Original Article:

The Prevalence of Acne Vulgaris and its Association with Sleep Quality Among Medical Students in King Saud bin Abdulaziz University for Health Sciences

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Abstract

Background and Aims:
Acne vulgaris is a common chronic inflammatory skin condition affecting the pilosebaceous unit. Emerging evidence suggests a link between poor sleep quality and acne. This study aims to assess the prevalence of acne vulgaris and its association with sleep quality among medical students at King Saud bin Abdulaziz University for Health Sciences (KSAU-HS).

Methods:
A cross-sectional study was conducted among 277 medical students at KSAU-HS, Riyadh, Saudi Arabia using a self-administered online questionnaire. Acne severity was assessed using the Investigator's Global Assessment (IGA) scale, while sleep quality was measured using components of the Pittsburgh Sleep Quality Index (PSQI). Data was analyzed using SPSS version 27, with statistical significance set at $p < 0.05$.

Results:
Acne severity was predominantly mild, with 23.5% having no acne (Grade 0), 28.5% with mild acne (Grade 1), and 23.1% with moderate acne (Grade 2). Poor sleep quality was reported by 50.5% of participants. Good sleep quality was significantly associated with lower acne severity and less frequent acne breakouts. Participants with good sleep quality were more likely to have no acne or only mild acne compared to those with poor sleep quality ($p < 0.001$). Gender showed a significant association with acne severity ($p = 0.033$), with females reporting higher acne severity than males, while age did not show a significant correlation.

Conclusion:
This study highlights a significant association between poor sleep quality and increased acne severity. Promoting healthy sleep habits may be beneficial in managing acne among medical students. Further research is needed to explore underlying mechanisms.

Keywords:
Acne vulgaris, Sleep quality, Saudi Arabia, Prevalence, Investigator's Global Assessment (IGA)

Introduction:

Acne vulgaris is a condition characterized by chronic inflammation of the skin [1]. It mainly affects the pilosebaceous unit, which is the structural unit of the hair follicle, resulting in the appearance of lesions such as nodules, papules, pustules and black heads [2, 3]. Recent global burden estimates indicate that acne vulgaris remains one of the most prevalent dermatological conditions worldwide, particularly among young adults [4]. Another study that was conducted in several countries revealed that medical students aged 21 had a prevalence rate of 57.2% 1. Acne mainly appears during teenage life, and it significantly decreases during young adulthood and onwards [5]. A local study that was conducted in Riyadh revealed that around 80% of the people aged (15-30) complained of acne which shows that the condition has a significant prevalence within the Saudi population [6].

Acne vulgaris is known to be caused or aggravated by several factors including positive family history, atopic diseases (asthma, eczema, allergic rhinitis), polycystic ovarian syndrome (PCOS) and lifestyle factors such as stress, smoking, and physical inactivity. Also, dietary habits play a major role as predisposing factors of the disease. This includes the consumption of dairy, alcohol, and foods with a high glycemic index [7, 8]. Moreover, other factors such as gender, ethnicity and sleep have been suggested as possible predisposing factors in multiple studies [2, 9]. In recent years, multiple studies conducted abroad suggest that there is a possible correlation between poor sleep hygiene and acne vulgaris [10, 11].

According to the national sleep foundation, the average teenagers' appropriate need of sleep is estimated to be around 8-10 hours, while 7-9 hours are considered adequate in young adults and adults [12]. Poor sleep quality is known to be a predisposing or aggravating factor in many diseases such as diabetes and hypertension and is known to affect physiological and psychological well-being 10. A multi-country meta-analysis done in 2023 showed that medical students sleep 6.5 hours per night on average meaning that less than 70% get the recommended sleep time of 7-9 hours [13].

Furthermore, all the studies that have established a possible association between poor sleep quality and acne vulgaris have been conducted outside the Kingdom of Saudi Arabia. Our aim is to provide evidence on the prevalence of acne vulgaris among medical students at King Saud bin Abdulaziz University for Health Sciences (KSAU-HS). We also aim to find the relation between acne vulgaris and quality of sleep. Finding a relation between the two may aid in the management and prevention

of the disease and its flare ups.

