

# Prevalence of Psychosomatic Disorders Among Dental Students with Recurrent Aphthous Stomatitis. A Cross-Sectional Study.

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## Research

**Keywords:** Psychosomatic disorders, RAS, DASS 21, Dental Students, Depression, Anxiety, Stress

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# Abstract

## Aims

To determine the prevalence of psychosomatic disorders among dental students with recurrent aphthous stomatitis.

## Method

A cross-sectional study was performed on 184 dental students with recurrent aphthous stomatitis (RAS). A p-value cut off point of 0.05 at 95% confident interval (CI) was used to determine statistical significance. Descriptive and inferential statistics were conducted where frequency and proportion were used, to present all categorical variables. Depression, Anxiety, Stress Scale questionnaires were used to assess the depression, anxiety, and stress of RAS dental students. The analysis assessed the relationship between RAS among socio-demographic characteristics of depression, anxiety, and stress by using a chi-square test.

## Results

The prevalence of depression was dominant among dental students at 62.5%. More than half of the respondents (58.2%) were anxious, whereas the prevalence of stress was lower i.e. 40.2%. There was no significant relationship found between depression and RAS ( $p > 0.05$ ).

## Conclusion

Age group in years and number of ulcers in each occurrence were statistically associated for anxiety and stress, and gender was also significant to anxiety. There was no significant relationship found between depression and RAS.

## Introduction

Body and mind complement each other and work as a unit. Most diseases are psychosomatic and involve the mind and body. Each physical disease has a mental component, and how an individual reacts and copes with it varies significantly.<sup>1,2</sup> The mouth signifies an organ of the expression of certain “instinctual” cravings and is charged with a high psychologic potential. The direct or indirect expression of emotions or conflicts may be the cause of certain diseases that affect the oral mucosa. Oral diseases with psychosomatic etiology have long been known in medicine, and mental or emotional factors may act as risk factors that may influence the beginning and development of oromucosal diseases.<sup>3,4,5</sup>

The relationship between the two is explained by two hypotheses: (1) A specific hypothesis states that expression of a predetermined disease or illness occurs due to a certain stimulus or conflicts or stressors. The heightened response of the body that persists even after the cessation of a stimulus evoked the change and eventually results in a disease. (2) A nonspecific hypothesis states that generalized stress

creates preconditions for a number of not necessarily predetermined diseases. According to this hypothesis, four varieties of reactions occur due to stress viz., healthy normal, neurotic, psychotic, and psychosomatic.<sup>4</sup>

Many authors have explained that life exists by maintaining homeostasis that is constantly confronted by intrinsic and extrinsic forces such as stressors. Favorable conditions improve the growth, development, and survival of the species. By contrast, the beginning of stress occurs during threatening situations, which are beyond the normal control of an individual, and may cause in dysphoria and finally emotional or somatic disease.<sup>6,7,8</sup> The stress response triggers the autonomic nervous system, mostly sympathetic, through the hypothalamic–pituitary–adrenal (HPA) axis, which secretes corticotropin-releasing factor (CRF) and arginine–vasopressin (AVP), leading to release of adrenocorticotrophic hormone (ACTH), enkephalins, and endorphins. Thus, the stress-response function acts through a positive, bidirectional feedback loop.<sup>9</sup> CRH and AVP are secreted in a circadian, pulsatile manner with approximately 2 to 3 secretory episodes per hour in non-stressful situations. In resting conditions, it peaks in early morning and progressively decreases as the day progresses. Diurnal variations are disrupted during stressful situations. The pulsations of CRH and AVP are improved during acute stress, resulting in increased ACTH and cortisol. Various other factors are also released in response to stress, such as angiotensin II, various cytokines, and lipid mediators of inflammation, which act on various components of the HPA axis, potentiating its activity.<sup>10</sup>

Therefore, the aim of the study is to determine the prevalence of psychosomatic disorders among dental students with recurrent aphthous stomatitis and its level of association.

## **Materials And Methods**

### **Ethical Approval**

The study was registered with the research center, and ethical approval was obtained from the institutional review board (IRB) of Riyadh Elm University (REU). The research registration number was **FPGRP/43737001/267**.

### **Study Population**

The cross-sectional study targeted the dental students registered at Riyadh Elm University (REU) at all levels (undergraduate, post graduate, and interns). For this, a structured questionnaire was sent randomly by email to all targeted population. The number of respondents was 184, and the response rate was 73.6%.

The exclusion criteria were subjects with special needs, pregnant women, epileptic subjects, subjects with a clinical history of psychosomatic alterations or treatment with psychoactive drugs, and individuals with history of oral surgery (except exodontia, implants, and impactions).

