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Association of Aphthous Ulceration with Psychological Stress During Exams Among Dental Students of HITEC-IMS

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ABSTRACT

Background: Recurrent aphthous stomatitis (RAS) is one of the most common mucosal disorders of the mouth. The exact etiology of aphthous ulcer is uncertain, but precipitated factors include stress, trauma, food sensitivity etc. The aim of this study was to find prevalence of aphthous ulceration and its association with psychological stress during exams among dental students of HITEC-IMS, Taxila.

Methodology: A cross sectional study was conducted among 130 undergraduate dental students. The data were collected using questionnaires in two sections-1) Prevalence of occurrence of RAS was assessed by using a self reported questionnaire and 2) Stress factor was assessed by using perceived stress scale.

Results: This study was carried out in 130 under graduate BDS students out of which 70% (91) experienced aphthous ulcer. 44 out of a total of 91 students with aphthous ulcer had moderate stress and 27 had severe stress. Perceived stress scores were considerably high in final year dental students (61.1%) ($p=0.000$). Among the student cohorts, final year BDS students were highly affected than others, which is statistically significant.

Conclusion: This study confirms a significant association between psychological stress, especially during exams, and the occurrence of recurrent aphthous stomatitis (RAS) among dental students. Final-year students, who reported higher stress levels, exhibited a greater prevalence of RAS, indicating the impact of academic pressures. Addressing stress management in dental education could benefit students' overall health and reduce the incidence of RAS, promoting better well-being and academic performance among future dentists.

Keywords: Recurrent aphthous stomatitis; oral ulcer; stress during exams; dental students; canker sore

Introduction

The term aphthous comes from the Greek word “aphtha”, meaning ulcer. Aphthous ulcers or recurrent aphthous stomatitis (RAS) are benign ulcerated, painful, shallow round ulcers with an erythematous halo covered by a yellowish-gray fibromembranous layer lesions commonly found in the oral cavity, with uncertain etiology, still controversial treatment and a differential diagnosis that requires attention and clinical experience [1].

The estimated prevalence of oral ulcers worldwide is 4%, with aphthous ulcers being the most common, affecting as many as 25% of the population worldwide. RAS occurs usually in the non-keratinized areas like lips, ventral surface of the tongue, buccal mucosa, floor of the mouth and soft palate [2].

Stanley classified RAS into 3 types- Minor, Major and Herpetiform ulcers. 80% of RAS are minor RAS or mild aphthous ulcers. They are small ulcers of 8-10mm size, 1 to 5 in number, affecting nonkeratinized mucosa and heals in 10-14 days without scarring. Major aphthous ulcers (10-15% of RAS) are larger than minor ones (>1cm) and may involve the keratinized oral mucosa such as the hard palate, fauces etc. They may take up to 6 weeks to heal and often leave a scar. In Herpetiform ulceration, there are groups of small ulcers more than 10, may be up to 100 in number of 1-3mm in diameter and last for about 10-14 days and heal without scarring [3].

RAS does not have a clear etiology. The development of recurrence can be related to 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 [4]. Studies of Ship *et al.* [5] and Miller *et al.* [6] showed association between RAS and stress whereas studies of Ferguson *et al.* [7] and Heft and Wray [8] did not show any association between them. Studies reveal an increased prevalence of RAS in students and also with higher level of education. This finding supports the role of stress and anxiety in occurrence of RAS among educated patients, especially during the time of examination.

The role of stress that results in RAS episodes is still unclear. Onset of ulcer may be attributed to the elevated levels of salivary cortisol or reactive oxygen species in the saliva. Stress can also lead to cheek or lip bite, or aggravate actions causing injury to the oral mucosa. The symptoms caused by RAS, such as pain during speaking, eating, and swallowing; discomfort; impairment in food and liquid intake; and can deeply affect the oral health-related quality of life of patients [9].

This cross sectional study was conducted to estimate the prevalence of aphthous ulcers among undergraduate dental students of Dental College HITEC-IMS, Taxila and to find out its association with psychological stress during exams.

Materials and Methods

This cross - sectional study was carried out among 18-22 year old First, second, third year and final year undergraduate students of Dental College HITEC-IMS, Taxila from January 2023 to January 2024. The ethical clearance for the present study was obtained from the Ethical Review Committee. An informed consent was obtained from all the willing participants. The data was collected using simple random sampling technique and a total of 130 students were finalized after fulfilling the inclusion and exclusion criteria. Students suffering from systemic diseases, taking medications like steroids that leads to immunosuppression, consuming spicy food frequently, with orthodontic appliances, female students having menstrual disturbances. Students diagnosed with psychological stress, depression or any other related condition and any parafunctional habit were excluded.