Methods:

A cross-sectional study was conducted among medical students at King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), College of Medicine, Riyadh, Saudi Arabia. The inclusion criteria included both males and females students currently studying at KSAU-HS COM, form stream 1 and 2. Students who did not complete the survey were excluded from the analysis. Data collection was performed through a self-administered online questionnaire distributed via Google Forms. The study population included approximately 800 medical students enrolled at KSAU-HS. Using the Raosoft sample size calculator with a 95% confidence level and a 5% margin of error, the calculated minimum sample size was 260 participants. Convenience sampling was employed to select participants who were willing and available during the data collection period.

A self-administered Google Forms questionnaire was distributed virtually to all KSAU-HS COM students in Riyadh. The questionnaire had an informed consent that explains the purpose of the study and was available in Arabic and English to ensure accessibility for all participants. It contained three sections, the first section asked about demographical data including age, gender, and batch. Investigator's Global Assessment (IGA) of acne severity was used to assess acne severity in the second section. The participants was asked to score their acne severity using the IGA which is a scale that measures the severity of acne vulgaris based on degree of facial involvement, number, and the type of lesions present on the skin (comedones, papules, pustules, cysts, and nodules) with 0 (clear), 1 (almost clear), 2 (Mild), 3 (Moderate), and 4 (severe) along with visual illustrations of types of acne to help the participants accurately identify and assess their own acne severity. Also, the frequency of breakouts and medication usage was asked in the second section. To assess the sleep quality in the last section, questions from The Pittsburgh Sleep Quality Index (PSQI) were used. It included questions about sleep duration, quality, latency, disturbances, and daytime sleepiness. Lastly, a question asking the participants if they believe their acne worsens after poor sleep. Both the Investigator's Global Assessment (IGA) and the Pittsburgh Sleep Quality Index (PSQI) are well-validated tools, with PSQI demonstrating a Cronbach's alpha of 0.83, indicating high internal consistency. Data was gathered and reviewed for completeness by the co-investigators on the research team. The study obtained ethical approval from the institutional review board at King Abdullah International Medical Research

Center, Riyadh, Saudi Arabia (Study Number: NRR24/001/10.).

The data analysis was conducted using SPSS version 27 [IBM SPSS Version 27.0. Armonk, NY: IBM Corp.]. Various statistical methods were used to examine the relationship between acne vulgaris and sleep quality. Descriptive statistics were used to summarize the demographic characteristics, acne severity, and sleep patterns of the participants. Crosstabulation with chi-square and exact probability tests (for small frequency distributions) were performed to assess the associations between sleep quality and acne vulgaris. Logistic regression analysis was utilized to identify significant predictors of sleep quality with different acne data. A p-value less than 0.05 was considered statistically significant.

Results:

Table 1: Bio-clinical characteristics, sleep patterns, and sleep quality data of Medical Students in King Saud bin Abdulaziz University for Health Sciences (N=277).

Data	No	%
Age in years		
18-20	41	14.8%
21-22	131	47.3%
23-28	105	37.9%
Mean ± SD		
Gender		
Male	196	70.8%
Female	81	29.2%
According to the IGA below, the severity of your acne?		
Grade 0	65	23.5%
Grade 1	79	28.5%
Grade 2	64	23.1%
Grade 3	44	15.9%
Grade 4	25	9.0%
How often do you experience acne breakouts?		
Daily	23	8.3%
Several times a week	61	22.0%

Once a week	76	27.4%
Rarely	117	42.2%
Do you use any medications for your acne?		
Yes	50	18.1%
No	227	81.9%
How many hours do you sleep a day on average in the past month?		
< 5 hours	40	14.4%
5-6 hours	57	20.6%
6-7 hours	90	32.5%
8-9 hours	73	26.4%
> 9 hours	17	6.1%
During the past month, how often have you had trouble staying awake during the day?		
Always (5 or more times a week)	22	7.9%
Often (3–4 times a week)	60	21.7%
Sometimes (1–2 times a week)	90	32.5%
Rarely (less than once a week)	68	24.5%
Never (no daytime sleepiness)	37	13.4%
During the past month, how long has it usually takes you to fall asleep each night?		
< 30 minutes	137	49.5%
30-60 minutes	108	39.0%
> 60 minutes	32	11.6%

