

RESEARCH ARTICLE

Awareness, beliefs, and self-medication practice of acne vulgaris among medical and pharmacy students in Yemen: A cross-sectional study

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Abstract

Background: Acne is a prevalent global skin condition, impacting around 9.4% of the population. This chronic inflammatory disease is commonly observed in the adolescent age group. The practice of self-medication for acne is widespread among medical and pharmacy students. This study aimed to evaluate self-medication practices and explore medical and pharmacy students' awareness, beliefs, and attitudes towards acne vulgaris. **Methods:** A questionnaire-based cross-sectional study was conducted among medical and pharmacy students in four colleges in the capital city of Yemen. All students attending the selected colleges during the study period (June and July 2023) were eligible to participate. **Results:** The findings revealed that 58.7% of students had acne. The overall rate of correct answers to the knowledge statements was 58.9%. The majority of students reported negative effects, including psychological and social impact. However, only a small proportion (23.9%) believed that acne negatively affected job performance. Slightly more than half of the students (54.5%) expressed willingness to use over-the-counter (OTC) drugs. Regarding effective practices, most students (61.4%) believed that maintaining a proper diet was crucial. **Conclusion:** The study reveals the widespread use of self-medication for acne and highlights the need to raise awareness about the effective management and control of acne.

Introduction

Yemen has long been one of the poorest countries in the Middle East and North Africa (MENA) and is currently enduring one of the most severe humanitarian crises globally. The conflict that began in 2014 has imposed significant economic and social burdens on the nation and its inhabitants. Between 2015 and 2022, the country witnessed a drastic 52% decline in GDP per capita, resulting in approximately two-thirds of the population, roughly 21.6 million people, requiring humanitarian assistance. In terms of educational status, illiteracy rates are the highest among individuals aged 41-45 years, reaching 74.2%, with 92.06% women, followed by the 36-40 age group at 60.57%, and then the 26-30 age group at 40.2% (World Bank Group, 2024).

Acne vulgaris (AV) is one of the most common skin disorders reported by dermatologists worldwide. It predominantly occurs in adolescents and young adults and can negatively affect their self-esteem, mood, and quality of life (Albahloul *et al.*, 2017; Wolkenstein *et al.*, 2018). Beyond its physical manifestations, acne can have profound psychological and social impacts on individuals. Psychologically, acne can lead to low self-esteem, feelings of self-consciousness, anxiety, and depression, particularly in adolescents and young adults. It can affect social interactions, leading to social withdrawal, avoidance of social situations, bullying, and even discrimination. These effects can result in decreased quality of life and may require holistic support and treatment approaches to address both the physical and emotional aspects of acne (Hazarika & Archana, 2016). Acne vulgaris is a chronic

inflammatory disease of the pilosebaceous unit characterised by various manifestations, such as seborrhoea, comedones, papules, pustules, nodules, cysts, and, in some cases, scars and keloids, which can persist throughout a person's life (El-Hamd *et al.*, 2017). Approximately 9.4% of the world's population suffers from acne vulgaris, commonly known as acne (Sachdeva *et al.*, 2021). The syndrome affects 85% of both male and female teenagers and can persist into adulthood (Lynn *et al.*, 2016). However, various studies have estimated the prevalence in teenagers to range from 28.9% to 91% (Allayali *et al.*, 2017; Tayel *et al.*, 2020).

It is widely recognised that acne vulgaris is influenced by multiple risk factors, including genetic, hormonal, environmental, and lifestyle aspects (Lynn *et al.*, 2016; Bhate & Williams, 2013). Research has reported that stress is a significant trigger and exacerbator of acne. It can lead to hormonal imbalances, particularly an increase in cortisol levels, which, in turn, can stimulate the sebaceous glands to produce more oil. This excess oil production can clog pores and create an environment conducive to the growth of acne-causing bacteria. Furthermore, stress can weaken the immune system, making it less effective in combating bacteria and inflammation in the skin (Zari & Alrahmani, 2017; Borzyszkowska *et al.*, 2022; Siddiqui *et al.*, 2024). The onset of acne lesions tends to occur earlier in females, suggesting a hormonal role. Acne is generally more severe in males (Adityan & Thappa, 2009) and tends to last longer in females. Its chronic nature implies that spontaneous remission can take several years (Albahloul *et al.*, 2017), with relapses often occurring even during treatment.

It should be acknowledged that acne is not a trivial condition, as it can have profound physical, social, and psychological effects, significantly impairing the quality of life (Albahloul *et al.*, 2017). While most cases of acne do not require a specific medical evaluation, there are instances where a medical workup may be necessary (Arabiah *et al.*, 2023). Although acne is a common problem, there are many myths and misconceptions associated with it, including its causes, factors that worsen or alleviate it, and its relationship with some foods, cosmetic products, and general hygiene (Manjunath *et al.*, 2019). These misconceptions are widespread among both patients and healthcare professionals and are further complicated by acne's complex and multifactorial nature (Brajac *et al.*, 2004). However, this misconception often results in delayed treatment and mismanagement of the condition. Therefore, exploring the knowledge, attitudes, beliefs, and practices related to acne plays a crucial role in understanding its etiopathogenesis and determining the outcomes for

individuals affected by acne. The knowledge and awareness of medical and pharmacy students are especially vital for treating acne effectively and addressing its psychological implications.

The term self-medication refers to the use of medicines without medical supervision, typically over-the-counter (OTC) drugs, to treat minor ailments at an individual's initiative. Self-medication is a common practice in Yemen and is likely influenced by the availability of medication without the need for a prescription. Clinical experience has often shown the worsening of acne conditions owing to the improper use of self-medication, particularly topical treatments (Manjunath *et al.*, 2019). Self-medication, while convenient, can harm health, manifesting in issues like misdiagnosis, masking symptoms, drug interactions, antibiotic resistance, organ damage, allergic reactions, and delayed treatment, all underscoring the risks of self-treatment without professional guidance (Ruiz, 2010). To the best of the author's knowledge, no study has been conducted in Yemen to investigate awareness, attitudes, and beliefs regarding acne and related self-medication practices, which are common among medical and pharmacy students. Hence, this study aimed to evaluate the knowledge, attitudes, beliefs, and self-medication behaviours of medical and pharmacy students in Yemen regarding acne vulgaris. It also aimed to explore students' perceptions of the various negative effects of acne, including its psychological and social impacts, as well as its influence on job performance.

Methods

Study design

This cross-sectional study was conducted between June and July 2023.

Study area and study population

The current study was carried out among final-year medical and pharmacy students in four colleges in the capital city of Yemen. All students attending the selected colleges during the study period were eligible to participate. Verbal informed consent was obtained from all participants, who were assured that their participation was voluntary and their responses were anonymous and confidential.

