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Stress and Dental Problems, Assessment of Stress Levels in Patients Visiting for Dental Treatment Running Title: Stress Levels in Patients Visiting for Dental Treatment

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Abstract

Context and Aim: The perception of stress might influence the pathogenesis of a physical disease by causing negative affective states which, then, exert direct effects on the physiological processes and the behavioral patterns of the individual that influence the predisposing and risk factors for the given disease process. Surprisingly, this theoretical perspective has not been discussed in the perspective of odontogenic problems. The present study was planned as an attempt towards the same.

Materials and Methods: The present cross-sectional study consisted of individuals randomly selected from the Outpatient Department aged 18 years and above over duration of 6 months. Perceived Stress Scale (PSS) was used to measure perception of stress.

Statistical Analysis Used: The data was analyzed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA) while Chi-square/Fisher's exact test were used to find significance of the study parameters. P-value<0.05 was considered statistically significant.

Results: In the present study, data collected revealed that unskilled individuals (29.4%) sought dental treatment more than the other categories of occupational groups while a correlation between the occupation and stress showed that stress levels were considerably lower in the professional than in the non-professional groups underlying the significance of education and professional status on the perception of stress in the said individuals.

Conclusion: From the present study, it could be concluded that in most of the cases, stress and dental problems are lying together as aggravating factors for one another. While there are promising treatments for stress, the management of stress is mostly dependent on the ability and willingness of an individual to make necessary changes for a healthy lifestyle which, in turn, reduces the

risk factors for further aggravating the vicious cycle of health-related issues.

Keywords: Stress levels; Patients; Dental treatment; Perceived stress scale

Introduction

The word stress is generally used to imply to the things which pose a challenge or, a threat to the normal well-being of an individual. Potentially stressful life events are thought to increase risk for disease when one perceives that the demands, these events impose, exceed an individual's adaptive capability. In turn, the perception of stress might influence the pathogenesis of physical disease by causing negative affective states which, then, exert direct effects on the physiological processes or, behavioral patterns of the individual that influence the predisposing and risk factors for a given disease process. It is a common assumption amongst the health researchers that the impact of subjectively stressful events is, to a certain extent, determined by individual's perceptions of their stressfulness [1]. The psychological states and traits of an individual might influence the immune systems in a manner that might alter body's ability to fight-off a given disease process.

Psychological stress is thought to influence a wide range of physiological processes and disease states with existing evidence supporting stress as a risk factor in depression, cardiovascular disease, HIV/AIDS, delayed wound healing, upper respiratory infections, autoimmune diseases and total mortality [2,3]. Sometimes, it is difficult to distinguish conceptually between an individual's perceived stress and psychological distress. For example, feelings of stress and overload are viewed as symptom of psychological disorder. As a result, a correlation between a scale assessing perceived stress and one assessing psychological distress may be partly or, totally attributable to the fact that some of the items in the two scales measure similar or, identical components. In short,

cross-sectional correlation between perceived stress and psychological distress may be totally artificial and correlation between perceived stress and physical disorder may actually reflect an association between psychological distress and physical disorder [1]. The above statements indicate a desirability of developing an instrument to measure a global level of perceived stress.

Perceived stress scale (PSS) questionnaire is designed to tap the degree to which respondents found their lives unpredictable, uncontrollable and overloading. These three issues have been repeatedly found to be the central components of the experience of stress. Surprisingly, this theoretical perspective has not been accompanied by development of psychometrically valid measures of perceived stress in the field of odontogenic problems. The present study was planned as an attempt to assess the stress levels in patients coming for dental treatment using perceived stress scale questionnaire used to measure an individual's perception of stress and to determine the likelihood of whether perceived stress might be making them more susceptible to stress-induced compromises of their health. In the present study, an attempt was made to measure an individual's perception of stress in the perspective of their occupation while a correlation was, also, tried to be sought to between the clinical and radiological diagnosis and their perceived levels of stress.

