

# A Study on Aphthous Ulcer and its Association with Stress among Medical Students of an Indian Medical Institution

Shiny George<sup>1</sup>, Biju Baby Joseph<sup>2</sup>

## ABSTRACT

**Introduction:** Aphthous ulcer or Recurrent aphthous stomatitis 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, and genetic predisposition. Previous studies have suggested that stress and anxiety have a role in the onset and recurrence of aphthous ulcers. Study was aimed to estimate the prevalence of Aphthous ulcer among medical students and to find out its association with stress.

**Material and methods:** A cross sectional study on 106 medical students of an institution in Kerala was carried out. It was a questionnaire based study. Questionnaire contained questions about aphthous ulcers and questions on perceived stress by modified perceived stress scale. Statistical analysis was done using SPSS 20. Student t test and chi square test were used and a p value of <0.05 was taken as significant.

**Result:** The prevalence of aphthous ulcers among medical students was high (62.3%). Family history was significant among the ulcer experienced group (p=0.004). Perceived stress scores were high among the medical students especially among the ulcer experienced group (p=0.001). 49 students (46.2%) were under high stress out of which 39 were with ulcer.

**Conclusion:** Medical students show a high prevalence of aphthous ulcers. Study revealed that they are having increased stress which is more so in the ulcer experienced group which indicates that stress may be the precipitating factor for aphthous ulcer in the vulnerable group.

**Keywords:** Aphthous ulcer, Recurrent aphthous stomatitis, Perceived stress

## INTRODUCTION

Aphthous ulcers or recurrent aphthous stomatitis (RAS) are common inflammatory lesions of the oral mucosa. 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.<sup>1</sup>

RAS occurs usually in the non-keratinized areas like lips, ventral surface of the tongue, buccal mucosa, floor of the mouth and soft palate.<sup>2</sup> They are usually painful, shallow round ulcers with an erythematous halo covered by a yellowish-gray fibromembranous layer.<sup>3</sup> Stanley classified RAS into 3 types.<sup>4</sup> 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 nonkeratinised oral mucosa and heal in 10-14 days without scarring. Major aphthous ulcers (10-15% of RAS) are larger than minor ones (>1cm) and may involve the keratinised 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. These ulcers may coalesce to form large ulcers and last for about

10-14 days and most of them heal without scarring even though they have a potential to scar.<sup>3</sup> This variant is commonly seen in women and has a late onset when compared to other variants.<sup>5</sup> The etiology of RAS is uncertain, and both environmental and genetic factors are indicated. The precipitating factors include stress, physical or chemical trauma, infection, allergy, genetic predisposition, or nutritional deficiencies.<sup>6,7</sup> Studies of Ship et al<sup>8</sup> and Miller et al<sup>9</sup> showed association between RAS and stress whereas studies of Ferguson et al<sup>10</sup> and Heft and Wray<sup>11</sup> 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.

How the stress causing RAS is not fully understood. It has been suggested that increased levels of salivary cortisol or of reactive oxygen species in the saliva initiates the lesions.<sup>12,13</sup> A genetic alteration of pathways linked to stressful responses may also be involved.<sup>14</sup> RAS has also been linked to immune system changes, namely the modifications that affect multiple immune system components like the distribution, proliferation and activity of lymphocytes and natural killer cells, phagocytosis, and production of cytokines and antibodies which may partially explain the role of stress in the etiology of RAS.<sup>13,14</sup>

Study was aimed to estimate the prevalence of Aphthous ulcer among medical students and to find out its association with stress

## MATERIAL AND METHODS

A cross-sectional study was carried out among 106 medical students of Azeezia Institute of Medical Sciences and Research, who are about to complete their first and second year of MBBS. The study was conducted in March 2015. After getting ethical clearance, an informed consent was taken from the participants and sampling was done using systematic random sampling method. Those students who were having serious systemic illnesses or taking medication which causes immunosuppression like steroids were excluded from the study. The data were collected using questionnaires. The questionnaires had two

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sections. The first section contained personal information and questions related to aphthous ulcers, such as ulcer experience, number of episodes in the last 1 year, number of ulcers in each episode, duration of each episode, site of ulcer, symptoms and remedial measures, associated conditions, self-reported periods of stress, tobacco consumption and family history.

The second part dealt with 10 questions about perceived stress using a modified perceived stress scale (PSS) by Cohen.<sup>15</sup> It consists of four positively stated items (items 4, 5, 7, and 8), the responses of which are reversed (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 and 4 = 0) and they are added to the responses of the rest of the items which gives an overall stress score. Stress scores in those with or without aphthous ulcers were compared.

## STATISTICAL ANALYSIS

Statistical analysis was done using student t test and Chi square test with the SPSS 20 version software.

## RESULTS

Study was carried out in 106 medical students out of which 62.3% (66 students) reported that they had experienced oral ulceration (Figure-1).

