

Original article

Prevalence and Psychological Stress in Oral Aphthous Ulcers among Dental Students at the University of Tripoli

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Recurrent aphthous ulcer (RAU) or canker sore is a common oral disorder characterized by recurrent painful ulcers in the oral mucosa. It affects approximately 20% of the population, is usually painful, interferes with eating, speaking, and swallowing, and can significantly impact an individual's quality of life. The study investigated oral ulcer prevalence, characteristics, and associated factors with assessing stress among dental students. The study was a cross-sectional questionnaire-based study involved 102 dental students of the age group 19-27 years who were selected. The questionnaire contains 2 sections. The first part included questions on the demographic characteristics of the participants and questions related to RAU, in the second part, the Hospital Anxiety and Depression Scale (HADS) was used to assess anxiety and depression in non-psychiatric hospital clinics and those who were given the history of RAU were diagnosed as an ulcer-experience student. Out of a total 102 dental students (19%) were male and (81%) were female with a mean age of 25.5 ± 2.3 years, The majority of respondents (81%) reported having experienced recurrent aphthous ulcers, many individuals (63%) reported that their RAU lasted less than 10 days, (40.7%) indicated that their RAU was labial mucosa, among those who identified factors, stress was the most commonly mentioned, with (60.4%), in HAD scale, found that ulcer-experienced students reported higher levels of anxiety and depression than others with no history of RAU. The study revealed a high prevalence of ulcers among respondents. There is a strong relationship between psychological stress and the development of RAU.

Introduction

Hippocrates first described aphthous ulcer with the Greek word *aphthi* meaning “to inflame”. which means ulceration [1,2]. Recurrent aphthous ulcer (RAU) or canker sore is a common oral disorder characterized by recurrent painful ulcers in the oral mucosa. It affects approximately 20% of the population, is usually painful, interferes with eating, speaking, and swallowing, and can significantly impact an individual's quality of life [3]. Recurrent aphthous ulceration is a condition of the oral mucosa characterized by inflammatory ulcers. These ulcers are shallow and round and are typically accompanied by an erythematous halo and characterized by the presence of a yellowish-gray slough, they primarily affect non-keratinized areas of the mouth, such as the lips, tongue, buccal mucosa, and soft palate [4-6].

Aphthous ulcers are categorized into three groups based on their size: major, minor, and herpetiform. Minor aphthous ulceration is defined by its small size (less than one cm in diameter), well-defined shape, and shallow depth. It typically heals within two weeks without leaving a scar. Major ulcers, on the other hand, are larger and deeper. These ulcers can take up to six weeks to heal and often leave scars. Lastly, multiple ulcers that reoccur frequently—up to 100 in number—are a hallmark of herpetiform ulceration. These are tiny, with a diameter of 2-3 mm [1,4,5]. The exact cause of RAS is unknown, but it is believed to be multifactorial, with factors such as hereditary, psychosomatic, infectious, hormonal (periods, pregnancy, or post-menopausal) factors, trauma, stress, food allergies, nutritional deficiencies (iron, vitamin B12, and folic acid) and hematological abnormalities, and immune dysfunction playing a role [6,7]. Increased salivary cortisol has also been linked with the development of RAU [4]. Anxiety and depression are common comorbidities in student patients with RAS, and they can exacerbate the symptoms and impact the treatment outcomes [8].

As aphthous ulcers develop, patients frequently show signs of increased stress, and multiple studies have documented a higher incidence, depression medication lowers the risk of ulcers [9]. There are several possible explanations for the causal link between recurrent aphthous ulcers and trait anxiety. Physical trauma and parafunctional behaviors like lip and cheek biting could be caused by an unidentified biochemical reaction or trait anxiety, which could start the ulcerative process. However, little data is

available about the risk factors of aphthous stomatitis among dental students. Avoiding trigger factors helps improve students' quality of life. Therefore, it is essential to assess the levels of anxiety and depression in patients with RAS to understand the disease better and provide appropriate management strategies.

