytoin)	■ Anti convulsant(phenytoin), Iodine containing medication
■ Antidepressants (SSRI)	■ Application of fresh gold cream 1 month ago
■ Birth control pills	■ Birth control pills, Iodine containing medication
■ Iodine containing medication	■ Lithium
■ Lithium, Iodine containing medication	■ Tab .methimazole 5 mg
■ Testosterone and anabolic steroids	■ Birth control pills,
■ Corticosteroid (Prednisone), Birth control pills,	

Figure 1: Medication history

3.14 Age group with occupation

116 were students of 10–25 years age group. The construction and agriculture workers (25–30 years) also appeared. High prevalence in students reflects age-based trends. Factors such as hormonal surges, academic stress, irregular sleep, and poor dietary habits are key contributors (Table 5). This aligns with several previous studies that have reported a similar trend of high acne prevalence among students. Among working adults, healthcare workers and outdoor laborers (e.g., construction and agriculture) also showed notable acne incidence, likely due to occlusive environments, mask usage, and exposure to environmental irritants. These occupational exposures should be taken into consideration in clinical treatment and prevention strategies [24], [25].

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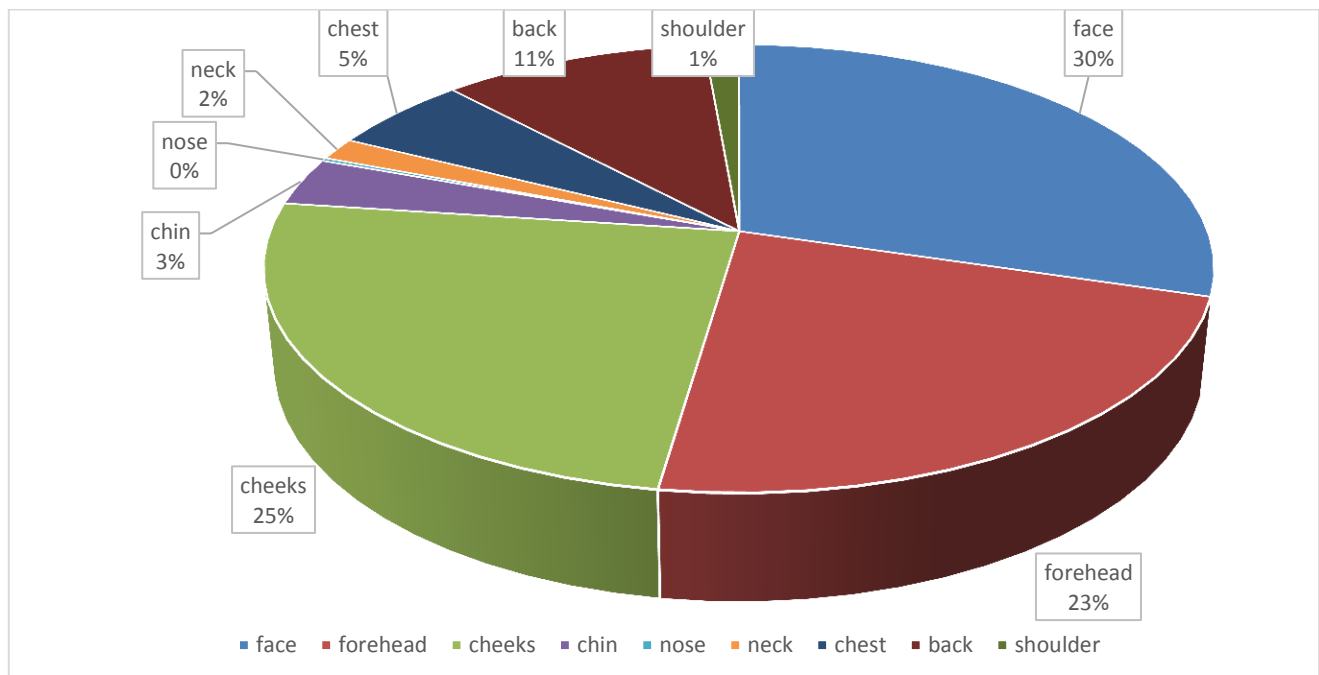
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3.15 Gender with topical corticosteroid

Table 6 illustrates the association between gender and use of topical corticosteroids (TC). Out of 84 TC users, females made up 51.2% (43) and males 48.8% (41). Betamethasone valerate was most used (40), followed by pigmela (16), clobetasole (14), and others. Statistically significant association is found between gender and topical corticosteroid usage.