Table 1 presents the bio-clinical characteristics, sleep patterns, and sleep quality data of 277 medical students at King Saud bin Abdulaziz University for Health Sciences. The majority of the students were male. Acne severity, as assessed by the Investigator Global Assessment (IGA) scale, showed a relatively even distribution across the lower grades. Most students had either no acne, mild acne or moderate acne. More severe acne, in Grades 3 and 4, was observed less frequently. In terms of acne breakout frequency, the largest group of students 117 (42.2%) reported

experiencing breakouts rarely. While 61 (22.0%) experienced breakouts several times a week. Daily breakouts were less common, reported by 23 students (8.3%). The vast majority of students reported not using any medications for their acne.

Regarding sleep duration, the largest group of students reported sleeping 6-7 hours per night (90, 32.5%). A significant proportion, however, reported sleeping less than 6 hours (97, 35%), with 40 (14.4%) sleeping less than 5 hours. As for sleep quality, the majority of students rated their sleep as either "fairly good" (116, 41.9%) or "very good" (51, 18.4%), indicating generally positive sleep experiences. However, a substantial portion reported "fairly bad" (74, 26.7%) or "very bad" (36, 13.0%) sleep quality. Daytime sleepiness was also prevalent, with the largest group (90, 32.5%) reporting experiencing trouble staying awake "sometimes" (1-2 times a week). Only 37 (13.4%) of students reported never experiencing daytime sleepiness. Finally, concerning sleep latency (time to fall asleep), nearly half of the students reported falling asleep in less than 30 minutes, while 108 reported taking 30-60 minutes.

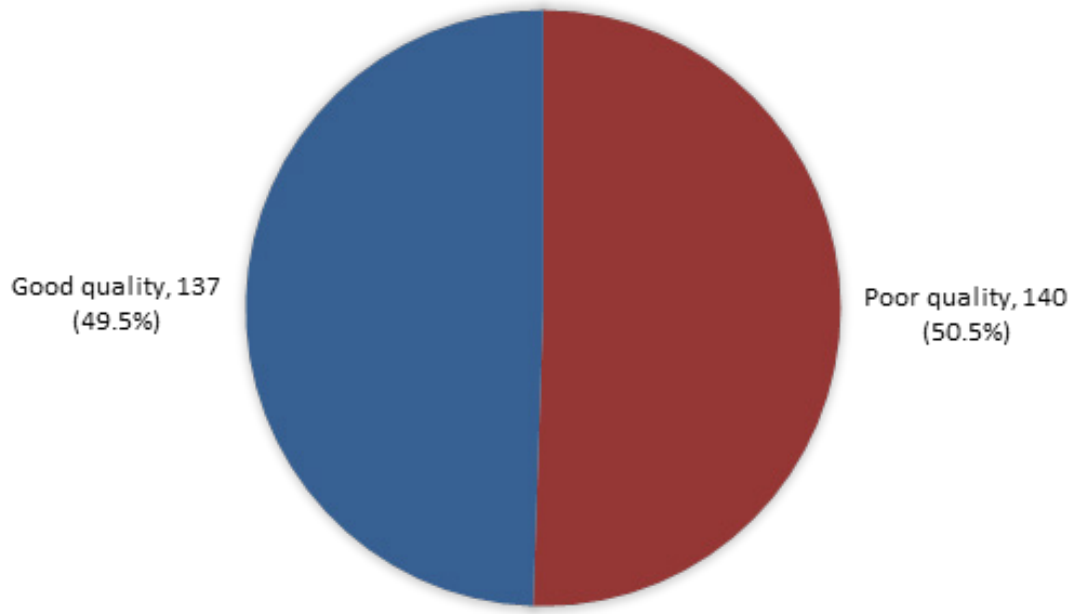


Figure 1: The Overall Sleep Quality Among Medical Students at King Saud bin Abdulaziz University for Health Sciences (N=277).

