

## Research Article

# Knowledge, Attitude and Practices about Acne Vulgaris among Secondary School Female Students in Karbala City Center 2024

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## Abstract

**Background:** Acne vulgaris is one of the most common skin diseases among teenagers and young adults, as it greatly affects the external appearance and psychological health of those affected. Adolescents are particularly vulnerable to this problem due to the hormonal and psychological changes they experience during this critical stage of life. The study aimed to evaluate the knowledge, attitudes, and practices of female adolescent students toward acne in secondary schools.

**Methods:** A cross-sectional study was conducted on 400 female students in secondary schools in the Karbala governorate center from April to November 2024.

**Results:** The study included females whose ages ranged from 15 to 19 years; the mean age was  $16.87 \pm 1.1$  years. About 61% of the participants suffered from acne. The study showed that 18.5% of participants had good knowledge, 59.2% had average knowledge, and 22.3% had poor knowledge. The majority of participants showed a neutral attitude and poor practices towards acne. The study indicated a statistically significant relationship between the mean knowledge score and age, educational level, and history of acne among the participants. It also indicated a statistically significant relationship between the mean attitude score and age and between the mean practice score and history of acne.

**Conclusions:** The study results showed moderate levels of knowledge and positive attitudes, with weak acne management practices among high school students. These findings underscore the need for educational programs to enhance student understanding and encourage healthy practices.

**Keywords:** Acne vulgaris; Knowledge; Attitude; Female students; Karbala

## Introduction

Acne vulgaris is a chronic inflammatory condition of the skin involving the pilosebaceous glands. It is commonly characterized by polymorphic lesions with resulting scarring [1]. Its pathology is influenced by various factors such as hormones, certain types of foods, medication intake, pollution, climate, psychological issues, and lifestyle choices, all of which lead to an increased incidence of it [2]. The pathogenesis of acne is multifactorial; four distinct processes were believed to play critical roles: increased sebum production, alteration of keratinization processes leading to comedone formation, follicular colonization by *Propionibacterium acnes*, and inflammatory mediators around the pilosebaceous unit (PSU) [3]. Unique lesions can be described as either non-

inflammatory (blackheads/open and closed/whiteheads) or inflammatory (papules, pustules, nodules, and cysts), leading to the development of scarring and pigmentation on the skin, requiring prolonged and ongoing treatment [4]. It usually affects areas of the skin with an increased number of sebaceous follicles (such as the face, upper chest, and back) [5]. This condition also affects both sexes and peaks among teenagers and young adults [6]. It affects all races and ethnicities, with its prevalence peaking between the ages of 15 and 20 years [7].

The factors influencing acne are classified into four main categories: the first category includes individual socioeconomic and biological factors, the second category includes natural environmental factors, the third element concerns the social environment, and the last element includes factors

of the built environment. Acne vulgaris is associated with high psychological and psychosocial distress and may affect various areas of life, causing social problems and psychological disturbances [8]. A recent study has reported that acne patients increasingly experience mental health challenges such as anxiety, depression, and suicidal thoughts [9]. Because it is often visible on the face, heightening issues of body image and socialization. Therefore, the impact of acne on health-related quality of life increased with increasing facial acne severity [10]. Facial scarring is more common, which emphasizes the importance of early and adequate intervention [11].

Acne vulgaris remains the most common inflammatory skin disease treated worldwide [12]. It is one of the 10 most common diseases in the world and the most common inflammatory skin disease [13]. It is considered a serious health problem among adolescents and young adults. It affects between 85% and 100% of people at some point in their lives and usually begins during puberty [14]. Worldwide, the prevalence of acne is estimated at 9.4 percent [15]. In another study in Saudi Arabia regarding acne, it has a worldwide prevalence of approximately 10% [16]. In Iraq, women are more susceptible to acne, especially those with oily skin [17].

Knowledge, attitudes, and practices (KAP) studies on acne vulgaris are crucial for understanding how adolescents perceive and manage this prevalent dermatological condition. By identifying gaps in awareness, negative attitudes, and harmful practices, these studies guide the development of effective educational and intervention programs that promote skin health and psychological well-being. Several studies indicate that secondary school female students have varying levels of knowledge about acne vulgaris, and many myths spread among students. A study conducted in Jordan found that there are common misconceptions among the community regarding acne, such as considering it a contagious disease and believing that squeezing acne lesions helps in healing them [18]. Despite an adequate level of knowledge, the study revealed suboptimal attitudes and practices toward acne, along with the persistence of several misconceptions related to the condition [19]. Better knowledge about the disease can immensely help improve the outcome of the disease and quality of life [20]. There was a

significant relationship between the knowledge and behavior of the students and acne vulgaris [21]. the importance of improving acne treatment strategies, focusing on personalized approaches to improve patient outcomes. There is a critical need for continuous education among healthcare providers regarding emerging treatment options and best clinical practices in acne management [22]. Despite being so common and very responsive to treatment, it is a major cause of depression among patients [23]. A study in Yemen indicated that there is a need to increase awareness about the effective management and control of acne [24].