The entire study sample was informed about the principles of the study and appealed to fill up the questionnaires which were circulated by investigator. The data was collected in two stages using validated, self-reported questionnaires comprising to avoid biasness of results (first time the entire study population was asked to fill in the questionnaires' during normal academic session, those suffering from any level of stress were excluded from the study. Then both parts of questionnaires were filled

First part included personal details and second part recorded details related to aphthous ulcers such as history of ulcer, prognosis period and site of ulcer. Interrogations regarding the presence of frequent oral ulcers and questions regarding the life style, stress factors, anxiety level, health and medications taken observed by the subjects were assessed.

Stress factor of the undergraduate students was assessed using Perceived stress scale [10]. The Perceived Stress Scale (PSS) is the most widely used psychological instrument for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress. The items are easy to understand, and the response alternatives are simple to grasp. The questions in the PSS ask about feelings and thoughts during the last month. PSS included of 14 items with answers varying from never to sometimes, fairly often and very often on the basis of the occurrence. The scale produces a single score with high and low scores indicating higher and lower levels of stress. The PSS-14 has a probable range from 0 to 56 scores.

The data was analyzed using SPSS version 21 software. Differences in proportions were compared using the Chi square test. Mean stress scores versus gender and professional years was calculated with Student's *t*-test and ANOVA respectively. Binary logistic regression analysis to evaluate the influence of the different stress levels on RAS. The level of significance was set at $P < 0.05$.

Results

Out of a total 130 students, there were 19 males and 111 females from all four BDS undergraduate academic years. A total of 32 students participated from 1st year BDS and 3rd year BDS, 30 students from 2nd year BDS and 36 students from final year BDS.

Buccal mucosa (41) was the most frequently involved reported site for aphthous ulceration followed by labial mucosa (40) in this study population. Most students reported the frequency of aphthous ulceration to be every 3 months (61.5%), this could be linked to psychological stress during exams as these students have their term exams every 03 months.

It was observed (Figure 1) that among a total of 91 students reported with aphthous ulceration 44 students suffered from moderate level of psychological stress during exams and 27 suffered from a high level of psychological stress during exams. On contrary students not experiencing aphthous ulceration mostly suffered from a low level of psychological stress during exams. Thus, proving psychological stress during exam to be one of the factor to cause aphthous ulceration or vice versa.

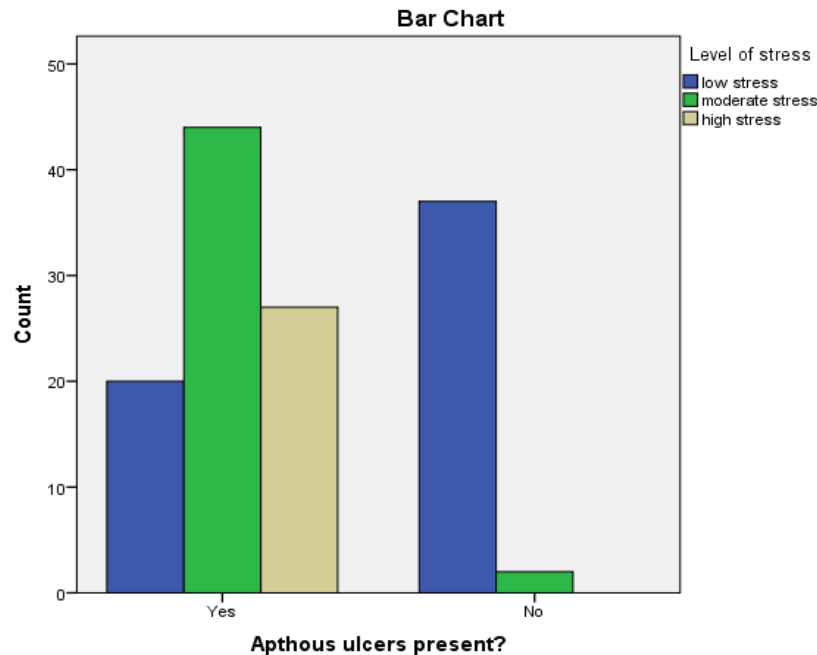


Figure 1: Association of apthous ulceration with psychological stress during exams.

