

## PSYCHOLOGICAL STRESS ASSOCIATED WITH APHTHOUS ULCERS AND TEMPOROMANDIBULAR DISORDERS

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### ABSTRACT

**Objective:** To assess the prevalence of stress as an etiological factor for aphthous ulcers and temporomandibular disorders.

**Study Design:** Cross sectional descriptive study.

**Place and Duration of Study:** Armed Forces Institute of Dentistry Rawalpindi, from Oct 2015 to May 2016.

**Material and Methods:** Two groups of patients were selected. Group I included 119 patients presenting with Aphthous Ulcers while group II had 64 subjects with complaints of temporomandibular disorders (TMDs). After a thorough history, Hospital Anxiety and Depression Scale (HADS) was used to assess stress in the patients. A HADS-A score of 7 was taken as significant anxiety while a HADS-D score of 7 depicted significant depression. Both groups were then subjected to laboratory examinations. Serum cortisol levels were assessed for both groups while Serum Folate, Ferritin and Vitamin B12 level for group I only. Data were analyzed using SPSS version 21 to calculate descriptive statistics including mean and standard deviations as well as frequencies and percentages. Relationship between HADS score and serum cortisol levels was assessed using Pearson's correlation coefficient. A  $p$ -value $<0.05$  was considered significant.

**Results:** For TMDs, 53 (82.8%) patients were found positive for stress while for aphthous ulcers, 61 (51.3%) were positive for stress. The correlation between HADS score and serum cortisol levels was found significant for both groups at a  $p$ -value $<0.001$ .

**Conclusions:** Patients showed a high prevalence of stress as an etiological factor for aphthous ulcers and temporomandibular disorders in a local setting.

**Keywords:** Aphthous ulcers, Stress, Temporomandibular disorders.

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### INTRODUCTION

With the recent advancements in health sciences, both the general population and the health professionals have gained increased awareness about oral health and its significance<sup>1</sup>. Like systemic diseases, oral diseases have a multi-factorial etiology<sup>2</sup> and stress often works as one of the leading etiological factors<sup>3</sup>. Stress manifests itself as somatic and/or psychological complaints such as lethargy, insomnia, anxiety and/or depression. Anxiety is "an emotional state, characterized by uneasiness, discomfort or fear about some defined or undefined threat" while depression is "a state of unhappiness or

sadness" experienced from time to time<sup>4</sup>.

It is believed that stress utilizes two mechanisms to deteriorate our immune system and facilitate disease process<sup>5</sup>. One is the biological mechanism mediated through the "hypothalamic-pituitary-adrenal (HPA) axis" and the production of "cortisol". Second is the behavioural mechanism that promotes poor health behaviours like smoking, alcoholism, consuming unhealthy diet, poor oral hygiene habits, parafunction etc<sup>6</sup>. Patient's oral health deteriorates in response to these unhealthy habits, leading to a variety of oral diseases.

Aphthous ulcers and temporomandibular disorders (TMDs) are the two oral diseases frequently linked to stress. Aphthous ulcers have a rather a bstruse etiology<sup>7</sup>. Clinically, minor aphthous ulcers appear as multiple small round

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lesions with well-defined margins and are associated with moderate to intense pain. They usually heal in 10-14 days; however, the severe types may persist for more than 2 weeks<sup>8</sup>. Earlier studies suggest that psychological disorders such as anxiety and depression could be responsible for the onset and relapse of aphthous ulcers. Other possible etiological factors include infection, allergy, trauma, genetic predilection, or nutritional deficiencies<sup>9,10</sup>.

Temporomandibular disorders is one of the most common ailments of the masticatory complex<sup>11</sup>. Acute onset cases tend to be mild and self-limiting where as in chronic onset cases, symptoms are severe with persistent pain<sup>12</sup>. Latest research about joint biomechanics and neuromuscular physiology suggests a multifactorial etiology for TMDs, thereby, mandating a multidisciplinary approach for their management<sup>13</sup>. Possible etiological factors

