# Prevalence of Oral Aphthous Stomatitis and Recurrent Herpes Labialis Among Dental Students

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#### **Abstract**

**Background:** The most frequent oral mucosal lesion is recurrent aphthous stomatitis. It first appears in childhood or adolescence and is evident as many tiny, recurrent, or ovoid ulcers with yellow floors and erythematous haloes. A widespread viral infection, herpes labialis, is characterized by recurrent vesicular lesions, frequently on the lips and perioral tissue.

**Objectives:** To find the prevalence of oral aphthous stomatitis and recurrent herpes labialis among dental students of Bilad Alrafidain University.

**Patients and Methods:** A cross-sectional study was conducted among 187 dental students of Bilad Alrafidain University, who are in the fourth and fifth stages of the dental department. The data were collected using questionnaires. Questionnaires required two sections. The first section restricted personal information. The second section involved questions related to aphthous ulcers and recurrent herpes labialis, including the duration and site of the ulcer after examination.

**Results:** In the present study, the number of students with aphthous ulcers in the fourth stage is 13 (14.1%), and in the fifth stage, 24 (25.3%), with a highly statistically significant difference. Out of 187 students, 10 (10.9%) had recurrent herpes labialis in the fourth stage, while 15 (15.8%) were in the fifth stage, indicating a highly significant statistical relationship. The number of students with recurrent aphthous stomatitis and recurrent herpes labialis in the fifth stage is 24 (25.3%) and 15 (15.8%), respectively, which is higher than in the fourth stage, where the numbers are 13 (14.1%) and 10 (10.9%), respectively, indicating a significant relationship.

**Conclusion:** Recurrent aphthous stomatitis is a lesion with a higher prevalence in females than in males. Stress during the period of academic examinations is one of the reasons for recurrent eruption of aphthous stomatitis and reactivation of recurrent herpes labialis.

**Keywords:** Aphthous stomatitis, Herpes labialis, Dental, Students, and Oral.

#### Introduction

The Greek word "aphtha," which means ulcer, is where the word "aphthous" was created. Recurrent aphthous stomatitis (RAS), also identified as aphthous ulcers, is a benign ulcerated lesions that usually develop on the mouth. The cause of these lesions is unknown, and treatment options are still controversial (1,2).

The oral mucosa is usually affected by inflammatory diseases such as aphthous ulcers or recurrent aphthous stomatitis. Aphthous ulcers are the most prevalent, affecting up to 25% of people worldwide,

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with an estimated 4% frequency of oral ulcers (3). Hippocrates initially used the term "aphthae" to describe mouth disorders, and canker sores are another name for ulcers, or aphthae (4,5).

RAS was divided into three classes: herpetiform, minor, and major ulcers. Minor or mild aphthous ulcers account for 80% of RAS. These are minute ulcers, 1 to 5 in number, measuring 8 to 10 mm in diameter, that affect the nonkeratinized oral mucosa and heal in 10 to 14 days without leaving any scars. Large aphthous ulcers (10–15% of RAS cases) can affect the keratinized oral mucosa, including the hard palate, and are bigger than minor ones (>1 cm). They frequently leave a scar and might take up to 6 weeks to heal. There are clusters of 1-3 mm-diameter tiny ulcers that number more than 10 and may number up to 100 in herpetiform ulceration (3).

Both environmental and genetic variables are associated with the development of RAS. Stress, chemical or physical trauma, illness, allergy, a genetic susceptibility, or nutritional inadequacies are some of the triggering reasons (6, 7).

In general, symptoms may comprise prodromal sensations like burning, itching, or stinging that may happen hours before any lesion manifests itself, and pain that is frequently exaggerated and associated with the degree of ulceration and is made worse by physical contact, especially with firm foods and beverages (e.g., if they are abrasive or acidic). The first few days after the ulcer forms are the most painful, but as the ulcer heals, the pain diminishes (8). Speaking and chewing may be uncomfortable if the tongue is affected, and swallowing may be painful if the soft palate, throat, or esophagus is affected by an ulcer (8).

