
Prevalence of acne vulgaris among a sample of high school students in Erbil City

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ABSTRACT

Background and objective: Acne vulgaris is one of the most prevalent dermatological conditions worldwide. Reliable research on the effects of acne on teenagers and its impact on quality of life is needed; such research may help dermatologists become more aware of the psychological impact of acne and may encourage teenagers to seek treatment. This study aimed to identify the prevalence of acne vulgaris among high school students in Erbil City.

Methods: A cross-sectional study was conducted among 400 high school students aged 12-19 years in Erbil City, Iraq. The study was carried out over about one year, from October 2024 to October 2025, using a voluntary structured questionnaire and clinical examination.

Results: Among the study population, 59% of students had acne, with a greater frequency among females (65.9%) than males (54.1%). Regarding severity, mild cases made up the majority (66.1%), followed by moderate (28.8%) and severe cases (5.1%). Acne was most frequent (63.6%) among those aged 16-17 years, though the difference across age groups was not statistically significant ($p = 0.066$). There was no significant association between socioeconomic status and acne prevalence ($p = 0.803$).

Conclusion: A large proportion of high school students in Erbil suffer from acne vulgaris, with a greater frequency among females than males. Adolescent acne may be lessened through early education, lifestyle counseling, and dermatological care.

Keywords: Prevalence, Acne vulgaris, Aggravating factors, Clinical types

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INTRODUCTION

Adolescent acne vulgaris is the most common skin ailment, affecting around 9% of people worldwide, and makes patients more vulnerable to mental and psychological issues (1). Acne vulgaris, the most prevalent skin condition, affects around 80% of people between the ages of 11 and 30 at some point; according to Global Burden of Disease (GBD) research, 85% of young adults aged 12-25 suffer from acne vulgaris (2). Regardless of gender, country, or financial background, acne is one of the top three skin problems. The pathophysiology of acne vulgaris, which affects people worldwide in late adolescence, is complex, with compelling evidence linking immunological responses, inflammation, bacterial hypercolonization, follicular hyperkeratinization, and sebaceous hyperplasia (3). The earliest description of acne dates back to ancient Egypt, where it was documented in the Ebers Papyrus (c. 1550 BC), one of the oldest known medical texts (4). Acne lesions typically occur on the face, chest, or upper back. Lesions may be noninflammatory closed comedones (papules formed by accumulation of sebum/keratin within the hair follicle, also called whiteheads), open comedones (distension of the hair follicle with keratin, leading to opening of the follicle, oxidation of lipids, and deposition of melanin, also called blackheads), or inflammatory papules, nodules, pustules, and cysts. Inflammatory lesions result from follicle rupture, which triggers an inflammatory response. Based on the extent and types of lesions, acne severity may be classified as mild, moderate, or severe (5). This is why local studies are important for better understanding the problem and devising effective approaches to prevent and treat acne in young people. Different regions show different prevalence rates: acne is most common in Latin America, with similar rates seen in Africa, while Europe has the lowest

incidence. Genetic background, environmental factors, eating behaviors, and cultural traditions all influence the development and severity of acne, producing distinct trends between populations (6).

Global and regional factors affect acne prevalence in Iraq and the Kurdistan Region; it is estimated that between 35% and 100% of teenagers may experience acne at some point. Acne vulgaris was identified in 293 (7.02%) of 4169 samples in a national Iraqi study, placing it fifth among all skin conditions; a household study found the prevalence of acne in Basrah reached 17%. Although acne affects girls earlier, more boys are affected in mid-adolescence (7), consistent with a regional Erbil-based study that similarly found variations in acne prevalence and its associated microorganisms by sex, age, and socioeconomic level (8). The natural rise and fall of hormones creates underlying conditions that lead to acne during adolescence and adulthood; testosterone, along with other androgens, expands and over-activates sebaceous glands, leading to excess sebum production that clogs pores (9), a mechanism further supported by a Kurdistan-region study linking higher serum insulin-like growth factor-1 levels — which rise alongside androgens during puberty — with greater acne severity (10). Research suggests that dietary choices also play a role in acne, as certain foods may exacerbate its symptoms (11). Eating foods with a high glycemic index, including refined carbohydrates and sugary products, leads to elevated insulin levels, which increases sebum production and causes skin inflammation (12). Genetics, environmental factors (temperature, pollution, humidity, sun exposure, mineral oils/halogenated hydrocarbons), nutrition, hormonal state, stress, smoking, comedogenic medications (androgens, halogens, corticosteroids), bacteria, and cosmetics are all considered important in the classical etiology of acne vulgaris.

