

PREVALENCE OF ACNE VULGARIS AND ITS ASSOCIATION WITH ACADEMIC STRESS AMONG UNDERGRADUATE MEDICAL STUDENTS IN PESHAWAR: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Acne vulgaris is a multifactorial skin condition characterized by the inflammation of pilosebaceous units, increased sebum production and microbial colonization affecting 85% of elder population globally. previous studies suggest that stress can be an influencing factor for the development of acne. Beside many psychological issues stress also cause many dermatological conditions. The aim of our study is to find association between academic stress and acne severity among medical undergraduates.

Methodology: A cross-sectional study conducted at four medical colleges of Peshawar for a period of 6 months. Non probability convenience sampling technique is used. The questionnaire has two scales (GAGS and PSS-10).

Results: Total number of students in this study were 384. Among these female participants were 59% and 41% were male participants. Percentages for moderate, low and high stress level were 78%, 11%, and 11%, with Prevalence of acne 68 %. Our results reported significant relationship between academic stress among students and acne vulgaris with a p value of 0.023. Stress can trigger and intensify the severity of acne vulgaris.

Conclusion: A statistically significant association was found between the acne and academic stress. So academic stress can contribute to develop and aggravate the severity of acne vulgaris.

Key words: Acne Vulgaris, Academic stress, perceived stress scale PSS, Global Acne Grading system GAGS

INTRODUCTION

Acne vulgaris is a common cutaneous inflammatory condition of the pilosebaceous units, it has a great psychological effect on individuals and will affect quality of life.¹ It is characterized by the lesions on face and trunk, these lesions include inflammatory papules, pustules, cysts and non-inflammatory blackheads and white heads.² There are a lot of risk factors causing Acne like hormonal imbalance, adolescent, eating habits, stress, hygiene, environmental exposure.³

Studies suggest that psychological Stress can also be a risk factor for acne vulgaris.⁴ Stress not only affects mental health but it also affects physical health and can also cause skin diseases such as acne.⁵ It triggers the release of hormones like cortisol, corticotropin releasing hormones, other substance p, that stimulates sebaceous glands and can cause acne.⁶ Among different forms of stress academic stress is most common specially among undergraduate students, and specially medical undergraduates are more exposed to these stresses.⁷ Academic stress includes stress due to various competitive exams, maintaining attendance, study load, and different assignments it leaves a great impact on students' physical and mental health.⁸ Studies have shown that students who are more stressed have more frequent and severe acne. A study conducted among the medical students of King Khalid Khan University showed a positive correlation between acne and stress with a p value of 0.001.⁹ Similarly a study conducted in Taif also proved significant correlation between both.¹⁰

So, our study was designed to find the association of acne with stress in medical undergraduate students. And, also will be able to find the prevalence and which area is affected the most. No such recent research has been conducted in our area so one of our main aims is to spread awareness of how stress can seriously affect one's lifestyle.

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MATERIAL AND METHODS

This cross-sectional study was conducted among undergraduate medical students of, Northwest School of Medicine, Khyber Medical College, Pak International Medical College and Rehman Medical College, in Peshawar. Ethical approval was obtained from the Institutional Review Board and Ethical Review Committee (ERB) of Northwest School of Medicine. A non-probability convenience sampling method was used, and the sample size was calculated taking 95% Confidence Interval, 5% margin of error, and prevalence of acne vulgaris was taken from previous studies, the calculated sample size was 384.

All the undergraduates medical students of the, aged 18 years and above, of Northwest School Of Medicine, Khyber Medical College, Pak International Medical College, and Rehman Medical College who gave informed consent were included, Students using corticosteroids or those diagnosed with other dermatological conditions like rosaces, fungal skin infections, psoriasis, vitiligo were excluded and who previously diagnosed with psychiatric disorder including psychosis, bipolar disorder, major depression, anxiety disorders, and taking any kind of medications for this were excluded from the study. Data was collected through a structured questionnaire, divided into three parts:

1. **Demographics:** It included the participant's name, gender, class, and institution.
2. **Perceived Stress Scale (PSS-10):** This section assessed the participants' stress levels using 10 questions with responses scored from zero (never) to four (very often). The total PSS-10 score ranged from 0 to 40, with scores of 0 to 13 indicating low stress, 14-26 representing moderate stress, and 27-40 indicating high stress.
3. **Global Acne Grading System (GAGS):** This part evaluated the severity of acne. This tool grades the severity of acne on the basis of its occurrence and severity at different regions of face and upper body parts.