Sample size

The sample size was determined using the formula $n = z^2 * p * (1 - p) / e^2$, assuming a proportion of 50%

for students with good knowledge of and attitudes toward AV. With a 95% confidence interval and a 5% margin of error, the initial estimated sample size was 377. The sample size was adjusted to 415 to account for a potential non-response rate of 10%.

Data collection instruments and procedures

An anonymous, structured, and validated self-administered questionnaire survey was used to assess medical and pharmacy students' knowledge, attitudes, beliefs, and self-medication practices towards acne vulgaris. The questionnaire was developed from various knowledge, attitude, and practice (KAP) studies according to their relevance to this research (Albahloul *et al.*, 2017; Allayali *et al.*, 2017; Hulmani *et al.*, 2017; Manjunath *et al.*, 2019; Gothandaramalingam & Rajendran, 2021). The draft of the questionnaire underwent examination for validity (both content and face) and reliability. A panel of three local experts independently reviewed the first draft to assess content validity. They evaluated the content, question format, sequencing, and clarity. No modifications were recommended following this review. Subsequently, the questionnaire was administered to 15 participants to evaluate face validity. During this process, the time taken to complete the questionnaire, issues related to patient comprehension, and the level of patient acceptance were documented. The participants did not provide any feedback. Following the completion of the assessment, each question and the questionnaire as a whole were deemed clear and relevant by at least seven out of the 15 respondents in the pilot group (Chan *et al.*, 2002). The same 15 participants were then re-administered the questionnaire to test its reliability, resulting in a Cronbach's alpha of 0.73. This value indicates that the alpha coefficient falls within the recommended range (≥ 0.70) (Bland & Altman, 1997). The final draft consisted of 30 items covering various areas. The first part included 11 items focusing on participants' demographics and general information, with three items addressing psychological, social effects, and effects on job performance answered with "Yes" or "No". The second part consisted of 13 items related to knowledge of acne and its treatment. The third part comprised five questions on attitudes and beliefs, and the fourth part included three questions about practices related to acne. Additionally, six statements explored participants' reasons for and beliefs about self-medication for acne vulgaris. All knowledge-related items were formulated with three response options: "Yes," "No," or "I don't know." Some questions were designed with only two possible responses, "Yes" or "No," while others offered three or four multiple-choice options.

A score of one was awarded for each correct answer on the knowledge items and a score of zero for incorrect answers. Responses of "I don't know" were recorded as incorrect. The total knowledge score was 13. KAP levels were categorised as "good" or "poor" based on Bloom's cut-off point. Participants with knowledge scores exceeding 60% were classified as having good knowledge, while those with scores below 60% were considered to have poor knowledge (Addis *et al.*, 2021).

Data analysis

Data were analysed using the Statistical Package for Social Sciences software (SPSS version 24, Chicago, IL, USA). Descriptive and inferential analyses were conducted. The chi-square test and Student's t-test were used to assess the association between dependent and independent variables. The association was considered significant when the *p*-value was less than 0.05. The Kolmogorov-Smirnov (K-S) test was used to assess the normal distribution of the continuous variables before performing inferential statistical tests.

Results

Description of the sample

A total of 402 participants completed the survey, yielding a response rate of 97% (402/415). The mean age of the students was 24.0 ± 0.1 , and the majority were male (59.0%). Most participants (212; 52.7%) were medical students, and more than half (235; 58.5%) were unmarried. The majority (58.7%) stated having acne, while 26.1% reported a family history of acne. The most commonly affected site was the face, while the least affected was the chest.

Table 1 presents participants' demographic characteristics, while Figure 1 shows the prevalence of acne among students.

Table I: Demographic characteristics (n=402)

Characteristic	n (%)
Gender	
Male	237 (59.0)
Female	165 (41.0)
Age groups	
<25	277 (68.9)
≥25	125 (31.1)
Marital status	
Non-married	235 (58.5)
Married	167 (41.5)
Majors	
Pharmacy	190 (47.3)
Medical	212 (52.7)
Family history of acne	
Yes	105 (26.1)
No	297 (73.9)
Suffering from acne	
Yes	236 (58.7)
No	166 (41.3)
Common site	
Face	274 (68.2)
Neck	35 (8.7)
Chest	26 (6.5)
Back	67 (16.7)
Information source	
Social media	49 (12.2)
Health professional	137 (34.1)
Seniors/Friends/relatives	175 (43.5)
Others	41 (10.2)

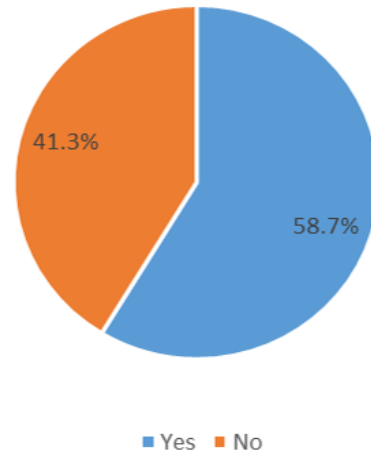


Figure 1: Prevalence of acne among students

Students' perception of acne's negative effects

The majority of students reported experiencing negative effects, including psychological and social impacts, while only a small percentage (23.9%) believed that acne negatively affected their work performance.

Figures 2, 3, and 4 display the percentages of students who perceived these negative effects, while Figures 5, 6, and 7 present students' beliefs about the prevalence of acne based on age, gender, and type of acne.

