

Chewing Gum, Stress and the Occurrence of Aphthous Stomatitis among University Students

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Canker sores (recurrent aphthous stomatitis) are small, shallow painful oral ulcers that develop on the soft tissue inside the mouth. While the exact cause remains unclear, one of the triggered factors is stress. Chewing gum, on the other hand, is considered a popular habit among university students. It's a way to cope with stress. This study aimed to find out if the consumption of chewing gum among university students as a way to overcome stress could play an indirect role in decreasing the frequency of aphthous stomatitis. Methods: An online Google form questionnaire shared through email and social media platforms targeting undergraduate university students.

Results: 906 students (age ranges from 18 to 25) responded to the questionnaire. 63.8 % of students experience daily stress and 53.6% of them complained of study-related stress. However, more than half of the students used chewing gum daily or several times during the week, and 70% of them feel that chewing gum help to reduce stress level. On the other hand, 62.7% of university students have been diagnosed with aphthous stomatitis, with an increased frequency during exam periods. The Spearman correlation coefficient exposed, a negative high significant correlation between chewing gum consumption and frequency of both aphthous stomatitis (-0.114) and stress (-0.239).

Conclusion: University life is a stressful environment and students should be aware of the potential connection between stress and the occurrence of aphthous stomatitis. Using chewing gum as a stress distraction technique, students can minimize the likelihood of developing a painful canker sore.

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Aphthous stomatitis (canker sores), is a painful small, shallow ulcer that affects the oral soft tissue. Eating, drinking and speaking became an uncomfortable experience.^{1,2} The recurrent aphthous stomatitis RAS is considered multifactorial in origin and the exact cause remains unclear, several factors are thought to contribute to its occurrence, such as stress.^{3,4} Previous studies suggested that psychological disorders such as stress, anxiety and depression have a strong correlation with RAS lesions.⁵⁻⁷

The academic pressure, social relationships and personal challenges laid a lot of anxiety and stress upon the shoulders of university students. This stress impacts their overall health condition, including oral health.⁸

Chewing gum, on the other hand, has long been considered a popular habit among students. It is seen as a way to cope with stress, improve concentration and maintain good oral hygiene. Recent research suggests that it may have actual stress relief benefits for the student.⁹

Moreover, it has been found that chewing gum could stimulate the release of dopamine from the brain, a neurotransmitter which is associated with the feeling of motivation, satisfaction and pleasure. Additionally, the physical movement of chewing can help reduce tension and improve focus, which makes it a helpful tool for maintaining high concentration during long study sessions and exams.^{10,11}

The purpose of the present study was to see if the university students' consumption of chewing gum as a strategy to lower the study-related stress, can eventually lead to a diminish in the occurrence of recurrent aphthous stomatitis.

MATERIAL AND METHODS

Research design

The study was carried out in compliance with Baghdad University College of Dentistry's experimental ethical guidelines. All respondents participated voluntarily, and the principles established in the Helsinki Declaration have been followed in this research. An online Google form questionnaire shared through email and social media platforms targeting undergraduate university students from different specialities.

Sample size calculation

To determine the required sample size, we used the formula:

$$\text{Sample Size} = (Z^2 * p * (1 p)) / E^2$$

Z refers to the z score corresponding to the desired confidence level (95% confidence level)

p denotes the estimated proportion of the population with a characteristic (we assume p=0.5 for an estimate)

E represents the desired margin of error (we considered it $\pm 5\%$)

Data collection

Data collection extended over eight months, from March 2023 to November 2023. The questionnaire starts with questions about gender, age and study speciality. Then there are three sections, with four questions for the chewing gum section and three questions for both stress and aphthous stomatitis sections. [Supplemental File 1](#) summarises the elements of the questionnaire.

Statistical analysis

Statistical Package for the Social Sciences (SPSS), version 28 applied to statistical analysis of data. First, the descriptive statistic. Second, the chi-square test, to assess whether there is a difference in the trend of the proportions in the two groups. Finally, the Spearman correlation test examines whether two variables are correlated with one another or not.

RESULTS

The total number of participants in the questionnaire was 906 undergraduate college students, with a response rate of 18. %. The age ranges from 18-25 as shown in [Figure 1](#). Among the respondents were