Stress impacts the immune system, which could help explain why some conditions are directly related to stress. It is frequently said that in training sessions for students with the illness, ulceration worsens during exam times and improves during rest times (9,10). As an

alternative, it has been proposed that during stressful times, oral parafunctional behaviors such as chewing on the lips or cheeks become more evident, which may trigger the mucosa to experience less severe damage (11). The primary type of herpetic stomatitis has systemic involvement, such as fever, and can be confused with RAS and recurrent in its intraoral form. On the oral mucosa, the vesicle phase can be detected. When it establishes as an ulcer, it's more diffuse and erythematous in many places, especially on keratinized mucosa, which is uncommon in RAS (2,6).

Herpes (genital or oral) and fulminant human encephalitis are illnesses brought on by the herpes simplex viruses 1 and 2 (HSV-1, HSV-2). These DNA-based viruses are members of the Herpesviridae family (12).

Recurrent herpes labialis (RHL) is a herpes simplex virus infection that often affects the lip (13). A burning ache as symptoms frequently follow little blisters or sores (13). Fever, sore throat, and swollen lymph nodes may also exist during the initial episode (13,14). The virus remains dormant in the trigeminal ganglion, even though the rash typically disappears after 10 days (13). Periodically, the virus can reactivate and cause another occurrence of sores on the lips or mouth (13). Between 15 and 40 percent of those who contract the HSV-1 infection, and 98% of the world's population, may go on to get RHL (15).

The present study aimed to determine the prevalence of oral aphthous stomatitis and recurrent herpes labialis among dental students following academic exams at Bilad Alrafidain University in Diyala, Iraq.

#### **Patients and Methods**

**Study design:** A cross-sectional study was conducted among 187 dental students of Bilad Alrafidain University, who are in the fourth and fifth stages of the dental department. After receiving ethical clearance, a well-versed

recurrent herpes labialis 2(8%) were males, and 8(32%) were females, as shown in Table 2.

The second group (fifth stage), students with recurrent aphthous ulcers, consisted of 3 males (8%) and 21 females (56.8%). In contrast, five males (20%) and 10 females (40%) had recurrent herpes labialis, as shown in Table 2.

Distribution of aphthous ulcer and recurrent herpes labialis according to academic stage: The number of students with aphthous ulcers in the fourth stage is 13 (14.1%), and in the fifth stage is 24 (25.3%), with a highly statistically significant level as shown in Table 3.

consent was obtained from the participants. Questionnaires required two sections. The first section restricted personal information. The second section is associated with aphthous ulcers and recurrent herpes labialis, such as duration (0-5 days) and site of ulcer after academic exams. In addition, photos of the students' aphthous ulcers were taken to determine the distribution of infection across different sites in the mouth.

**Inclusion criteria:** The students included in this study were divided into two groups as follows: 1-Group 1 (fourth stage): Ninety-two students (33 male and 59 female). 2-Group 2 (fifth stage): Ninety-five students (34 male and 61 female).

**Exclusion criteria:** Students taking medication that causes immunosuppression, such as steroids, or those with systemic diseases, were excluded from the study. Data were collected using questionnaires.

# **Statistical Analysis**

The program employed to distinguish the outcome of alteration factors in study variances is the Statistical Analysis System (SAS 2018). A chi-square test was run to determine whether there is a significant difference between expected frequencies and observed frequencies in one or more classes.

#### **Results**

**Distribution of the studied groups according to gender:** The total number of participants in the research was 187 students; 67 (35.8%) were males, and 120 (64.2%) were females. Regarding the first group (fourth stage), which consisted of 92 students (49.2%), 33 were males (17.6%) and 59 were females (31.6%), as shown in Table 1. The second group (fifth stage) included 95(50.8%) students, 34(18.2%) were males, and 61(32.6%) were females, as shown in Table 1. Regarding the first group (fourth stage), students with a recurrent aphthous ulcer, 4 (10.8%) were males and 9 (24.3%) were females. In contrast,

**Table 1.** Distribution of the studied groups according to gender.

	Male		Fem	ale	D volue	Total		
Stage	No.	%	No.	%	P-value	No.	%	
Forth	33	17.6	59	31.6	0.0067 **	92	49.2	
Fifth	34	18.2	61	32.6	0.0056 **	95	50.8	
Total	67	35.8	120	64.2	0.0001 **	187	100	
P-value	0.902 NS							
** (P≤0.01), NS: Non-Significant.								

