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Severity of acne, stress, and food habits of medical students at Taif University, Saudi Arabia

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Abstract:

BACKGROUND: Stress and food habits seem to be associated with acne, but no study has been reported from in Taif, Saudi Arabia. The aim of this study was to determine the association between the severity of acne, stress, and food habits of undergraduate medical students.

MATERIALS AND METHODS: A cross-sectional study was conducted among 585 undergraduate medical students. Data was collected on students' demographics, academic year, and level. The Global Acne Grading System (GAGS) was utilized for a clinical evaluation of acne severity and an assessment of the presence and location of acne lesions. To assess respondents' stress, the Perceived Stress Scale (PSS) was employed, and adolescent food habits checklist (AFHC) assessed the food habits. To test for statistical significance, Chi-squared test was used for qualitative data, whereas Mann-Whitney U test and, Kruskal–Wallis tests were performed for quantitative variables.

RESULTS: The mean age of students was 21.16 ± 1.81 years, 53.5% were female and 53.8% were in the preclerkship academic level. Of these, 9.7%, 78.5%, and 11.8% had low, moderate, and high stress levels. The overall prevalence of acne was 88.2%; Mild, moderate, severe and very severe acne were present among 59%, 23.9%, 3.9% and 1.4% of students respectively. Female students had a significant higher percent of severe acne and students in preclerk ship years had significant higher mean AFHC scores. Students with severe stress had a significant higher mean GAGS score and lower mean AFHC scores. A significant positive correlation was found between GAGS scores and PSS.

CONCLUSION: The high rates of stress and acne of the study's participants demand that medical students be given greater attention with regard to dermatology and psychiatric diseases.

Keywords:

Acne, food, medical, stress, students

Introduction

Acne is a chronic inflammatory condition of the pilosebaceous unit that affects hair follicles on the face, neck, chest, and back.[1] Contrary to popular belief, acne can affect people of all ages and is not restricted to teenagers and young people.[2-4] Eating high glycemic index foods may contribute to the development of acne while drinking milk or eating chocolate could aggravate it. Omega-3 fatty acid-rich diets are beneficial because they reduce the production of inflammatory cytokines.[5,6]

The interaction between the nervous system and the skin is complicated,[7] and although it has long been assumed that stress causes or worsens acne, its impact on the severity of the condition has been overlooked.

A multicenter study by 17 Korean hospitals discovered that 82% of individuals had acne as a result of psychological stress.[8]

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Furthermore, a study of final-year medical students at the University of Melbourne in Australia discovered that 67% of students identified stress as an exacerbating factor for acne.[9] Previous Saudi research found that medical students had significant stress. In this region, 63% and 53% of medical students attend King Saud University and King Faisal University, respectively.[10,11]

There was a correlation between an increase in stress intensity and an increase in acne severity.[12,13] Research has also related dietary habits with the consumption of fast food, sugar, and fat all of which are favorably linked to the development of acne.[14-16] However, no study has as yet been conducted to address this issue in undergraduate medical students at Taif University, Saudi Arabia. The aim of this study was, therefore, to determine the association between the severity of acne, stress, and the food habits of undergraduate medical students.

Materials and Methods

A cross-sectional study was conducted from June to September 2022. Ethical approval was obtained from the Institutional Review Board vide Letter No. HAO-02-T-105 dated 05/12/2021 and informed written consent was taken from all participants in the study.

The inclusion criteria were undergraduate medical students of 1st to 6th year at Taif University, who agreed to participate in the study by signing an informed consent form at the beginning of the questionnaire. The exclusion criteria were postgraduate or undergraduate students who refused to participate in the study. The total number of undergraduate medical students was 1100, and our sample size was calculated using a sample size calculator from the University of California, San Francisco. Using a margin of error of 5% and a 95% confidence interval, we assumed the optimum sample size as 285 medical students. However, owing to the nature of the investigation, and also to boost the power of the study, all 585 responses were included in the statistical analysis.

A predesigned online questionnaire in a Google form was administered to all medical students who satisfied the inclusion criteria. The questionnaire, in English, had four sections. The first section had items to collect data on the participants' demographics, academic year, and level. The second section included the Global Acne Grading System (GAGS), which is used to clinically classify the severity of acne. Acne lesions (comedones, papules, pustules, and nodules) were observed and documented. Each type of lesion was given a value depending on severity: no lesions = 0, comedones = 1, papules = 2, pustules = 3, and nodules = 4. The local score (local score) was calculated as follows: local score = factor × grade (0–4). The global score is the sum of the local scores, and the global score was used to grade acne severity. A score of 1–18 is considered mild; a score of 19–30 is moderate; a score of 31–38 is severe; and a score of >39 is very severe.[17]

The third section included the Perceived Stress Scale (PSS), the most commonly used psychological test to assess stress perception was used to measure the degree to which the respondents' external situation was perceived as being under stress. The scale also includes numerous direct questions about current stress levels.[18] The Arabic version of the PSS scale showed adequate reliability and validity.[19] The scale consists of ten questions, with scoring done using a 5-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = fairly frequently, and 4 = always). The scores for the four positively stated items 4, 5, 7, and 8 were reversed (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1, and 4 = 0), and the total was calculated by adding the scores for each item. Individual PSS scores range from 0 to 40, with higher scores indicating greater perceived stress.