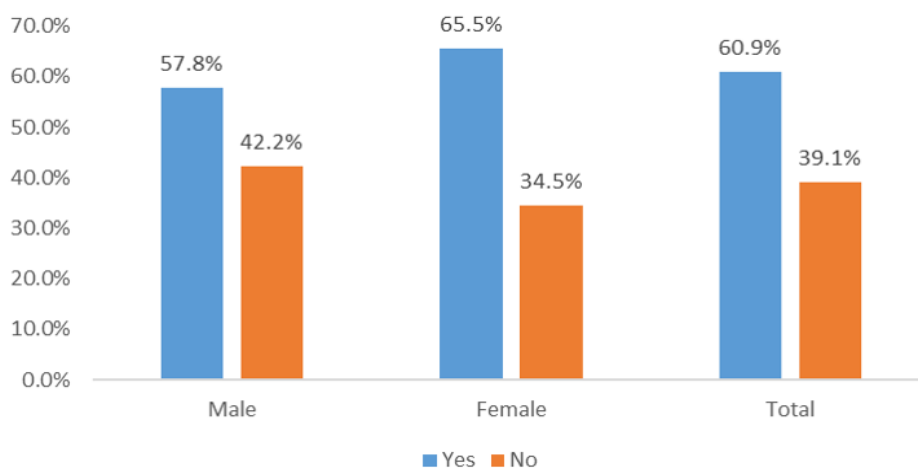


Figure 2: Students' perception of acne's psychological effects

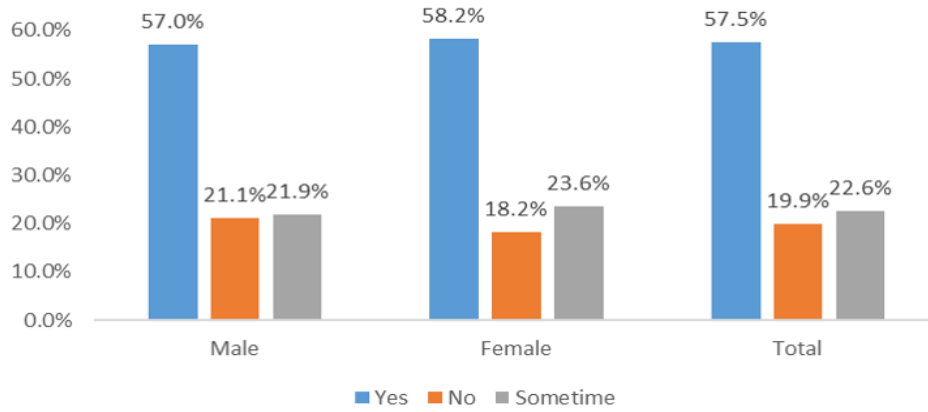


Figure 3: Students' perception of acne's social effects

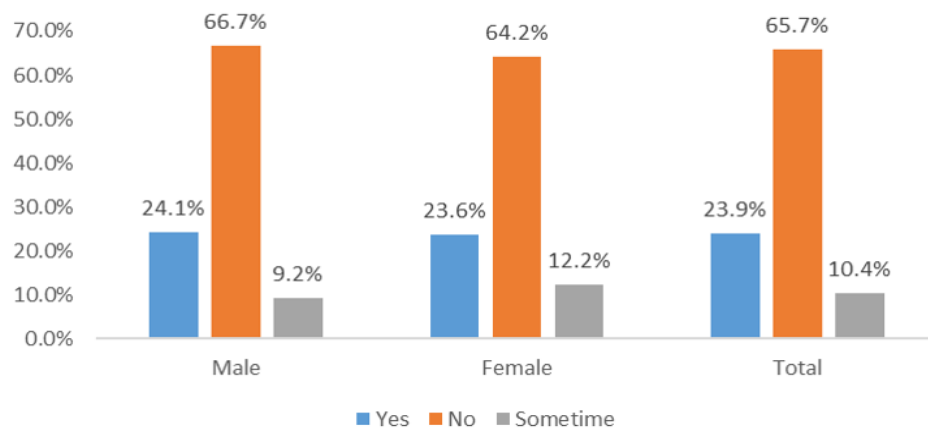


Figure 4: Students' perception of acne's negative effects on job performance

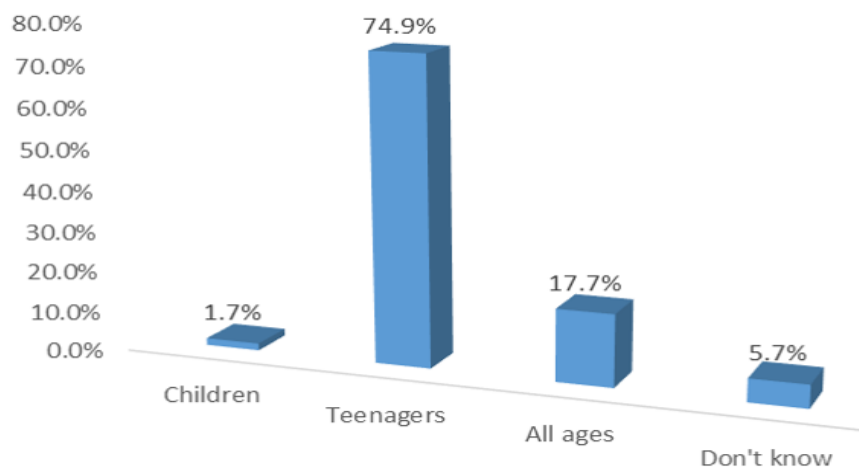


Figure 5: Students' beliefs about the acne prevalence of by age

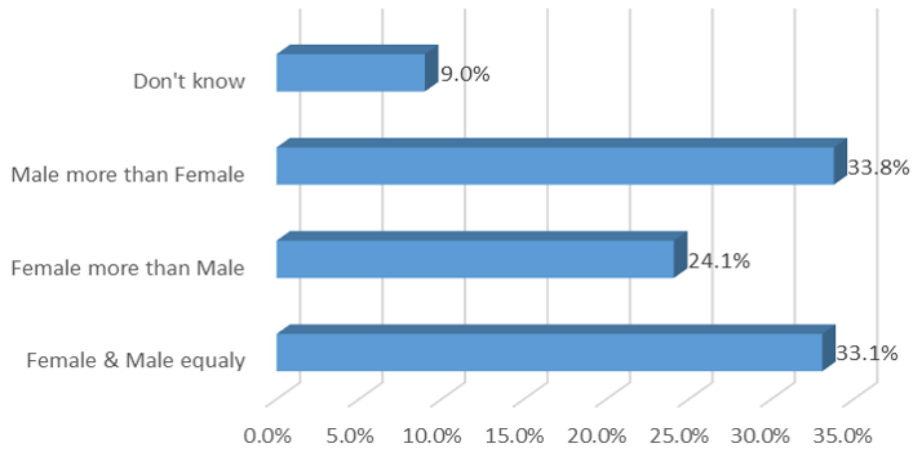


Figure 6: Students' beliefs about the prevalence of acne by gender

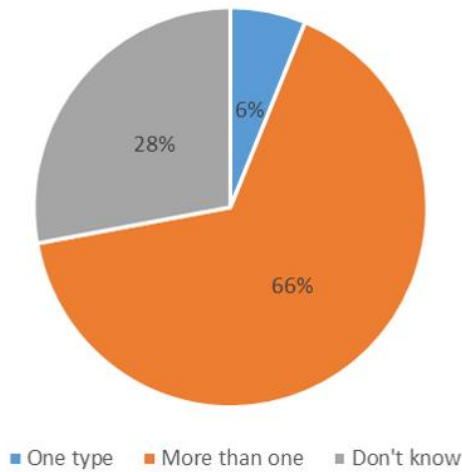


Figure 7: Students' beliefs about the types of acne

Knowledge about acne vulgaris

The mean total knowledge score was 7.2 ± 2.7 out of the maximum attainable score of 13. The overall rate of correct answers for the knowledge statements was 54.6%. Students thought that the most common factors responsible for acne and its aggregation were oily skin, squeezing, stress, cosmetics, oily foods, and premenstrual flare. Table II shows the detailed responses to knowledge questions.

A T-test was performed to examine whether there were any statistically significant differences in means of the students' knowledge scores in terms of their demographic characteristics. Statistically significant differences ($p < 0.05$) in means of knowledge scores were found between genders and among those who had a family history of acne (Table III).