Collected data was analyzed using SPSS version 27. Descriptive statistics were employed to summarize demographic and participant characteristics, with quantitative variables such as age presented as mean \pm standard deviation (SD), and qualitative variables like gender and year of study described using frequencies and percentages. For academic stress, the Perceived Stress Scale (PSS-10) scores were categorized into three levels: low, moderate, and high stress. The frequency and percentage of students falling into each stress category were calculated and presented in tabular form.

The prevalence of acne was determined based on the presence of inflammatory lesions in various body areas. The frequency and percentage of students with specific types of lesions (e.g., comedones, papules, pustules, nodules) on the forehead, cheeks, nose, chin, chest, and upper back were calculated and tabulated.

To assess the association between academic stress levels and the prevalence of acne, a chi-square test of independence was performed. The results were considered statistically significant at a p-value

RESULTS

Demographics and Participant Characteristics: A total of 384 students with an average age of $20.7 \pm SD 2.67$ years were included in the study. Among which the majority of participants were females 226(59%) while 158 (41%) were males and the male to female ratio was 79:113(0.70:1). Participants were included from four different institutes, with a total of 140 (37%) from Khyber Medical College, 113(29.4%) from North School of Medicine, 73(19.0%) from Rehman Medical College, and 57(15%) from Peshawar Institute of Medical Sciences. In terms of the study year, 128(33%) of participants were in their second year, followed by 122(32%) in their first year, 70(18%) in their third year, 34(9%) in their fourth year, and 30(8%) in their fifth.

Table 1: Demographics and Participant Characteristics

Characteristic	Mean \pm S. D	Frequency (n)	Percent (%)
Age (years)	20.7 \pm 2.6		
Gender			
Male		158	41
Female		226	59
Institute			
KMC		140	37
RMC		74	19
PIMC		57	15

NWSM		113	29
Year of Study			
First year		122	32
Second year]		128	33
Third year		70	18
Fourth year		34	9
Fifth year		30	8

S.D: Standard deviation.

Academic Stress among students: Out of a total 384 students, the majority of the students 300 (78%) were having moderate stress levels, 42(11.0%) students had low-stress levels, and almost the same percentage was reported for high stress levels 42(11%).

Table 2: Level of stress among students

Stress Category	Frequency (n)	Percent (%)
Low Stress	42	11
Moderate Stress	300	78
High Perceived Stress	42	11

Prevalence of Acne among students: Out of a total 384 students, 261 had at least one type of inflammatory lesions like papules, pustules, or nodules on different parts of their body, involving face, chest or back, resulting in the prevalence of acne to be 68%. Nose was the highly affected region with percentage of 271(71%) and least affected area was cheeks 242(63.0%). The most common type of inflammation in all the region were comedones with highest frequency 73(19%) observed on forehead, 17.4% and 16.9% on cheek, 16.7% on nose, 15.9% on chin and 10.9% on chest and upper back. High frequency of papules and nodules were also observed on forehead while pustules were observed more on chin.

Table 3: Frequency and Percentage of Lesions on Various Body Areas

Area	No Lesion (n/%)	Comedone (n/%)	Papule (n/%)	Pustule (n/%)	Nodule (n/%)
Forehead	233 (60.7%)	73 (19.0%)	44 (11.5%)	22 (5.7%)	12 (3.1%)
Right Cheek	225 (58.6%)	67 (17.4%)	61 (15.9%)	20 (5.2%)	11 (2.9%)
Left Cheek	242 (63.0%)	65 (16.9%)	52 (13.5%)	21 (5.5%)	4 (1.0%)
Nose	273 (71.1%)	64 (16.7%)	30 (7.8%)	16 (4.2%)	1(0.3%)
Chin	249 (64.8%)	61 (15.9%)	32 (8.3%)	32 (8.3%)	10 (2.6%)
Chest & Upper Back	263 (68.5%)	42 (10.9%)	54 (14.1%)	18 (4.7%)	7 (1.8%)

Association of academic stress with the prevalence of acne: A statistically significant association (0.02) was found between the prevalence of acne and academic stress. Of those with mild levels of stress, 23 (54.8%) had acne, compared to 19 (45.2%) who did not experience any acne symptoms while those with moderate stress, 97 (32.3%) did not have acne, whereas 203 participants (67.7%) had acne. Of those who were categorized in high levels of stress, only 7 (17.1%) did not have acne, whereas 34 (82.9%) did suffer from acne.

Table 4: Association of Academic Stress with Prevalence of Acne

Categories of Stress	No Acne (n/%)	Have Acne (n/%)	p-value
Low Stress	19 (45%)	24 (55%)	0.023
Moderate Stress	97 (32%)	203 (68%)	
High Perceived Stress	Seven (17%)	34 (83%)	

DISCUSSION

This cross-sectional study evaluated the prevalence of acne vulgaris and its association with academic stress among undergraduate medical students in Peshawar. The finding demonstrates a high burden of acne and a significant association between increasing stress and prevalence of acne vulgaris among medical students, indicating acne as a stress sensitive dermatological condition among medical students.