Table 3: Summarizes the dietary habits of patients.

Diet Type	Number
Dairy products	5
Dairy products, Fried food	2
Fried food	2
Fried food, non-vegetarian diet	3
High glycemic food	9
High glycemic food, Dairy products	4
High glycemic food, Dairy products, Fried food	15
High glycemic food, Fried food	11
High glycemic food, Fried food,	1
High glycemic food, Fried food, Dairy products, Non vegetarian diet	20
High glycemic food, Fried food, Non vegetarian diet	3
High glycemic food, Non vegetarian diet	3
High glycemic food, Non vegetarian diet, Dairy products	12
Non vegetarian diet	9
Non vegetarian diet, Dairy products	3
Normal diet	48

Figure 2: Site of Acne

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Table 4: 1Indication of Topical corticosteroid use, and medical history

Gender	Female	Male	Grand Total
Indication of topical corticosteroid use			
Cure of acne	8	9	17
Facial dermatosis	7	1	8
Fair skin tone	13	11	24
Fair skin tone, Cure of acne	2	-	2
Fair skin tone, Facial dermatosis	1	1	2
Fair skin tone, Post acne hyper pigmentation	8	9	17
Post acne hyper pigmentation	1	-	1
Tinea	2	8	10
Eczema	1	-	1
Atopic dermatitis	-	2	2
Total	43	41	84
Medical history			
Polycystic ovarian disease	9	-	9
Thyroid	7	-	7
Hormonal imbalance	6	-	6
Polycystic ovary syndrome	4	-	4
Melasma	3	-	3
Thyroid, Hormonal imbalance	2	-	2
PCOD, Thyroid	2	-	2
Tinea	-	1	1
Mania	-	1	1
Seborrheic dermatitis	-	1	1
Lichen planus	1	-	1
Total	34	3	37

Table 5: Age group with social history and occupation

Age group	10 to 15	16 to 20	21 to 25	26 to 30	31 to 35	Grand Total
Social history						
Alcohol	-	10	11	-	-	21
Smoking	-	4	7	2	-	13
Tobacco	-	4	3	-	-	7
None	13	65	26	4	1	109
Total	13	83	47	6	1	150
Occupation						
Agriculture worker	-	1	2	1	-	4
Construction worker	-	9	12	-	-	21

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Age group	10 to 15	16 to 20	21 to 25	26 to 30	31 to 35	Grand Total
Healthcare worker	-	-	2	1	-	3
Housewife	-	-	1	3	1	5
Industrial worker	-	-	-	1	-	1
Student	13	73	30	-	-	116
Total	13	83	47	6	1	150

Table 6: Gender with topical corticosteroid

Topical corticosteroid	Gender		Grand Total
	Female	Male	
Betamethasone valerate	27	13	40
Clobetasole propionate	7	7	14
Fluticasone propionate	1	2	3
Pigmela cream	6	10	16
Sunban pro lotion, Brite lite	2	9	11
Total	43	41	84
Mean	8.4 ± 7.57		
Median	7		
Mode	2		
Chi-Square (χ^2)	10.65		
Degrees of Freedom	4		
p-value	0.03		

Both genders used corticosteroids almost equally, with a slightly higher use in females. Misuse of potent TCs like betamethasone and clobetasole raises concerns of acne. TC usage is widespread and unregulated, often prescribed or self-used without dermatological guidance. Education on side effects is vital. Despite equal usage rates numerically, patterns of steroid type and application frequency might differ by gender, warranting targeted interventions. Topical steroid use was widespread, possibly indicating self-medication or incorrect prescriptions, a known aggravator of steroid-induced acneiform eruptions [21]. In previous studies where females were more likely to use topical corticosteroid and it highlighted the role of over-the-counter availability and lack of awareness as a key factor in a driving misuse [7]. Integrate hormonal screening, lifestyle assessment, and safe treatment education into acne management at secondary care level.

CONCLUSION

This study highlights that acne is most prevalent in adolescents (16–25 yrs) and young adults, especially females. Significant risk factors include unhealthy diet, oily skin, hormonal irregularities, inadequate sleep, and misuse of topical corticosteroids. Educational awareness regarding diet, hygiene, and medication use is essential. Screening for polycystic ovarian disease and hormonal disorders in female patients should be routine in acne management.

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