Table II: Responses to knowledge questions (n=402)

Item	Yes n (%)	No n (%)	Don't know n (%)
K1. Can consuming chocolate cause acne	207 (51.5)	137 (34.1)	58 (14.4)
K2. Can consuming spicy food cause acne	130 (32.3)	140 (34.8)	132 (32.8)
K3. Can eating oily food cause acne	250 (62.2)	107 (26.6)	45 (11.2)
K4. Does acne vulgaris occur in oily skin	352 (87.6)	21 (5.2)	29 (7.2)
K5. Does acne vulgaris worsen by squeezing/picking	347 (86.3)	18 (4.5)	37 (9.2)
K6. Does use of cosmetics cause acne vulgaris	289 (71.9)	38 (9.5)	75 (18.7)
K7. Do you think that acne vulgaris is genetic in nature?	185 (46.0)	126 (31.3)	91 (22.6)
K8. Is acne vulgaris associated with premenstrual flare?	271 (67.4)	44 (10.9)	87 (21.6)
K9. Do you think that acne vulgaris is aggravated by stress?	325 (81.0)	42 (10.0)	35 (9.0)
K10. Do you think that acne vulgaris is aggravated in pregnancy?	115 (28.6)	181 (45.0)	106 (26.4)
K11. Is acne vulgaris considered a disease?	78 (19.4)	309 (76.9)	15 (3.7)
K12. Do you think that acne vulgaris is contagious?	85 (21.1)	292 (72.6)	25 (6.2)
K13. Can exposure to sun cause acne vulgaris?	167 (41.5)	147 (36.6)	88 (21.9)

Table III: Association of knowledge levels with sociodemographic characteristics (n=402)

Variables	n	Knowledge	
		Mean (±SD)	p-value*
Gender			
Male	237	6.57 (2.86)	0.045*
Female	165	7.16 (2.93)	
Age groups			
<25	277	6.99 (2.82)	0.07
≥25	125	6.42 (3.04)	
Marital status			
Non-married	235	6.78 (2.98)	0.78
Married	167	6.86 (2.78)	
Majors			
Pharmacy	190	6.94 (2.72)	0.41
Medical	212	6.70 (3.05)	
Family history of acne			
Yes	105	7.06 (2.72)	0.004*
No	297	6.11 (3.26)	
Suffering from acne			
Yes	236	7.02 (2.85)	0.09
No	166	6.52 (2.95)	

Note: Independent-samples t-test was used; *Significant at $P < 0.05$.

Attitude of students towards acne vulgaris

Regarding the first question on attitude, “What would you do if you develop acne lesions,” slightly more than half of the students (54.5%) indicated their readiness to use OTC drugs. Furthermore, 37.1% stated their intention to consult doctors, while a small portion (34; 8.5%) preferred using home remedies; of those, 24 (70.6%) were female. In response to the second question, “Do you feel depressed when you get acne,” more than half of the students (229; 57.0%) reported not experiencing feelings of depression related to acne, while the remaining 173 (43.0%) reported having negative emotions towards acne. Chi-square analysis showed a strong association between knowledge levels and feelings of depression ($p = 0.004$).

Practice of students towards acne vulgaris and self-medication

Three specific questions addressed students’ practices. Regarding self-care, the majority of students (61.4%) believed that maintaining a proper diet was the most effective practice. Only 26.1% consulted a dermatologist during their last acne episode. Self-medication for acne was highly prevalent, with nearly 76.0% of participants practising it. Oral medications,

including antibiotics, were used by 212 students (52.7%). Further details are presented in Table IV.

The association between sociodemographic variables, consulting a dermatologist, and taking OTC drugs was investigated using chi-square analysis. The analysis revealed a statistically significant association ($p < 0.001$) between sex and practice statements. Regarding consulting a dermatologist, a higher proportion of females reported having consulted a dermatologist compared to males (61.2% vs 30.8%). In terms of taking OTC drugs, approximately two-thirds of students (70.3%) were male.

Table IV: Practices towards acne vulgaris (n=402)

Questions	n (%)
Q1. Self-care includes: (more than one)	
Face wash	104 (25.9)
Drinking water	94 (23.4)
Proper diet	247 (61.4)
Aloe Vera	153 (37.8)
Q2. Did you consult a dermatologist last time when you got acne?	
Yes	105 (26.1)
No	297 (73.9)
Q3a. Do you take over the counter medication?	
Yes	308 (76.6)
No	94 (23.4)
Q3b. Which treatment was used? (more than one)	
Natural topical treatment	249 (61.5)
Oral medications	212 (52.7)
Medical lotion	136 (33.8)

Table V shows the responses of the study sample to self-medication. Among the students surveyed, 41.0% reported being self-motivated for self-medication, whereas others were influenced by family, friends, and advertisements. After experiencing a significant increase in the number of acne lesions, 33.0% of students initiated treatment. The most commonly cited reasons for self-medication were the perception that acne was a minor issue, the prohibitive cost of professional treatment, and the convenience of self-medication. Before starting treatment, approximately 29.0% of students believed that self-medication was both safe and effective. Of those who self-medicated, 59.5% obtained their medications from pharmacies, whereas 6.0% obtained them from general stores. Only 4.7% acknowledged that self-medication worsened their acne.

Table V: Practices of self-medication

Questions	n (%)
Q1. Motivation for treatment	
Self-Motivated	165 (41.1)
Family	70 (17.5)
Friends	56 (14.0)
Advertisement	17 (4.0)
Not Applicable	94 (23.4)
Q2. Initiation of self-medication	
As soon as noticed	102 (25.4)
When acne increase in number	132 (33.0)
On advice of family	56 (14.0)
On advice of friends	17 (4.2)
Not Applicable	94 (23.4)
Q3. Reason for self-medication	
Acne is a trivial problem	117 (29.2)
Convenient	78 (19.5)
Treatment is expensive	102 (25.5)
Others	9 (2.4)
Not Applicable	94 (23.4)
Q4. Belief in self-medication	
Safe and Effective	117 (29.2)
Harmful and Dangerous	67 (16.9)
No opinion	122 (30.5)
Not Applicable	94 (23.4)
Q5. Source of self-medications	
Pharmacy	239 (59.5)
Friends	31 (7.6)
General Store	24 (6.0)
Home	14 (3.5)
Not Applicable	94 (23.4)
Q6. Result of self-medication	
Cured	51 (12.6)
Controlled	154 (38.3)
Exacerbated	19 (4.7)
No Effect	84 (20.9)
Not Applicable	94 (23.4)

Discussion

Acne, a prevalent condition affecting adolescents worldwide, is characterised by a complex combination of factors. The average prevalence (58.7%) of acne observed in the present study was higher than that previously reported (Allayali *et al.*, 2017; El-Hamd *et al.*, 2017), where the prevalence ranged between 14.4% and 55.9%. This higher prevalence may result from the reported risk factors. However, it was lower than the

prevalence reported in other studies (Joseph *et al.*, 2014; Leelavathi *et al.*, 2015; Zari & Turkistani, 2017; Tameez-Ud-Din *et al.*, 2019; Talanikar & Upadhye, 2019; Sakr *et al.*, 2020), where the range was between 66.6% and 83.4%. A recent intervention study has provided evidence of a strong correlation between stress and acne (Zari & Alrahmani, 2017). Psychological stress can trigger the production of neuropeptides, which may play a significant role in the development of acne vulgaris (Wolkenstein *et al.*, 2018). Additionally, the higher prevalence of acne among students may be influenced by certain lifestyle factors. A study from 2017 demonstrated that inadequate or poor-quality sleep, high glycaemic load diets, and the consumption of soft drinks, junk food, fatty food, and chocolate can exacerbate acne (Allayali *et al.*, 2017).