The aim of this research is to study the general awareness of females about the disease and to know the attitudes and behavior of female students in dealing with acne. Thus, the results may facilitate our understanding of students' needs, which will ultimately lead to enhancing treatment strategies and increasing awareness and educational programs in the future for this age group with the aim of reducing and eliminating its physical and psychological effects.

## Materials and Methods

### Patients

A cross-sectional study was conducted on secondary schools for girls in Karbala city center. A multistage stratified random sampling method was adopted to select 7 schools, which are Al-Najah School for Girls, Ishraqat Al Huda School for Girls, Al Khalidat Girls School, Gaza School for Girls, Al Thaqafah School for Girls, Al-Rawdatain School for Girls, and Al-Surur School for Girls. The sample size estimation was based on the following formula [24]:

$$N = Z^2 P (1-P)/d^2$$

Where:

- N is the sample size.
- Z is the statistic corresponding to level of confidence (1.96 for 95% CI).
- P is expected prevalence (that can be obtained from the same studies or a pilot study conducted by the researchers); p was set as 0.5.
- d is precision (corresponding to effect size).

Based on the above estimation method, the minimum required sample size was 384. The survey ended by gathering 400 females, which exceeded the minimum number required for the study, and the data collection was conducted using

a simple random sampling. The data collection was conducted over five months, from the 1st of April to June 2024 and then from the 1st of October to the 1st of November 2024, through face-to-face interviews with the patients using a questionnaire as the data collection instrument.

### **Data collection**

Data were collected over 2-3 days per week, and each interview took approximately 10-15 minutes of time for each student. The names of all schools within this geographical area were taken, and multistage stratified random sampling was conducted for them. The schools resulting from this sample were chosen to conduct the questionnaire, where the educational stages in each school were divided into three stages included in the questionnaire, which are the fourth, fifth, and sixth stages. Then a random sample was conducted for each stage to choose one class from it and conduct an interview with each student through a pretested, structured questionnaire. The questionnaire was administered in the local language after obtaining verbal consent from students and, for female students under the age of 18. Parental consent was obtained before starting to fill out the questionnaire, taking into account their privacy without mentioning names, and providing the student with any information needed to use the questionnaire as a data collection tool. A structured questionnaire was prepared for the study and evaluated by experts specialized in community medicine and dermatologists. The questionnaire consisted of the following data: the first part of the questionnaire consisted of 16 questions regarding the studied variables, the second part consisted of 16 questions on the knowledge about acne vulgaris, the third part consisted of 12 questions on the attitude, and the fourth part consisted of 11 questions on the practices. This study included female students whose ages range from 15 to 19 years and who are in the 4th, 5th, and 6th grades in girls' secondary schools. Also included were all female students, whether suffering from acne vulgaris or not. Female students not willing to participate in the study and females with drug-induced and other acne-form eruptions were excluded.

### **Scoring system**

The knowledge questionnaire items were scored for each item (true answer = 1, and false or don't know answer = 0). Then the sum of the scores was

obtained and divided by the number of items (16) to develop the mean knowledge score.

The overall knowledge level was calculated for each item of the questionnaire throughout, considering good knowledge > 70%, moderate knowledge = 50-70%, and poor knowledge < 50%.

### **Overall Attitude Level**

The 12 attitude questions in the questionnaire form were considered to obtain the overall attitude score. For each question, if the answer was "agree," it was given 3 points, while "neutral" was given 2 points and "disagree" given 1 point. The total score ranged from 12 to 36 points. For each participant, a positive attitude was considered when the total scores of the participants reached 29 points and above, whereas a score of 19 or 28 points was considered as neutral, and a score between 12 and 18 points was regarded as a negative attitude.

The practice questionnaire items were scored for each item (true answer = 1, and false or don't know answer = 0). Then the sum of the scores was obtained and divided by the number of items (11) to develop the mean practice score.

### **Ethical approval**

Ethical approval for this study was obtained from the Medical Research Bioethical Committee at the University of Karbala, College of Medicine (No. 24-20, dated 23 April 2024), and from the General Directorate of Education in Kerbala Governorate (No. 10862, dated 13 February 2024). Verbal consent was obtained from all participants, and for female students under the age of 18, parental consent was obtained.

