

Orofacial Manifestations of Stress, Anxiety and Depression

*Mercy OKOH, **Dickson S. OKOH

**Department of Oral and Maxillofacial Pathology and Medicine, University of Benin.*

***Department of Oral Pathology and Medicine, University of Benin Teaching Hospital.*

Correspondence

Dr. M. Okoh

Department of Oral and Maxillofacial Pathology and Medicine
University of Benin.

Email: mercy.okoh@uniben.edu

ABSTRACT

Oral changes with psychosomatic etiology are still an insufficiently confirmed and investigated subgroup of psychosomatic diseases. psychogenic factors like stress, anxiety and depression may act as an underlying risk factor that could influence the initiation and development of oral mucosal diseases. Dental practitioners should expect more patients presenting at the dental clinic with underlying emotional and psychological disorders. A review of literature showed a positive association between psychological alterations and changes in the oral mucosa, particularly in conditions like oral lichen planus, recurrent aphthous stomatitis, parafunctional habits, temporomandibular disorders and burning mouth syndrome. Recognition of such psychological or emotional disturbance benefits both the patient and clinician. Hence psychological management should be taken into consideration when treating patients with these psychosomatic disorders

Keywords: Anxiety, depression, oral manifestations

INTRODUCTION

Stress is a state of mental or emotional strain or tension resulting from adverse or very demanding circumstances. According to World Health Organization (WHO), stress-related problems will be one of the foremost causes of disability by the end of Year 2020 (Kaur et al., 2016).

The body responses to stress involve a chain reaction of hormonal and physiological changes. When the body is stressed, a trigger is sent to the hypothalamus and this induces the hypothalamus to further send signals to the anterior pituitary gland and adrenal medulla thus inducing the production of several hormones including norepinephrine, adrenaline, cortisol which have several effects on the human body and can over a prolonged period cause a suppression of the host immunity.

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Suppression of the host immunity which occurs with continuous and constant exposure to stress can alter normal systemic function of the body, including the oral cavity, leading to the incidence of a number of systemic diseases such as diabetes, hypertension and autoimmune diseases (Uma & Gnanasundaram, 2010; Bhushan et al., 2014; Kaur et al., 2016; Pietrangle, 2020).

Anxiety disorders form a category of mental health diagnoses that lead to excessive nervousness, fear, apprehension, and worry. Depression is a mood disorder that causes constant feeling of sadness and loss of interest. It is proved that depression and anxiety

can influence the physical health by several pathophysiologic mechanisms. Enhancing the risk of infections by modification of the immune system function and increasing pro-inflammatory cytokines and thereafter induction of vascular inflammation (Mohammadi et al., 2019).

Some studies (Warren et al., 2000; Mohammadi et al., 2019), suggest that depression is closely related to poor oral health. When someone is depressed, they lose interest in everyday activities, and in many cases, the person stops taking care of themselves, including neglecting his or her oral health in general. The reduced energy and motivation associated with depression can affect oral health by neglecting oral hygiene procedures, which leads to an increased risk of dental caries and periodontal disease, cariogenic nutrition, avoidance of necessary dental care and antidepressant-induced xerostomia. Regression analysis indicated that depressed patients are at the greater risk of tooth missing and developing dental caries, and presenting poor periodontal and gingival status (Mohammadi et al., 2019).

A review of literature showed a positive association between psychological alterations and changes in the oral mucosa, particularly in conditions like oral lichen planus, recurrent aphthous stomatitis, parafunctional habits, temporomandibular disorders and burning mouth syndrome (Preeti et al., 2011; Suresh et al., 2015; Kalkur et al., 2015; Adayonfo & Okoh, 2016; Kaur et al., 2016; Khayamzadeh et al., 2019). Thus, psychogenic factors like stress, anxiety and depression may act as an underlying risk factor that could influence the initiation and development of oral mucosal diseases. Hence psychological management should be taken into consideration when treating patients with the following oral disorders.

Lichen planus (LP)

Oral lichen planus (OLP) is an immunologically mediated mucocutaneous disorder. Skin lesions are classically described as purple, pruritic, polygonal papules usually affecting the flexor surface of extremities. Oral lesions can present as reticular, erosive, atrophic, plaque like, papular or bullous type. Reticular lichen planus is common and it involves the buccal mucosa, lateral and dorsal tongue, gingiva, palate and vermillion border (Arpita & Ansul, 2017).