The fourth section had the adolescent food habits checklist (AFHC). The AFHC is a widely used effective tool for determining the eating habits of adolescents and adults. To complete the AFHC questionnaire, a positive/negative (yes/no) response format was chosen. Each "healthy" response earned participants one point. Attaining a high score demonstrated healthy eating habits on the part of the individual.[15,20,21] Both the GAGS and the AFHC were tested for validity and reliability. A pilot study was conducted on 30 students for each scale and for the introduction of any modifications to the questionnaire. The preliminary sample was not included in the final sample.

Data were analyzed using the Statistical Package for the Social Sciences Software (SPSS) program version 26 (IBM Corp.: Armonk, NY, USA). To assess the relationship between variables, qualitative data were expressed as numbers and percentages, and the Chi-squared test (χ^2) was used. Quantitative data were expressed as mean and standard deviation, and nonparametric variables were tested using the Mann–Whitney and Kruskal–Wallis tests. The correlation analysis was performed using Spearman's test. The odds ratio was calculated with a 95% confidence interval and a $P < 0.05$ was considered statistically significant.

Results

Table 1 shows that the mean age of the participants was 21.16 ± 1.81 years, 53.5% were females, 53.8% were in the preclerkship academic level, and 18.5% were in the 3rd academic year.

Table 1: Sociodemographic characteristics of medical students at Taif University, Saudi Arabia, 2022 (*n*=585)

Characteristics	*N* (%)
Age	
≤21	327 (55.9)
>21	258 (44.1)
Age (years)	21.16±1.81
Gender	
Male	272 (48.5)
Female	313 (53.5)
Academic year	
1st	100 (17.1)
2nd	107 (18.3)
3rd	108 (18.5)
4th	107 (17.1)
5th	100 (17.1)
6th	63 (10.8)
Academic level	
Preclerkship	315 (53.8)
Clerkship	270 (46.2)
Stress level	
Low stress	57 (9.7)
Moderate stress	459 (78.5)
High stress	69 (11.8)
Acne prevalence	
No acne	69 (11.8)
Mild	345 (59)
Moderate	140 (23.9)
Severe	23 (3.9)
Very severe acne	8 (1.4)

The mean PSS was 20.22 ± 5.51 and the mean total GAGS was 13.13 ± 10.05. The mean AFHC was 10.33 ± 4.72. Of the participants, 9.7%, 78.5%, and 11.8% had low, moderate, and high stress levels, respectively, based on the PSS scale scores classification. The prevalence of any type of acne was 88.2%, with a prevalence of mild, moderate, severe, and very severe acne at 59%, 23.9%, 3.9%, and 1,4%, respectively.

Female participants had a significant higher percent of severe acne compared to males (39.1% vs. 60.9%) ($P < 0.05$). However, a nonsignificant relationship was found between the severity of acne and participants' demographics other than gender, academic year, stress level, or AFHC scores ($P > 0.05$) [Table 2].

With regard to academic level, participants in the preclerk ship years had significant higher mean AFHC scores healthy eating habits compared to participants of the clerkship years ($P < 0.05$). However, there was a nonsignificant relationship between academic level and acne severity or stress level ($P > 0.05$) [Table 3].

Participants who had a severe stress level had a significant higher mean GAGS score and a significant lower mean AFHC scores ($P < 0.05$) [Table 4].

Table 5 shows that a nonsignificant relationship was found between acne severity and PSS or AFHC scores ($P > 0.05$).

A significant positive correlation was found between GAGS scores and PSS ($r = 0.16$, $P < 0.001$) [Figure 1].

Multivariate logistic regression analysis was done to assess the risk factors (independent predictors) of acne severity in the studied patients. It was found that being a female or being under a high level of stress were risk factors (independent predictors) of acne severity in the studied students [Table 6].

Discussion

The aim of this study was to assess the association between acne severity, stress, and the food habits of medical students. According to the study, 9.7% of participants had low stress, 78.5% had moderate stress, and 11.8% had high stress.