**Table 2**. Distribution of aphthous ulcer and recurrent herpes parameters among the studied groups.

	Aphthous ulcer					Recurrent herpes						
Stage	Male	%	Female	%	Total	%	Male	%	Female	%	Total	%
Forth	4	10.8	9	24.3	13	35.1	2	8	8	32	10	40
Fifth	3	8	21	56.8	24	64.9	5	20	10	40	15	60
Total	7	19	30	81	37	100	7	28	18	72	25	100
P-value	0.0001 ** 0.0004 **						0.0004 ** 0.0074 **					
** (P≤0.01).												

**Table 3.** Distribution of the observed frequencies in the two categories, none and present, of aphthous ulcer in different samples.

Store	Count & noncontages	Aphth	ous ulcer	Total	P-value		
Stage	Count & percentages	None	Present	Totai			
Forth	Count	79	13	92	0.0001 **		
Form	% within group	85.9%	14.1%	100.0%	0.0001		
TS:CAL	Count	71	24	95	0.0001 **		
Fifth	% within group	74.7%	25.3%	100.0%	0.0001		
Total	Count	150	37	187	0.0001 **		
	% within group	80.2%	19.8%	100.0%	0.0001 **		
** (P≤0.01)							

Out of 187 students, 10 (10.9%) had recurrent herpes labialis in the fourth stage, and 15 (15.8%) in the fifth stage, with a statistically highly significant relationship as shown in Table 4. The number of students with RAS and RHL in

the fifth stage is 24 (25.3%), 15(15.8%), respectively, more than in the fourth stage, 13(14.1%), 10(10.9%), respectively, with a significant relationship as shown in tables (3,4,5).

**Table 4.** The distribution of the observed frequency in two categories, none and present, of recurrent herpes labialis in different samples.

Stage		Recurr	ent herpes	Total		
Stage		None	Present	Total		
Farreth	Count	82	10	92	0.0001 **	
Fourth	% within group	89.1%	10.9%	100.0%	0.0001 ***	
Fifth	Count	80	15	95	0.0001 **	
FIIII	% within group	84.2%	15.8%	100.0%	0.0001 ***	
Total	Count	162	25	187	0.0001 **	
	% within group	86.6%	13.4%	100.0%	0.0001	
** (P≤0.01)						

**Distribution of aphthous ulcers according to the infection site:** The lower lip was the most frequently affected anatomical region,

with 15 students, followed by the cheek, with nine students, and then the upper lip, with five students, as shown in Table 5.

picture shows a male from the fifth stage of the Dentistry College, age 23 years old, with recurrent herpes labialis on the left side of his lower lip, as shown in Figure 1.

The pictures show recurrent aphthous

stomatitis in the lower lip (A) of a 22-year-old female from the fourth stage of Dentistry College, and (B) of a 23-year-old male from the fifth stage of Dentistry College, as shown in Figure 2.

**Table 5.** Distribution of aphthous ulcers according to infection site and gender.

	Distribution by infection site							
	Aphtho	us ulcer		Aphtho	us ulcer			
	Fourth stage			Fifth stage				
Parameters	Male	Female	Total	Male	Female	Total	Total	
	No.	No.		No.	No.			
Lower lip	2	4	6	1	8	9	15	
Cheek	0	2	2	1	6	7	9	
Tongue	1	1	2	0	1	1	3	
Floor of the mouth	0	1	1	0	0	0	1	
Upper lip	0	1	1	0	4	4	5	
Palate	1	0	1	1	2	3	4	
Total	4	9	13	3	21	24	37	
P-value	0.0419 *		0.0271*	0.0052 **		0.0038**	0.0007**	
* (P\le 0.05), ** (P\le 0.01)								



**Figure 1.** A male with recurrent herpes labialis at the age of 23 years from the fifth stage of the Dentistry College.



