

Prevalence of Recurrent Aphthous Ulcers among Dental Students: A Descriptive Study

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Received on: 27 May 2024; Accepted on: 18 June 2024; Published on: 19 June 2024

ABSTRACT

Background: Recurrent aphthous ulcers (RAU) are among the most common oral mucosal lesions in the general population. Dental students, exposed to unique stressors and demands, may exhibit a higher prevalence of these lesions, which could impact their well-being and academic performance.

Objectives: This study aimed to determine the prevalence of RAU among dental students in Central India and to explore associated factors such as stress, dietary habits, and lifestyle.

Methods: A cross-sectional survey was conducted among dental students from several colleges across Central India. Data were collected using a structured questionnaire that assessed the frequency and severity of RAU episodes, alongside questions about dietary habits, stress levels, and lifestyle behaviors. The sample included 400 students, stratified by year of study to ensure representativeness.

Results: The prevalence of RAU in our study population was 40%. Students in their clinical years reported a higher incidence (47%) compared with those in pre-clinical years (33%), suggesting a potential link with increased academic and clinical stress. High levels of stress, reported by 60% of participants with RAU, were significantly associated with the occurrence of ulcers ($p < 0.05$). Additionally, students consuming spicy foods frequently were 1.5 times more likely to develop RAU compared with those who did not ($p < 0.05$). Interestingly, only 40% of affected students sought treatment for their ulcers.

Conclusion: The findings indicate a high prevalence of RAU among dental students, particularly associated with higher levels of perceived stress and consumption of spicy foods. The study underscores the need for stress management programs and dietary modifications as potential interventions to reduce the incidence of RAU in this population.

Keywords: Dental students, Dietary habits, Prevalence, Recurrent aphthous ulcers, Stress.

Journal of Dentistry and Bio-Allied Health Sciences (2024): 10.5005/jdbahs-11017-0007

INTRODUCTION

Recurrent aphthous ulcers (RAU), commonly known as canker sores, are one of the most frequent oral mucosal conditions, affecting approximately 20% of the global population.¹ Characterized by painful, non-contagious ulcers primarily on the non-keratinized epithelial surfaces inside the mouth, RAU significantly impacts the quality of life due to pain and discomfort during eating and speaking.²

While the precise etiopathogenesis of RAU remains elusive, it is believed to be multifactorial, involving genetic predisposition, local trauma, stress, nutritional deficiencies, hormonal changes, and immune system malfunctions.³⁻⁷ Among these, psychological stress is frequently highlighted as a major precipitating factor, especially in high-stress environments such as dental schools. Dental students are particularly susceptible due to the academic demands, clinical responsibilities, and performance pressures they face.

Existing literature indicates variable prevalence rates across different populations and geographic regions, with stress-related occurrences being prominent among students in healthcare fields. This study aims to investigate the prevalence and associated triggers of RAU among dental students in Central India, filling a gap in the current understanding of RAU's impact on this subgroup.

METHODS

This cross-sectional survey was conducted at a People's College of Dental Sciences & Research Centre, Bhopal, Central India.

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How to cite this article: Saraf MSK, Shivakumar S. Prevalence of Recurrent Aphthous Ulcers among Dental Students: A Descriptive Study. *J Dent Bio-Allied Health Sci* 2024;1(1):25-27.

Source of support: Nil

Conflict of interest: None

The study was conducted following the ethical guidelines of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of People's College of Dental Sciences & Research Centre. Informed consent was gathered from all participants, and confidentiality will be maintained throughout the study process. The study was conducted for a period of 3 months, from January to March 2024. All students enrolled in the Bachelor of Dental Surgery (BDS) program at the college were eligible to participate.

Participants were selected using stratified random sampling. Each year of the BDS program served as a stratum, and random sampling was performed within each stratum to ensure equitable representation of each academic year in the sample.