According to the study, 9.7% of participants experienced low stress, 78.5% had moderate stress, and 11.8% had high stress. A survey of 400 undergraduate students in Riyadh found that 29.8% had little stress and 29.5 had high stress levels.[22] Furthermore, a study of 98 Portuguese medical students showed that 62.2% them had acne.[23]

We discovered that female participants had a significantly higher percentage of severe acne than male participants, with a significant $P = 0.05$. This can be explained by another study conducted in Riyadh, which found that females under stress ate more than usual, 82% of whom chose to eat sweets and snacks when under stress, and 68% reported that they were losing control.[15] A systematic review of 35 articles discovered that high glycemic index/glycemic load foods, dairy products, fat-containing foods, and chocolate are acne-promoting variables. Acne-protective factors include fatty acids and fruit and vegetables.[14] Therefore, we believe that changes in the levels of stress do alter food habits leading either directly or indirectly to an increase in the prevalence of and severity of acne.

In our study, 59% of the students had mild acne, 23.9% had moderate acne, 3.9% had severe acne, and 1.4% extremely severe acne. Zari and Alrahmani, 2017, discovered that 72%, 22.9%, and 2.8% of 144 6th-year female medical students, respectively, had low, moderate, and severe acne.[12]

Table 2: Relationship between acne severity and participant's demographics, academic year, stress level, and adolescent food habits checklist scores (*n*=585)

Variables	Acne prevalence					χ^2	*P*-value
	No acne *N* (%)	Mild acne *N* (%)	Moderate acne *N* (%)	Severe acne *N* (%)	Very severe acne *N* (%)		
Age							
≤21	45 (65.2)	190 (55.1)	76 (54.3)	11 (47.8)	5 (62.5)	3.42	0.49
>21	24 (34.8)	155 (44.9)	64 (45.7)	12 (52.2)	3 (37.5)		
Age (years)	21±1.98	21.21±1.85	21.08±1.75	21.3±1.18	21±1.6	4*	0.695
Gender							
Male	45 (65.2)	148 (42.9)	66 (47.1)	9 (39.1)	4 (50)	12.08	0.017
Female	24 (34.8)	197 (57.1)	74 (52.9)	14 (60.4)	4 (50)		
Academic year							
1st	9 (13)	54 (15.7)	30 (21.4)	4 (17.4)	3 (37.5)	25.7	0.135
2nd	20 (29)	57 (16.5)	27 (19.3)	2 (8.7)	1 (12.5)		
3rd	16 (23.2)	67 (19.4)	19 (13.6)	4 (17.4)	2 (25)		
4th	9 (13)	61 (17.7)	27 (19.3)	8 (34.8)	2 (25)		
5th	8 (11.6)	62 (18)	26 (18.6)	4 (17.4)	0		
6th	7 (10.1)	44 (12.8)	11 (7.9)	1 (4.32)	0		
Stress level							
Low stress	10 (14.5)	33 (9.6)	12 (8.6)	2 (8.7)	0	10.18	0.252
Moderate stress	52 (75.4)	275 (79.7)	111 (79.3)	16 (69.6)	5 (62.5)		
High stress	7 (10.1)	37 (10.7)	17 (12.1)	5 (21.7)	3 (37.5)		
AFHC, mean ± SD	10.7±4.56	10.23±4.74	10.14±4.67	11.38±5.38	10.65±4.8	4*	0.722

*Kruskal–Wallis test. AFHC=Adolescent food habits checklist, SD=Standard deviation

Table 3: Relationship between academic level and acne severity, stress level, and adolescent food habits checklist scores (*n*=585)

Variables	Academic level		χ^2	*P*-value
	Preclerkship. *N* (%)	Clerkship *N* (%)		
Acne prevalence				
No acne	45 (14.3)	24 (8.9)	6.74	0.15
Mild acne	178 (56.5)	167 (61.9)		
Moderate acne	76 (24.1)	64 (23.7)		
Severe acne	10 (3.2)	13 (4.8)		
Very severe acne	6 (1.9)	2 (0.7)		
Stress level				
Low stress	29 (9.2)	28 (10.4)	1.5	0.47
Moderate stress	253 (80.3)	206 (76.3)		
High stress	33 (10.5)	36 (13.3)		
AFHC (mean±SD)	11.09±4.38	9.43±4.96	4.31*	<0.001

*Mann–Whitney test. AFHC=Adolescent food habits checklist, SD=Standard deviation

We discovered that students with a high stress level had a significantly higher mean GAGS score and a significantly lower mean AFHC score, indicating that they were eating unhealthy foods. We also discovered that stress levels had a significant relationship with GAGS and AFHC scores, with $P = 0.005$ and $P < 0.001$, respectively.