## MATERIAL AND METHODS

A cross-sectional descriptive study was carried out at OPD of Armed Forces Institute of Dentistry, Rawalpindi from October 2015 to May 2016. Sample size was calculated using WHO calculator. By keeping the values of confidence level (1- $\alpha$ ) at 95%, absolute precision (margin of error) at 0.09, anticipated population proportion at 0.84 for TMDs and 0.52 for aphthous ulcers, the sample size was calculated to be 64 for TMDs and 119 for aphthous ulcers. Patients with age between 18 and 35 years, no known systemic illness and presenting complain of oral ulcers and/or TMJ pain were selected using non-probability consecutive sampling technique while those with one or more chronic diseases (e.g. diabetes, hypertension, malignancy etc.), known deficiency of iron, vitamin B12 or folic acid, endocrine disorders, long-term corticosteroid therapy, known psychiatric illness, a history of

**Table: Mean hospital anxiety and depression scale (HADS) score and serum cortisol levels in study groups.**

Oral disease	HADS score (Mean $\pm$ SD)	Serum cortisol $\mu$ g/dL (Mean $\pm$ SD)	Pearson's correlation coefficient (r)	p-value
Group I (aphthous ulcers)	8.85 $\pm$ 3.65	33.16 $\pm$ 18.63	0.948	<0.001
Group II (temporomandibular disorders)	10.67 $\pm$ 3.63	43.89 $\pm$ 17.19	0.945	<0.001

include physiological, social, emotional, and/or occupational factors that, alone or in combination, result in the clinical presentation of the disease<sup>14</sup>. Chronic TMD patients often report associated symptoms of anxiety, inadequate amount and quality of sleep, and periods of depression or low energy levels<sup>15</sup>.

This objective of this study is to assess the prevalence of stress as an etiological factor for aphthous ulcers and TMDs. This will allow early screening of the population of local setting at risk and help provision of required clinical treatment and support, resulting in improved oral health of patients.

psychotropic medication and/or use of illicit substances/drugs were excluded from the study. Patients were divided into two groups on the basis of their disease. Group I included all patients with aphthous ulcers while group II had all subjects with complaints of temporomandibular disorders (TMDs). After a thorough history, hospital anxiety and depression scale (HADS) was used to assess stress in both the groups. A HADS-A score of 7 was taken as significant anxiety while a HADS-D score of 7 depicted significant depression. Both groups were then subjected to laboratory examinations. Serum cortisol levels were assessed for both

groups while serum folate, ferritin and vitamin B12 levels for group one only.

Data were analyzed using SPSS version 21. Numerical variables such as age, HADS score and serum cortisol levels were presented as mean and standard deviation while frequencies and percentages were calculated for categorical variables such as gender and etiological factors of aphthous ulcers and TMDs. Relationship between

group I subjects was  $8.85 \pm 3.65$  while that for group II was  $10.67 \pm 3.63$ . For serum cortisol levels, group I had a mean value of  $33.16 \pm 18.63$   $\mu\text{g/dL}$  whereas group II had a mean value of  $43.89 \pm 17.19$   $\mu\text{g/dL}$ . The correlation between HADS score and serum cortisol levels was found significant ( $p < 0.001$ ) for both groups (table). The frequencies of various etiological factors for aphthous ulcers and TMDs were also calculated, with the highest percentage for stress for both

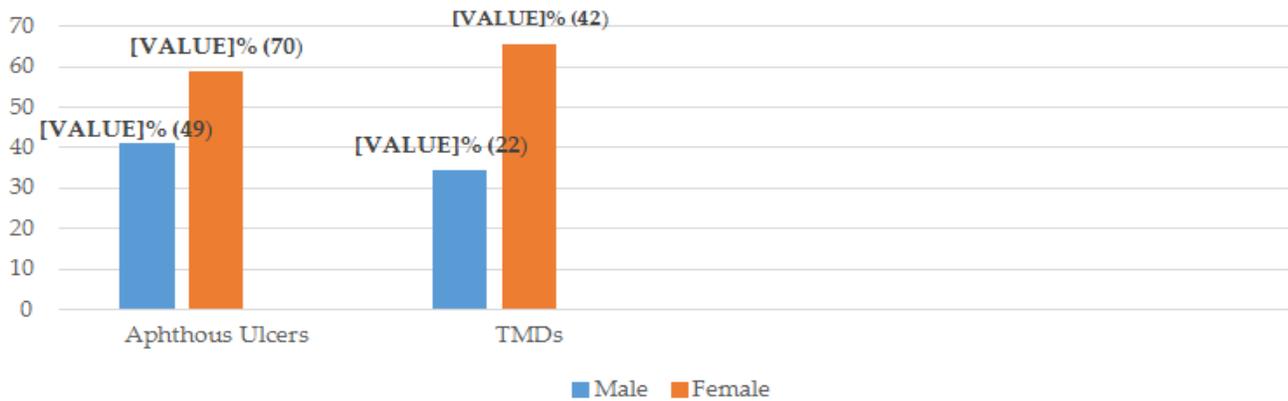


Figure-1: Gender-wise distribution of study subjects among groups.