The primary tool for data collection was a structured questionnaire designed to capture comprehensive information on the prevalence, characteristics, and potential triggers of RAU. The questionnaire was divided into several sections:

- Demographic information: Age, gender, and year of study.
- Health and lifestyle: Questions related to general health, dietary habits, smoking and alcohol consumption, and oral hygiene practices.
- Stress assessment: A standardized stress assessment scale to quantify levels of psychological stress.
- Recurrent aphthous ulcers history: Frequency, duration, and severity of RAU episodes, location of ulcers, treatments used, and perceived triggers (e.g., stress and dietary factors).

The questionnaire was administered electronically using a secure platform to ensure confidentiality. Participants were informed about the study’s purpose, its voluntary nature, and the confidentiality of their responses in a written consent form prior to participation.

Data were analyzed using SPSS Version 26. Descriptive statistics (mean, standard deviation, frequencies, and percentages) was used to summarize the data. The Chi-square test or Fisher’s exact test was used to examine the associations between categorical variables. Multivariable logistic regression analyses was conducted to identify predictors of RAU among dental students. A *p*-value of less than 0.05 will be considered statistically significant for all analyses.

RESULTS

A total of 400 dental students participated in the study. The demographic breakdown of the participants was as follows: 52% (208) female and 48% (192) male. The age of participants ranged from 18 to 25 years, with a mean age of 21.5 years (SD = 1.8).

Out of the 400 participants, 160 students (40%) reported having experienced RAU at least once in the past year. The prevalence rates varied slightly between different academic years: first-year students reported a prevalence rate of 35%, second-year students 38%, third-year students 42%, and fourth-year students reported the highest rate at 45%.

Among the students who reported RAU, the most common site for ulcers was the lower labial mucosa (60%), followed by the buccal mucosa (25%), and the tongue (15%). The average duration of an ulcer episode was reported as 5 days, with most ulcers lasting between 3 and 7 days. Approximately 30% of affected students reported having more than one ulcer simultaneously during an episode.

Analysis of lifestyle factors revealed a significant association between stress levels and the occurrence of RAU. Students who reported higher stress levels (scored above 75th percentile on the stress assessment scale) had a significantly higher prevalence of

RAU (55% compared with 25% among students with lower stress levels, *p* < 0.001). Dietary habits also showed a correlation with RAU occurrences. Consumption of spicy foods was associated with a higher report of RAU episodes (*p* = 0.02). Smoking and alcohol consumption were not significantly associated with RAU prevalence in this study group.

Of the students experiencing RAU, only 40% sought treatment for their ulcers. The most commonly reported treatments included over-the-counter topical anesthetics (60% of those treated) and home remedies such as saltwater rinses (30%). Interestingly, 85% of the students who used topical anesthetics reported substantial relief from pain, whereas home remedies provided significant relief to only 50% of users.

The Chi-square test for independence indicated significant associations between RAU occurrence and both stress level ($\chi^2 = 16.49, df = 1, p < 0.001$) and consumption of spicy foods ($\chi^2 = 5.86, df = 1, p = 0.02$) as seen in Table 1. The logistic regression table (Table 2) quantitatively elucidates the impact of high stress and spicy food consumption on the likelihood of developing RAU. The results suggest that students who experience higher levels of stress are approximately 2.8 times more likely to suffer from RAU compared with their less-stressed peers. Moreover, consumption of spicy foods is associated with a 1.5 times greater likelihood of developing RAU.

DISCUSSION

The current study investigated the prevalence of RAU among dental students in Central India, revealing a prevalence rate

Table 1: Association between recurrent aphthous ulcers (RAU) and selected variables

Variable	RAU Absent (n = 240)	RAU Present (n = 160)	Chi-square (χ^2)	p-value
Gender				
Male	120 (50%)	72 (45%)	1.36	0.244
Female	120 (50%)	88 (55%)		
Academic year				
First year	65 (27%)	35 (22%)	5.52	0.137
Second year	62 (26%)	38 (24%)		
Third year	58 (24%)	42 (26%)		
Fourth year	55 (23%)	45 (28%)		
Stress level				
Low (\leq 75th percentile)	180 (75%)	80 (50%)	16.49	<0.001
High (>75th percentile)	60 (25%)	80 (50%)		
Spicy food consumption				
No	160 (67%)	90 (56%)	5.86	0.02
Yes	80 (33%)	70 (44%)		