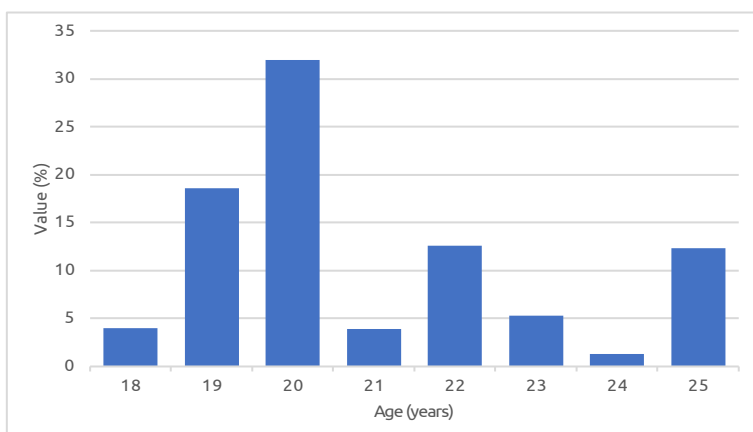


Figure 1 Age range of the participants

Table 1 Demographic characteristics of the participants

	N (%)	
Gender	Male	432 (47.7)
	Female	474 (52.3)
Study Field	Business Administration	20 (2.2)
	Medical technician	218 (24.1)
	Dentistry	358 (39.5)
	Engineering	264 (29.1)
	Other	46 (5.1)

52.3% females and 47.7% males. The students are from different specialities, as shown in [Table 1](#).

Stress, Chewing Gum and Aphthous Stomatitis

As the results revealed a high percentage of 63.8 of students experience daily stress and 57.4% have a stress level above five on a scale of ten. Besides, 53.6% of college students complained of study-related stress. However, more than half of the students used chewing gum daily and several times during the week. Additionally, the main reason to consume chewing gum was to reduce stress and anxiety. Furthermore, 70% of students feel that chewing gum helps them to reduce stress levels.

On the other hand, 62.7% of university students have been diagnosed with aphthous stomatitis, with an increased frequency during exam periods, as shown in [Table 2](#).

Correlation between variables

The chi-square test was applied to test the statistically significant relationship between variables. [Table 3](#), the frequency of aphthous stomatitis significantly correlated ($p=0.01$) with the frequency of stress. Furthermore, there is a significant correlation ($p=0.005$) between chewing gum consumption and study-related stress [Table 4](#). Additionally, a significant correlation ($p=0.04$) between chewing gum usage and the frequency of aphthous stomatitis [Table 5](#).

The Spearman correlation coefficient [Table 6](#), exposed the following, a negative high significant correlation between chewing gum consumption and frequency of both aphthous stomatitis (-0.114) and stress (-0.239).

Table 2 Stress, Chewing Gum and Aphthous Stomatitis response

Stress-related questions and answers		
Frequency of stress	Daily	578 (63.8)
	Weekly	142 (15.7)
	Rarely	174 (19.2)
	Never	12 (1.3)
Level of stress (on a scale of 10)	1	40 (4.4)
	2	44 (4.9)
	3	70 (7.7)
	4	68 (7.5)
	5	164 (18.1)
	6	92 (10.2)
	7	128 (14.1)
	8	140 (15.5)
	9	62 (6.8)
	10	98 (10.8)
Sources of stress	Personal expctations & self-pressure	118 (13)
	Personal relationships	122 (13.5)
	Study-related stress	486 (53.6)
	Family responsibilities	126 (13.9)
	More than one sources	54 (6)
Chewing gum-related questions and answers		
Chew gum consuming	Daily	218 (24.1)
	Several times during the week	283 (31.2)
	Occasionally (irregular intervals)	375 (41.4)
	Don't use chewing gum	30 (3.3)
Reason to use chewing gum	Reduced stress & anxiety	438 (48.3)
	As a distraction method	92 (10.2)
	Improve the mood	202 (22.3)
	Reduce food cravings	144 (15.9)
	Don't use chewing gum	30 (3.3)
Situations to consume chewed gum to relieve stress	While studying	104 (11.5)
	Between classes	396 (43.7)
	During an exam	140 (15.5)
	All the time	236 (26.0)
	Don't use chewing gum	30 (3.3)
Chewing gum helps reduce stress levels	Yes	634 (70)
	No	272 (30)
Aphthous stomatitis-related questions and answers		
Diagnosed with aphthous stomatitis	Yes	568 (62.7)
	No	338 (37.3)
frequency of aphthous stomatitis	Often	254 (28.0)
	Usually	98 (10.8)
	Occasionally	216 (23.8)
	Never	338 (37.3)
Increase in frequency during exams	Yes, often	252 (27.8)
	Yes, always	192 (21.2)
	Sometimes	124 (13.7)
	No	338 (37.3)

Table 3 Frequency of stress vs. aphthous stomatitis (count)

Frequency of stress	Daily	Weekly	Rarely
Often (2–3×/year)	180	32	40
Usually (>4×/year)	80	10	8
Occasionally (≤1×/year)	120	26	70

Table 4 Sources of stress vs. chewing gum frequency (count)

How often chew gum	Daily	Several times/ week	Occasionally
Personal expectations	24	42	48
Personal relationships	42	35	41
Study-related stress	122	148	200
Family responsibilities	12	42	68
More than one source	18	16	18