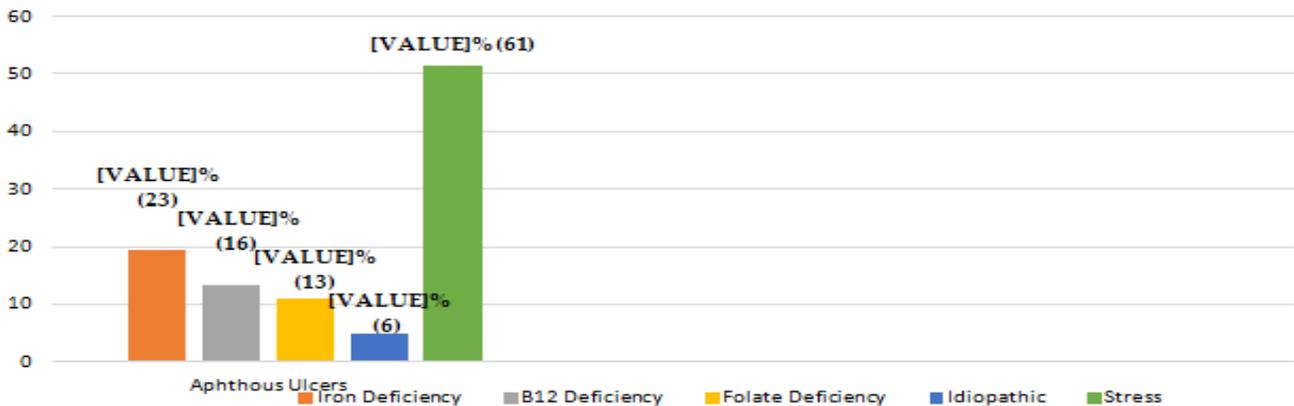


Figure-2: Percentage of various etiological factors for aphthous ulcers.

HADS score and serum cortisol levels was assessed using Pearson’s correlation coefficient. A  $p$ -value  $< 0.05$  was considered significant.

**RESULTS**

Majority of the study subjects were females – 58.8% (n=70) in group I and 65.6% (n=42) in group II (fig-1). The mean age for subjects in group I was  $26 \pm 4$  years while for group II, mean age was  $25 \pm 4$  years. Mean HADS score for

group I and II (fig-2 & 3). For aphthous ulcers, 61 subjects were positive for stress, 23 subjects had serum ferritin levels less than 11ng/mL indicating iron deficiency (reference range female 11–307 ng/mL, for males 24–336 ng/mL), 16 subjects were low on vitamin B12 with mean serum vitamin B12 levels of 189 pg/mL (reference range 200–900pg/mL) and 13 subjects had folate deficiency with serum folate levels  $< 3$  ng/mL (reference range for adults 3–20 ng/mL).

