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Research article

Acne Association with Some Risk Factors, Including Fast Food and Cosmetics, Among Adolescent Males and Females

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Acne is a common dermatological condition influenced by various genetic, dietary, and lifestyle factors. This cross-sectional study was conducted in Al-Ajelat city, Libya, to assess the association between acne and risk factors such as fast-food consumption, cosmetic usage, and perimenstrual flare. A total of 153 adolescent males and females participated, recruited from schools, colleges, and dermatology clinics. Data were collected through a structured questionnaire covering demographic information, family history, self-perception, dietary habits, cosmetic use, and medical opinions. The results showed that acne prevalence was higher among females (67.3%) and those aged 12–18 years (63.4%). A significant proportion (52.9%) had a family history of acne, suggesting a genetic component. Self-perception analysis indicated moderate psychological effects, including lower confidence and self-esteem. Dietary patterns revealed frequent consumption of fast food (58.8%) and sugary foods (58.2%), which may contribute to acne development. Cosmetic usage was relatively low, with 77.1% avoiding loose powder and 83% not using foundation. Statistical analysis using the Chi-square test and logistic regression identified significant associations between acne and lifestyle factors. These findings highlight the need for awareness programs promoting healthy dietary habits, skincare routines, and psychological support for individuals affected by acne.

Introduction

The skin condition known as acne vulgaris manifests as inflammation and infection of the polycebaceous follicles. Blackheads, papules, pustules, and nodules are the hallmarks of acne vulgaris, an inflammation of the facial skin caused by an overabundance of oil glands that obstruct the hair follicle channels and pores (1,2). The majority of adolescents with acne are between the ages of 15 and 19 for women and 17 and 21 for men. On the other hand, minor acne, which is a normal process, affects 85% of adolescents, while serious acne affects 15%, prompting them to consult a physician or dermatologist. The term "common acne" refers to the type of acne known as acne vulgaris. It is a skin illness brought on by modifications to the sebaceous glands. Because of the infection that was present, the skin became inflamed, giving it a red hue. Additionally, young individuals frequently suffer from acne, a skin condition that causes pimples. Acne affects most people, although it is most common in teenagers going through hormonal changes. Treatment for acne varies depending on its severity, which can range from mild with a few, sporadic pimples to moderate with inflammatory papules or severe with nodules and cysts.

One of the most common factors causing facial acne is cosmetics. Accordingly, students majoring in makeup and beauty frequently complain of facial skin issues, such as acne-prone skin, which can cause uncomfortable and itchy effects, like leaving scars (black spots and pockmarks), which can disrupt activities and lower female students' self-esteem (3). Food is another risk factor that is thought to play a significant part in the development of acne issues, especially fast food. Currently, acne is believed to be worsened by meals heavy in fat and sugar. This is because a lot of fat and sugar will cause the hormone insulin to be stimulated and increased in level. Insulin is a hormone that helps the body metabolize glucose. An increase in the number of oil gland cells and sweat glands on the face may result from the rise in blood insulin hormone levels. Therefore, teenagers who suffer from acne may experience psychological and emotional damage as a result of their symptoms [4, 5]. Dependently, this issue is particularly important because many teenagers, even those without acne, have low self-worth and a tendency to be self-conscious about their looks [5]. Moreover, Other variables, including skin type (sensitive skin), frequency of usage, or cosmetics content, can also affect the incidence of acne (6).

Clinically, comedones, pustules, papules, nodules, and cysts are among the several types of acne vulgaris (7). Because they have more sebaceous glands, the face, chest, back, and arms are the area's most commonly afflicted by acne (8). Besides of the aforementioned risk factors, previous studies suggest that endocrine abnormalities, genetic factors, excessive sun exposure, the usage of abrasive and compressive clothing, and the consumption of certain medications may all be etiologic factors for acne (9).