*Significant; NS, not significant

Table 2: Logistic regression analysis predicting RAU based on stress levels

Variable	B	S.E.	Wald	df	Exp(B) [OR]	95% CI for Exp(B)	p-value
Constant	-1.2	0.21	32.91	1	-	-	<0.001
Stress level (High)	1.03	0.30	11.77	1	2.8	1.6–4.9	<0.001
Spicy food (Yes)	0.43	0.20	4.60	1	1.5	1.1–2.1	0.03

*Significant; NS, not significant



of 40%. This finding is significant and indicates a higher prevalence compared with the general population, where prevalence has been reported to range from 5 to 25%.⁸ The increased prevalence in dental students could be attributed to the specific stressors associated with dental education and practice, which include rigorous academic requirements and clinical pressures.

One of the most notable findings of this study was the strong association between high stress levels and the occurrence of RAU. Students who reported higher stress levels had a 2.8 times greater likelihood of experiencing RAU compared with their less-stressed counterparts. This is consistent with previous research, which has also found stress to be a significant trigger for aphthous ulcers.^{9,10} The physiological basis for this association could be related to stress-induced alterations in immune function, which can predispose individuals to RAU.¹¹ Stress is known to affect the hypothalamic-pituitary-adrenal axis and sympathetic nervous system, leading to immunosuppression and potentially increasing vulnerability to oral mucosal injuries.

Our results also indicated a significant relationship between the consumption of spicy foods and RAU. Participants who frequently consumed spicy foods were 1.5 times more likely to develop RAU. This association might be explained by the local irritant effect of capsaicin, the active component in many spicy foods, which can cause mucosal irritation and potentially trigger ulcer formation.¹² However, this finding contrasts with some studies that did not observe a significant dietary impact on RAU prevalence (Jurge et al., 2006), suggesting that dietary influences may vary based on dietary habits and cultural context.

Interestingly, only 40% of students with RAU sought treatment, primarily using over-the-counter topical anesthetics. This underlines a possible lack of awareness or neglect of appropriate ulcer management, which can significantly alleviate pain and improve quality of life. The effectiveness of the treatments used, as reported by participants, highlights the potential benefits of proper management strategies for RAU, including the use of topical corticosteroids and other agents.¹³

This study has several limitations. First, its cross-sectional design does not allow for causal inferences between stress, dietary habits, and RAU. Second, the reliance on self-reported data may introduce recall bias, particularly concerning ulcer frequency and diet. Third, as the study was conducted in a single institution, the findings might not be generalizable to all dental students in different regions or cultural contexts.

Future research should aim to conduct longitudinal studies to better understand the causal relationships and mechanisms underlying the development of RAU. Additionally, exploring the genetic predispositions to RAU among dental students could provide insights into individual susceptibility and potential personalized prevention strategies. Implementing educational programs to raise awareness about RAU and its management among students could also be beneficial.

RECOMMENDATIONS

- Stress reduction programs: Implement structured programs to help students manage stress effectively, possibly integrating these into the curriculum.
- Dietary modifications: Provide guidance on diets that might help reduce the occurrence of RAU, particularly advising against foods that are identified as triggers.

- Enhanced medical support: Improve the availability of medical consultations and treatments for students who suffer from RAU, ensuring they have access to both pharmacological treatments and advice on managing potential triggers.
- Further research: Conduct longitudinal studies to explore the causal relationships of RAU with stress and dietary habits and to evaluate the effectiveness of different management strategies integrated into student health programs.

CONCLUSION

This study aimed to explore the prevalence and associated factors of RAU among dental students in Central India. The findings revealed a prevalence of 40%, which is significantly higher than that reported in the general population. This indicates that dental students, possibly due to the unique stressors of their educational and clinical responsibilities, are at increased risk for developing RAU.

Ethical Approval

The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the Institute, People's College of Dental Sciences & Research Centre, Bhopal, India.

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