Figure 1 illustrates the overall sleep quality among 277 medical students at King Saud bin Abdulaziz University for Health Sciences. Particularly, 140 students (50.5%) reported poor overall sleep quality, while 137 students (49.5%) reported good overall sleep quality.

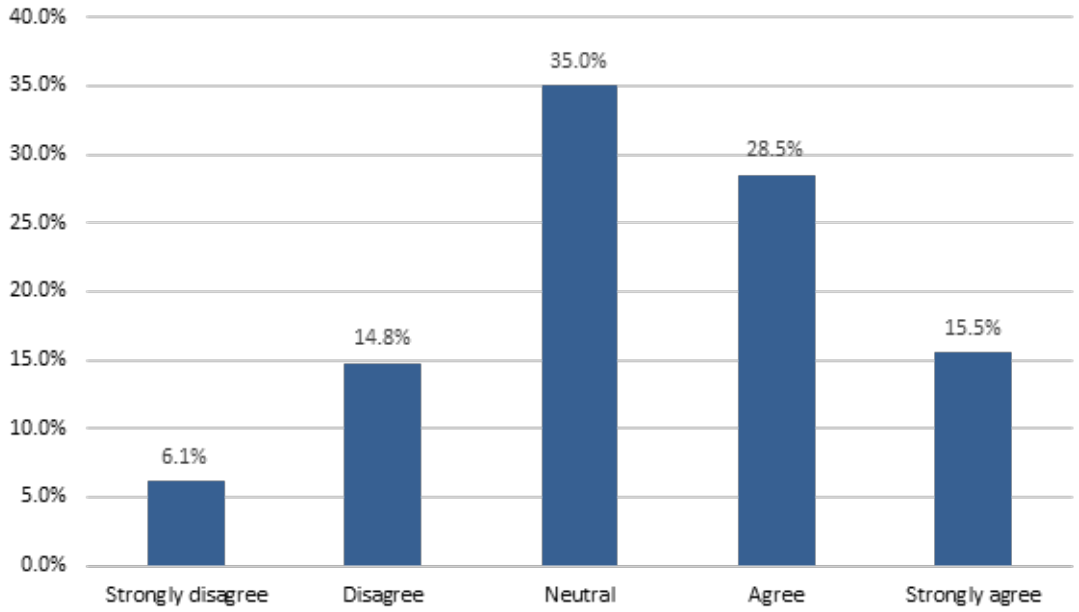


Figure 2: Perceived Relationship Between Sleep Quality and Acne Exacerbation Among Medical Students (N=277).

Figure 2 assessed the perceived relationship between sleep quality and acne exacerbation Among Medical Students. A significant portion of the students held a neutral stance (97, 35.0%), and reported uncertainty or a lack of perceived correlation between sleep and acne. A total of 122 (44%) of students believe there is a positive relationship between poor sleep and acne worsening. On the other hand, a smaller number 58 (20.9%) of students disagreed as they did not believe poor sleep affects their acne.

Table 2 : Association Between Overall Sleep Quality and Acne Characteristics Among Medical Students (N=277).

Acne data	Overall sleep quality				p-value	OR (95% CI)
	Poor quality		Good quality			
	No	%	No	%		
According to the IGA below, the severity of your acne?						
Grade 0	13	20.0%	52	80.0%		28 (9.9-41.3) *
Grade 1	22	27.8%	57	72.2%	.001*^	20.1 (6.5-33.7) *
Grade 2	46	71.9%	18	28.1%		4.5 (1.1-16.9) *
Grade 3	36	81.8%	8	18.2%		2.6 (0.5-10.3)
Grade 4	23	92.0%	2	8.0%		Ref
How often do you experience acne breakouts?						
Daily	21	91.3%	2	8.7%		Ref
Several times a week	48	78.7%	13	21.3%	.001*	2.8 (0.6-12.6)
Once a week	40	52.6%	36	47.4%		9.5 (2.1-29.3) *
Rarely	31	26.5%	86	73.5%		18.3 (7.3-26.4) *