The study results also showed that final year BDS students were mostly suffering from a high level of psychological stress during exams (Figure 2) with a statistically significant p value = 0.000, as well as greater percentage of apthous ulceration (Figure 3) with a p value of 0.056 compared to rest of three BDS undergraduate academic years. The possible explanation could be increased course content per term exam as well as enhanced pressure to complete clinical quota per departmental rotation which comprise advanced level treatment and increased number of patients to be treated by each final year BDS student within a defined duration of academic calendar compared to rest three years.

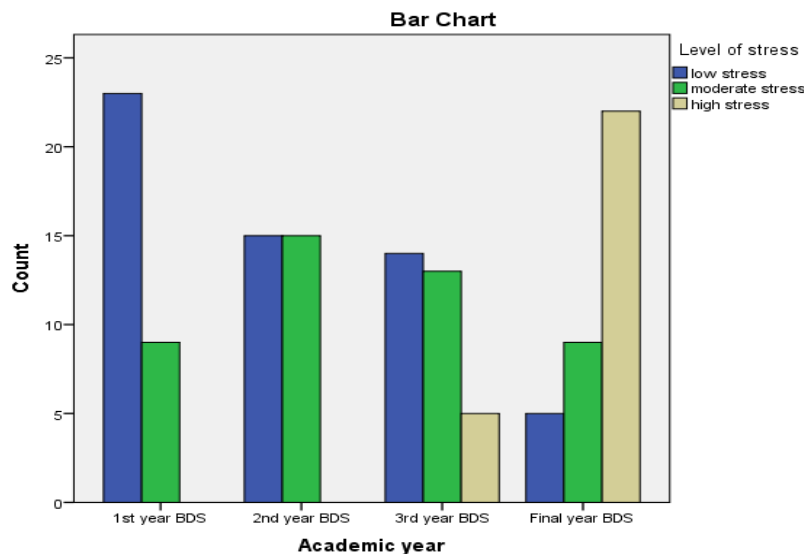


Figure 2: Association of undergraduate BDS academic years and psychological stress during examination.

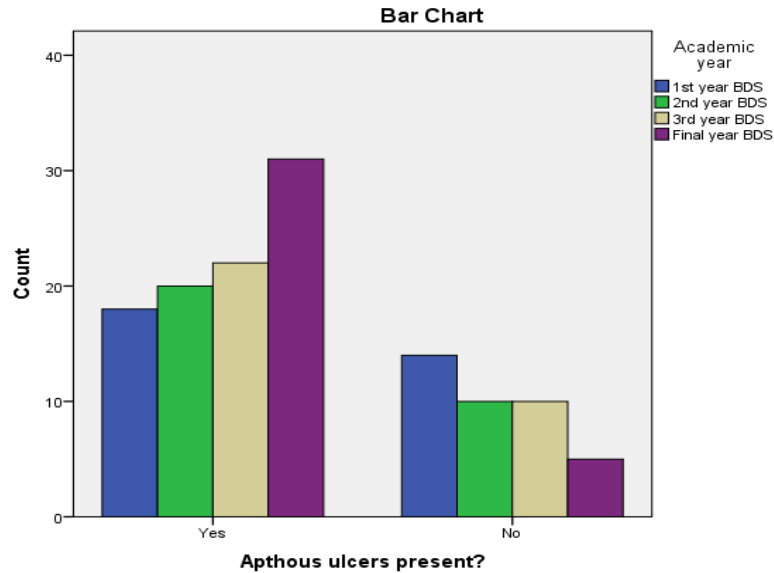


Figure 3: Association of aphthous ulceration during exams with undergraduate BDS academic years

Table 1: gender distribution

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	19	14.6	14.6	14.6
	female	111	85.4	85.4	100.0
	Total	130	100.0	100.0	

Table 2: of participants from each academic year

Academic year		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1st year BDS	32	24.6	24.6	24.6
	2nd year BDS	30	23.1	23.1	47.7
	3rd year BDS	32	24.6	24.6	72.3
	Final year BDS	36	27.7	27.7	100.0
	Total	130	100.0	100.0	

Table 3: Frequency of apthous ulceration

How often do you suffer from oral ulcers?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	every month	7	5.4	5.4	5.4
	every 2 months	36	27.7	27.7	33.1
	every 3 months	80	61.5	61.5	94.6
	every 6-12 months	7	5.4	5.4	100.0
	Total	130	100.0	100.0	