Acne vulgaris often results in discomfort, mental anguish, disfigurement, and sometimes irreversible scarring; patients may also experience feelings of humiliation and worry, both of which can exacerbate mental distress. This multifactorial pathogenesis reflects several exposome factors. The four main causes of acne are excessive sebum production, abnormal hyperkeratinization of the pilosebaceous follicles, hyperproliferation of the bacterium *Cutibacterium acnes* (formerly *Propionibacterium acnes*), and inflammatory mechanisms (13). Treatment protocols vary depending on symptom severity, lesion specificity, and the patient's age and skin type (14). Medical interventions for acne include prescription creams, oral medications, and hormonal treatments, as well as lifestyle modifications and procedural treatments (15). Acne is a widespread condition, but little research has examined how many individuals in Iraq, particularly the Kurdistan Region, are affected by it. In Erbil, where many teenagers reside, factors including nutrition, lifestyle, and environment may contribute to acne. The goal of this study is to determine how common acne vulgaris is among Erbil City high school students, and to identify its aggravating factors.

METHODS

Study Design and Setting

This study used cluster sampling, starting with eight randomly selected secondary schools across Erbil, Kurdistan Region of Iraq, over the period October 2024 to October 2025. Fifty students aged 12-19 years, of both genders, were then randomly chosen from each school, ensuring a representative sample of the city's adolescent population.

Study Sampling

A multistage approach was used, involving cluster, stratified, and simple random sampling to select

a sample of 400 students. A database of high schools was obtained from the statistics section of Erbil's Directorate of Education. The research identified four geographical regions within Erbil city, according to Erbil municipality boundaries, and a randomized sampling method was used to select the schools. In the first stage, eight schools were randomly selected to represent Erbil's various geographic and demographic areas. In the second stage, the total sample was divided equally across the selected schools, with 50 pupils randomly chosen from each school to participate in the survey.

Using a 95% confidence level ($Z = 1.96$), a 5% margin of error ($d = 0.05$), and an assumed proportion (p) of 0.5, the minimum required sample size was 384 participants. To allow for possible missing responses or incomplete data, the sample size was increased to 400.

Data Collection

Data were collected using a structured questionnaire with three parts: sociodemographic details, medical history, and related risk factors. This approach helped analyze acne prevalence and its links to background and health factors among Erbil high school students. A pilot study was first conducted on a random sample of ten students (not included in the main study) to test the questionnaire, and adjustments were made based on the response. Data collection then began with permission from the Erbil Ministry of Education and school officials. After the study's purpose was explained, students of all grades and both sexes were invited to participate. Verbal consent was obtained, and participants completed the questionnaire in five to ten minutes following a dermatologist's assessment. An equal number of 50 students were selected from each grade based

on the sample size distribution, and all students approached agreed to participate.

Pupils meeting the following criteria were eligible for participation: (1) adolescent pupils, regardless of gender; (2) agreed to participate. Students meeting any of the following criteria were excluded: (1) endocrine disturbances such as diabetes; (2) mental health disorders; (3) systemic lupus erythematosus; (4) heart disease.

Statistical Analysis

Data were manually entered into a database, and analysis was conducted using the Statistical Package for the Social Sciences (SPSS). The data first underwent a thorough cleaning process to identify and address missing or inconsistent responses. Descriptive statistics were used to summarize the sociodemographic characteristics of participants and the prevalence of acne. Inferential statistics were then used to explore the association between age and acne vulgaris; the Chi-square test was applied to test the association between the prevalence of acne and age. A p-value ≤ 0.05 was considered statistically significant.

Each item in the socioeconomic section of the questionnaire was scored on a scale from 0 to 4, with 0 denoting "not at all" and 4 denoting "having the condition most of the time."

Ethical Approval

Ethical approval was obtained from the Ethics Committee and the Scientific Committee of the College of Medicine, Hawler Medical University, after review and approval of the study protocol (Meeting code: 2; Paper code: 8).

RESULTS

Four hundred students participated in the study, from eight different high schools in Erbil City. Their mean age ($\pm$ SD) was 15.5 ($\pm$ 1.6) years, the median was 16, and the age range was 12-19 years. Around half (48.8%) of the sample were aged 16-17, and 58.3% were male.

Around half (48%) of fathers and 44.5% of mothers were college graduates, while only 5.3% and 12% of fathers and mothers, respectively, were illiterate. The majority (72.8%) of students lived in owned houses, and 79.3% had a family car. Around half of fathers (44.3%) and 19.8% of mothers worked in high-level occupations, while 10.3% of fathers were unemployed and 60.5% of mothers were housewives. Family income was reported as insufficient in 9% of families. Taking all these factors together, 8.3% of students were of low socioeconomic status (SES), 39.8% medium SES, and 52% high SES (Table 1).