Do you use any medications for your acne?						
Yes	30	60.0%	20	40.0%	.139	1
No	110	48.5%	117	51.5%		1.6 (0.8-2.9)

P: Pearson X2 test **^: Exact probability test** **OR: Odds Ratio**
CI: Confidence interval *** P < 0.05 (significant)**

Table 2 examines the association between overall sleep quality and acne characteristics in 277 medical students. For IGA acne severity, students reporting good sleep were significantly more likely to have less severe acne. Specifically, those with Grade 0 acne were 28 times more likely to have good sleep quality (OR 28, 9.9-41.3), and those with Grade 1 acne were 20.1 times more likely to have good sleep quality (OR 20.1, 6.5-33.7), compared to those with poor sleep. Even for Grade 2 acne, good sleep was associated with a 4.5 times higher likelihood (OR 4.5, 1.1-16.9). Similarly, good sleep quality was strongly linked to less frequent acne breakouts. Students with good sleep were 18.3 times more likely to experience rare breakouts (OR 18.3, 7.3-26.4) and 9.5 times more likely to experience breakouts only once a week (OR 9.5, 2.1-29.3). However, no statistically significant association (p = .139) was observed between sleep quality and the use of acne medication.

Table 3: Distribution of Acne Severity (IGA) by Age and Gender Among Medical Students (N=277).

	According to the IGA below, the severity of your acne?										
Demographics	**Grade 0**		**Grade 1**		**Grade 2**		**Grade 3**		**Grade 4**		**p-value**
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	
Age in years											
18-20	9	22.0%	11	26.8%	7	17.1%	12	29.3%	2	4.9%	.182
21-22	26	19.8%	37	28.2%	32	24.4%	22	16.8%	14	10.7%	
23-28	30	28.6%	31	29.5%	25	23.8%	10	9.5%	9	8.6%	
Gender											
Male	48	24.5%	60	30.6%	49	25.0%	27	13.8%	12	6.1%	.033*
Female	17	21.0%	19	23.5%	15	18.5%	17	21.0%	13	16.0%	

P: Pearson X2 test
*** P < 0.05 (significant)**

Table 3 inspects the distribution of acne severity, as measured by the Investigator Global Assessment (IGA), across age and gender demographics of medical students. While age showed numerical variations in acne severity, statistical analysis revealed no significant association (p = .182). For the 18-20 age group, the distribution was: Grade 0 (9, 22.0%), Grade 1 (11, 26.8%), Grade 2 (7, 17.1%), Grade 3 (12, 29.3%), and Grade 4 (2, 4.9%). For the 21-22 age group: Grade 0 (26, 19.8%), Grade 1 (37, 28.2%), Grade 2 (32, 24.4%), Grade 3 (22, 16.8%), and Grade 4 (14, 10.7%). For the 23-28 age group: Grade 0 (30, 28.6%), Grade 1 (31, 29.5%), Grade 2 (25, 23.8%), Grade 3 (10, 9.5%), and Grade 4 (9, 8.6%). However, a statistically significant association (p = .033) was observed between gender and IGA severity. For males: Grade 0 (48, 24.5%), Grade 1 (60, 30.6%), Grade 2 (49, 25.0%), Grade 3 (27, 13.8%), and Grade 4 (12, 6.1%). For females: Grade 0 (17, 21.0%), Grade 1 (19, 23.5%), Grade 2 (15, 18.5%), Grade 3 (17, 21.0%), and Grade 4 (13, 16.0%).

Table 4: Distribution of Acne Breakout Frequency by Age and Gender Among Medical Students (N=277).