Table 5 Aphthous stomatitis frequency vs. chewing gum consumption (count)

Aphthous stomatitis frequency	Never	Often (2–3×/year)	Usually (>4×/year)	Occasionally (≤1×/year)
While studying	28	30	10	36
Between classes	140	108	50	98
During an exam	56	46	16	22
All the time	95	70	25	55

Table 6 The Spearman correlation coefficient

Correlations			
Use chewing gum		Frequency of stress	Frequency of aphthous stomatitis
	Correlation Coefficient	-0.239**	-0.114**
	Sig. (2-tailed)	.000	.001
	N	906	906

****.** Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

This study aimed to find out if the consumption of chewing gum among university students as a way to overcome stress could potentially play an indirect role in decreasing the frequency of aphthous stomatitis. Stress is common among university students. To cope with study-related stress, the students try different strategies. In particular, chewing gum, an available, low-cost, and popular

product can provide the necessary distraction to manage stress.¹²

The findings from this study confirm some of the results from previously published research on chewing gum and stress. Multiple studies have concluded that consuming chewing gum can reduce stress levels. A study by Scholey, et al found that as compared to non-chewing, there was a significantly high reduction in stress and anxiety in the chewing

SUMMARY BOX

- Increased chewing gum usage associated with reduced occurrence of aphthous stomatitis: The study revealed a significant negative correlation between regular chewing gum usage and the occurrence of aphthous stomatitis among university students. Those who reported consistent chewing gum use had a lower prevalence of aphthous stomatitis compared to those who did not regularly chew gum.
- Stress levels positively linked to aphthous stomatitis: The findings indicate a positive association between stress levels and the occurrence of aphthous stomatitis. Students who reported higher stress levels were more likely to experience recurrent episodes of aphthous stomatitis compared to those with lower stress levels.
- Gum chewing as a potential stress management strategy: The study suggests that chewing gum could serve as a feasible stress management strategy among university students. Participants who engaged in regular gum chewing reported lower stress levels compared to those who did not chew gum, potentially leading to a reduced risk of developing aphthous stomatitis.

condition.¹³ Another study by Smith and Woods proved that the chewing gum group showed lower stress, anxiety and depression, as well as less fatigue as compared to the non-chewing group.¹⁴

The cause of aphthous stomatitis is multifactorial, and stress is one of the triggers of its occurrence in young college students. Without a doubt, exam time is a known source of students feeling of anxiety and being overwhelmed by stress.^{15,16} The finding from this study showed a significant positive correlation exists between the frequency of aphthous stomatitis and the frequency of stress, which is supported by the findings from previous studies dealing with the same subject. Firstly, an updated study by Nurdiana et al concluded that stress is one of the etiological factors of recurrent aphthous stomatitis.³ Secondly, a recent study by Hamdani et al revealed a high-stress level correlated significantly with recurrent aphthous stomatitis.¹⁷

The role of stress as a trigger of recurrent aphthous stomatitis is still unclear. Moreover, the underlying

exact mechanism remains controversial. Huldig et al findings suggest that the stressful life events involved with the initiation of aphthous stomatitis.¹⁸

Obviously, as the stress level decreased, the incidence of recurrent aphthous stomatitis decreased. For this reason, the students depending on chewing gum as a way to reduce stress can indirectly lower the incidence of the undesired side effect related to exam time which is (aphthous stomatitis). As the current study results revealed, the participants who used chewing gum all the time and between classes, are less to suffer from the RAS. The majority of them either never complained about RAS, or have an occasional (once a year or less) incidence.

An interesting study by Choi et al concluded that oral problems are a part of stress responses.⁸ In addition, a study by Singh et al found that Yoga plays a role in the promotion of oral health, due to its role in reducing stress and improving the well-being of individuals.¹⁹

Moreover, chewing gum may also stimulate salivary flow, which can help to neutralized acids in the mouth and promote oral health. The increase in the saliva flow has a beneficial effect on the irritation and inflammation reduction in the oral cavity, which in turn contributes to RAS reduction. An exciting study by Zunt, evaluated such correlation between the salivary flow rates and the occurrence of RAS. The study concluded that the reduction in the unstimulated salivary flow rate due to hypofunction of the salivary gland correlates with the RAS.²⁰

The application of stress distraction measures could be a good strategy to overcome many stresses related to oral and general health problems, such as recurrent aphthous stomatitis.

CONCLUSION

University life is a stressful environment and students should be aware of the potential connection between stress and the occurrence of aphthous stomatitis. Using chewing gum as a stress distraction technique, students can minimize the likelihood of developing a painful canker sore. It is obligatory to optimise the overall oral health and focus on academic and personal growth without unnecessary discomfort.

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