The prevalence of acne was 59% (236/400), as shown in Figure 1. Acne was more common among females (65.9%) than males (54.1%). There was no significant association between socioeconomic status and the prevalence of acne ($p = 0.803$), as presented in Figure 2.

Table 1. Sociodemographic characteristics of the studied participants (n=400)

Variable	Category	n	%
Age (years)	12-13	59	14.8
	14-15	106	26.5
	16-17	195	48.8
	18-19	40	10.0
Gender	Male	233	58.3
	Female	167	41.8
Father's education	Illiterate	21	5.3
	Read/write/primary	37	9.3
	Intermediate	71	17.8
	Secondary	79	19.8
	College and above	192	48.0
Mother's education	Illiterate	48	12.0
	Read/write/primary	42	10.5
	Intermediate	59	14.8
	Secondary	73	18.3
	College and above	178	44.5
House ownership	Owned	291	72.8
	Partially owned	15	3.8
	Rented/other	94	23.5
Car ownership	Yes	317	79.3
	No	83	20.8
Father's occupation	High-level	177	44.3
	Non-manual	81	20.3
	Manual	101	25.3
	Unemployed	41	10.3
Mother's occupation	High-level	79	19.8
	Non-manual	51	12.8
	Manual	28	7.0
	Housewife	242	60.5
Family income	Exceeds needs	155	38.8
	Sufficient	209	52.3
	Not sufficient	36	9.0
Socioeconomic status	Low	33	8.3
	Medium	159	39.8
	High	208	52.0

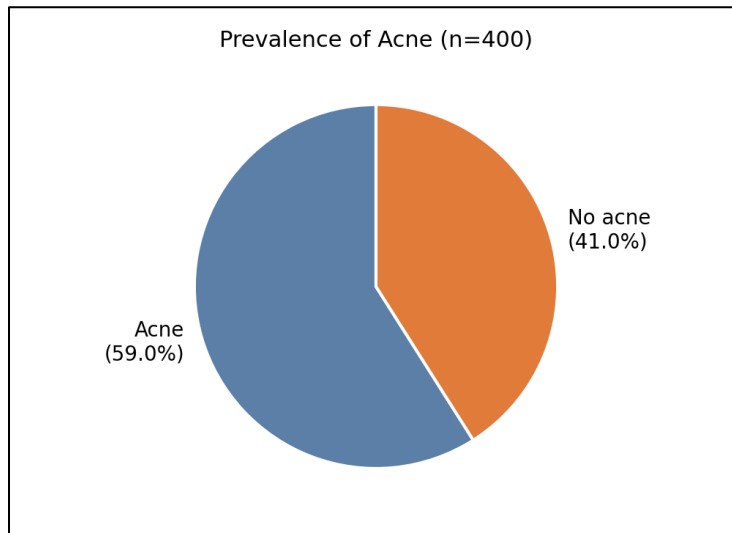


Figure 1. Prevalence of acne

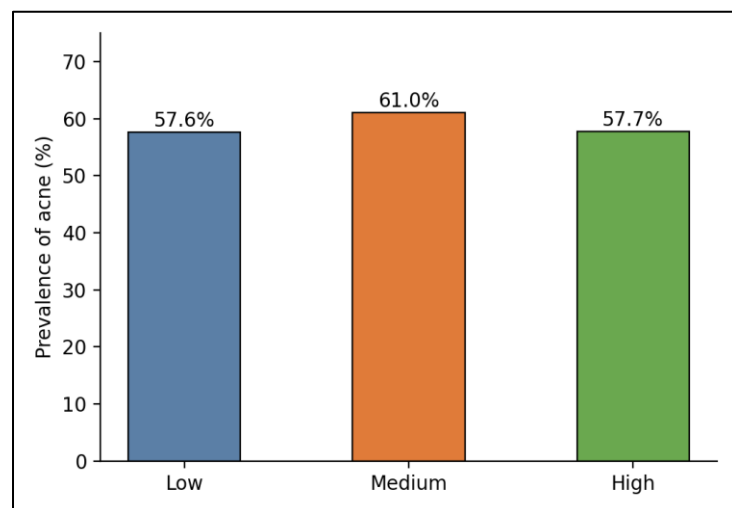


Figure 2. Prevalence of acne by socioeconomic status

Acne was severe in 5.1% of students and mild among two-thirds (66.1%). The menstrual cycle was irregular in 26.4% of female students. Only 16.9% of students had consulted a dermatologist in the previous three months. The most common site of acne was the face (92.4%). About one-third (34.7%)

of students experienced physical pain from acne, and the most common types were whitehead acne (48.7%), papules (48.7%), and blackhead acne (44.9%). About half (50.8%) of students had noticed lasting scars (Table 2).