### **Statistical analysis**

The data of the present study were entered and analyzed throughout using the Statistical Package for the Social Sciences (SPSS 24.0 for Windows). The descriptive statistics were used in terms of frequency and percentage and mean  $\pm$ SD in appropriate tables and graphs. Possible association between variables was made through the independent t-test or ANOVA test and post hoc test. Significance level was considered when  $p < 0.05$ .

## **Results**

The present study included 400 secondary school female students in Karbala City. Slightly more than half, 271 (67.7%), of them were less than 18 years old. Rural residence accounted for less than one-fifth of study participants. Good economic status

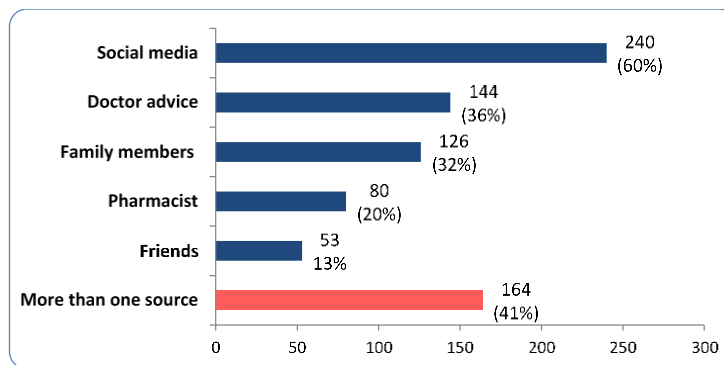
was reported by 252 (63%) of study participants, whereas weak economic status was reported by only 14 (3.5%). More than half of the female students are within the normal range for body mass index (258, 64.5%). More than half of the students had regular menstrual cycles, and the same percentage had current or previous polycystic ovary syndrome (273, 68.2%). A history of acne in the family was reported by 249 (62.2%) of the study females. Stress was reported by more than half (274, 68.5%) of study participants, mainly because of daily life or because of their academic study, as described in Table 1. The source of

information of the study participants about acne was mainly social media (240, 60%), followed by doctor advice and family members (36% and 32%, respectively) (Figure 1). The study revealed that 244 (61%) of the study participants reported that they suffered from acne. Other than acne, skin allergy was the highest skin disease reported by the study females, followed by fungal infection and psoriasis (Figure 2 and 3). There was no significant association of the presence of acne and the age groups among the study participants ( $p = 0.345$ ), as shown in Table 2.

Table 1: Socio-demographic characteristics of the study participants

Variables	Categories	Total No. (%)
Class level	Class 4	133 (33.3)
	Class 5	133 (33.3)
	Class 6	134 (33.4)
Age in years	<18	271 (67.7)
	18 and more	129 (32.3)
	mean $\pm$ SD	16.87 $\pm$ 1.14
BMI (kg/m <sup>2</sup> )	<18.5	78 (19.5)
	18.5 - 24.9	258 (64.5)
	25 and more	64 (16)
	mean $\pm$ SD	21.69 $\pm$ 3.45
Residence	Urban	328 (82)
	Rural	72 (18)
Economic status	Good	252 (63)
	Average	134 (33.5)
	Weak	14 (3.5)
Father education	Not read and write	11 (2.8)
	Primary education	43 (10.8)
	Secondary education	152 (38)
	College and higher	194 (48.4)
Mother education	Not read and write	10 (2.5)
	Primary education	59 (14.8)
	Secondary education	173 (43.3)
	College and higher	158 (39.5)
History of acne in the family	Yes	249 (62.2)
	No	151 (37.8)
Stress	Yes	274 (68.5)
	No	126 (31.5)
Causes of stress (n=274)	Because of daily life	129 (47.1)
	Because of the study	109 (39.8)
	Because of exams	36 (13.1)
Regular cycle	Yes	273 (68.2)
	No	127 (31.8)
Presence or history of PCOs	Yes	273 (68.2)
	No	127 (31.8)
	Don't know	127 (31.8)