**Figure 2.** Recurrent aphthous stomatitis in the lower lip: (A) Female of age 22 years old from the fourth stage of Dentistry College, (B) Male of age 23 years old from the fifth stage of Dentistry College.

#### **Discussion**

The oral mucosa is frequently affected by recurrent aphthous stomatitis, primarily affecting non-keratinized tissues. It typically initiates in childhood, is symptomatic, recurrent, and presents clinically as ulcers, which may seem like a single or many lesions (1,13). It is a widespread illness that affects 20% of the general population and 9% of children, according to estimates (16).

Communal illness is herpes labialis (cold sore, fever blister). It's a rash that marks lips and other mucous membranes, and it's notable by blisters and erythema that are associated with a burning sensation (17). It is triggered by the reactivation of latent infection of virus-1 of herpes simplex (HSV-1) (15).

In the present study, it is interesting to find that 150 individuals do not have recurrent aphthous stomatitis, and 162 individuals do not have recurrent herpes labialis. This could be explained by the fact that stress does not always affect the oral cavity.

Although the exact reason for RAS is still unidentified, Sawair (17) noted in 2010 that the disorder can be made more likely to recur by stress, dietary sensitivity, physical or chemical harm, and genetic susceptibility (2,17,18).

The present study showed that the prevalence of RAS is 14.1% in the fourth stage and 25.3% in the fifth stage, with a highly statistically significant association recognized. This may be explained by the fact that stress has diverse adverse effects on health, many of which are facilitated by its action on the immune system. According to research, stress can trigger type 1- type 2 cytokine-mediated or proinflammatory immune responses, making it hard to control innate and adaptive immune responses (18). This study supports the idea that stress and anxiety play a role in the

development of RAS in educated patients, particularly during the examination.

Our study agrees with the studies of Gallo et al. (7) and Sharma et al. (19), which showed the relation between RAS and stress. Al-Omiri et al. (20) researched 50 RAS patients' psychological profiles and found that either stressful circumstances or anxiety can encourage recurring sessions of this illness. According to the scientists, while under stress, salivary cortisol concentration increases, stimulating the immune system to attract leukocytes to sites of inflammation and playing a crucial part in the condition's pathophysiology (17,20).

Our study agrees with the studies of another researcher, who describes RAS as a lesion with high prevalence in females (21,22). Whereas we disagree with other studies that don't approve of the theory of the presence of an association between this condition and gender, such as Leonardo et al. (23) and Chattopadhyay and Shetty (24), who confirmed a lack of a relationship between RAS and gender. This high prevalence in females is indicated by women seeking additional medical attention.

The prevalence of RHL and RAS was higher in women than in men, which correlated with the fact that women experience more hormonal changes.

George and Joseph (3) supposed that the duration of an aphthous ulcer (0–2 days) was 17%, (3-5 days) was 38.7%, and that stress and examinations were responsible for 41.1% and 22.6% of cases, respectively. These results are similar to the results of the present study, which reported that the prevalence of aphthous ulcer in duration (0-5 days) is 19.8% in both stages related to examination.

Areas like the buccal and labial mucosa, the floor of the mouth, the ventral surface of the tongue, and the soft palate are often affected by recurrent aphthous ulcers (25). In the present study, the lower lip was the most commonly affected anatomical region, with 15 students, followed by the cheek with nine students, then the upper lip with five students.

The present study exhibited that the prevalence of

RAS and RHL in the fifth stage is (25.3% 15.8% respectively) more than in the fourth stage (14.1% 10.9% respectively), with a significant relationship. This may be explained by the fact that students in the fifth stage are more anxious because they are in the final stage and about to graduate from college. Our study agrees with the study of Faulkner and Smith (25). They noted that recurrent HSV-1 reactivation was connected to higher levels of psychological stress. This could be clarified by the fact that stress elevates cortisol levels, which depress the immune system and contribute to the reactivation of viral latency (26).