## Data collection

Informed consent form and electronic questionnaire were distributed randomly by official administration email through the postgraduate office of REU. The questionnaires had three sections. The first section included demographic data including age, gender, education level, marital status. The second section contained personal information and questions related to Recurrent Aphthous Stomatitis (RAS).<sup>11</sup> In RAS section, the subjects were asked to report the time of last ulcer experience, the frequency of the ulcer, the number of ulcers in each occurrence, and to determine the area of occurrence.

The third section evaluated the aspects of depression, anxiety, and stress applying the Depression, Anxiety, Stress Scale (DASS 21).<sup>12</sup> The DASS 21 is a 21-item self-report questionnaire designed to measure the severity of a range of symptoms common to both depression, anxiety, and stress. The essential function of the DASS is to assess the severity of the core symptoms of depression, anxiety, and stress. Many studies among different populations confirmed that the DASS is comprehensible and sensitive to detecting common mental disorders<sup>13</sup>, and is a reliable and valid method of assessing features of depression, anxiety, and tension-stress<sup>14</sup>.

## Statistical analysis

The data analysis was performed by using Statistical Packages for Social Sciences version 21. Level of significance was set at  $< 0.05$ . Descriptive and inferential statistics were used. Frequency and proportion were used to present all categorical variables. DASS 21 was used as questionnaires to assess the depression, anxiety, and stress of dental students with RAS. Based on the given criteria, the answer options for each question was from 0 = Did not apply to me at all, 1 = Applied to me to some degree or some of the time, 2 = Applied to me to a considerable degree, or a good part of time, 3 = Applied to me very much, or most of the time.

DASS 21 was divided into three equal parts for depression, anxiety, and stress (seven questions each), each predictor has an equal total score of 21 points, and the summed score was multiplied by 2 to obtain a total score of 42 points<sup>12</sup>. Normal categories (not depressed, not anxious, not stressed) were classified by the score range of 0 to 9 and categories with a mental disorder (depressed, anxious, stressed) were classified by the score range of 10 to 42 or from mild to extremely severe. The analyses assessed the relationship between RAS among sociodemographic characteristics and DAS by using a chi-square test.

## Results

There were 184 dental students that voluntarily enrolled in this study. Age range was from 20 to 54 year. Of the 184 respondents, 55.4% were female and the remainder was males. Of the participants, 37% were post graduate students, followed by clinical level students (28.8%), interns (17.4%), and pre-clinical students (16.8%). The majority of the group were single (64.1%) compared with married (35.9%). Regarding time of last ulcer, 57.1% occurred more than 6 months previously, 9.8% occurred 6 months

previously, 12% occurred within the last 3 months, 12.5% occurred in the previous month, and 8.7% presently occurred. Many respondents had recurrence of ulceration once in more than 6 months previously (66.3%), followed by once in 6 months previously (13.6%), and the remaining had a single recurrence once in 3 months and once in 1 month. Additionally, 79.9% of the respondents had a one-time recurrence, 13% had a recurrence three to six times, and 7.1% had a recurrence more than six times, and the most common areas in ascending order were lips, cheek, gingiva, and tongue, including multiple areas (**Table 1**).

The prevalence of DAS among dental students is presented in (**Table 2**). Based on the DASS 21 assessment, the majority of the respondents had normal results for depression, anxiety, and stress (Fig. 1). Notably, depression was dominant among dental students and accounted for 115 (62.5%), and no depression was relatively less, 69 (37.5%). The criteria for anxiety was identical to that of depression (anxious = 10–42, not anxious = 0–9 points) and the result revealed that more than a half of the respondents were anxious 58.2% (107) compared with not anxious with 41.8% (77), whereas the prevalence of stress followed the same pattern (stressed = 10–42, not stressed 0–9 points) where it was found that “stressed” was lower, 74 (40.2%), compared to “without stress”, 110 (59.8%).

In the relationship between DAS among sociodemographic characteristics and RAS, a significant difference was found at the level of anxiety ( $p=0.029$ ) and level of stress ( $p=0.026$ ) among age groups in years, but no statistical difference on level of depression ( $p=0.0236$ ) was observed. Gender was statistically significant at the level of anxiety ( $p=0.004$ ); however, no relationship was found at level of depression ( $p=0.193$ ) and level of stress ( $p=0.132$ ). Number of ulcers in each occurrence shows a significant relationship for level of anxiety ( $p=0.014$ ) and level of stress ( $p=0.007$ ) but negative for the level of depression ( $p=0.077$ ). There was also found a negative relationship at the level of DAS for the following variables: educational level, marital status, time of last ulcer, and frequency of ulceration (**Table 3**).

## Discussion

The current study investigated RAS and its association with psychosomatic disorders. The findings have thus contributed to articles that have investigated the phenomena of this oral mucosal condition. Contemporary literature have associated RAS with different symptoms and with psychological factors. In this study, we aimed to analyze psychological factors and how they affected patients with RAS; thereby establishing the level of association between RAS and Psychosomatic disorder.