Acne is believed to be provoked by several dietary categories, including: Candy, bread, spaghetti, chocolate, biscuits, cakes, ice creams, and muesli are examples of foods with a significant glycemic index (GI) that can affect the development of AV by causing high insulin levels, according to Cordain and colleagues (10). Through the action of androgen hormones, IGF-1, IGFBP-3, and retinoid receptor signaling systems, high insulin levels can set off endocrine processes and

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influence the development of acne. By affecting aberrant keratinization, excessive follicular epithelial proliferation, and androgen-mediated sebum production, these variables interact to affect the pathophysiology of acne [10].
In this context, nuts, processed meats, fried foods, milk, butter, and cheese are examples of foods high in saturated fat that will raise the amount of sebum and induce inflammation. Progesterone, estrogen, and androgen analogues are all found in milk. Furthermore, milk contains biologically active compounds such as glucocorticoids, peptide hormones, and Transforming Growth Factors-β (TGF-β) that influence the pilosebaceous gland [11]. A questionnaire-based cohort research with 47,355 female acne patients was the first to reveal the link between dairy and acne [12]. The same group's three-year prospective study, which included 6094 girls between the ages of 9 and 15, discovered a positive correlation between the prevalence of acne and the consumption of full-fat, skimmed, and low-fat milk, but not with non-milk, milk-based items, pizza, or chocolate (13).
Overindulging in fast food will raise free radical levels, which will cause the skin to generate more oil and break out more frequently. The sebaceous glands' physiological functions include lubricating the skin and eliminating dead skin cells, but too many of them can clog pores. To lower free radicals and preserve healthy skin, the body needs to consume antioxidants like vitamins C and A (14,15).
According to the literature review, cosmetics are an essential risk factor leading to the incidence of acne. However, other factors, including skin type (sensitive skin), frequency of usage, or the makeup of cosmetics, might also affect the likelihood of acne (6). Pathologically, increased sebum production and thicker sebaceous follicles are two factors in the pathophysiology of acne vulgaris. Androgen hormones control the production of sebum and are also involved in alterations to sebocyte and keratinocyte cells, which result in the formation of comedones and microcomedones that evolve into inflammatory lesions. People also have pilosebaceous follicle hyperplasia, which may be brought on by acne patients' lower levels of linoleic acid (16).
Historically, Acne has been connected to several cosmetics. Inspired by their discovery of persistent adult acne in females who used beauty products—an observation not shared by their older male counterparts—this phenomenon was initially identified in 1972 as a distinct entity known as acne cosmetica (17,18). Accordingly, this cross-sectional study has been conducted in Al-Ajelat city, Libya to evaluate how certain essential lifestyle practices, such as fast-food consumption, usage of cosmetic types (loose powder, compact powder, sunblock, foundation, blush), and the effect of perimenstrual flare on the occurrence of acne among adolescent males and females.

Methods

Study design

This cross-sectional study was conducted in Al-Ajelat city, Libya, to assess the association between acne and risk factors such as fast-food consumption, cosmetic usage, and perimenstrual flare among 153 participants of adolescent males and females.

Data collection

Data collection was carried out between November 2023 and March 2024. Participants were divided into three age groups (12-18, 19-23, and > 24 years old). who either had or did not have acne. Participants were recruited from schools, colleges, and dermatology clinics in Al-Ajelat city. Adolescents aged less than 12 years and those who provided informed consent were included in this study. Individuals with other dermatological conditions unrelated to the acne and others on long-term medication that may influence acne were excluded.
A structured questionnaire-based survey was used to collect data. The questionnaire consisted of seven sections: the participants' demographic profile, family history, self-perception for acne patients, food consumption, acne symptoms, use of cosmetics, and the doctor's opinion about patients.

Data analysis

Data were analyzed using SPSS (Version 22). Descriptive statistics were used to summarize demographic and lifestyle factors. The Chi-square test and logistic regression analysis were used to assess associations between acne and risk factors. A p-value < 0.05 was considered statistically significant.

Ethical consideration

Ethical approval was obtained from the Institutional Board of Al-Ajelat Hospital. Participants provided written informed consent, and confidentiality was maintained throughout the study.