**DISCUSSION**

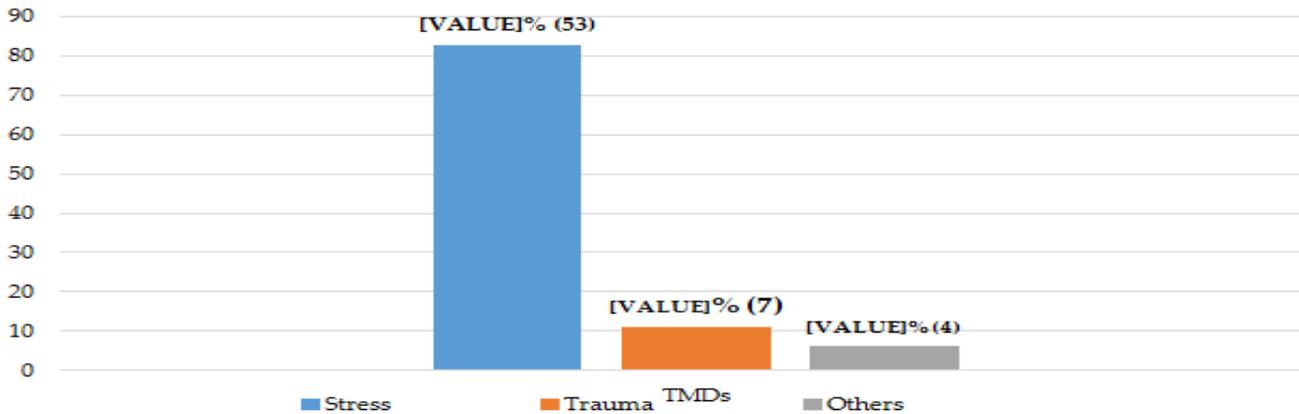
Sufficient data can be found in literature emphasizing the role of stress as an etiological factor for oral diseases. However, no appreciable work has been done in this regard on the local population. The present study aimed to assess the prevalence of stress as one of the etiological factors for the two most common oral diseases namely, aphthous ulcers and temporomandibular disorders (TMDs).

For Aphthous ulcers, the HADS score in the present study ranged from 3 to 18 with a mean of 8.85. Patients with ulcers out of 119 were positive for stress, making a total of 51.3%. Of these 61 subjects, 36 were females depicting a greater

aphthous ulcers as compared to the control group.

In the present study, the second most prevalent etiological factor for aphthous ulcers was iron deficiency (19.3%) with 23 subjects having serum ferritin level less than 11 ng/mL. Of these 23 subjects, 17 were females. This may be attributed to the poor socio-economic conditions and poor dietary conditions of the general population and especially to the predilection of females towards iron deficiency owing to poor dietary intake and menstrual blood loss.

Group II patients with TMDs had a mean HADS score of 10.67. Fifty three patients were



**Figure-3: Percentages of various etiological factors for temporomandibular disorders.**

tendency of females towards stress. These findings compare favorably with the results of Abdullah JM<sup>16</sup> who reported a 43% prevalence of stress for aphthous ulcers. Similar results have been stated by George and Joseph<sup>7</sup> who evaluated the prevalence of aphthous ulcers in Indian population and reported stress as the main etiological factor in 56% of the cases. Results of the present survey also endorse the findings of Patil et al<sup>8</sup> who reported stress as the most common etiological factor for aphthous ulcers in Indian population occurring in up to 55% of the patients, with females being more commonly affected (56.3%). Similar to the findings of the present survey, Nadendla et al<sup>9</sup> found a significantly higher anxiety score in patients with

positive for stress, making a total of 82.8%. Of these 53 patients with positive HADS score, 35 were females, again indicating a predilection of females towards stress. Comparable results have been reported in a study on Chinese population by Lie et al<sup>17</sup> where a significantly higher prevalence (70%) of stress was found in patients suffering from temporomandibular disorders. Kindler et al<sup>11</sup> in a study on TMDs found a plausible relationship between depressive or anxiety symptoms and an increased risk for joint or muscle pain. This supports our hypothesis of stress as an etiological factors in TMDs. About 78% of patients in Kindler’s study had history of anxiety or depression while 70% of the patients were females. These findings compare favorably to those of the present study.

For both groups of patients, a significant correlation was found between HADS score and serum cortisol levels ( $p < 0.001$ ). Serum cortisol levels were checked to evaluate stress in an objective manner, validating the HADS score values. A positive correlation eliminates any doubts and confirms the presence of stress in affected individuals. However, the role of stress in oral diseases could be better explained and established if salivary cortisol levels could be measured. Moreover, screening of patients for psychological stress should be a part of routine dental history and examination. If intercepted early, it could lead to better patient management and improved healthcare. Proper referral should be made to a psychologist or psychiatrist.

Stress works as a causative factor in a number of orofacial diseases<sup>3,18,19</sup>. Data on this area of research in the local population is scarce. There exists a need to carry out further research with a larger sample size as well as to evaluate the role of stress in other oral diseases as well.

## CONCLUSION

Patients showed a high prevalence of stress as an etiological factor for aphthous ulcers and temporomandibular disorders in a local setting.

## ACKNOWLEDGMENT

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## CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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