Methods

Study design and setting

A cross-sectional- questionnaire based study was conducted among 102 dental undergraduate students of all years from first-year BDS to interns, with age groups ranging from 19 to 27 years, carried out in 2024 at the faculty of dentistry. Before distributing the questionnaire, each participant's verbal agreement was obtained and they were guaranteed that their answers would remain private. Students on immunosuppressive medications were not allowed to participate in the study.

Questionnaire development and distribution

Researchers created the questionnaire following a thorough examination of the literature. The questionnaire contains 2 sections. The first part included questions on the demographic characteristics of the participants such as age, gender, enrolled year, and questions related to medical history, medications, smoking, oral aphthous ulcer, duration, frequency, site, trigger factors, type of food. Most questions were closed-ended but there were a few open-ended questions to allow free response.

In the second part, the Hospital Anxiety and Depression Scale (HADS) was used to assess anxiety and depression in non-psychiatric hospital clinics. It is quick, short, and easy to answer, consisting of 7 HAD-A items and 7 HAD-D items (14 items). The total score ranges from 0 to 21 for both anxiety and depression. Three score ranges are categorized as follows: normal (0-7), borderline abnormal (8-10), and abnormal (11-21). HAD-A and HAD-D with scores greater than 7 depicted significant anxiety and significant depression.

Statistical Analysis

Data were analyzed using SPSS version 25. Frequencies and percentages were calculated for categorical variables. Chi-square tests were employed to evaluate the associations between categorical variables. A p-value of less than 0.05 was considered statistically significant.

Ethical consideration

Ethical approval to perform this work was obtained from the Scientific Research and Ethics Committee at the University of Tripoli, Tripoli, Libya [reference number: SREC-010/82].

Results

Demographic characteristics of participants

Figure 1 shows the gender distribution of participants, with 19% being male and a significant majority, 81%, being female with a mean age of 25.5 ± 2.3 years. Regarding the year enrolled, 20% were interns, while a mere 2% were in their first year and another 2% were in their second year. The largest groups were those in their third year at 36% and those in their fourth year at 40%. Regarding comorbidities, 6% of participants had a history of bronchial asthma, compared to 94% without such a history. Only 2% reported a history of hypertension, while 98% did not. Furthermore, 20% of participants had gastrointestinal conditions, while 80% did not report any.

Table 1 revealed that a substantial majority of respondents (81%) reported having experienced some type of recurrent aphthous ulcer, while a smaller portion (19%) stated they had not. Among those who had experienced RAU, the duration varied. Many individuals (63%) reported that their RAU lasted less than 10 days, while a smaller portion (29.6%) indicated that they persisted for 10 to 14 days. A few participants (7.4%) experienced ulcers lasting more than 14 days. In frequency, most of those who had experienced RAU (59.3%) reported recurring episodes, whereas a notable portion (40.7%) stated that they did not have frequent occurrences.

The analysis also examined the anatomical sites of the ulcers. Many respondents (35.8%) reported RAU located in the buccal mucosa, while others (40.7%) indicated that their RAU was labial. Additionally, some experienced ulcers in both buccal and labial sites (8.6%), and others reported ulcers in another anatomical site (14.8%).