Results

The demographic profile of the participants

The demographic profile of the participants (Table 1) reveals that the majority (63.4%) fall within the age group of 12–18 years, followed by 30.7% in the 19–23 age range, while only a small percentage (5.9%) are 24 years and above. This indicates that most of the participants are adolescents, which aligns with the study's focus on acne prevalence among young individuals. In terms of gender distribution, females make up a significant majority (67.3%) compared to males (32.7%), suggesting a higher participation rate among female respondents. This could be attributed to greater concern about acne-related issues among females or a higher willingness to engage in studies related to skincare and cosmetics.
Regarding weight distribution, the most common weight range among participants is 51–60 kg (37.3%), followed by 61–70 kg (31.4%). A smaller percentage (15.7%) falls within both the lower (40–50 kg) and higher (71 kg and above) weight categories. This indicates that the majority of the respondents maintain an average body weight.
Skin color data shows that more than half of the participants (56.2%) have brown skin, while 32% have white skin, and 11.8% have black skin. This reflects the natural diversity in skin tones among the population of Al-Ajelat city. The study

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also highlights that most respondents (83%) reside in rural areas, whereas only 17% live in urban settings. This suggests that acne-related concerns and associated lifestyle factors are being studied predominantly within a rural demographic. Finally, educational background indicates that a larger proportion of the participants (63.4%) are in higher education, while 36.6% are still in secondary school. This suggests that the study population consists of relatively well-educated individuals who may have a better understanding of skincare and lifestyle factors contributing to acne. Overall, these demographic findings provide a clear picture of the study participants, with a predominance of younger, female, and rural respondents, which may have implications for the study's findings on acne risk factors.

Table 1. The demographic profile of participants.

Respondent Characteristics		Frequency	Percentage
Age	(12-18)	97	63.4%
	(19-23)	47	30.7%
	(24 and above)	9	5.9%
Gender	Male	50	32.7%
	Female	103	67.3%
Weight	(40-50)	24	15.7%
	(51-60)	57	37.3%
	(61-70)	48	31.4%
	(71 and above)	24	15.7%
Skin color	White	49	32%
	Brown	86	56.2%
	Black	18	11.8%
Area of life	Rural	127	83%
	Urban	26	17%
Education level	Secondary School	56	36.6%
	Higher Education	97	63.4%

Family history of acne patients

The data on family history of acne reveals that nearly half of the respondents (47.1%) reported no family history of acne, while the remaining 52.9% had at least one affected family member. Among those with a family history, 23.5% indicated that their brothers or sisters had acne, making it the most commonly reported familial relationship. Additionally, 19% of respondents identified other relatives as having acne, while 10.5% reported that both parents were affected (Table 2). These findings suggest a possible genetic predisposition to acne, as more than half of the participants had a family history of the condition.

Table 2. Family history of participants.

Relationships	Frequency	Percentage
Father and Mother	16	10.5%
Brothers and Sisters	36	23.5%
Others	29	19%
No	72	47.1%

Self-perception for acne patients

The self-perception data for acne patients (Table 3) highlights the psychological impact of the condition. A significant portion of respondents reported feeling unattractive (47.7% little, 28.8% medium, 23.5% a lot), with a mean score of 1.76 and a standard deviation of 0.811, indicating moderate self-perception concerns. Similarly, 51.6% felt little embarrassment, 30.1% medium, and 18.3% a lot, with a mean of 1.67, suggesting that acne affected their confidence to some extent. Feelings of self-consciousness were reported by 43.1% (little), 30.7% (medium), and 26.1% (a lot), with a slightly higher mean of 1.83, reflecting a notable impact. Dissatisfaction with appearance was prevalent, with 56.2% experiencing little dissatisfaction, 25.5% medium, and 18.3% a lot, resulting in the lowest mean score of 1.62, showing widespread but varying concern. Lastly, 60.1% reported little impact on self-confidence, 17% medium, and 22.9% a lot, with a mean of 1.63, reinforcing that while acne affected self-esteem, the severity varied among individuals. Overall, these findings suggest that acne moderately influences self-perception, with some individuals experiencing a stronger emotional and psychological impact than others.

Table 3. Self-perception for acne patients.