Materials and Methods

The present cross-sectional study consisted of 598 individuals randomly selected from the outpatients aged above 18 years in a duration of 6 months. The patients included in the study were informed about the details of the study and a written informed consent was obtained. The study protocol was approved by the Institutional Ethics Committee governing the protection of privacy of the subjects enrolled for the study. A detailed case history was taken including chief complaint, history of presenting illness and medical and personal histories. A thorough clinical examination, including systemic and regional examination, was done. Treatment planning was done based on the final diagnosis arrived after the necessary investigations. After an initial work-up, Perceived Stress Scale (PSS) (Table 1) was used to measure perception of stress.

The said scale was tested for internal validity before the actual conduct of the study and was found to have good internal consistency reliability with a Cronbach's alpha coefficient of 0.78.

Statistical analysis

The data was analyzed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA). The statistical software used for the analysis of the data included SAS 9.2, SPSS version 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment version 2.11.1 while Microsoft word and Excel were used to generate graphs, tables etc. Descriptive and inferential statistical analysis was carried-out. Results on continuous data were presented as Mean \pm SD (Min-Max) while results on categorical

measurements were presented in Number (%). Chi square/Fisher's exact tests were used to find significance of the study parameters on the categorical scale between two or, more groups. P-value<0.05 was considered statistically significant.

Results

In the present study, Perceived Stress Scale (PSS) (Table 1) was used to measure perception of stress.

Table 1 Perceived Stress Scale (PSS) scores and associated levels of health concern.

Total Score	Perceived Stress Levels	Health Concern Levels
0-7	Much Lower than Average	Very Low
08-Nov	Slightly Lower than Average	Low
Dec-15	Average	Average
16-20	Slightly Higher than Average	High
21 and over	Much Higher than Average	Very High

Table 2 shows the distribution of the patients according to their occupation most of whom were found to be from the unskilled group with 176 patients (29.4%) while the least commonly seen were from the group of miscellaneous category with only 8 patients (1.3%) in the said group. Housewives and students constituted the second and third largest groups with 152 patients (25.4%) and 102 patients (17.1%) observed.

Table 2 Showing the distribution of patients according to their occupation.

Occupation	No. of patients	Percentage (%)
Unskilled	176	29.4
Skilled	60	10
Housewives	152	25.4
Business People	16	2.7
Executives	12	2
Service	47	7.9
Professionals	25	4.2
Students	102	17.1
Others	8	1.3
Total	598	100

Table 3 shows the study groups divided on basis of the clinical and radiological diagnosis in which 245 patients (40.9%) were diagnosed with chronic generalized gingivitis

while the least common condition diagnosed was leukoplakia with only 9 cases (1.5%) reported.

Table 3 Showing the study groups divided on basis of the clinical and radiological diagnosis.

Clinical and Radiological Diagnosis	No. of patients	Percentage (%)
1.Acute peri-apical abscess	54	9
2.Chronic generalized gingivitis	245	40.9
3.Oral submucous fibrosis (OSF)	26	4.3
4.Chronic apical periodontitis	40	6.7
5.Completely edentulous	14	2.3
6.Chronic irreversible pulpitis	134	22.4
7.Partially edentulous	32	5.4
8.Recurrent aphthous ulcer	28	4.7
9. Leukoplakia	9	1.5
10.Lichen planus	16	2.6
Total	598	100

Table 4 shows the perceived stress levels amongst the patients with maximum patients falling under the category of

high level stress with scores between 16-20 constituting 42.0 % patients followed by the category of very high level stress with 130 patients (21.7%) involvement.

Table 4 Showing perceived stress levels amongst the patients.

Perceived Stress Levels	No. of patients	Percentage (%)
Very Low	38	6.4
Low	64	10.7
Average	115	19.2
High	251	42
Very high	130	21.7
Total	598	100

Only 38 patients (6.4%) were observed with very low level stress with scores of less than 6. The results shown in **Table 5** reveal the correlation between the clinical and radiological diagnosis and perceived stress levels in which patients diagnosed with oral sub-mucous fibrosis (OSF) and lichen planus showed highly significant results with relatively higher level stress with corresponding p-values of 0.027 and 0.03 respectively.