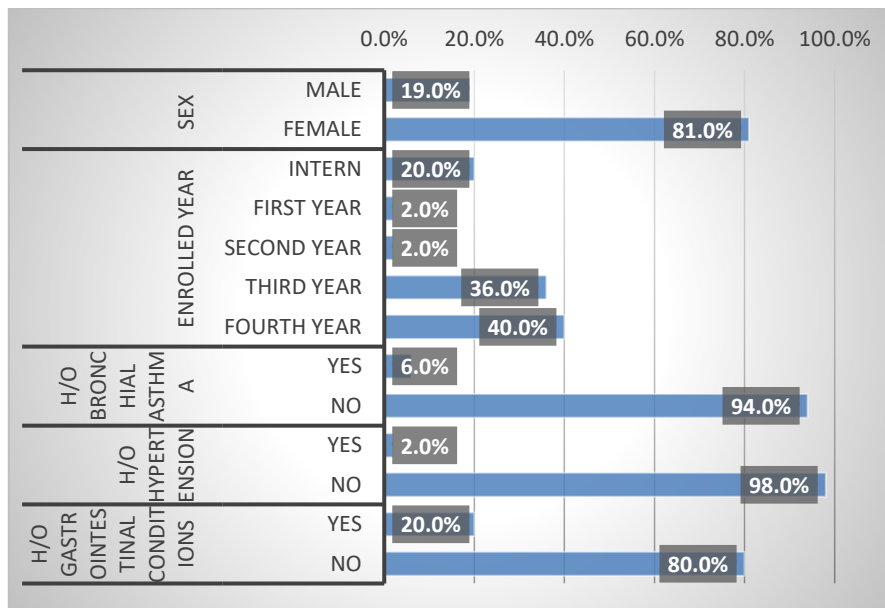


Figure 1. Demographic characteristics of Dentistry Students at the University of Tripoli

Table 1. Assessment of ulcer experience, duration, and anatomical site

Variable	Frequency	Percentage
Have you experienced any type of ulcer before?	Yes	81
	No	19
Duration of Ulcer (If yes)	Less than 10 days	51
	10 to 14 days	24
	More than 14 days	6
Frequency of Ulcer	Yes	48
	No	33
Site of Ulcer	Buccal	29
	Labial	33
	Both buccal and labial	7
	Another site	12

Table 2 indicated that a significant portion of respondents (65.4%) feel that there are factors associated with their RAU, while (34.6%) do not believe there are any such factors. Among those who identified factors, stress was the most commonly mentioned, with (60.4%) of respondents attributing their RAU to it. Anxiety was also noted as a contributing factor by (41.5%) of participants. Additionally, (17.0%) of respondents indicated that certain types of food could be associated with their ulcers, while only (5.7%) mentioned the menstrual cycle as a relevant factor. When examining the regular consumption of specific types of food, a notable (82.7%) of respondents reported consuming hot food, while (45.1%) indicated that they regularly eat salty food. Spicy food was also commonly consumed, with (44.4%) of participants acknowledging its regular intake.

Table 2. Factors associated with ulcers and regular consumption of food

Item	Yes Frequency (%)	No Frequency (%)
Do you feel any factors associated with the ulcer?	53 (65.4%)	28 (34.6%)
If Yes, Mention the Factors		
Stress	32 (60.4%)	21 (39.6%)
Anxiety	22 (41.5%)	31 (58.5%)
Any food	9 (17.0%)	44 (83.0%)
Menstrual cycle	3 (5.7%)	50 (94.3%)
Regular Consumption of Food		
Hot food	67 (82.7%)	14 (17.3%)
Salty food	37 (45.1%)	44 (54.9%)
Spicy food	36 (44.4%)	45 (55.6%)

HAD scale for assessing stress factor

The HAD scale was used to report the relationship between recurrent aphthous ulcer incidents and psychological factors, specifically anxiety and depression levels, which are detailed in Table 3. According to HADS, among individuals with RAU, 29.6% reported normal anxiety levels, 54.3% had borderline abnormal anxiety levels, and 16.0% were classified as having abnormal anxiety levels. Conversely, among those without ulcers, 47.4% reported normal anxiety levels, 52.6% had borderline abnormal levels, and none were reported to have abnormal anxiety levels. Regarding depression levels: Of those with RAU, 51.9% were categorized as having normal depression levels, 40.7% were borderline abnormal, and 7.4% were classified as abnormal. In contrast, among those without ulcers, 47.4% reported normal depression levels, 31.6% were borderline abnormal, and 21.1% were classified as abnormal. The p-values for anxiety (0.104) and depression (0.196) indicate no significant statistical differences between these psychological factors and the occurrence of ulcers in this sample.