Oral lichen planus may represent the manifestation of a mucosal reaction to a variety of etiological factors. The cause is unknown, but it is classified as an autoimmune disorder which may be precipitated or exacerbated by psychosocial stressors. LP is described as an adult disease. The typical age of presentation is between 30 and 60 years. Exact etiology of the LP is unknown, but it has been demonstrated that degeneration of the epithelial basal layer, resulting from a change in cell-mediated immune response, has a significant role in the pathogenicity of the lesion. Therefore, any factor that can influence the cell-mediated immune response can have a role in the development of the disease. Factors such as stress and psychological problems, especially depression and anxiety, have been mentioned as aetiologic factors in OLP because exacerbations of OLP have been linked to the periods of psychological stress and anxiety (Ismail et al., 2001; Uma & Gnanasundaram, 2010; Kalkur et al., 2015).

There is currently no cure for OLP. Treatment is aimed primarily at reducing the length and severity of symptomatic outbreaks. Topical steroids are the first-choice agent for the treatment of symptomatic, active OLP. Other topical agents that have been used in cases resistant to topical steroids include retinoids, cyclosporine, and tacrolimus (Kalkur et al., 2015)



Reticular type of Lichen Planus.

Parafunctional Habits

Parafunctional habits are unusual, unconscious, and sometimes, involuntary activities of the masticatory system that do not have functional purposes. They are believed to cause complications and problems in the teeth and the temporomandibular joint (TMJ), exerting recurrent microtraumas on the masticatory system.

Oral parafunctional habits are related to any abnormal hyperactivity of the oro-mandibular system (Khayamzadeh et al., 2019). They are prevalent in all societies in varying intensity and have potential physical and psychological implications. Parafunctional habits, as one of the etiological factors of temporomandibular disorders (TMD), are an individual's response to increased stress. Bruxism and clenching are among the most common forms.

A study by Kaur et al., among 450 patients demonstrated bruxism in higher prevalence in psychiatric patients than in normal individuals. It was more prevalent in males than in females and was seen more in the age group of 31–40 years (Kaur et al., 2012). Stressful states can trigger parafunctional episodes that contribute to myofascial pain. Anxiety and stress are potent direct contributors to pain, pain results in maladaptive behaviors such as parafunction, and parafunction may be a coping response to potential threat coupled with hypervigilance and somatosensory amplification.

Dry Mouth

Stress is thought to inhibit saliva production. Dry mouth is also a common side effect of prescription drugs (antidepressant-induced xerostomia) commonly used by patients with high level of anxiety and depression. In that way, both the problem and the solution lead to xerostomia. Dryness of mouth affects the quality of life. In young adults, the causes are usually associated with stress, anxiety, depression, and nutritional deficiencies. Alcohol abuse and use of illicit drugs also are significant contributors in the

etiopathogenesis of dry mouth (Kandagal et al., 2012; Kaur et al., 2016).

The mouth's first line of defense against bacteria is saliva, and in cases of xerostomia there is an increased risk of dental caries, oral erosive and ulcerative lesions, periodontal disease and infection.

Oral Ulcer

Generalized anxiety and depression are associated with oral ulcers. Generalized anxiety may cause an elevation in salivary cortisol and/or in immune regulatory activity in inflammation by increasing the quantity and activity of leukocytes thereby increasing the likelihood of oral ulcers. Generalized anxiety may also be associated with cheek or lip biting, or other actions causing injury to the oral mucosa (Zwiri, 2015; Folayan et al., 2021).

The following oral ulcers have been linked to stressful lifestyle: Recurrent aphthous ulcer (RAU), Herpes labialis, Acute necrotizing ulcerative gingivitis and Erythema multiforme.

Recurrent Aphthous Ulcer: This is a disorder characterized by recurring ulcers confined to the oral mucosa in patients, and are one of the most painful and common oral mucosal diseases with uncertain etiology. Increased stress/anxiety has been reported as trigger for RAU. Other predisposing factors include; hormonal changes, dietary factors, trauma, food allergy (Nadendla et al., 2015). Psychological stresses induce immunoregulatory activities by increasing the number of leukocytes at the sites of inflammation (Kaur et al., 2016).