Items	Little	Medium	A lot	Mean	St. Dev
	N (%)				
How unattractive did you feel	73 (47.7)	44 (28.8)	36 (23.5)	1.76	0.811
How embarrassed did you feel	79 (51.6)	46 (30.1)	28 (18.3)	1.67	0.769
How self-conscious did you feel	66 (43.1)	47 (30.7)	40 (26.1)	1.83	0.817
How dissatisfied with your appearance did you feel	86 (56.2)	39 (25.5)	28 (18.3)	1.62	0.778
How much was your self-confidence negatively affected	92 (60.1)	26 (17)	35 (22.9)	1.63	0.843

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Food consumption

The data in Table 4 reveals that most participants (58.8%) consume 1–3 fast food meals per week, with spicy food (79.7%) being the most preferred type. Regarding healthy food intake, 60.8% eat fruit once daily, while 55.6% consume one dairy serving per day. Vegetable consumption is relatively low, with 37.3% eating just one serving daily. Hydration habits show that 46.4% drink only one liter of water per day. Bathing frequency is generally high, with 57.5% showering more than seven times per week. Additionally, 58.2% consume a diet high in refined sugars, carbohydrates, and chips, which may contribute to acne development.

Table 4. Food consumption for participants.

Items		Frequency	Percentage	Mean	St. Dev
		N (%)			
Fast food meals/ week number	(1-3)	90	58.8	1.62	0.811
	(4-6)	31	20.3		
	(7 and above)	32	20.9		
What kind of fast food	Spicy	122	79.7	1.33	0.687
	Sweet	12	7.8		
	Both of them	19	12.4		
Number of fruits taken per day	1 meal	93	60.8	1.70	0.994
	2meals	25	16.3		
	3 meals	23	15		
	4meals	12	7.8		
Number of dairy servings per day	1	85	55.6	1.88	1.120
	2	23	15		
	3	24	15.7		
	4	21	13.7		
Vegetable servings per day	1 meal	57	37.3	2.01	0.939
	2meals	46	30.1		
	3 meals	41	26.8		
	4meals	9	5.9		
number a liters of water per day	1 liter	71	46.4	1.76	0.801
	2 liters	47	30.7		
	3 liters	35	22.9		
Bathing frequency per week	(1-3)	34	22.2	2.35	0.823
	(4-6)	31	20.3		
	(7and above)	88	57.5		
A diet containing huge of refined	Sugar	17	11.1	3.08	1.144
	Carbohydrates	43	28.1		
	Chips	4	2.6		
	All of them	89	58.2		

Acne symptoms

The data on acne symptoms among participants (Table 5) shows that most individuals experience moderate to severe breakouts, with 35.9% having 6–10 bumps and 28.8% having more than 11. Scabbing is generally mild, as 73.2% reported little scabbing. Oily skin is common, with 40.5% experiencing excessive oiliness. Pus-filled bumps are prevalent, with 71.9% having 3–5 pimples containing pus. Acne spreads beyond the face for 46.4% of participants, primarily affecting the back (24.2%) and shoulders (13.7%). The majority of respondents (61.4%) have white pimples, while 62.7% experience acne bumps rather than nodules or cysts. Additionally, 65.4% admit to frequently picking or pressing their pimples, a habit that may worsen acne severity. These findings highlight the widespread impact of acne, particularly in terms of oiliness, lesion type, and breakout frequency.

Table 5. Acne symptoms among participants.

Items		Frequency	Percentage	Mean	St. Dev
		N (%)			
How many bumps did you have on your face	(3-5)	54	35.3	1.93	0.800
	(6-10)	55	35.9		
	(11 and above)	44	28.8		
How much scabbing from facial acne	Little	112	73.2	1.35	0.633
	Medium	28	18.3		
	A lot	13	8.5		
How oily was your facial skin	Little	25	16.3	2.24	0.717
	Medium	66	43.1		
	A lot	62	40.5		
	(3-5)	110	71.9	1.39	0.670

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How many bumps full of pus did you have on your face	(6-10)	27	17.6		
	(11 and above)	16	10.5		
Does acne spread to other places besides your face	Yes	71	46.4	1.54	0.500
	No	82	53.6		
If yes, where in your body	Back	37	24.2	2.90	1.276
	Shoulder	21	13.7		
	Both of them	15	9.8		
	Nothing	80	52.3		
Does acne pimples (Black, White, or Both of them)	Black	32	20.9	1.97	0.622
	White	94	61.4		
	Both of them	27	17.6		
Acne lesions imply such as:	Bumps	96	62.7	1.44	0.616
	Nodules	47	30.7		
	Cysts	10	6.5		
Do you frequently pick or press the pimples?	Yes	100	65.4	1.35	0.477
	No	53	34.6		

Use of cosmetics

The data on cosmetic use among participants (Table 6) shows that 77.1% do not use loose powder**,** and among those who do, only 2.6% apply it more than once a day**.** Sunblock usage is more common, with 43.1% using it**,** though 56.9% never apply it**.** Among users, 35.9% apply it once daily, and 7.2% more than once**.** Foundation use is relatively low, with 83% not using it**,** and the 17% who do apply it only once a day**.** Blush is used by 35.3% of respondents, while 64.7% never use it. Among users, 24.8% apply it once daily**,** and 10.5% use it multiple times per day**.** These findings suggest that while some participants use cosmetics, the frequency of application is generally low.