Table 3. Ulcer experience with anxiety and depression levels

Variables	Ulcer experience		P- Value
	Yes	No	
	Frequency (%)	Frequency (%)	
Anxiety Level			
Normal	24 (29.6%)	9 (47.4%)	0.104
Borderline abnormal	44 (54.3%)	10 (52.6%)	
Abnormal	13 (16.0%)	0 (0.0%)	
Depression level			
Normal	42 (51.9%)	9 (47.4%)	0.196
Borderline abnormal	33 (40.7%)	6 (31.6%)	
Abnormal	6 (7.4%)	4 (21.1%)	

Discussion

Oral aphthous ulcer is one of the most common oral mucosal lesions. This condition impacts on the quality of life. The etiology of aphthous ulceration is complex and still not completely understood, various factors can trigger RAS development [10]. Our study found that the prevalence of RAU self-reported by dental students was 81%, which is less than the (90.3%) prevalence of the study conducted by Wan Ahmad Kamil et al., among UiTM Dental Students in Malaysia and (83.3%) in Al-Azhar University dental student in Egypt, while other studies also among dental students in India [5], Iran [11], Afghanistan [3], and Saudi Arabia [12] demonstrated 60%, 40.2%, 30%, and 21.7% prevalence respectively. A Comparison of the present findings with those previous studies should be undertaken with caution because of differences in the study design, sample size, and geographic location. This finding suggests that RAU is highly prevalent among dental students, as most of the respondents were female. Additionally, numerous studies have shown that women are more likely than men to have RAS Wan Ahmad Kamil et al., [10], Rathod et al., [13], Ziaei et al., [14], and Al-Johani [12].

Regarding the duration of RAU, most of them (63%) reported that the ulcer lasted less than 10 days which is in line with Ebrahim et al., [15] in Egypt, Thevara et al., [5] in India and Aljmal et al., [16] in Saudi Arabia. Furthermore, other studies by Dua et al., [17], Rathod et al., [13], and Wan Ahmad Kamil et al., [10] also reported that RAU healed within 5 days. Slightly More than half 59.3% of participants revealed that they have recurrent episodes of RAU. The present result was close to the outcome that was detected by a study carried out on a sample of dental students in India, which recorded [17] a prevalence of 53%.

As regards the site, the present study revealed that the most affected site was the labial mucosa in 33 (40.7%), followed by buccal mucosa in 29 (35.8%), and other sites in the oral cavity in 12 (14.8%). These findings are approximately similar to prior research that found the buccal mucosa and lips to be the most affected areas [11, 13, 15], while [18] found Buccal mucosa were the site of (54.5%) RAU, because these two sites are more prone to trauma by lip and cheek biting. Moreover, our study indicated that a significant portion of respondents (65.4%) feel that there are trigger factors associated with their RAU, stress and anxiety were the most commonly mentioned, with (60.4%), and (40.5%) of percentage respectively. We can explain the high prevalence rate of RAU in this study to stress and anxiety because compared to other academic courses dental students are under more stress due to the nature of the curriculum and clinical courses. This observation was shown to be stress-high in (81.81%) of ulcer-experienced students [13] and coincided with studies conducted in 2020, which found that stress (68%) and (61%) were a risk factor in ulcer-experienced students respectively [5, 19]. A comparable result was achieved in studies by Ebrahim et al., [15], were found that (59.2 %) of the cases had stress and anxiety in (22.4 %) of the cases or anger in