Demographics	How often do you experience acne breakouts?								p-value
	Daily		Several times a week		Once a week		Rarely		
	No	%	No	%	No	%	No	%	
Age in years									
18-20	4	9.8%	12	29.3%	9	22.0%	16	39.0%	.260
21-22	15	11.5%	27	20.6%	39	29.8%	50	38.2%	
23-28	4	3.8%	22	21.0%	28	26.7%	51	48.6%	
Gender									
Male	15	7.7%	39	19.9%	55	28.1%	87	44.4%	.468
Female	8	9.9%	22	27.2%	21	25.9%	30	37.0%	

Table 4 reveals the distribution of acne breakout frequency by age and gender among medical students. Statistical analysis revealed no significant association between either age (p = .260) or gender (p = .468) and the reported frequency of acne

breakouts. Regarding age, while there were numerical variations in the distribution of breakout frequencies across the different age groups (18-20, 21-22, and 23-28 years), these differences were not statistically significant. Similarly, when comparing males and females, the distribution of breakout frequencies showed no statistically significant differences. Both genders showed a similar pattern of breakout frequency distribution.

Discussion:

The observed frequency of acne vulgaris severity among medical students, with a predominance of lower grades on the IGA scale, aligns with patterns reported in similar populations. The higher prevalence of mild or absent acne (Grades 0–2) compared to severe forms (Grades 3–4) may reflect the transient nature of acne in young adults or the impact of self-care practices in a health-literate cohort. This reflects findings among medical students in the United Arab Emirates, where mild acne was most common, possibly due to heightened awareness of skincare or early intervention behaviors [14]. Similarly, a Canadian study noted that moderate acne was more prevalent than severe cases in young adults, suggesting age-related declines in severity as individuals move beyond adolescence [15]. Although acne commonly decreases after adolescence, a notable proportion of individuals continue to experience persistent or recurrent acne in adulthood [16].

The reported acne breakout frequency, with rare or weekly occurrences predominating, may reflect the role of stress as a modifiable exacerbating factor. Medical students face high academic and clinical stressors, which have been shown to exacerbate acne severity through inflammatory and hormonal pathways[17]. A study of Canadian medical trainees highlighted that cyclical stress during exams correlated with transient increases in acne severity [18]. The lower frequency of daily breakouts could indicate effective coping mechanisms or episodic triggers (e.g., dietary changes, sleep disruptions) rather than chronic predisposition. Also, the low utilization of acne medications despite clinically apparent cases raises questions about barriers to care. This aligns with recent evidence suggesting that acne remains under-treated in young adults, often due to misconceptions regarding treatment or access barriers [19]. In Canada, cost and access to dermatologists may further limit treatment uptake, as observed in a population-based study where only 20% of individuals with moderate-to-severe acne sought prescription therapies [19]. In comparison to other Gulf countries, similar trends have been observed. For example,

studies from Kuwait and the United Arab Emirates report comparable acne prevalence and stress-related exacerbations among university students, with sleep disruption consistently identified as a contributing factor. Additionally, climatic conditions across the Gulf—characterized by high humidity and temperature—may further promote excess sebum production and skin occlusion, intensifying acne severity in susceptible individuals. Cultural practices such as cosmetic product use and lifestyle stressors shared among Gulf students may contribute to the regional similarity in acne patterns. In comparison to other Gulf countries, similar trends have been observed. Studies from Kuwait and the United Arab Emirates have reported comparable acne prevalence and stress-related exacerbations among university students, with sleep disruption consistently identified as a contributing factor [20, 21]. Studies from Oman and Qatar similarly report notable acne burden in student and young adult populations, reinforcing the influence of lifestyle and psychosocial stressors across the region[22, 23]. Additionally, climatic conditions across the Gulf—characterized by high humidity and temperature—may further promote excess sebum production and skin occlusion, intensifying acne severity in susceptible individuals. Cultural practices such as cosmetic product use and lifestyle stressors shared among Gulf students may contribute to the regional similarity in acne patterns. The reliance on non-pharmacological approaches among medical students may reflect the prioritization of academic demands over skin health or the cultural normalization of mild acne.