### Depression Associated with RAS

Some investigators have theorized that stress during student life is a major factor in RAS, although the difference in age groups should be considered as well<sup>15</sup>. Depression, anxiety, and stress (DAS) are psychosomatic disorders that have a significant influence on RAS are elaborated on in this study. Incidence of depression among dental students in this study was high (62.5%). The prevalence of

depression among patients with RAS had also been discussed<sup>16,17,18</sup>. Ajmal et.al.<sup>16</sup> published "Prevalence and Psychological Stress in Recurrent Aphthous Stomatitis among Female Dental Students in Saudi Arabia." and analyzed depression and anxiety of dental students using the Hospital Anxiety and Depression Scale (HADS) questionnaire. They reported that 65% of the students had depression, which was comparable to the finding in this study.

### **Anxiety Associated with RAS**

Moreover, another crucial member of psychosomatic illness is anxiety. In this study, more than half of the respondents were anxious, 58.2%. This finding is consistent with papers published locally and abroad<sup>17-24</sup>. The highest rates of anxiety disorder among patients with RAS was reported by Ajmal et.al.<sup>16</sup> They reported 88% of the female dental students were suffering from anxiety, which was far off distant compared with the finding of this study. Notably, a study from Croatia registered the lowest prevalence of anxiety, 26.5%.<sup>19</sup> Additionally, Alrashdan and Alkhader<sup>21</sup> observed that patients with persistent RAS often had elevated anxiety levels.

### **Stress Associated with RAS**

Stress resulting from student life may be the precipitating factor for the higher prevalence of RAS in a cohort of professional students.<sup>25</sup> The prevalence of stress in this study was 40.2%, which was lower than in those without stress. Articles on the same subject have discussed stressful events in various forms.<sup>21-28</sup> The highest incidence of stress among patients with RAS was recorded by Ajmal et.al.<sup>16</sup> They reported that 90% of patients with RAS were exposed to stress. The present paper is in agreement with Gavic et.al.<sup>19</sup> They reported that 44.1% of the patients with RAS reported stress.

Huling et.al.<sup>26,27</sup> have related RAS to stressful events. Al Rashdan and Al khader<sup>21</sup> remarked that experiencing a stressful life event increased the incidence of an RAS episode by almost three times, and mental stressors had a larger effect than physical stressors on the occurrence of RAS episodes.

### **Measurement of Psychosomatic Disorder among patients with RAS**

Psychosomatic disorder is one of the most significant factors that influenced patients with RAS. Psychosomatic disorder affects physical and mental health and could affect the progression of oral mucosal disorders. Many studies have demonstrated that in most of the oral problems such as chronic pain disorders, BMS, and RAS, mental health plays a vital role in their pathogenesis. Thus, mental state evaluation is necessary to assess if oral illness is affecting the physical and emotional being of the patient. This study measured the psychosomatic disorder of patients with RAS by using (DASS) 21 questionnaires<sup>12</sup> because this scale measures and assesses three types of psychosomatic disorders (depression, anxiety, and stress) simultaneously.

### **Limitations**

The generalization of this study is subject to limitations. First, the findings could be more beneficial if the associated diseases were indicated in a specific manner, similar to the aforementioned articles, adding to the substantiality of this paper. Second, to create a comprehensive overview of psychosomatic disorder and its effect on patients with RAS, adding more variables in the baseline characteristics would be ideal, such as RAS duration and number of RAS episodes. Last, increasing the sample size would indicate be most changes, because this would provide significant results that could provide additional information regarding the phenomena of this study subject because in any study of this type the higher the number of study subjects, the higher the power of study to detect significant changes.

## **Conclusions**

More than half of the dental students with RAS were either depressed or anxious; with the incidence of stress being considerably less than that. Age group in years and number of ulcers in each occurrence were statistically associated with anxiety and stress, and gender was also a significant factor for anxiety. However, this paper found no significant relationship between depression and RAS. This finding does not exclude the possibility that depression and anxiety are the most influential factors in patients with RAS. In this regard, this issue must be addressed in future studies to further manage the development of RAS where a specialist in psychosomatic disorders plays a vital role in coping with this type of disorder. In the management of RAS, traditional and conventional methods could be used to shorten the duration of the healing time or at least temporarily relieve pain.

## **Declarations**

### **Acknowledgements:**

Not applicable.

### **Authors' contributions:**

The whole study was done by SFAH

### **Funding:**

Not applicable.

### **Availability of data and material:**

The data sets examined for this study are available from the corresponding author upon reasonable request.