A study (Keenan and Spivakovksy, 2013) shows stressful life events were significantly associated with the onset of RAU episodes but not with the duration of the RAU episodes. There is no definitive curative treatment for RAU. Treatment strategies must be directed toward providing symptomatic relief by reducing pain, increasing the duration of ulcer-free periods, and accelerating ulcer healing (Keenan and Spivakovksy, 2013; Arpita and Ansul, 2017).



Recurrent Aphthous Ulcer.

Herpes Labialis

Following resolution of the primary herpetic infection, reactivation of the herpes simplex virus in the sensory ganglion due to immune suppression by stress result in herpes labialis.

This lesion is characterized by multiple, grouped, fragile vesicles that ulcerate and coalesce, most common on vermillion border of the lips or adjacent skin. Application of 5% Acyclovir cream during the prodromal phase lessens the clinical course.



Herpes Labialis.

Acute Necrotizing Ulcerative Gingivitis

This is an endogenous oral infection characterized by necrosis of the interpapillary gingival. It has an acute clinical presentation with the distinctive characteristics of rapid onset of interdental gingival necrosis, gingival pain, bleeding, and halitosis. Systemic symptoms such as lymphadenopathy and malaise could be also found. There are various predisposing factors such as stress, nutritional deficiencies, and immune system dysfunctions, especially, HIV infection that seems to play a major role in its pathogenesis. Classic ANUG without an underlying medical disorder, is found mostly in those between the ages of 16 and 30 years, and it is associated with 3 major factors: poor oral hygiene with pre-existing marginal gingivitis, smoking and emotional stress (Malek et al., 2017).

loneliness. Individuals with depressive symptoms presented higher risk of periodontitis (risk ratio [RR] 1.19). The presence of depressive symptoms was also associated with moderate/severe periodontitis (total effect RR 1.18). There is a link between negative emotions and the development of periodontal disease due to neglect of routine oral health hygiene (Mohammadi et al., 2019).

Dental Caries

Psychological and emotional stress can lead to a neglected oral health routine, unhealthy lifestyle choices, cariogenic nutrition, and dry mouth which can increase the risk of dental caries (Mohammadi et al., 2019).

Erythema Multiforme

Oral erythema multiforme may occur secondary to herpetic infection. In herpes associated erythema multiforme, it is most likely that HSV-DNA fragments in the skin or mucosa precipitate the disease. In this case, the role of stress is evident with deregulation of T-lymphocyte activity (Shamim, 2014; Adayonfo and Okoh, 2016).

Delusional (Psychogenic) Halitosis

This is a psychosomatic disorder. It refers to the thought or fear that one has bad breath when in reality there is no bad breath. Halitosis in this context only exists in the mind of the patient. Delusional halitosis can become a full-blown phobia and can begin to interfere with one's job or life in general. It is also associated with depression and symptoms of obsessive compulsive disorder (Uguru et al., 2011; Omoregie et al., 2016).

Periodontal Disease

The reduced energy and motivation associated with depression can affect oral health by neglecting oral hygiene procedures, which leads to an increased risk of dental caries, avoidance of necessary dental care, smoking and periodontal disease. Long-term stress affects the immune system, increasing susceptibility to infections such as periodontal diseases (Folayan, 2021). A scientific review of related studies found a strong link between periodontal (gum) disease and mood conditions like stress, distress, anxiety, depression and

Biting of Oral Mucosa (Self-mutilation)

Self-mutilation due to biting of the oral mucosa originates as a result of chronic cheek, lip, or tongue biting. This is often observed in people who are under stress, and psychogenic background must be ruled out in individuals who exhibit this activity. This type of behavior may also be exhibited in cases in which people wish to obtain special attention from family members (Shamim, 2014).

Psychogenic/Idiopathic Orofacial Pain

These are disorders of the orofacial region presenting with vague pain attributed to psychological stress. Emotional disorder such as anxiety state or stressful life events, can often give rise to orofacial symptoms such as facial pain by somatization of the psychological distress in 50% of the cases around the orofacial region to cause psychogenic orofacial pain (Okoh et al., 2015). Somatization is a term used to describe the process by which an individual's psychological and social distress are manifested as bodily symptoms that cannot be wholly attributed to organic pathology.

Psychogenic orofacial conditions include: Temporomandibular disorders (TMDs), Atypical facial pain, Atypical odontalgia, Burning mouth syndrome and Tension headaches. The pain is characterized by long period of time with no remission or change in character, previous history of various investigations with no organic pathology, pain distribution is not consistent with anatomical distribution, and patient may describe the pain as being clearly associated with emotional factors (Okoh et al., 2015).