Locally, a comparison of acne vulgaris among medical students in Saudi Arabia with the current study reveals both prominent differences and similarities. Studies conducted in Saudi Arabia consistently report a higher prevalence of moderate-to-severe acne. Alraddadi et al. (2018) [24] found that 38.5% of medical students in Tabuk had moderate acne and 22.7% had severe acne, which contrasts with the current study's finding. This disparity may be attributed to environmental factors such as extreme heat and humidity, which can exacerbate sebum production, as well as cultural practices like the use of occlusive clothing (e.g., hijabs) and frequent cosmetic use, which can increase skin occlusion and irritation [25]. Academic stress, a well-documented acne trigger, is prevalent in both contexts. Notably, both the Saudi Arabian studies and the current research highlight a significant underutilization of acne medications. This underutilization is likely due to factors such as misconceptions about side effects, preferences for traditional

remedies, and barriers to accessing care, reflecting a global trend of inadequate acne management in young adults [26].

Regarding sleep quality and its relation with acne, our study highlights a concerning prevalence of poor sleep quality among medical students at King Saud bin Abdulaziz University for Health Sciences, with about half reporting suboptimal sleep. This is consistent with global trends among medical trainees, where high academic demands and irregular schedules disrupt sleep patterns [27]. Poor sleep quality has been associated with increased inflammatory mediators and worsened acne severity in recent clinical studies [28]. The current study also revealed that students with good sleep quality were far more likely to exhibit milder acne (Grades 0–2) compared to those with poor sleep, suggesting that adequate sleep may play a protective role in mitigating acne severity. This is in concordance with existing evidence that poor sleep contributes to increased psychological stress and inflammatory responses, and that sleep deprivation is associated with elevated cortisol levels, all of which can exacerbate acne [28,29]. The strong association between good sleep and less frequent breakouts further supports the notion that sleep quality influences acne dynamics, potentially by regulating sebum production and inflammatory pathways [30]. Interestingly, no significant association was found between sleep quality and the use of acne medications. This may indicate that sleep quality independently affects acne severity and breakout frequency, irrespective of treatment adherence. Alternatively, it could reflect the underutilization of medications in this population, as previously noted, or the possibility that students with good sleep quality may rely less on pharmacological interventions due to milder symptoms.

The stress-sleep-acne triad is particularly relevant in Saudi Arabia, where cultural and academic pressures may increase stress levels among students. Stress-induced sleep disturbances can lead to increased sebum production and inflammatory responses, worsening acne [31]. Furthermore, the hot and humid climate in many parts of Saudi Arabia may exacerbate acne by increasing sweat and sebum production, creating an environment conducive to bacterial growth and follicular occlusion [25]. These environmental factors, combined with poor sleep, may explain the higher prevalence of severe acne observed in Saudi studies compared to other regions. Despite the clear association between sleep quality and acne, awareness of this relationship remains limited among students. A significant proportion of students in Saudi studies have reported neutral or uncertain views on the connection between sleep and acne,

suggesting a need for greater education on the role of sleep in dermatological health[32]. Addressing sleep hygiene and stress management through targeted interventions could improve both acne outcomes and overall well-being in this population.

Conclusions and recommendations

In conclusion, the current study among medical students at King Saud bin Abdulaziz University for Health Sciences revealed a significant prevalence of acne vulgaris, primarily mild to moderate, and suboptimal sleep quality. While good sleep was strongly associated with less severe acne and fewer breakouts, most students did not use acne medications, and poor sleep quality did not influence medication use. Females reported more severe acne, but age was not a significant factor. Based on these findings, recommendations include educational interventions on the sleep-acne association, stress management programs, improved access to dermatological care, and university-led sleep hygiene promotion. Study limitations include the cross-sectional design, which restricts causal inference, reliance on self-reported measures which may introduce recall or reporting bias, and the use of convenience sampling, which may limit generalizability. Future studies should incorporate longitudinal designs and clinical dermatologic assessment to confirm acne severity.

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Conflicts of interest: There are no conflicts of interest.

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