Table 5 Showing correlation between the clinical and radiological diagnosis and perceived stress levels. +Suggestive significance (p-value: 0.05<p<0.10), *Highly significant (p-value: 0.01<p ≤ 0.05), ** Strongly significant (p-value: p ≤ 0.01).

Clinical and Radiological Diagnosis	Perceived Stress Levels					Total (n=598)	p-value
	Very Low	Low	Average	High	Very High		
	(n=38)	(n=64)	(n=115)	(n=251)	(n=130)		
Acute peri-apical abscess	2 (5.3%)	10 (15.6%)	10 (8.7%)	25 (10%)	7 (5.4%)	54 (9%)	0.169
Chronic generalized gingivitis	16 (42.1%)	17 (26.5%)	53 (46.08%)	100 (39.8%)	59 (45.3%)	245 (40.9%)	0.11
Oral submucous fibrosis (OSF)	0 (0%)	1 (1.6%)	4 (3.5%)	9 (3.6%)	12 (9.2%)	26 (4.3%)	0.027*
Chronic apical periodontitis	2 (5.3%)	4 (6.3%)	7 (6.1%)	20 (8%)	7 (5.4%)	40 (6.7%)	0.874
Completely edentulous	3 (7.9%)	2 (3.1%)	1 (0.9%)	5 (2%)	3 (2.3%)	14 (2.3%)	0.163
Chronic irreversible pulpitis	13 (34.2%)	18 (28.1%)	24 (20.9%)	51 (20.3%)	28 (21.5%)	134 (22.4%)	0.316
Partially edentulous	1 (2.6%)	4 (6.3%)	5 (4.3%)	18 (7.2%)	4 (3.1%)	32 (5.4%)	0.426
Recurrent aphthous ulcer	1 (2.6%)	4 (6.3%)	4 (3.5%)	15 (6%)	4 (3.1%)	28 (4.7%)	0.596
Leukoplakia	0 (0%)	2 (3.1%)	3 (2.6%)	2 (0.79%)	2 (1.5%)	9 (1.5%)	0.53
Lichen planus	0 (0%)	2 (3.1%)	3 (2.8%)	6 (2.1%)	5 (3.2%)	16 (2.7%)	0.03*

Table 6 similarly, reveals the correlation between the occupation of the patients and perceived stress levels depicting strongly significant results for the professionals with

significantly low level stress with the corresponding p-value of 0.002.

Table 6 Showing correlation between the occupation of the patients and perceived stress levels. + Suggestive significance (p-value: 0.05<p<0.10), *Highly significant (p-value: 0.01<p ≤ 0.05), ** Strongly significant (p-value: p ≤ 0.01).

Occupation	Perceived Stress Levels					Total (n=598)	p-value
	Very Low (n=38)	Low (n=64)	Average (n=115)	High (n=251)	Very High (n=130)		
Unskilled	9 (23.7%)	22 (34.4%)	34 (29.6%)	71 (28.3%)	40 (30.8%)	176 (29.4%)	0.804
Skilled	6 (15.8%)	2 (3.1%)	15 (13%)	24 (9.6%)	13 (10%)	60 (10%)	0.2
Housewives	7 (18.4%)	14 (21.9%)	30 (26.1%)	65 (25.9%)	36 (27.7%)	152 (25.4%)	0.769
Business People	0 (0%)	2 (3.1%)	3 (2.6%)	6 (2.4%)	5 (3.8%)	16 (2.7%)	0.762
Executives	2 (5.3%)	2 (3.1%)	4 (3.5%)	4 (1.6%)	0 (0%)	12 (2%)	0.552
Service	3 (7.9%)	2 (3.1%)	11 (9.6%)	22 (8.8%)	9 (6.9%)	47 (7.9%)	0.557
Professionals	6 (15.8%)	3 (4.7%)	2 (1.7%)	7 (2.8%)	7 (5.4%)	25 (4.2%)	0.002**
Students	5 (13.2%)	16 (25%)	15 (13%)	48 (19.1%)	18 (13.8%)	102 (17.1%)	0.179
Others	0 (0%)	1 (1.6%)	1 (0.9%)	4 (1.6%)	2 (1.5%)	8 (1.3%)	0.925