PCOs = Polycystic Ovary Syndrome, BMI = Body Mass Index

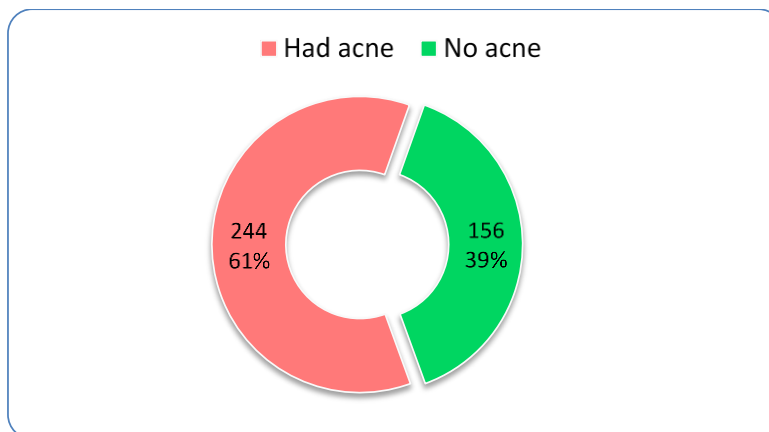


**Figure 1:** Source of information of the study participants about acne

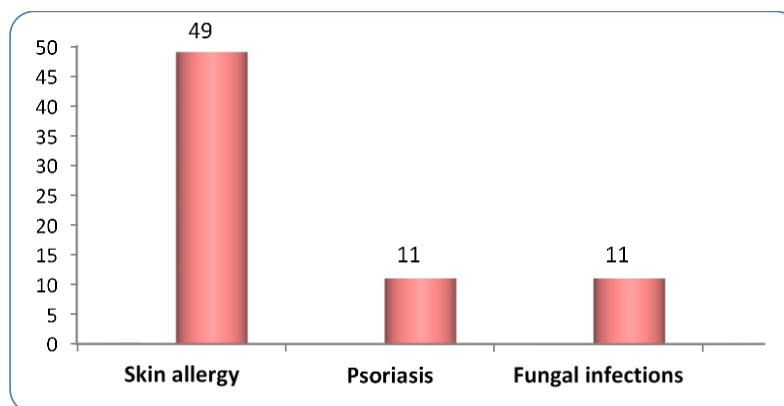
**Table 2:** Association of acne with age groups among study participants

Characteristics		Age groups (year)		Total No. (%)	p-value
		< 18	18 and more		
Presence of acne	Yes	161 (66%)	83 (34%)	244 (100%)	0.345
	No	110 (70.5%)	46 (29.5%)	156 (100%)	

The chi-square test was used for comparison. Significant P value of less than 0.05



**Figure 2:** Proportion of acne among study participants



**Figure 3:** frequency of other skin disease among study

In regard to the 16 knowledge questions of the questionnaire form about acne, 333 (83.2%) of the study participants respond correctly to the question "Do you think that psychological stress and tension increase the appearance of acne?", 313 (78.2%) to the question "Is it possible to treat acne?", and 301 (75.2%) to the question "Does popping and squeezing pimples worsen the condition and

increase the appearance of pimples?" Whereas only 37 (9.3%) of the study participants respond correctly to the question "Do you think that eating spicy food causes acne?" and 67 (16.7%) of the study participants respond correctly to the question "Acne is considered a contagious disease." The overall knowledge score concluded that good knowledge represented less than one fifth, 74

(18.5%), of the total participants; moderate knowledge was 237 (59.2%); and poor knowledge was 89 (22.3%), as shown in Table 3 and Figure 4. In regard to the 12 attitude questions of the questionnaire form about acne, the overall attitude score concluded that a positive attitude represented 121 (30%) of the total participants, neutral 265 (66%), and negative attitude was only 14 (4%), as shown in Table 4 and Figure 5. The results of the current study revealed that 122 (30.5%) of the study participants reported that they consulted a doctor the last time they had acne. The use of medications for acne without consulting a doctor

was reported by 111 (27.8%) of the study participants.

The results revealed that 237 (59.2%) of the study females did not follow a healthy diet to avoid acne breakouts. More than one half, 232 (58%), reported squeezing and removing pimples when they appear. The study revealed that 112 (28%) of the study females reported the use of preventive measures to control acne and prevent its reappearance; the most frequent measures were facing wash, eating healthy, avoiding touching the pimples, and doctors, as described in Table 5 and Figure 6.