Table 2. Medical history of students affected by acne (n=236 unless noted)

Variable	Category	n	%
Severity	Mild	156	66.1
	Moderate	68	28.8
	Severe	12	5.1
Regular menstrual cycle (n=110)	Yes	81	73.6
	No	29	26.4
Consulted a dermatologist (past 3 mo)	Yes	40	16.9
	No	196	83.1
Site of acne	Face	218	92.4
	Back	95	40.3
	Chest	46	19.5
	Shoulder	72	30.5
Physical pain/discomfort	Yes	82	34.7
	No	154	65.3
Type of acne	Whitehead	115	48.7
	Blackhead	106	44.9
	Papules	115	48.7
	Pustules	64	27.1
	Nodules	24	10.2
	Cysts	10	4.2
Lasting scars noticed	Yes	120	50.8
	No	116	49.2

Categories for site and type of acne are not mutually exclusive, so percentages sum to more than 100% within each group.

The most common triggering factors reported were sweating (47%) and cosmetics (32%); only eight students identified stress as a triggering factor. More than half (57.2%) of students reported no effect of season on their acne, while 33.9% reported it was worse in the hot season and 8.9% reported it

was worse in the cold season. Around half (48.3%) of students reported an effect of food on their acne; among those, the food types most often implicated were sweet food (36.8%), oily food (25.4%), and spicy food (11.4%), as presented in Table 3.

Table 3. Triggering factors of acne vulgaris among the studied participants

Category	Factor	n	%
Triggers (n=236)	Sweating	111	47.0
	Cosmetics	76	32.0
	Using other personal tools	58	24.6
	Perfume	37	15.7
	Tight clothes	23	9.7
Other triggers (n=21)	Stress	8	38.1
	Pollution	2	9.5
	Menstrual cycle	2	9.5
	Wool clothes	2	9.5
	Other (single mentions)	7	33.3
Effect of season (n=236)	No effect	135	57.2
	Worse in hot season	80	33.9
	Worse in cold season	21	8.9
Food effect (n=236)	Yes	114	48.3
Type of food (n=114)	Sweet food	42	36.8
	Oily food	29	25.4
	Sweet and oily food	10	8.8
	Spices	13	11.4
	Sweet, oily, and spicy food	6	5.3
	Other (single mentions)	14	12.3

The highest prevalence of acne (63.6%) was among those aged 16-17 years, and the lowest (44.1%) among those aged 12-13. The difference across age

groups was not statistically significant ($p = 0.066$), as presented in Table 4.

Table 4. Prevalence of acne by age

Age (years)	Acne No. (%)	No acne No. (%)	Total	p*
12-13	26 (44.1)	33 (55.9)	59 (100.0)	0.066
14-15	63 (59.4)	43 (40.6)	106 (100.0)	
16-17	124 (63.6)	71 (36.4)	195 (100.0)	
18-19	23 (57.5)	17 (42.5)	40 (100.0)	
Total	236 (59.0)	164 (41.0)	400 (100.0)	

**Calculated by chi-square test.*

DISCUSSION

Approximately 35 articles reviewed in preparing this study differed in study design, acne definition, severity grading systems, variables studied, and population characteristics; age and sex distributions also differed between studies depending on the type of acne and the variables of interest to the researchers. This study involved students from eight high schools in Erbil City in a cross-sectional design. The findings indicate a notably high prevalence of acne vulgaris among students, aligning with global epidemiological patterns. According to research by Heng et al., acne affects 85-90% of teenagers worldwide, making it one of the most common skin disorders in this age group (17). Other studies have examined the prevalence of acne vulgaris, but were not as broad as the current study in terms of sample size, associated factors included, number of schools involved, and the age range of students. The prevalence of acne vulgaris in this study — with a sample size of 400 students and a mean age (SD)

of 15.5 (± 1.6) years — was 59%, similar to other studies conducted in Jordan (45%), Syria (34%), Turkey (40.1%), and Saudi Arabia (56.2%) (18). The prevalence of acne was 61% in medium socioeconomic classes, and there was no significant association between socioeconomic status and the prevalence of acne ($p = 0.803$). By comparison, Anaba et al. found acne more common among teenagers from higher socioeconomic classes (60.7%) (19).