### **Ethics approval and consent to participate:**

The ethical approval was obtained from the institutional review board (IRB) of Riyadh Elm University (REU). The research registration number was **FPGRP/43737001/267**.

**Consent for publication:**

Not applicable.

**Competing interests:**

The author declare that he has no competing interest.

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## Tables

Table 1  
Sociodemographic characteristics of and recurrence  
of ulceration in the study group

Study Variables	N (%) (n=184)
Age group in years	
• ≤ 25 years old	101 (54.9%)
• > 25 years old	83 (45.1%)
Gender	
• Male	82 (44.6%)
• Female	102 (55.4%)
Educational Level	
• Pre-clinical level	31 (16.8%)
• Clinical level	53 (28.8%)
• Intern	32 (17.4%)
• Post graduate	68 (37.0%)
Marital Status	
• Single	118 (64.1%)
• Married	66 (35.9%)
Time of last ulcer	
• Experiencing presently	16 (08.7%)
• Occurred last 1 month	23 (12.5%)
• Occurred last 3 months	22 (12.0%)
• Occurred last 6 months	18 (09.8%)
• Occurred more than 6 months	105 (57.1%)
Frequency of ulceration	
• Once in a month	16 (08.7%)
• Once in 3 months	21 (11.4%)
• Once in 6 months	25 (13.6%)
• Once in more than 6 months	122 (66.3%)

<b>Study Variables</b>	<b>N (%)</b> (n=184)
Number of ulcer in each occurrence	
• One time	147 (79.9%)
• 3–6 times	24 (13.0%)
• > 6 times	13 (07.1%)
Area of occurrence	
• Cheek	41 (22.3%)
• Gums	32 (17.4%)
• Lips	61 (33.2%)
• Tongue	21 (11.4%)
• Multiple areas	29 (15.8%)

Table 2  
Prevalence of DAS among patients with RAS

<b>Factor</b>	<b>N (%)</b> (n=184)
Depression	
• Depressed	115 (62.5%)
• Not depressed	69 (37.5%)
Anxiety	
• Anxious	107 (58.2%)
• Not anxious	77 (41.8%)
Stress	
• Stressed	74 (40.2%)
• Not stressed	110 (59.8%)
DAS – Depression, Anxiety, Stress; RAS – Recurrent Aphthous Stomatitis	

Table 3  
 Relationship between DAS among sociodemographic characteristics  
 and RAS (n=184)

Factor	Level of Depression		Level of Anxiety		Level of Stress	
	Depressed	ND	Anxious	NA	S	NS
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
	(n=115)	(n=69)	(n=107)	(n=77)	(n=74)	(n=110)

N = Depressed ND = Not Depressed

## Figures

Figure 1: Distribution of DAS

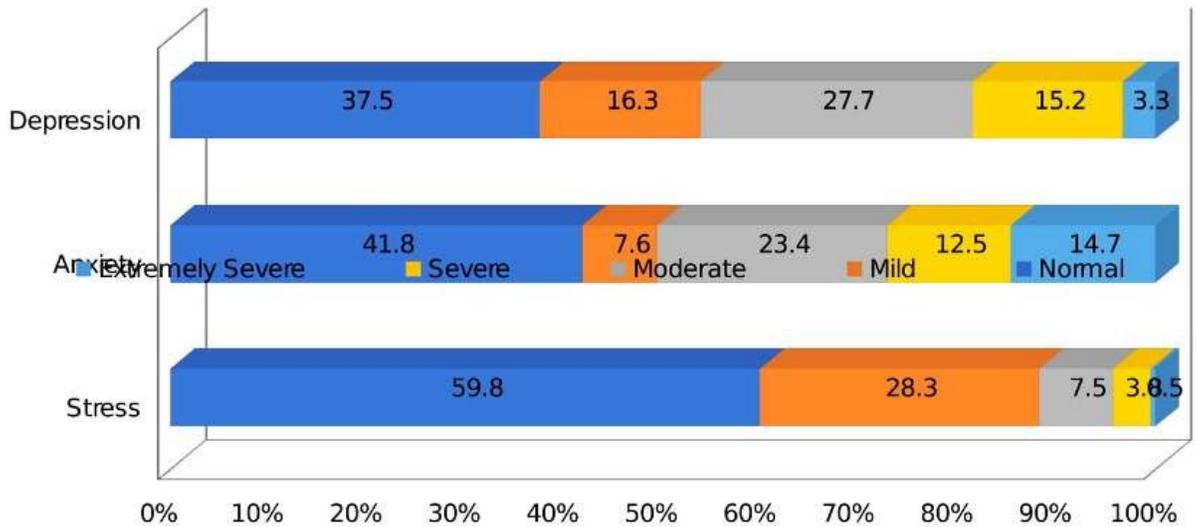


Figure 1

Illustrates the distribution of DAS among the students.