The face was the most commonly involved site of acne in the present study, with 68.2% of the lesions involving this area of the body. Comparable findings on the presence of acne lesions on the face have been reported in several studies (Allayali *et al.*, 2017; Hulmani *et al.*, 2017; Zari & Turkistani, 2017; Manjunath *et al.*, 2019; Tameez-Ud-Din *et al.*, 2019), where the range was between 43.0% and 90.0%. However, Pokharel and Harish (2014) reported that only 26% of participants knew that acne usually affects the face, neck, and chest. The face, chest, and back all have high sebaceous gland activity with excessive growth of *Propionibacterium acnes* within sebaceous gland ducts, making these sites prone to acne (Kubba *et al.*, 2009). In the present study, acquaintances (seniors, friends, or relatives) were identified as the primary sources of information, accounting for 43.5% of the responses, aligning with previous findings showing that friends and seniors were the most common sources of information (Patil *et al.*, 2014). Medical and pharmacy school curricula are designed to provide students with comprehensive exposure to clinical settings, fostering a solid bond of trust and friendship between batchmates and their seniors. As a result, seniors and friends may exert the greatest influence on students regarding making decisions about self-medication.

in the current study, the majority of students reported negative psychological and social effects. About 61% and 58% of students indicated a psychological and social impact, respectively, while 23.9% believed that work performance was affected by acne. This result contrasts the findings of a Saudi study, in which 10.9% of the sample perceived an impact on work achievement (Albokhari, 2019).

Assessment of a patient's knowledge of acne is crucial and aids physicians in managing and improving treatment adherence. Although acne is not related to diet of any sort, about half of the study sample believed

that diet was an aggravating factor. Many participants had misconceptions that consuming oily food (n=250, 62.2%) and chocolates (n=207, 51.5%) can cause acne. These findings are consistent with previous research showing that 60% and 53% of participants believed that oily foods and chocolate contributed to acne (Hulmani *et al.*, 2017). In another study, spicy or fried foods were thought to cause acne, while fewer participants associated chocolate with acne (Su *et al.*, 2015). Diet was also frequently listed as a potential cause of acne, with one study reporting it as a primary factor for 28.4% of participants (Al Mashat *et al.*, 2013).

Increased androgenic secretion due to chronic stress may lead to the development of acne in women (Clarke *et al.*, 2007). In the present study, 81% of students were aware that aggravation of acne might be linked to stress, demonstrating better knowledge compared to other studies where 51% (Hulmani *et al.*, 2017) and 58.4% (Al Mashat *et al.*, 2013) of the sample linked acne to stress. In line with the present findings, one study reported that 82% of participants believed that stress aggravates acne and that acne contributes to feelings of depression (Pokharel & Harish, 2014). In addition to depression (Clarke *et al.*, 2007; Kubba *et al.*, 2009) and anxiety (Clarke *et al.*, 2007), some studies reported that medical students also experience negative self-image and lack of confidence (Kubba *et al.*, 2009; Wisuthsarewong *et al.*, 2020). The majority (87.6%) of respondents knew that oily skin is prone to acne, consistent with previous observations (Pokharel & Harish, 2014). In this study, 86.3% of the participants knew that acne lesions were worsened by squeezing, picking, or rubbing. These results are comparable with those of studies conducted in Saudi (Al-Natour, 2017) and Indian populations (Hulmani *et al.*, 2017), where 82% and 83% knew that acne lesions worsen by squeezing, picking, or rubbing, respectively. In contrast, a study among Nepali secondary school students reported that only 37% of respondents recognised that acne is exacerbated by these actions (Pokharel & Harish, 2014). Other surveys on beliefs about acne have yielded varied results, with reports of 42.4% (Rigopoulos *et al.*, 2007), 74% (Pokharel & Harish, 2014), and 15.4% (Al Mashat *et al.*, 2013) of respondents in different groups believing that poor hygiene and infection can cause acne.

Among the students surveyed, only 21.1% believed that poor hygiene and infection played a significant role in the development of acne, while 71.9% identified cosmetic products as an aggravating factor. The latter percentage is higher than those reported in other studies, showing that only 41% and 53% of the participants, respectively, believed that the use of cosmetic products aggravated acne (Al-Natour, 2017; Hulmani *et al.*, 2017). Conversely, in research among

Indian youth, 32% incorrectly believed that acne should be treated with cosmetics (Kaushik *et al.*, 2017).

The role of genetics in the pathogenesis of acne is well-established. In the present study, 46% of participants believed that genetics contributes to the development of acne. This result is similar to the findings of previous research (Hulmani *et al.*, 2017) but higher than those from a study in Albania, which reported that only 6% of participants attributed acne to genetic factors (Savo *et al.*, 2020).

Acne is a common skin condition affecting teenagers and adolescents worldwide. The prevalence of acne in the present study was 74.9%, consistent with the findings of research among medical students in India (Talanikar & Upadhye, 2019). Regarding knowledge, 54.6% had good knowledge of factors associated with acne, aligning with the results of a study conducted in an Indian population (Hulmani *et al.*, 2017). Females and patients with a positive family history of acne had significantly higher scores ($p < 0.05$). Age, social status, majors, and suffering from acne were not significantly associated with the participants' knowledge levels. Similar results were reported among Nepali secondary school students, with just over half (52%) having good knowledge (Pokharel & Harish, 2014). In contrast, a study in Nigeria concluded that over 80% of the respondents had good knowledge of acne (Onayemi *et al.*, 2006). Poor knowledge, false beliefs, and many misconceptions were prevalent among students in the current study, which is comparable to previous studies in other populations, including individuals with acne or those without, across different cultures. This deficiency highlights the need for improved acne education for patients, the general public, and students alike. In this study, 57.0% of the participants stated that they did not feel depressed when experiencing acne. These results are more favourable than those of previous research, where 81% of the patients reported feeling depressed (Hulmani *et al.*, 2017). This difference could be attributed to cultural variations among the study populations.