Among those who complained of ulcer episodes, 14 were suffering at the time of the study, 11 of them had ulcer 1 month back, 16 of them between 3 and 6 months and 25 of them had more than 6 months back (table-1). Frequency of ulceration was once in 6 months for majority (37) and the rest used to experience it on once in a month to once in 3 months duration (table-1). Majority (56) were having a single ulcer during each episode and lasting for 3-5 days (41). Predominant area of occurrence was cheek (33) followed by lips and gums (12 each). Slight (41.6%) to moderate pain (37%) was frequently observed. Majority of the participants did not take any medication (38) whereas a good proportion (20) had used vitamins and topical gels and very few had sought some home remedies (8). None of them were exposed to tobacco in any form. Positive family history was reported by about 19% of the study participants which was statistically very significant ( $p=0.004$ ). Out of the 66 participants who experienced ulcer, 43 were females and 23 were males. It did not show any significance statistically ( $p=0.805$ ). Among the 106 participants, 78 reported to have some form of stress out of which 24 (15 with ulcer and 9 without ulcer) had exam as the main cause of stress. For 9 (6 with ulcer and 3 without ulcer) of them change of food, 6 (5 with and 1 without ulcer) of them loss of near and dear ones and 24 (19 with and 5 without

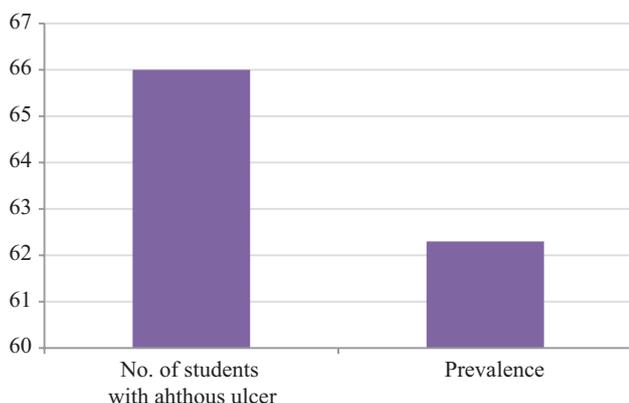


Figure-1: Prevalence of aphthous ulcer among medical students

ulcer) of them 2 or more of these were the causes of stress. For 16 of them none of the above mentioned were the cause for the stress (figure-2). There was no statistical significance noted between self reported stress among ulcer-experienced and ulcer-nonexperienced individuals ( $p=0.337$ ). Statistical analysis did not show any significance between ulcer and cause of stress ( $p=0.092$ ). 21 students with ulcer reported to have an associated vitamin deficiency and 4 of them had associated fever and gastric ulcer 2 had skin problems. But in majority of them (31 with ulcer and 28 without ulcer) it was not associated with any other conditions. On statistical analysis it was found significant with a p value of 0.008 which indicates that aphthous ulcer is not associated with any other conditions. When PSS scores of ulcer experienced individuals were compared with that of ulcer-nonexperienced group, it was statistically very significant

Factors associated with aphthous ulcers			
Aphthous Ulcer experience		Number	%
Time of last ulcer	Experiencing presently	14	13.2
	1 month	11	10.4
	3 months	8	7.5
	6 months	8	7.5
	>6 months	25	23.6
Frequency of ulceration	Once in a month	15	14.2
	Once in 3 months	14	13.2
	Once in 6 months	37	34.9
No. in each episode	1	56	52.8
	3-6	9	8.5
	>6	1	0.9
Duration of the ulcer	0-2 days	18	17.0
	3-5 days	41	38.7
	6-10 days	7	6.6
Area of occurrence	lips	12	11.3
	cheek	33	31.1
	gums	12	11.3
	tongue	2	1.9
	Multiple areas	7	6.6
Medication	Vitamins/topical gels	20	18.9
	Home remedy	8	7.5
	No medication	78	73.6
Associated with any condition	Fever	4	3.8
	Skin problems	2	1.9
	Gastric ulcer	4	3.8
	Repeated infections	1	0.9
	Vitamin deficiency	21	19.8
	Diabetes mellitus	0	0
	Hormonal change	0	0
	Trauma	0	0
	Other conditions	2	1.9
	none	31	29.2
Family history	Yes	18	17.0
	No	48	45.3
Associated with stress	Yes	51	48.1
	No	14	13.2
Form of stress	exam	24	22.6
	Loss of near and dear ones	6	5.7
	Change in food	9	8.5
	Others	16	15.1
	Multiple reasons	24	22.6

Table-1: Factors associated with aphthous ulcers

( $p=0.001$ ) which showed that the perceived stress scores were high among the medical students especially among the ulcer experienced group. 49 students (46.2%) were under high stress according to perceived stress scale out of which 39 were with ulcer. 40 students (37.7%) had stress in the average range, but among them 21 were with ulcer and 19 without ulcer (figure-3).