Table 3: Knowledge questions and their answers of the study participants

Knowledge Questions	True answer No. (%)	False answer No. (%)	Do not know No. (%)
1. Do you think that eating spicy food causes acne?	37 (9.3)	339 (84.7)	24 (6)
2. Do you think eating fatty foods not causes acne?	247 (61.7)	83 (20.8)	70 (17.5)
3. Do you think oily skin helps acne appear?	253 (63.2)	78 (19.5)	69 (17.3)
4. Does popping and squeezing pimples worsen the condition and increase the appearance of pimples?	301 (75.2)	58 (14.5)	41 (10.3)
5. Do you think that cleaning the skin using traditional methods increases the appearance of pimples?	142 (35.5)	163 (40.8)	95 (23.8)
6. Does using cosmetics help acne break out?	214 (53.3)	106 (40.7)	95 (23.8)
7. Is lack and poor personal hygiene related to the appearance of acne?	296 (74)	47 (11.8)	57 (14.2)
8. Do you think that hormonal imbalance causes acne?	293 (73.2)	69 (17.3)	38 (9.5)
9. Acne is considered a contagious disease.	67 (16.7)	280 (70)	53 (13.3)
10. Is acne a hereditary disease?	101 (25.3)	218 (54.4)	81 (20.3)
11. Is acne seasonal and affected by the change of seasons?	170 (42.5)	142 (35.5)	88 (22)
12. Is the appearance of acne related to or affected by the menstrual cycle?	293 (73.2)	47 (11.8)	60 (15)
13. Does acne cause serious scarring if left untreated?	263 (65.7)	75 (18.8)	62 (15.5)
14. Is it possible to treat acne?	313 (78.2)	33 (8.3)	54 (13.5)
15. Do you think that psychological stress and tension increase the appearance of acne?	333 (83.2)	33 (8.3)	34 (8.5)
16. Does acne appear only on the face?	290 (72.5)	74 (18.5)	36 (9)
Overall mean knowledge score and confidence interval	9.32±2.46 (C.I= 9.08 – 9.56)		

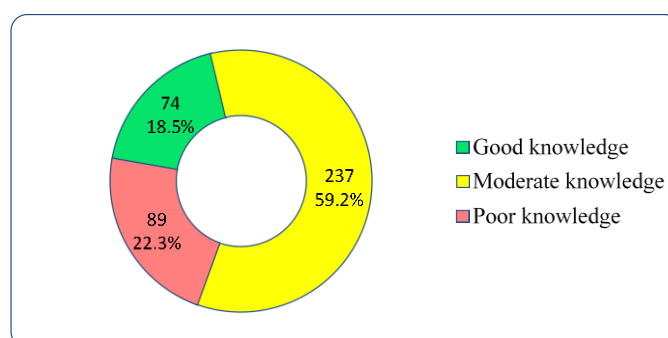


Figure 4: level of knowledge among study participants

The analysis of data of the current study revealed that there was a significant difference in mean knowledge score among the three classes of the secondary schools (class 4, class 5, and class 6). The ANOVA test and post hoc test concluded that class 6 revealed significantly lower mean knowledge scores than class 4 and class 5 ( $p < 0.001$ ).

The mean knowledge score of females under 18 years was significantly higher than that of those 18 years and older ( $p = 0.004$ ). The study concluded that participants who reported the presence of acne

had significantly higher mean knowledge scores ( $p = 0.016$ ), as shown in Table 6.

In regard to the mean attitude score, analysis of data of the current study revealed that the mean attitude score was neutral, and for females under 18 years, it was significantly lower than that of 18 years and older ( $p = 0.018$ ), as shown in Table (7). Regarding mean practice score, the study concluded that participants who reported the presence of acne had significantly higher scores ( $p < 0.001$ ), as shown in Table (8).

Table 4: Attitude questions and their answers of the study participants

Attitude questions	Agree No. (%)	Neutral No. (%)	Disagree No. (%)
1. Avoiding fast food and oily foods an important preventive measure to control acne.	269 (67.2)	49 (12.3)	82 (20.5)
2. If you wash your face frequently, you are less likely to get acne.	312 (78)	34 (8.5)	54 (13.5)
3. If you suffer from acne, this will affect your personality.	132 (33)	36 (9)	232 (58)
4. Stress and anxiety caused or worsened your acne.	265 (66.2)	59 (14.8)	76 (19)
5. Cosmetics and makeup cause you to have acne.	186 (46.5)	84 (21)	130 (32.5)
6. Self-medication is part of personal skin care.	126 (31.5)	84 (21)	190 (47.5)
7. Offering advice on some acne treatments to your friend or family member.	205 (51.2)	33 (8.3)	162 (40.5)
8. Consulting a doctor important to treat acne.	314 (78.4)	35 (8.8)	51 (12.8)
9. It is necessary to follow up the acne condition with the doctor during the treatment period.	222 (55.4)	73 (18.3)	105 (26.3)
10. Acne, if present, can negatively affect the way you interact with others.	109 (27.3)	50 (12.5)	241 (60.2)
11. You feel depressed when acne appears.	229 (57.2)	41 (10.3)	130 (32.5)
12. Feel embarrassed by your family and friends because of pimples on your face.	190 (47.4)	33 (8.3)	177 (44.3)
Overall mean attitude score and confidence interval	26.32±4.15 (C.I= 25.91 – 26.73)		