Table 6. Cosmetics usage among participants.

Items		**Frequency**	**Percentage**	**Mean**	**St. Dev**
		N (%)			
Use of loose powder	Yes	35	22.9	1.77	0.421
	No	118	77.1		
If you use how many times per day	Never	118	77.1	1.25	0.494
	Once a day	31	20.3		
	More than once a day	4	2.6		
Use sunblock	Yes	66	43.1	1.57	0.497
	No	87	56.9		
If you use sunblock how many times per a day	Never	87	56.9	1.50	0.660
	Once a day	55	35.9		
	More than once a day	11	7.2		
Use of foundation	Yes	26	17	1.83	0.377
	No	127	83		
If you use foundation how many times per a day	Never	127	83	1.17	0.377
	Once a day	26	17		
	More than once a day	0	0		
Use of Blush on	Yes	54	35.3	1.65	0.479
	No	99	64.7		
If you use of Blush on how many times per a day	Never	99	64.7	1.46	0.679
	Once a day	38	24.8		
	More than once a day	16	10.5		

The doctor's opinion about the participation of acne patients.

The data in Table 7 indicates that most participants experience mild acne (52.9%), while 35.9% have light acne, and 11.1% suffer from severe cases. Premenstrual flare-ups affect 40.5% of participants, while 59.5% do not notice changes in acne severity related to their menstrual cycle. Regarding hormonal changes, only 13.1% report experiencing them, whereas 86.9% do not. Notably, none of the participants take specific medications for acne, as 100% reported not using any treatments. These findings highlight that while acne severity varies, hormonal influences and medication use appear to play a minor role in this group.

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Table 7. The doctor's opinion about the participation of acne patients.

Items		Frequency N (%)	Percentage N (%)	Mean	St. Dev
Overview of acne (severity)	Light	55	35.9	1.75	0.642
	Mild	81	52.9		
	sever	17	11.1		
premenstrual flare (acne severity)	Yes	62	40.5	1.59	0.493
	No	91	59.5		
Any of the hormonal changes	Yes	20	13.1	1.87	0.338
	No	133	86.9		
Taking certain medications	Yes	0	0	2.00	0.000
	No	153	100		

Discussion

Global improvement ratings (given by the patient or the dermatologist) have been used to evaluate treatment outcomes, and a large portion of the literature on acne has previously focused on the clinical assessment of acne in terms of lesion counts or severity classes. However, neither severity nor global measurements are intended to identify shifts in a patient's quality of life in relation to their health. In certain circumstances, general quality of life measures is better, but by concentrating on areas of functioning that are most impacted by the condition and typically hold the highest significance for patients, disease-specific measures are more effective at identifying change [18]. A person's food practices, personal hygiene, and level of physical activity are all examples of their lifestyle, behaviors, and attitudes. Diet and cleanliness are thought to be significant factors in the aggravation of skin lesions in acne sufferers. Many acne sufferers believe that their disease is mostly caused by inadequate hygiene, thus, they try to treat the lesions by washing their skin frequently. According to research on the topic, mild cleaning may lessen the size and intensity of acne lesions [19, 20].

The current study's findings showed that the study group is made up of people with a fair amount of education, who might be more knowledgeable about the skincare and lifestyle variables that contribute to acne. With a preponderance of younger, female, and rural responses, these demographic statistics paint a clear image of the study participants and may have consequences for the findings on risk factors for acne. Furthermore, according to the data on family history of acne, 52.9% of respondents had at least one family member with acne, while nearly half (47.1%) claimed no family history of acne.