Temporomandibular disorders (TMDs)

Characteristic TMD symptoms include pain on palpation of the masticatory musculature, pain on jaw opening, restricted jaw opening, and clicking or crepitus on jaw opening. Patients commonly report pain that is more widespread than just the masticatory musculature and are likely to report headaches and pain elsewhere, even low back pain (Tait et al., 2017).

The strongest predictors of TMD onset, based on the Orofacial Pain: Prospective Evaluation and Risk Assessment (OPPERA) study, are psychological. Increased risk of TMD onset was associated with higher baseline levels of reported somatic symptoms, psychosocial stress, and affective. Further analysis of the data suggested that a general predisposing factor underlay the above predictors: global psychological and somatic symptom levels appear to represent a risk factor associated with the development of TMD symptoms. Inasmuch as the latter findings also overlap with risk factors associated with the likelihood that TMD symptoms will become chronic, TMD appears to represent a condition with a strong biopsychosocial profile, a profile that suggests the potential importance of psychological interventions integrated into a multidisciplinary treatment plan (Fillingim et al., 2013; Tait et al., 2017).

Burning mouth syndrome

This is associated with burning sensation of the tongue, lips, and other mucosal surfaces. Sleep disturbances are a common finding among burning mouth syndrome patients. The exact cause of burning mouth is still unknown, however, suggested possible causative factors include hormonal disturbances associated with

menopause; psychogenic factors such as stress, anxiety, and depression; life events; personality disorders; cancer phobia; and nerve abnormalities (Uma & Gnanasundaram, 2010). In a study (Kaur et al., 2016), it was found to be more in females than in males and significantly higher in stress-related patients than that in controls.

Management:

- Patients with the aforementioned dental disorders should be carefully assessed through a good history taking with attention paid to the their 'Family and Social history' and 'Past Medical history'.
- The use of Psychometric instruments such as Depression, Anxiety, Stress Scale (DASS-42). DASS-42 is a self-report questionnaire consisting of 42 symptoms divided into three subscales of 14 items: Depression scale, anxiety scale, and stress scale. Beck's Depression and Anxiety Scales for the assessment of depression and anxiety symptoms (the scale is a questionnaire for the assessment of depression and anxiety symptoms which includes 21 items each). The Hospital Anxiety and Depression Scale which comprises 14 questions: seven questions assess anxiety symptoms and the other seven assess depressive symptoms respectively (Kalkur et al., 2015).
- Measurement of stress biomarkers (e.g., Cortisol, C-Reactive protein and interleukins):
The stress biomarkers commonly researched include (Arpita and Ansul, 2017):
 - Metabolic markers – S. cholesterol, high-density lipoprotein (HDL) cholesterol, Total cholesterol-HDL ratio, S. Albumin, Glycosylated hemoglobin
 - Immunological markers – Interleukin-6 (IL-6), Tumor necrosis factor (TNF- α), C-Reactive protein (CRP), Insulin-like growth factor (IGF-1)
 - Neuro-endocrine markers – Cortisol, Dehydroepiandrosterone (DHEA), and cortisol-DHEA ratio, adrenaline, noradrenaline, dopamine and aldosterone.
- The therapeutic intervention should aim at integrating two objectives: The resolution of the symptoms like elimination of mucosal erythematous lesion, ulceration, pain and the patient's personal development, taking into account the patient's needs (treatment of the oral conditions should go together with psychological management and counselling of the patient as first part of management protocol).
- Management of psychological component of stress related oral disorders relies mainly on two

therapeutic modalities – Pharmacologic management (anti-anxiety, anti-depressants and sedatives/hypnotics) and stress relaxation training (biofeedback, cognitive behavioural therapy, hypnosis). Patients should be encouraged to find their own de-stressor that helps them relax such as exercise, reading a book, going for a walk or listening to music etc.

- Some of these patients would benefit from referral to the psychiatrist, hence the dental surgeon should co-manage with the mental health professionals.

CONCLUSION

Psychogenic factors like stress, anxiety and depression may act as a risk factor that could influence the initiation and development of oral mucosal diseases. Dental practitioners should expect more patients presenting at the dental clinic with underlying emotional and psychological disorders.

Hence psychological management should be taken into consideration when treating patients with these oral diseases.

Source of support

None

Conflict of Interest

None

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