Self-medication for acne is a common practice among students. In this study, 76.6% of the students suffering from acne practised self-medication, similar to the results from Indian (Raikar & Manthale, 2018) and Saudi Arabian (Alduraibi & Altowayan, 2022) studies among medical and pharmacy students, where 77.4% and 63.95% of participants practised self-medication, respectively. Furthermore, a study among medical students with acne reported self-medication in 59.2% of students with acne, which is similar to our findings (Karamata *et al.*, 2017) reported self-medication in 59.2% of patients with acne, which is similar to our findings. However, our results were in contrast with the

findings of other studies (Karamata *et al.*, 2017; Talanikar & Upadhye, 2019) where 50.2%, 35.8%, and 50.0% of participants practised self-medication. The likely explanation for this high incidence among the students in our study is probably the lack of regulation on the OTC sale of medication. Self-medication was significantly more common among the students with facial lesions (67.5%).

Students with facial lesions sought a dermatologist's consultation much more frequently (71.4%) than those with lesions in other body parts. The face has significant cosmetic importance, and any visible lesions cause considerable distress to the patient (Tameez-Ud-Din *et al.*, 2019). In the current study, 71% of individuals who practised self-medication were males, aligning with a Serbian study (Lukovic *et al.*, 2014) but contrasting with Indian research (Karamata *et al.*, 2017), where self-medication rates were reported as 74.3% and 47.8% among males, respectively.

Regarding acne treatment, over half (52.7%) of the sample in this study used oral medications, while 33.8% opted for topical lotions. Only 26.1% of students preferred seeking treatment from a dermatologist. In a study among Indian patients (Hulmani *et al.*, 2017), 74% of participants used medications, whereas in Croatia (Brajac *et al.*, 2004), most patients (63%) relied on medical creams for acne treatment. In the present study, the topical route of administration was the most common, with 249 participants (61.5%) choosing this method, consistent with previous research (Karamata *et al.*, 2017), showing that participants favoured topical medications. The topical route of administration is widely regarded as one of the safest routes of administration, and the accessibility of numerous OTC topical drugs makes it a convenient choice for students.

This study revealed that a substantial proportion of students (25.9%) believed that frequent face washing could effectively alleviate acne. This misconception may arise from the belief that frequent washing helps maintain clean, oil-free skin and removes dirt. However, research found that frequent face washing did not lead to a significant improvement in acne (Manjunath *et al.*, 2019). In the present study, the most prevalent reason for self-medication was the perception that acne was a trivial problem (29.2%), closely followed by concerns over the cost of treatment (25.5%). These findings are consistent with those of other studies (Zafar *et al.*, 2008; Karamata *et al.*, 2017; Talanikar & Upadhye, 2019) where the mild nature of the disease was reported as the most common reason for self-medication. More than half (56.7%) of the participants expressed that self-medication was a component of self-care. Some students (29.4%) favoured advising their friends about self-medication

for acne. A comparable study in Pakistan found that 31.8% of students favoured offering medication advice to their friends (Zafar *et al.*, 2008). The present study also found that students preferred to use medication on an as-needed basis. More than 70% of participants reported reading the leaflet, package insert, or label instructions, while over 90% paid attention to the expiry date. These findings suggest that, during clinical training, students were trained to prioritise reading the label before using medication. However, it is noteworthy that inappropriate use may increase the risk of adverse effects or antimicrobial resistance, even if medications are used topically (Amirthalingam *et al.*, 2015).

Strengths and limitations

The main strength of this study is that it is the first of its kind in Yemen to address the awareness, beliefs, and attitudes of medical and pharmacy students towards acne vulgaris. As a result, it provides valuable insights into health education and preventive measures for the disease among young individuals and the general population. However, there are several limitations to consider. Firstly, due to its cross-sectional design, a strict causal interpretation of the results is not possible. Secondly, while the response rate of the target population was acceptable and the results were comparable to other findings, the sample may not be representative of the entire population, limiting generalizability. Lastly, self-reporting surveys may be subject to social desirability bias, where participants may provide positive answers to attitude and practice questions based on perceived expectations.

Conclusion

This study highlights that acne is considered a trivial problem and that the use of self-medication for acne is common among medical and pharmacy students in Yemen. Students should be made aware that acne can be managed and controlled effectively. Drugs, including antimicrobials, were used on an as-needed basis, which may lead to inappropriate use and increase the risk of adverse drug effects or antimicrobial resistance. Awareness about the use of drugs, the risk of adverse effects, and antimicrobial resistance among students during their undergraduate training will help reduce self-medication and subsequently improve rational prescribing in their future careers.

Furthermore, the present study revealed that students with acne had poor practices and unfavourable attitudes despite moderate knowledge. Regarding self-care, the majority of students expressed the belief that

maintaining a proper diet was the most effective practice. The knowledge and attitude of medical and pharmacy students regarding self-medication of acne mandates improvements in the existing dermatology curriculum. A higher percentage of male students utilised over-the-counter (OTC) drugs. The sale of OTC drugs should be closely regulated to minimise dispensing without appropriate prescriptions. The findings indicated a significant association between gender and practice.

Ethical consideration

The study was approved by the ethical Committee at Alrowad Medical College (protocol code A-23-27, approved on April 17, 2023). This study was conducted in accordance with the principles of the Declaration of Helsinki. After addressing all participant inquiries, the researcher explicitly asked each participant for verbal consent to participate in the study.

Conflict of interest

The author declares no conflict of interest.

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References

- Addis, S. G., Nega, A. D., & Miretu, D. G. (2021). Knowledge, attitude and practice of patients with chronic diseases towards COVID-19 pandemic in Dessie town hospitals, Northeast Ethiopia. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *15*(3), 847–856. <http://dx.doi.org/10.1016/j.dsx.2021.03.033>
- Adityan, B., & Thappa, D. M. (2009). Profile of acne vulgaris- A hospital-based study from South India. *Indian Journal of Dermatology, Venereology and Leprology*, *75*(3), 272–278. <http://dx.doi.org/10.4103/0378-6323.51244>

- Al Mashat, S., Al Sharif, N., & Zimmo, S. (2013). Acne awareness and perception among population in Jeddah, Saudi Arabia. *Journal of the Saudi Society of Dermatology & Dermatologic Surgery*, *17*(2), 47–49. <https://doi.org/10.1016/j.jssdds.2013.05.003>

- Albahloul, A. M., Alshotairy, H. A., Abdullah, R. A. A., Mogharbel, B. F., & Malky, A. M. (2017). Assessment of knowledge, attitude and practice toward acne Vulgaris among community in Jeddah City, 2016. *The Egyptian Journal of Hospital Medicine*, *66*(1), 193–197. https://ejhm.journals.ekb.eg/article_14529.html