(8.8 %) of the cases. In 2017 Kunikullaya et al., [20] demonstrated elevated levels of salivary stress markers such as salivary cortisol among a group of RAU cases, in comparison with the control group. Finally, in our study 29.6% had normal anxiety, 54.3% had borderline abnormal anxiety, and 16.0% had abnormal levels of HADS with no significant difference between RAU and anxiety, in comparison with Doddamani et al., [21] where 33.3% had normal, 33.3% had borderline, and 33.3% had abnormal but with significant difference (*p value 0.008*). For depression 51.9% were had normal depression, 40.7% had borderline, and 7.4% had abnormal which approximately similar to Doddamani et al., [21] were found 80% had normal depression, 20% had mild and did not found abnormal. With no statistically significant between RAU and depression. In study by Dhopte et al., [22] used modified perceived stress scale (PSS)10 showed that high levels of stress, anxiety and depression in students with a history of RAU. Also at Khyber college of dentistry Safi et al., [6] demonstrated that anxiety and depression were the most common risk factor among dental student.

Conclusion

The study revealed a high prevalence of ulcers among respondents, with many experiencing the condition. Most ulcers resolved quickly, while some lasted longer, indicating a chronic nature with recurring episodes. The majority of ulcers were labial or located in the mucosal area. Many respondents attributed their RAU to stress and reported other factors like dietary habits involving hot, salty, and spicy foods. Additionally, individuals with RAU showed higher levels of stress. Further research is needed to investigate the links between psychological factors, dietary habits, and RAU recurrence.

Limitations

The study has several limitations that should be considered. The sample size may be limited, affecting the generalizability of the results to all dental students. Reliance on self-reported data introduces potential bias, as participants might inaccurately report their experiences with oral ulcers. The cross-sectional design limits the ability to establish causal relationships, and the lack of clinical diagnosis raises concerns about data accuracy.

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Conflicts of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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الملخص

القرحة القلاعية المتكررة أو القرحة القلاعية هي اضطراب فموي شائع يتميز بقرح مؤلمة متكررة في الغشاء المخاطي للفم. وهو يؤثر على ما يقرب من 20% من السكان، وعادة ما يكون مؤلماً، ويتداخل مع الأكل والتحدث والبلع، ويمكن أن يؤثر بشكل كبير على نوعية حياة الفرد. بحثت الدراسة في انتشار قرحة الفم وخصائصها والعوامل المرتبطة بها مع تقييم التوتر بين طلاب طب الأسنان. كانت الدراسة عبارة عن دراسة مقطعية قائمة على استبيان شملت 102 من طلاب طب الأسنان من الفئة العمرية 19-27 عامًا الذين تم اختيارهم. يحتوي الاستبيان على قسمين. تضمن الجزء الأول أسئلة حول الخصائص الديموغرافية للمشاركين والأسئلة المتعلقة بالقرحة القلاعية المتكررة، في الجزء الثاني، تم استخدام مقياس القلق والاكتئاب في المستشفى لتقييم القلق والاكتئاب في عيادات المستشفيات غير النفسية وأولئك الذين تم إعطاؤهم تم تشخيص تاريخ القرحة القلاعية المتكررة كطالب يعاني من القرحة. من بين إجمالي 102 من طلاب طب الأسنان (19%) كانوا ذكورًا و(81%) إناثًا بمتوسط عمر 25.5 ± 2.3 سنة، أفاد غالبية المشاركين (81%) أنهم تعرضوا لقرحة قلاعية متكررة، العديد من الأفراد (63%) أفادوا أن القرحة القلاعية المتكررة الخاص بهم استمر أقل من 10 أيام، (40.7%) أشاروا إلى أن القرحة القلاعية المتكررة لديهم كان الغشاء المخاطي الشفهي، من بين أولئك الذين حددوا العوامل، كان الإجهاد هو الأكثر شيوعًا، مع (60.4%)، في مقياس القلق والاكتئاب في المستشفى، وجد أن الطلاب الذين يعانون من القرحة أبلغوا عن مستويات أعلى من القلق والاكتئاب من الآخرين الذين ليس لديهم تاريخ في القرحة القلاعية المتكررة. وكشفت الدراسة عن ارتفاع معدل انتشار القرحة بين المشاركين. هناك علاقة قوية بين الضغط النفسي وتطور القرحة القلاعية المتكررة.