We discovered a significant positive correlation between GAGS and PSS with $P = 0.001$ in our study, implying that students with higher PSS had higher acne grades. These findings are consistent with a Jeddah study that included 104 medical students and discovered that increased level

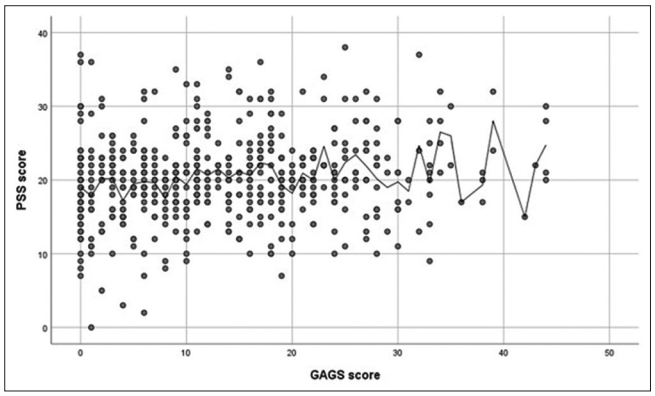

Figure 1: Spearman's correlation analysis between GAGS scores and PSS scores. $r = 0.16$, $P = <0.001$). GAGS = Global Acne Grading System, PSS = Perceived Stress Scale

of stress was strongly correlated with increased severity of acne with a $P < 0.01$.[13] Furthermore, a study conducted by Chiu *et al.*, of 19 participants showed that an increase in perceived stress strongly correlated with exacerbation of the severity of acne with a $P < 0.01$.[24]

The reason for this is that stress activates the hypothalamic-pituitary-adrenal axis, which raises corticotropin-releasing hormone levels (CRH). CRH aggravates acne by stimulating lipid synthesis and steroidogenesis in the sebaceous gland. CRH also stimulates the production of the cytokines interleukin 6 (IL-6) and IL-11 in keratinocytes, which causes inflammation thought to play a role in the etiology of acne.[12]

Table 4: Relationship between stress level and participant's age, global acne grading system, and adolescent food habits checklist scores (*n*=585)

Variables	Stress level			Kruskal–Wallis test	*P*-value
	Low Mean±SD	Moderate Mean±SD	Severe Mean±SD		
Age	21.12±1.72	21.15±1.86	21.19±1.63	2	0.899
GAGS	10.86±10.13	12.86±9.27	16.77±11.31	2	0.005
AFHC	10.76±4.6	10.63±4.6	7.91±4.99	2	<0.001

GAGS=Global acne grading system, AFHC=Adolescent food habits checklist, SD=Standard deviation

Table 5: Relationship between acne severity and Perceived Stress Scale and adolescent food habits checklist scores (*n*=585)

Variables	Acne severity			Kruskal–Wallis test	*P*-value
	No or mild acne Mean±SD	Moderate acne Mean±SD	Severe or very severe acne Mean±SD		
PSS score	2±0.45	2.03±0.45	2.19±0.54	2	0.079
AFHC	10.31±4.71	10.19±4.67	11.19±5.16	2	0.425

PSS=Perceived Stress Scale, AFHC=Adolescent food habits checklist, SD: Standard deviation

Table 6: Multivariate logistic regression analysis of risk factors of acne severity like age, gender, academic year, stress level, and adolescent food habits checklist scores

Variables	β	*P*-value	AOR (95% CI)
Age ≤21	0.12	0.076	0.12 (0.91-1.07)
Females	3.07	0.031	1.8 (0.61-2.01)
1st academic year	0.5	0.817	0.13 (0.8-1.06)
Severe stress	3.19	0.004	2.05 (1.6-3.14)
AFHC score >10	1.34	0.063	0.89 (0.19-1.45)

AOR=Adjusted odds ratio, CI=Confidence interval, AFHC=Adolescent food habits checklist

One of the limitations to this study was that the questionnaires were distributed online and for only one medical college with a snapshot method. Besides, the use of a self-administered survey to assess the severity of acne without confirmatory assessment by a dermatologist could also present another limitation. Future prospective or case–control studies are recommended to assess the causal relationships between variables.

Conclusion

The high prevalence of acne and stress observed in the studied students need to prompt attention to skin and psychiatric disorders in medical students. As the study revealed a positive correlation between stress and acne severity, a reduction in the stress level of students through psychological support and awareness campaigns is required. Therapeutic approaches can be tailored to needs, with possible behavioral intervention as necessary.

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Conflicts of interest
There are no conflicts of interest.

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