- Albokhari, Heba. (2019). Knowledge and beliefs regarding acne vulgaris among governmental secondary school students in Makkah Almukarramah, 2018. *American Journal of Medical Sciences and Medicine*, *7*(4), 162–172. <http://dx.doi.org/10.12691/ajmsm-7-4-4>

- Alduraibi, R. K., & Altowayan, W. M. (2022). A cross-sectional survey: Knowledge, attitudes, and practices of self-medication in medical and pharmacy students. *BMC Health Services Research*, *22*(1), 352. <https://doi.org/10.1186/s12913-022-07704-0>

- Allayali, A. Z., Asseri, B. N., AlNodali, N. I., Alhunaki, R. N. M., & Algoblan, S. F. G. (2017). Assessment of prevalence, knowledge, attitude, and psychosocial impact of acne vulgaris among medical students in Saudi Arabia. *Journal of Clinical & Experimental Dermatology Research*, *8*(4), 1–7. <http://dx.doi.org/10.4172/2155-9554.1000404>

- Al-Natour, S. H. (2017). Acne vulgaris: Perceptions and beliefs of Saudi adolescent males. *Journal of Family and Community Medicine*, *24*(1), 34–43. <http://dx.doi.org/10.4103/2230-8229.197180>

- Alrabiah, Z., Wajid, S., Babelghaith, S. D., & Al Arifi, M. N. (2023). Knowledge, attitudes, and practices of community pharmacists toward the management of acne vulgaris in Saudi Arabia. *Frontiers in Medicine*, *10*, 1133765. <http://dx.doi.org/10.3389/fmed.2023.1133765>

- Amirthalingam, S., Yi, K. S., Ching, L. T., & Mun, N. Y. (2015). Topical antibacterials and global challenges on resistance development. *Tropical Journal of Pharmaceutical Research*, *14*(5), 919–924. <https://doi.org/10.4314/tjpr.v14i5.24>

- Bhate, K., & Williams, H. C. (2013). Epidemiology of acne vulgaris. *British Journal of Dermatology*, *168*(3), 474–485. <http://doi.org/10.1111/bjd.12149>

- Bland, J.M., Altman, D.G. (1997). Statistics notes: Cronbach's alpha. *British Medical Journal*, *314*(7080), 572. <https://doi.org/10.1136/bmj.314.7080.572>

- Borzyszkowska, D., Niedzielska, M., Kozłowski, M., Brodowska, A., Przepiera, A., Malczyk-Matysiak, K., Cymbaluk-Płoska, A., & Sowińska-Przepiera, E. (2022). Evaluation of hormonal factors in acne vulgaris and the course of acne vulgaris treatment with contraceptive-based therapies in young adult women. *Cells*, *11*(24), 4078. <https://doi.org/10.3390/cells11244078>

- Brajac, I., Bilić-Zulle, L., Tkalčić, M., Lončarek, K., & Gruber, F. (2004). Acne vulgaris: myths and misconceptions among patients and family physicians. *Patient Education and Counseling*, *54*(1), 21–25. [https://doi.org/10.1016/S0738-3991\(03\)00168-X](https://doi.org/10.1016/S0738-3991(03)00168-X)

- Chan, C. S., Fabb, W. E., & Hazlett, C. B. (2002). Validation of an instrument to assess patient attitudes towards prescribing of pharmaceuticals by doctors. *Journal of Clinical Pharmacy and Therapeutics*, **27**(4), 249–256. <https://doi.org/10.1046/j.1365-2710.2002.00417.x>
- Clarke, S. B., Nelson, A. M., George, R. E., & Thiboutot, D. M. (2007). Pharmacologic modulation of sebaceous gland activity: mechanisms and clinical applications. *Dermatologic clinics*, **25**(2), 137–146. <http://dx.doi.org/10.1016/j.det.2007.01.004>
- El-Hamd, M. A., Nada, E. E. D. A. A., Moustafa, M. A. K., & Mahboob-Allah, R. A. (2017). Prevalence of acne vulgaris and its impact of the quality of life among secondary school-aged adolescents in Sohag Province, Upper Egypt. *Journal of Cosmetic Dermatology*, **16**(3), 370–373. <http://dx.doi.org/10.1111/jocd.12328>
- Gothandaramalingam, H. V., & Rajendran, D.N. (2021). KAP study on acne among undergraduate medical students. *Annals of Tropical Medicine & Public Health*, **23**(23), 232–363. <https://www.researchgate.net/publication/351121995>
- Hazarika, N., & Archana, M. (2016). The psychosocial impact of acne vulgaris. *Indian Journal of Dermatology*, **61**(5), 515–520. <https://pubmed.ncbi.nlm.nih.gov/27688440/>
- Hulmani, M., Bullappa, A., Kakar, S., & Kengnal, P. (2017). Knowledge, attitude and practice towards acne vulgaris among acne patients. *International Journal of Research in Dermatology*, **3**(1), 107–112. <https://doi.org/10.18203/issn.2455-4529.IntJResDermatol20170797>
- Joseph, N., Kumar, G. S., & Nelliyanil, M. (2014). Skin diseases and conditions among students of a medical college in southern India. *Indian Dermatology Online Journal*, **5**(1), 19–24. <http://dx.doi.org/10.4103/2229-5178.126023>
- Karamata, V. V., Gandhi, A. M., Patel, P. P., & Desai, M. K. (2017). Self-medication for acne among undergraduate medical students. *Indian Journal of Dermatology*, **62**(2), 178. http://dx.doi.org/10.4103/ijid.ijid_243_16
- Kaushik, M., Gupta, S., & Mahendra, A. (2017). Living with acne: Belief and perception in a sample of Indian youths. *Indian Journal of Dermatology*, **62**(5), 491–497. http://dx.doi.org/10.4103/ijid.IJD_100_16
- Kubba, R., Bajaj, A.K., Thappa, D.M., Sharma, R., & Vedamurthy, M. (2009). Factors precipitating or aggravating acne. *Indian Journal of Dermatology, Venereology and Leprology*, **75**, S10–12. <https://ijdv.com/factors-precipitating-or-aggravating-acne/>
- Leelavathi, M., Tan, H., Pua, J., Apipi, M., Sohami, A. E., & Mahat, N. F. (2015). Acne disability, self-management and help-seeking behaviour among medical students. *Medicine and Health*, **10**(1), 1–9. <https://journalarticle.ukm.my/8669/1/1.%2520Leelavathi%2520M%2520et%2520al.pdf>
- Lukovic, J. A., Miletic, V., Pekmezovic, T., Trajkovic, G., Ratkovic, N., Aleksic, D., & Grgurevic, A. (2014). Self-medication practices and risk factors for self-medication among medical students in Belgrade, Serbia. *PLoS One*, **9**(12), e114644. <https://doi.org/10.1371/journal.pone.0114644>
- Lynn, D. D., Umari, T., Dunnick, C. A., & Dellavalle, R. P. (2016). The epidemiology of acne vulgaris in late adolescence. *Adolescent Health, Medicine and Therapeutics*, **7**, 13–25. <http://dx.doi.org/10.2147/AHMT.S55832>
- Manjunath, S. N., Maneesha, G., & Bant, D. D. (2019). A study knowledge and practice of self-Medication for acne among college students in Hubli. *MedPulse International Journal of Community Medicine*, **13**(3), 38–42. <http://dx.doi.org/10.26611/10111335>
- Onayemi, O., Aghanwa, H. S., Soyinka, F., & Morakinyo, O. (2005). A descriptive cross-sectional survey of prevalence, knowledge and perceptions of acne vulgaris among secondary school students in Nigeria. *Nigerian Medical Practitioner*, **48**(3), 73–76. <http://dx.doi.org/10.4314/nmp.v48i3.28769>
- Patil, S. B., Vardhamane, S. H., Patil, B. V., Santoshkumar, J., Binjawadgi, A. S., & Kanaki, A. R. (2014). Self-medication practice and perceptions among undergraduate medical students: A cross-sectional study. *Journal of Clinical and Diagnostic Research: JCDR*, **8**(12), HC20–HC23. <https://doi.org/10.7860/jcdr/2014/10579.5313>
- Pokharel, G., & Harish, B. (2014). Acne Vulgaris: Knowledge and attitude among Nepali school students. *International Journal of Nursing Research and Practice*, **1**, 29–33. <https://www.citefactor.org/article/index/20161>
- Raikar, D.R., & Manthale, N.S. (2018). A cross sectional study of self-medication for acne among undergraduate medical students. *International Journal of Research in Dermatology*, **4**(2), 211–214. <https://doi.org/10.18203/issn.2455-4529.IntJResDermatol20181821>
- Rigopoulos, D., Gregoriou, S., Ifandi, A., Efstathiou, G., Georgala, S., Chalkias, J., & Katsambas, A. (2007). Coping with acne: Beliefs and perceptions in a sample of secondary school Greek pupils. *Journal of the European Academy of Dermatology and Venereology*, **21**(6), 806–810. <http://dx.doi.org/10.1111/j.1468-3083.2006.02091.x>
- Ruiz, M. E. (2010). Risks of self-medication practices. *Current Drug Safety*, **5**(4), 315–323. <https://doi.org/10.2174/157488610792245966>
- Sachdeva, M., Tan, J., Lim, J., Kim, M., Nadeem, I., & Bismil, R. (2021). The prevalence, risk factors, and psychosocial impacts of acne vulgaris in medical students: A literature review. *International Journal of Dermatology*, **60**(7), 792–798. <http://dx.doi.org/10.1111/ijid.15280>
- Sakr, S., Hachem, D., Ghaddar, A., & Taha, N. (2020). Assessment of knowledge, attitude, and practice toward acne vulgaris among the Lebanese young adult population. *Our Dermatology Online*, **11**(e), e169.1–e169.6. <http://dx.doi.org/10.7241/ourd.2020e.169>
- Savo, I., Jorgaqi, E., Vasili, E., Mishtaku, S., Demaj, D., & Jafferany, M. (2020). Treatment-seeking behavior, knowledge and beliefs about acne vulgaris among adolescents: A cross-sectional study in high school students in Tirana, Albania. *Dermatologic Therapy*, **33**(4), e13500. <http://dx.doi.org/10.1111/dth.13500>