## DISCUSSION

In the present study the prevalence of aphthous stomatitis was 62.3% (figure-1). Similar studies have been reported from India as well as other countries. Studies of Handa et al from Jaipur reported a prevalence of 26% and a study of Naito et al from Japan revealed a prevalence of 31%.<sup>16,17</sup>

As our study population was medical students, we can attribute this high prevalence rate of aphthous ulcer in this study to stress because compared to other professional courses medical students endure more stress due to the nature of the medical curriculum. Apart from that students appear to be under some stress due to the fear of impending exams or compulsion to complete assignments given. In this study 46.2% (49 students) of the students were under high stress as indicated by the high PSS score (figure-3). There are a number of studies suggesting association of anxiety, depression, and psychological stress with RAS.<sup>9,18,19</sup> Huling LB, recorded daily stress of events in 160 cases of patients of RAU through telephone follow-up,<sup>13</sup> which found that stressful events may involved in initiation of new RAS episodes. On the contrary study of Pedersen A on 22 patients in 1989 found no association between stress and RAU and concluded that standardized circumstances are needed to demonstrate such associations using increased keratinization of the oral mucosa.<sup>20</sup>

There are studies showing the role of stress in the development of RAS especially in those who have an underlying anxiety trait.<sup>12,21,22</sup> 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.<sup>23</sup> 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 our study none of the students reported to be using tobacco. This is not completely reliable because the students may not have revealed the history of smoking for fear of scrutiny by faculty. It has been suggested that cigarette smoking prevents aphthous ulcers, and it has been proposed that a component of tobacco which is systemically absorbed might be responsible for protecting against aphthous ulcer. Smokeless tobacco was found to be protective, suggesting nicotine as the protective factor.<sup>24</sup>

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.<sup>16</sup> The Mean stress scores of females were more compared to males in this study, which is similar to study reported by Singh et al<sup>25</sup> in which female nursing students perceived more stress than male students.

In the present study even though there was increased stress among medical students we could not find a difference in stress experienced between first year and 2<sup>nd</sup> year MBBS students. This is in contrary to the studies of Handa et al<sup>16</sup> and Singh et

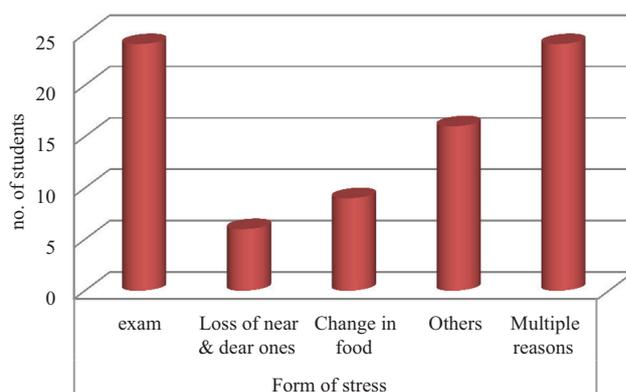


Figure-2: Form of stress among medical students with aphthous ulcers

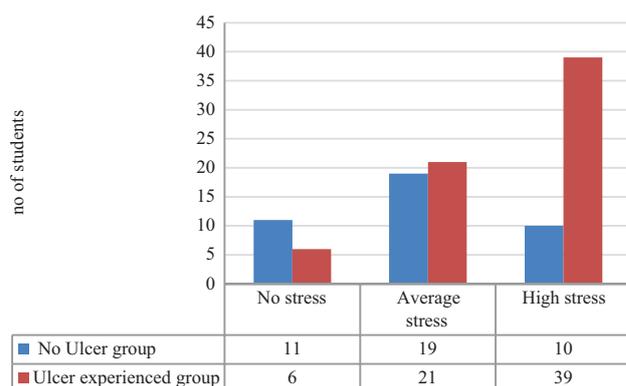


Figure-3: Relation between aphthous ulcer and stress according to PSS score

al<sup>25</sup> who reported that higher class students felt more stress when compared to juniors. The reason for increased stress among 1<sup>st</sup> 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.

Recurrent aphthous ulcers occur commonly on areas like the buccal mucosa and labial mucosa, floor of the mouth, ventral surface of the tongue and soft palate.<sup>26</sup> In majority of the participants (33) of the present study, the ulcer was observed on the cheeks. Majority (56) were having a single ulcer during each episode and lasting for 3-5 days (41 students). 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.<sup>27</sup>

In our study 38 of them did not take any treatment measures. But a good proportion of the participants (20) were resorted to the vitamin supplements and topical gels as majority of the clinicians prescribe these during ulcer episodes and a few of them the home remedies (table-1). A statistically significant relation was seen between family history and ulcer ( $p=0.004$ ). It has been proposed that patients with a positive family history of RAS may develop oral ulcers at an earlier age and have more severe symptoms than those with no such history.<sup>28,29</sup> We should aim to decrease the symptoms when treating and also to prolong duration of ulcer free periods. Patients should also be advised to maintain good daily oral hygiene. Measures should be taken to decrease the stress among medical students which not only decrease their suffering but also improve their academic performance.

## CONCLUSION

In this study we found that prevalence of apthous ulcers was high among medical students and the self reported stress was also very high among them. When we evaluated with modified perceived stress scores (PSS), we found a significant association between stress and apthous ulcer which was confirming the above said finding. As it is clear about the high stress among medical students, some interventions are required to reduce the stress among medical students.

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