Table 4: Sites of occurrence of apthous ulceration reported

Site of apthous ulcers?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	40	30.8	30.8	30.8
	Tongue	1	.8	.8	31.5
	Palate	7	5.4	5.4	36.9
	Buccal mucosa	41	31.5	31.5	68.5
	Labial mucosa	40	30.8	30.8	99.2
	Floor of the mouth	1	.8	.8	100.0
	Total	130	100.0	100.0	

Discussion

The prevalence of apthous stomatitis in the present study was 61% and similar results were obtained by Maheswaran *et al.* [11] among the students of a dental institution in south India. Studies of Handa *et al.* [12] from Jaipur reported a prevalence of 26%. Studies from other parts of the world such as Japan [13], Sulaimani City [14], Iran [15] and Turkey 16 reported prevalence rates of 31%, 28.2%, 25.2% and 25.5% respectively.

As our study population was undergraduate dental students, we can attribute this high prevalence rate of apthous ulcer in this study to stress because compared to other professional courses dental students endure more stress due to the nature of the dental curriculum and work load. Ship JA [17] reported frequency of RAS as 66.9% and Donatsky O [18] mentioned as 66% among Danish dental students. In this study 41% (41 students) of the students were under high stress as indicated by the high PSS score. (Figure 2)

There are a number of studies suggesting association of anxiety, depression, and psychological stress with RAS. Huling LB, [19] recorded daily stress of events in 160 cases of patients of RAS and observed that stressful events may lead to initiation of new RAS episodes. On the contrary study of Pedersen A [20] on 22 patients found no association between stress and RAS and concluded that standardized circumstances are needed to demonstrate such associations using increased keratinization of the oral mucosa.

There are studies showing the role of stress in the development of RAS especially in those who have an underlying anxiety trait. A report by Kasi PM *et al.* in 2007 showed that significant levels of stress were identified among medical graduates, which led to their management of stress using

negative coping mechanisms [21]. As a result of stress habits like biting the cheeks and lips may develop which will injure the oral mucosa and cause oral ulcers.

In the present study 51% of female students were affected by RAS. The findings were similar to study by Safadi in Jordanian dental patients [22]. In addition to this Patil *et al.* 9 also reported that females (56.3%) were more habitually affected compared to males (43.7%) and the results were statistically significant. It could be due to more level of stress among females due to emotional conditions which can have an effect on their immune response. Also, hormonal changes during pregnancy and menstruation also have an impact on stress. 9 On contrary to this Rao *et al.* found that males had higher Recurrent aphthous stomatitis (87%) compared to females (74%) [23].

Among the participants, females had higher RAS prevalence compared to males, which is similar to study reported by Handa *et al.*, where females are more commonly affected than males. 12 The Mean stress scores of females were more compared to males in this study were similar to study reported by Singh *et al.* [24] in which female nursing students perceived more stress than male students.

In the present study even though there was increased stress among dental students we could not find a difference in stress experienced between 1st year, 2nd year and 3rd year BDS students. This is in contrary to the studies of Handa *et al.* and Singh *et al.* who reported that higher class students felt more stress when compared to juniors. The reason for increased stress among 1st year students may be because first year is a transitional period from school to professional education and they are finding it difficult to cope up with the vast curriculum.

In the present study majority of the participants (53) were having ulcers during each episode lasting for less than 10 days. Similar observations were seen in the study of Safadi in 2009 in a study on Jordanian dental students who noticed that two – thirds of the subjects, ulcers lasted for less than a week. [22].

In our study 54 had some kind of medical problem and 63 were on medications not related to ulcer treatment. Some medical conditions and medications are important factors in the occurrence of the ulcer [25]. This study didn't record the location of the ulcers.

The Perceived Stress Scale (PSS) in the present study stated that stress level is positively correlated with RAS. Correspondingly Rao *et al.* [23]. stated that existence of stress adds to the chances of having RAS by 3.1 times. Similarly, Gallo *et al.* [26] observed that patients with recurrent aphthous stomatitis exhibited high level of stress than the control group.

Conclusion

This study has outlined the factors involved in prevalence of recurrent aphthous stomatitis and its association with stress and reported the observational methods that can be enlisted to decrease the stress among dental students but also improve their academic performance. The current data can assist in premeditated planning to ensure wellbeing for future dentists. When we evaluated with modified perceived stress scores (PSS), we found a significant association between stress and aphthous ulcer which was confirming the above said finding.

This study suggested impact of psychological factors such as anxiety, stress and depression on the quality of life of RAS patients. Although depression and anxiety levels were comparable to normal individuals, but psychological stress was found to be an important trigger factor for the initiation of recurrent ulcers.

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