Regarding RHL, the present study showed that the prevalence of RHL is 10.9% in the fourth stage and 15.8% in the fifth stage, with a highly statistically significant connection identified. This may be clarified by the fact that individuals who commonly experience HSV-1 reactivation are more susceptible to the adverse effects of stress on the immune system. The central nervous system, endocrine system, and immune system are just a few examples of the body's mechanisms that can be altered by stress, defined as a force that creates a somatic reaction outside of normal bodily processes (27,28).

#### **Conclusion**

Recurrent aphthous stomatitis is a lesion with a higher prevalence in females than in males. Stress during the period of academic examinations is one of the reasons for recurrent eruption of aphthous stomatitis and reactivation of recurrent herpes labialis. It was recommended to conduct a new study involving a large number of Iraqi students during the academic examination period and to study immune dysregulation during the stress period.

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**Ethical clearance:** This study received approval from the Scientific and Ethical Committee of the College of Medicine at the University of Diyala, in collaboration with Bilad Alrafidain University. The approval code is 2024HMI868.

Conflict of interest: None.

Use of Artificial Intelligence (AI): The authors declare that they were not using generative artificial intelligence for the preparation, creation, or language editing of this manuscript.

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# انتشار التهاب الفم القلاعى الفموي والهربس الشفوي المتكرر بين طلاب طب الاسنان

الحيدر مهدي عيدان، اغسق عبد الله محمود، البتهال قحطان عثمان

#### الملخص

الخلفية: : آفة الغشاء المخاطي للفم الأكثر شيوعا هي التهاب الفم القلاعي المتكرر. يظهر لأول مرة في مرحلة الطفولة أو المراهقة ويظهر على شكل العديد من القرح الصغيرة أو المتكررة أو البيضاوية ذات الأرضيات الصفراء والهالات الحمامية. تتميز العدوى الفيروسية واسعة النطاق بالهربس الشفهي بآفات حويصلية متكررة، في كثير من الأحيان على الشفاه والأنسجة المحيطة بالفم.

الأهداف: معرفة مدى انتشار التهاب الفم القلاعي الفموي والهربس الشفوي المتكرر بين طلاب طب الأسنان في جامعة بلاد الرافدين.

المواد والطرق: تمت الموافقة على دراسة مقطعية بين ١٨٧ طالبا من طلاب طب الأسنان من جامعة بلاد الرافدين، الذين هم في المرحلتين الرابعة والخامسة من قسم طب الأسنان. وتم جمع البيانات باستخدام الاستبيانات. تتطلب الاستبيانات قسمين. القسم الأول المعلومات الشخصية. أما القسم الثانى فيشمل الأسئلة المرتبطة بالقرح القلاعية والهربس الشفوي المتكرر، مثل مدة القرحة وموقعها بعد الفحص.

النتائج: في الدراسة الحالية بلغ عدد الطلاب المصابين بالقرحة القلاعية في المرحلة الرابعة ١٣ ( ( ١ , ٤ ١ ))، وفي المرحلة الخامسة ٢٤ ( ٢ , ٥ ١ ))، بمستوى دال إحصائياً. من بين ١٨٧ طالبا، كان ١٠ ( ( , ١٠ , ١ )) مصابين بالهربس الشفوي المتكرر في المرحلة الرابعة، في حين كان ١٥ ( ( , ١٠ ) في المرحلة الخامسة، مع وجود علاقة ذات دلالة إحصائية عالية. بلغ عدد الطلاب المصابين بالتهاب الفم القلاعي المتكرر والهربس الشفوي المتكرر في المرحلة الخامسة ٢٤ ( ( 7 , 7 ) ))، و ١٥ ( ( 7 , 0 ) ) على التوالي، مع وجود علاقة معنوية.

الاستنتاج :التهاب الفم القلاعي المتكرر هو آفة أكثر انتشارا في الإناث مقارنة بالذكور. يعد الإجهاد خلال فترة الامتحانات الأكاديمية أحد أسباب الطفح المتكرر لالتهاب الفم القلاعي وإعادة تنشيط الهربس الشفوي المتكرر.

الكلمات المفتاحية: التهاب الفم القلاعي، الهربس الشفوي، الأسنان، الطلاب، والفم.

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