Table 5: Practice questions and their answers of the study participants

Practice questions	Yes No. (%)	No No. (%)	Don't know No. (%)
1. Did you consult a doctor the last time you had it?	122 (30.5)	246 (61.5)	32 (8)
2. Do you use medications if you suffer from it without consulting a doctor?	111 (27.8)	270 (67.4)	19 (4.8)
3. Do antibiotic drugs have an important role in treating acne vulgaris if you have it?	119 (29.8)	96 (24)	185 (46.2)
4. Do you follow a healthy diet to avoid acne breakouts?	128 (32)	237 (59.2)	35 (8.8)
5. Does reducing your weight contribute to reducing the appearance of acne if you suffer from it?	93 (23.3)	171 (42.7)	136 (34)
6. Do you prefer traditional treatments to control acne if it appears?	117 (29.3)	221 (55.2)	62 (15.5)
7. Do you use cosmetics to hide pimples and acne if they appear?	135 (33.7)	232 (58)	33 (8.3)
8. If pimples appear, do you squeezing and removing them?	232 (58)	145 (36.2)	23 (5.8)
9. Do you prefer to use herbs to treat pimples and acne?	101 (25.3)	214 (53.4)	85 (21.3)
10. Do you wash your face with facial cleansing products regularly?	259 (46.7)	119 (29.8)	22 (5.5)
11. Have you taken any preventive measures to control acne and prevent its reappearance?	112 (28)	238 (59.5)	50 (12.5)
Overall mean Practice score and confidence interval	3.82±1.85 (C.I= 3.64 – 4.01)		

## Discussion

The results of the current study showed that the most common source of information about acne, with more than half of the study participants citing social media, was similar to the results of a study conducted in Montenegro [25] and another by Alnafisah *et al.* (2022) in Saudi Arabia [6]. However, current results contradict the results of this study, which reported that family was the

primary source of information for participants [26-27]. Finally, the Faheim and Ahmad (2021) study mentioned that friends were the most preferred source of information by the participants [28]. The differences in research results among participants on this item are due to several factors, including the participant's age, culture, parents' educational level, and access to healthcare services. Some also resort to easier and faster, but less reliable, options, such as the internet.

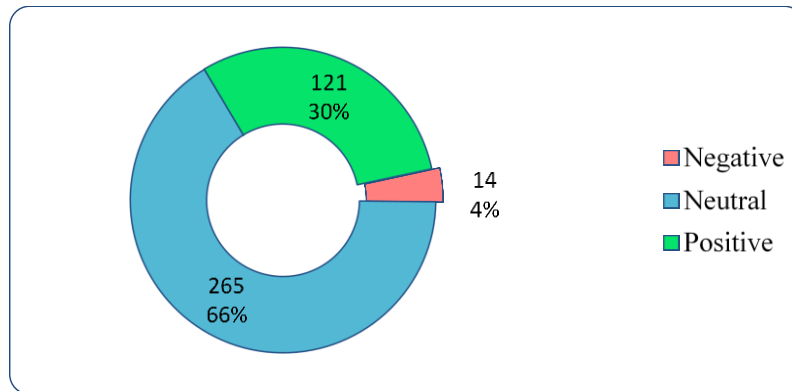


Figure 5: level of attitude among study participants



Figure 6: frequency of preventive and control measures of acne among study participants

**Table 6:** Association of the socio-demographic characteristics of participants and the Mean Knowledge Score

Characteristics	Categories	Mean Knowledge Score	p-value
Class level	Class 4	9.69±2.27	< 0.001*
	Class 5	9.91±2.32	
	Class 6	8.36±2.50	
Age in years	<18	9.56±2.38	0.004*
	18 and more	8.81±2.55	
BMI	<18.5	9.51±2.17	0.731
	18.5 - 24.9	9.28±2.43	
	25 and more	9.23±2.88	
Residence	Urban	9.35±2.41	0.531
	Rural	9.15±2.67	
Economic status	Good	9.32±2.50	0.763
	Average	9.37±2.38	
	Weak	8.86±2.51	
Presence of acne	Yes	9.55±2.49	0.016*
	No	8.95±2.37	
History of acne in the family	Yes	9.42±2.52	0.277
	No	9.15±2.34	

\* Significant p-value of less than 0.05. Independent t-test or ANOVA test were used for comparison