The psychological effects of acne, however, are shown by the self-perception statistics for acne patients (Table 3). With a mean score of 1.76 and a standard deviation of 0.811, a considerable percentage of respondents (47.7% little, 28.8% medium, and 23.5% a lot) expressed moderate concerns about their appearance. Similarly, with a mean of 1.67, 51.6% reported feeling little humiliation, 30.1% felt medium, and 18.3% felt a lot, indicating that acne had some impact on their confidence. The 604 participants who answered that acne required treatment were questioned about the best therapies to employ, in contrast to the findings reported by Poli et al. [21]. According to the respondents, systemic medications given by a doctor, a healthy lifestyle, and topical medications prescribed by a doctor or pharmacist should all be used to treat acne. They did not think that visiting a psychologist, using antiseptics, ordinary store-bought products, or cosmetic procedures were the best ways to cure acne. Regarding the effectiveness of personal hygiene products in treating acne, opinions differed. Overall, these findings suggest that acne moderately influences self-perception, with some individuals experiencing a stronger emotional and psychological impact than others.

Furthermore, Table 4 shows that the majority of individuals (58.8%) eat one to three fast food meals a week, with the most popular variety being spicy food (79.7%). In terms of eating a healthy diet, 55.6% of people consume one serving of dairy each day, and 60.8% eat fruit once a day. 37.3% of people only consume one serving of vegetables each day, which is a significantly low consumption rate. Food is currently recognized as one of the risk factors thought to contribute to the development of acne issues. A high-fat diet that contains saturated fatty acids is one of them, and it causes acne to worsen [22, 23]. Foods with high fat and sugar content are known to cause acne, according to research [24]. This is because a lot of fat and sugar will cause the hormone insulin to be stimulated. Insulin is a hormone that helps our bodies metabolize glucose. An increase in the number of oil gland cells and sweat glands on the face may result from this rise in blood insulin hormone levels. Acne will eventually result from this. Furthermore, the current study revealed that the majority of those with acne have moderate to severe outbreaks, with 28.8% having more than 11 pimples and 35.9% having 6–10 bumps. Since 73.2% of respondents reported little scabbing, scabbing is often minor. With 40.5% of people having very oily skin, oily skin is frequent. Pus-filled pimples are common; 71.9% of people have three to five pus-filled pimples. For 46.4% of individuals, acne extends outside of the face, mostly affecting the shoulders (13.7%) and back (24.2%).

Although women today must wear cosmetics, these products might cause skin conditions like Acne Vulgaris (AV). Adolescents and young adults frequently have AV [25, 26, 27]. Other factors, such as skin type (sensitive skin), frequency of usage, or cosmetics content, also affect the incidence of AV [6]. According to the study's findings, 77.1% of people do not use loose powder for cosmetic purposes, and of those who do, only 2.6% use it more than once a day. Although 56.9% of people never use sunscreen, 43.1% of people use it. 35.9% of users use it once a day, and 7.2% use it more than once. The percentage of people who use foundation is comparatively low, with 17% applying it only once a day and 83% not using it at all. Of those surveyed, 35.3% use blush, while 64.7% never use it. 10.5% of users use it more than once a day, while 24.8% use it once a day. These results imply that although some participants wear makeup, it is typically applied seldom.

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Propionibacterium acnes (PA) colonization, hyperproliferation of pilosebaceous follicles, elevated sebum production, and the inflammatory process are the four pathogeneses of acne [6, 25–28]. Cysts, comedones, papules, pustules, and nodules are clinical signs of acne. The goal of this study is to demonstrate the connection between the use of various cosmetics (loose powder, compact powder, sunscreen, foundation, blush) and the incidence of AV, given the widespread use of cosmetics and the prevalence of AV.

Conclusion

In conclusion, this study highlights key factors associated with acne prevalence among adolescents and young adults in Al-Ajelat city, Libya. The findings suggest that acne is more common among females and younger individuals, with a significant portion having a family history of the condition, indicating a possible genetic predisposition. Self-perception analysis reveals that acne moderately affects confidence and self-esteem. Dietary habits, particularly frequent fast food and high-sugar consumption, may contribute to acne development. Additionally, while cosmetic use is present, its frequency is relatively low. These results emphasize the need for greater awareness of acne risk factors and lifestyle modifications to help manage and prevent the condition.

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