The demographics of our study reflects that the mean age of participants were 20.7 ± 2.6 years, with the majority of female participants, this finding is comparable with recent studies conducted in Pakistan^{11,12,14}, where female participants with stress related dermatological conditions were in majority. Female may have a high prevalence rate of acne and stress due to various factors like hormonal fluctuations, diet, cosmetic use or greater health seeking behaviors all of which have been highlighted as contributing factors in previous studies^{13,14}

The demographic and academic distribution of the participants in our study, represents a large proportion of participants enrolled in first and second year of their Medical colleges (65%), these statistics correlates with national and international studies with the same proportion of showing higher stress and dermatological conditions among early years of medical education^{11,14}. Early academic exposure, academic overload, frequent assessment in early years of medical educations can cause psycho dermatological conditions. Similar age and year wise distribution has also been reported among medical students in Saudi Arabia and Palestine showing that early medical years are vulnerable period for stress related acne development¹⁵.

In our study majority of the students 78% experienced moderate academic stress, the academic stress level among medical students of our study aligns with the recent studies, where moderate stress was the most prevalent among medical students¹⁶. This comparable distribution of stress across regions suggests that medical universities impose academic pressure and stress on students irrespective of geographical distribution. Studies suggest that

even moderate but persistent stress has a significant influence on skin homeostasis¹⁷. Academic stress activates hypothalamic pituitary adrenal axis that increase the secretion of cortisol and also increase the sebaceous gland activity which then leads to inflammatory lesions on skin all of which plays a major role in causing acne vulgaris⁶.

The prevalence of acne vulgaris in our study was found to be high (68%) with the facial areas as the most common areas being involved, these findings also correlates with previous studies reporting the prevalence rates of acne vulgaris of about 71.1% and 80.9%^{15,18}. Studies conducted in covid 19 pandemic further demonstrates that high stress level among students were associated with higher incidence of acne, emphasizing stress as a consistent precipitating factor¹⁹. While some studies have reported a lower prevalence rate of 45%, 55%^{12,20}. Despite the prevalence difference among all these studies, most common type of inflammatory lesion among the participants were comedonal acne, which supports the consistency of acne morphology in young adults.

Our study showed a statistically significant relationship of academic stress and acne vulgaris ($p=0.0023$). Prevalence of acne increased with increasing stress levels from 55% to 83% among students with high stress levels, similar relationship was observed in various other studies^{14,16,21}. A recent systematic review of Middle Eastern medical students further confirmed that stress is a major contributing actor acne vulgaris¹³. These findings suggests that psychological stress act as a significant modifier for acne vulgaris.

Difference between studies that supports non-significant and weaker associations between stress and acne may be due to inclusion of confounding variables like sleep, diet, different diagnostics criteria, use of different stress scale, and grading of acne¹⁹.

However, an overall body of evidence and convergence of findings of different studies supports the the significant associations between academic stress and acne vulgaris. This study has several limitations. As a cross-

sectional study, it cannot establish causality between academic stress and acne vulgaris. Self-reported data on stress and acne presence may introduce reporting and recall bias. Additionally, the exclusion of confounding variables such as sleep, diet, hormonal status and cosmetics uses limits the accuracy of stress as an isolated variable. The study population drawn exclusively from four medical colleges of Peshawar which may not be representative of all medical students of Pakistan which affects the generalizability of the results.

CONCLUSION

This study reveals a noteworthy prevalence of acne vulgaris among undergraduate medical students, with 68% of participants exhibiting some sort of acne. The findings highlight a statistically significant association (0.023) between academic stress and the severity of acne, signifying that stress may be a contributing factor to the exacerbation of acne. With the majority of students experiencing moderate stress, these results draw attention to the need for effective stress management interventions and further investigation into the psychological impacts of acne vulgaris on medical students.

DECLARATION

Authors Contributions:

1. **Nadia Qazi:** Supervisor, conceptualization of study design, Data analysis, final prove reading
2. **Wasif Ullah khan:** literature search, conceptualization of study design, synopsis writing, data collection, data analysis, data interpretation, manuscript writing, proof reading.
3. **Tayyaba Shahzad:** literature search, conceptualization of study design, synopsis writing, data collection, manuscript writing, prove reading,
4. **Fahad Ullah:** literature search, data collection, manuscript writing, proof reading
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