Table 7: Association of the socio-demographic characteristics of participants and the Mean Attitude Score

Characteristics	Categories	Mean Attitude Score	p-value
Class level	Class 4	25.77±4.19	0.139
	Class 5	26.42±4.34	
	Class 6	26.77±3.88	
Age in years	<18	25.99±4.26	0.018*
	18 and more	27.03±3.83	
BMI	<18.5	27.09±4.33	0.172
	18.5 - 24.9	26.19±3.88	
	25 and more	25.92±4.86	
Residence	Urban	26.25±4.14	0.476
	Rural	26.64±4.21	
Economic status	Good	26.44±4.15	0.713
	Average	26.08±4.02	
	Weak	26.50±5.45	
Presence of acne	Yes	26.50±4.13	0.274
	No	26.04±4.18	
History of acne in the family	Yes	26.64±4.12	0.050
	No	25.80±4.16	

\* Significant P value of less than 0.05. Independent t-test or ANOVA test were used for comparison

Table 8: Association of the socio-demographic characteristics of participants and the Mean Practice Score

Characteristics	Categories	Mean Practice Score	p-value
Class level	Class 4	3.80±1.96	0.056
	Class 5	3.56±1.83	
	Class 6	4.11±1.73	
Age in years	<18	3.76±1.91	0.301
	18 and more	3.96±1.71	
BMI	<18.5	3.59±1.86	0.314
	18.5 - 24.9	3.83±1.85	
	25 and more	4.06±1.82	
Residence	Urban	3.84±1.82	0.662
	Rural	3.74±1.98	
Economic status	Good	3.96±1.89	0.066
	Average	3.52±1.74	
	Weak	4.14±1.83	
Presence of acne	Yes	4.09±1.86	< 0.001*
	No	3.40±1.76	
History of acne in the family	Yes	3.80±1.77	0.705
	No	3.87±1.98	

\* Significant P value of less than 0.05. Independent t-test or ANOVA test were used for comparison

More than half of the study participants reported that they suffer from acne, and this is close to the results of the Netherlands study [29]. While these studies reported different results from the current study in Saudi Arabia, the percentages were lower (7.7%) in Jeddah City, (14.3%) in Arar City, and 45% in a study conducted by Jaber *et al.* (2020) in Jordan [30–32].

There are several factors that cause results to vary between studies regarding participants' medical history of acne. This discrepancy is due to the different designs of studies, as some research relies on participants' self-answers while others rely on direct clinical assessment. Studies also vary in their

definition of medical history; some include mild acne, while others focus only on moderate and severe cases. In addition, geographical and cultural factors and genetic and hormonal differences among individuals also vary from country to country. The importance of self-reporting among adolescents cannot be overlooked, as it may lead to under- or overreporting of symptoms. Thus, affecting the reliability of the data obtained.

In the current study, the majority of participants had a moderate knowledge level. These results may be explained by inadequate health education provided to adolescents about acne vulgaris. A study conducted in Jeddah supported this finding,

which reported a similar result, with moderate knowledge being around 59% [30]. This is also consistent with the findings of studies conducted in Indonesia and India, respectively [33-34]. The results were higher than those reported by Yorulmaz *et al.* (2020), who found that the average level of knowledge was 48% [35]. It was much lower than the findings of a study by Rafati *et al.* (2021) among high school students in southern Iran, where the average knowledge rate reached 87% [36].

Knowledge regarding acne among adolescents varies in different studies due to several influencing factors. Most notable are the cultural and social differences that affect individuals' perceptions of skin health and skin care methods. Furthermore, the sources of information adolescents rely on vary from one environment to another, leading to disparities in knowledge levels. Additionally, the level of education and health literacy is an important factor contributing to raising awareness among students. The age group and educational level of adolescents may also influence their level of knowledge. Finally, differences in research tools and methods used, such as questionnaire design or data analysis methods, may also contribute to disparities in results between studies.

In the current study, the majority of participants, about two-thirds, had a neutral attitude level, which is close to the results of this research supported by findings in southern Iran and in Assiut City [36-37]. The results of the current study are inconsistent with studies in Saudi Arabia by Alnafisah *et al.* (2022) and in Pakistan by Deepa Mohan Lal *et al.* (2021), respectively [6, 38]. The results of adolescents' attitudes toward acne vary across studies and research due to a number of influencing factors. The most important of these factors are differences in social and cultural environments that shape individuals' perceptions of appearance and the importance of skin care, which in turn influences their attitudes toward acne. Also, adolescents' personal experiences vary, such as the severity of the condition and its impact on self-confidence. Some may treat acne as a normal condition associated with adolescence, while others may feel anxious or embarrassed as a result. In addition, family, media, and the surrounding community play a significant role in shaping attitudes. Research methods also differ between

studies, leading to variability in results. Finally, the level of awareness and knowledge related to acne also influences attitudes. The greater the knowledge, the more positive and realistic the attitude toward the condition.