There are several techniques for assessing acne severity, but none is universally accepted, and they cannot be used interchangeably since they do not measure the same disease components. Measuring illness severity is nonetheless critical for clinical practice, including evaluation and follow-up, as well as for comparing studies in the literature; such measurements are generally subjective. One commonly used method is lesion counting, which is time-consuming but potentially more accurate; other methods use grading systems. A multi-rater validation study found that acne lesion counting

had good reliability when performed by a trained rater, and that reliability could be increased through rater training and use of a standard template (20). In this study, two-thirds (66.1%) of the sample had mild acne, whereas 5.1% had severe acne, assessed subjectively by lesion counting; this differs from other studies, possibly reflecting differences in the treatment options used by students. The findings are in line with a study by Mashi et al., in which 51.8% of individuals had mild acne (21). Over the study period, the number of visits for acne has reportedly decreased, even though it remains the second most prevalent diagnosis encountered by dermatologists, and fewer primary care physicians are consulting on acne overall; the cornerstones of acne therapy have nonetheless remained largely unchanged, as reported by Grada et al. (22). In the current study, the proportion of students who had consulted a dermatologist was 16.9%. The most common site of acne was the face (92.4%); by comparison, in the study by Shah et al., the most common site was the cheek (85%) (23). Nearly one-third (34.7%) of students experienced physical pain, compared with a study by Ding et al., in which 35.29% of patients had flushing, 25.88% experienced pruritus, and 50.59% experienced pain as concurrent symptoms (24).

Whitehead acne (48.7%), papules (48.7%), and blackhead acne (44.9%) were the most prevalent forms in the current study, followed by pustules (27.1%), nodules (10.2%), and cysts (4.2%). By contrast, the study by Abbas et al. found that comedones were more common than other lesion types (3). Around half (50.8%) of the sample had noticed lasting scars, consistent with Liu et al., who found that 59% of the adult acne group had acne scars (25); scarring can be reduced with early, efficient therapy tailored to acne severity (26). Cosmetics (32%) and sweating (47%) were the most frequent triggering factors, and only eight students

identified stress as a trigger. Other research has found that frequent exposure to cosmetics is significantly positively correlated with acne severity in teenage women, suggesting that inappropriate cosmetic use may contribute to acne recurrence; research from the Iberian Peninsula and Latin America has consistently produced similar findings, and Chinese research has also shown that cosmetic use increased the likelihood of developing acne (27). Only 33.9% of students in the current study reported that acne was worse in the hot season, whereas 40% of participants (n=225) in the study by Hamza et al. reported feeling aggravated after exposure to hot weather (28). Approximately half of students (48.3%) reported that eating had an effect on their acne; the food types most often implicated were sweet food (36.8%), oily food (25.4%), and spicy food (11.4%). A study by Kostecka et al. similarly demonstrated that nutrition and food choices may either prevent or worsen acne outbreaks; in that study, female respondents identified fast food (56%), chocolate (56%), spices (46%), salt (35.6%), and milk (38.7%) as the primary dietary irritants, while male respondents identified milk (21.6%), protein drinks (30%), spices (67%), and spicy/salty snacks (72.9%) as the primary causes (29). This study found no significant difference in acne prevalence according to age ($p = 0.066$). Given the high prevalence and impact of acne, early recognition, education, and school-based screening programs are essential to managing acne effectively and reducing its long-term physical and emotional consequences.

Limitations of the Study

Establishing causal links and monitoring changes over time are not possible with a cross-sectional design. The prevalence of acne may be influenced by psychological or lifestyle factors that were not thoroughly evaluated, such as stress, nutrition, or

sleep. Some questions in the questionnaire were self-administered, so responses depended on each student's personal understanding of the items, and it is possible that severity ratings were not applied uniformly across all data collectors. The questionnaire was also translated into Kurdish, which may have affected the precise meaning of some items. Another limitation is that data collection was carried out by a single researcher; a team could have accomplished more.

CONCLUSION

Acne vulgaris is highly prevalent among high school students in Erbil City, with significant cosmetic and psychosocial consequences. Among students with acne, hygiene, food, and hormones were frequently mentioned as causes; among those without acne, hormones, stress, greasy food, menstruation, makeup, and poor hygiene were commonly thought to exacerbate acne. These primary pathogenic factors offer researchers clues for developing different acne treatments. Understanding the irritants that lead to the development of microcomedones, and the conversion of non-inflammatory lesions into inflammatory lesions, is crucial for optimizing the efficacy of both novel and existing therapies.

COMPETING INTEREST

The authors declare that they have no competing interests.

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