Siddiqui, I., Rais, U., & Tahir, M. (2024). Exploring stress-induced mechanisms in acne pathogenesis. *Research Square*, *12*(4), 1–31. <https://www.researchsquare.com/article/rs-4477781/v1>

Su, P., Chen Wee Aw, D., Lee, S. H., & Han Sim Toh, M. P. (2015). Beliefs, perceptions and psychosocial impact of acne amongst Singaporean students in tertiary institutions. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft*, *13*(3), 227–233. <https://doi.org/10.1111/ddg.12578>

Talanikar, H. V., & Upadhye, J. J. (2019). Knowledge, attitude and practices of medical students about self-medication for acne. *International Journal of Research in Medical Sciences*, *7*(3), 849–853. <http://dx.doi.org/10.18203/2320-6012.ijrms20190935>

Tameez-Ud-Din, A., Malik, I. J., Bhatti, A. A., Tameez Ud Din, A., Sadiq, A., Khan, M. T., Chaudhary, N. A., & Arshad, D. (2019). Assessment of Knowledge, attitude, and practices regarding self-medication for acne among medical students. *Cureus*, *11*(8), e5510. <https://doi.org/10.7759/cureus.5510>

Tayel, K., Attia, M., Agamia, N., & Fadl, N. (2020). Acne vulgaris: prevalence, severity, and impact on quality of life and self-esteem among Egyptian adolescents. *Journal of the Egyptian Public Health Association*, *95*(1), 1–7. <http://dx.doi.org/10.1186/s42506-020-00056-9>

Wisuthsarewong, W., Nitiyarom, R., Kanchanapenkul, D., Arunkajohnask, S., Limphoka, P., & Boonchai, W. (2020). Acne beliefs, treatment-seeking behaviors, information media usage, and impact on daily living activities of Thai acne patients. *Journal of Cosmetic Dermatology*, *19*(5), 1191–1195. <http://dx.doi.org/10.1111/jocd.13132>

Wolkenstein, P., Machovcová, A., Szepietowski, J. C., Tennstedt, D., Veraldi, S., & Delarue, A. (2018). Acne prevalence and associations with lifestyle: A cross-sectional online survey of adolescents/young adults in 7 European countries. *Journal of the European Academy of Dermatology and Venereology*, *32*(2), 298–306. <http://dx.doi.org/10.1111/jdv.14475>

World Bank Group. (2024). *The World Bank in Yemen*. Retrieved August 17, 2024 from <https://www.worldbank.org/en/country/yemen/overview>

Zafar, S. N., Syed, R., Waqar, S., Zubairi, A. J., Vaqar, T., Shaikh, M., Yousaf, W., Shahid, S., & Saleem, S. (2008). Self-medication amongst university students of Karachi: prevalence, knowledge and attitudes. *JPMA. The Journal of the Pakistan Medical Association*, *58*(4), 214–217. <https://pubmed.ncbi.nlm.nih.gov/18655436/>

Zari, S., & Alrahmani, D. (2017). The association between stress and acne among female medical students in Jeddah, Saudi Arabia. *Clinical, Cosmetic and Investigational Dermatology*, *10*, 503–506. <http://dx.doi.org/10.2147/ccid.s148499>

Zari, S., & Turkistani, A. (2017). Acne vulgaris in Jeddah medical students: Prevalence, severity, self-report, and treatment practices. *Journal of Cosmetics, Dermatological Sciences and Applications*, *7*, 67–76. <http://dx.doi.org/10.4236/jcda.2017.71007>