In the current study, the mean practice score percentage was poor for the studied participants. These results were similar to those reported in Karnataka, southwestern India, by Hulmani *et al.* (2017), and in Pakistan by Deepa Mohan Lal *et al.* (2021) and Perveen *et al.* (2023) [23, 38-39]. While the results of this research in Udaipur, Rajasthan, India, conducted by Ansari *et al.* (2023) conflict with current results, where practices were good [34].

The results of studies on adolescents' practices regarding acne vary due to several influential factors. The most prominent of these are cultural and social differences between societies. Furthermore, the varying levels of knowledge and health awareness among adolescents are a key factor affecting the nature of practices, as the use of appropriate treatments increases in environments with high health literacy. Additionally, differences in the research tools used in studies may lead to discrepancies in results. The impact of economic factors, which may limit some individuals' ability to access appropriate healthcare, cannot be overlooked, nor can the influence of the media and social networking sites, which sometimes promote scientifically unproven products or practices. All of these factors combined contribute to explaining the marked variation in research findings related to adolescents' practices regarding acne.

The current study concluded that participants who reported experiencing acne had significantly higher average knowledge scores. This finding may be due to the fact that those with acne research their condition and seek information from various sources. These studies support current findings in India and in Pakistan [5, 23].

Current study results showed that the average score on acne-related health practices was higher among adolescent girls with acne than among those without acne. This suggests that acne patients were more likely to adhere to proper skincare practices than those without acne. This may be explained by the psychological and social impact of acne on adolescent girls, which leads them to seek solutions and experiment with various methods to improve

the appearance of their skin. While current research results did not agree with the research that mentioned that acne sufferers have less healthy practices among its results in Pakistan and in India, respectively [5, 23, 39].

The findings of studies on acne-related behaviors among adolescents differ due to multiple reasons. Ethnic and community-based variations significantly affect the types of health and skincare routines practiced. Additionally, awareness and understanding play a crucial role in shaping how individuals respond to acne. Differences in research instruments and survey methods from one study to another also contribute to the inconsistencies in outcomes. Moreover, psychological and personal aspects, such as concerns about physical appearance or low self-worth, can influence some teenagers to engage in harmful or excessive skincare behaviors.

Finally, the availability and accessibility of health services are factors influencing the quality of practices adolescents follow when dealing with acne. A limitation of this study is that it was conducted in only one city and specifically in the center; therefore, the results cannot be generalized. Accordingly, it is proposed to conduct future studies in more than one city. Also, the sample size is relatively small and may not adequately represent the wider adolescent population and type. One of the limitations is the narrow age range, such as 15 to 19 years old. This may lead to the exclusion of younger adolescents who may have different perceptions and experiences with acne. Other limitations of the study include its cross-sectional design, which limits causal inferences, and the potential for self-reporting bias regarding acne prevalence. Additionally, the focus on adolescent girls may limit the generalizability of the findings to other populations or regions. Finally, the place of residence was a restriction, as it included most of the urban areas, considering that the study was within the city center, and therefore the beliefs and practices of the cultures surrounding acne can vary widely, which affects attitudes and knowledge. Despite this limitation, this study makes an important contribution by offering insights into adolescent girls' knowledge, attitudes, and practices. It also assesses their level of knowledge, attitudes, and practices and identifies the variables that influence this level. It also highlights the role of educational and awareness

programs. Overall, the study provides information to improve the knowledge of this important age group and enhance their therapeutic practices.

## Conclusions

This study found that most participants had moderate levels of knowledge and neutral attitudes, while their practices were poor. Also, a history of acne had an impact on the knowledge and practices of the students. Although the knowledge level in this study was moderate, several myths were prevalent among the students. This study revealed significant gaps in knowledge, attitudes, and practices related to acne vulgaris among adolescents, requiring targeted interventions, and highlights the need for educational programs aimed at improving the understanding and management of acne vulgaris.

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### Author contributions:

Conceptualization: N.M.A. and B.A.A.; Methodology: N.M.A. and B.A.A.; Formal analysis and investigation: N.M.A.; Writing: N.M.A.; Resource: N.M.A., B.A.A., and M.B.R.; Supervision: B.A.A. and M.B.R.

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