Discussion

Psychological stress has been found to contribute to poorer health practices, increased disease risk, accelerated disease progression, greater symptom reporting, more frequent health service utilization and increased mortality apart from the mentioned morbidity-related features. The term psychological stress has been defined as the extent to which an individual perceives (appraises) that demands exceed the ability to cope in life. Perceived Stress Scale (PSS) was developed by Cohen S et al. [3] to measure the degree to which situations in an individual's life are appraised as stressful and was first published in 1983. Since then, it has become one of the most widely used psychological instruments for measuring non-specific perceived stress [4]. It has been used in studies assessing the stressfulness of situations [5,6], the effectiveness of stress-reducing interventions [7-10] and the extent to which there are associations between psychological stress and psychiatric and physical disorders [11-13].

Perceived Stress Scale predicts both, the objective biological markers of stress and the increased risk for disease among persons with higher perceived levels of stress [14-25]. It provides better prediction than obtained with life event scales of psychological symptoms, physical symptoms and utilization of health services. It has, also, been used as an outcome variable with life events, coping processes and personality factors prospectively predicting changes in the PSS [1,3].

Prior to the development of the PSS, assessment of stress tended to focus on objective indicators of specific stressors. This tendency subsequently overlooks the influence an individual's subjective interpretation of a stressor including the long-term impact it might have upon the life of an individual. Cohen et al. viewed this void of the subjective component in assessing stress and developed the PSS in response. Specifically, the PSS is based upon Lazarus's original transactional model of stress that argues that the experience of a stressor is influenced by evaluations on the part of the individual as to how well an individual can manage the stressor given the coping resources [26].

The original PSS consisted of 14 items that were purported to form a uni-dimensional scale of global perceived stress. 3 Although scores on the 14-item PSS tended to exhibit good reliability estimates across the literature, four of the items tended to perform poorly when evaluated using exploratory factor analysis. As a result, the PSS is commonly implemented using the 10-item form [27].

Up till now, comparing stress levels in our society has been impeded by a lack of study of stress. So, an attempt was made to assess stress levels in patients coming for dental treatment using perceived stress scale (PSS) questionnaire.

In the present study, data collected revealed that unskilled individuals (29.4%) seek dental treatment more than other categories of occupational groups including the skilled, business, executive, service and professional groups followed by the housewives (25.4%) and students (17.1%). Out of the 598 patients screened who came for the dental treatment, 40.9% cases were of chronic generalized gingivitis as authors perception of the survey could find that the patient experienced symptoms of bleeding, halitosis and other gingival problems which were the main reasons of concern followed by tooth decay (22.4%) and pain and swelling in relation to the teeth (acute peri-apical abscess, 9%). On the other hand, the potentially malignant epithelial lesions (PMELs) like leukoplakia cases reported were rare (1.5%) most of which were diagnosed during the routine clinical examinations and were not the basis of patients' chief complaints. When patients were questioned regarding the same, it was found that they were not worried about them much since such lesions did not pose any problem in the normal functioning of their lives. This posed as a challenge in educating the patients regarding the harmful nature of such lesions although they did not affect patients' daily routine.

In the present study, it was found that patients coming for the dental treatment had high levels of stress with 251 (42%) of the patients falling under the same category followed by very high level of stress observed in 130 patients (21.7%) suggesting that patients coming for the dental treatment are

stressed out in their lives regarding their personal and family problems.

The correlation between levels of stress and disease prevalence in the oral cavity showed a moderately significant relation with the corresponding p-value being 0.01 with the respective p-values for the same in case of oral submucous fibrosis (OSF) and oral lichen planus being 0.027 and 0.03 respectively. When the patients were counseled, it was observed that the conditions which made the patients to visit the hospital were difficulty in opening the mouth and burning sensation with difficulty in chewing food being the prime concerns which brought the patients under high and very high levels of stress eventually resulting in their visit of dental hospitals for the treatment.

The above two conditions were followed by chronic generalized gingivitis with a p-value being 0.11 for which the patients had significant amount of stress leading to their visit to the dental hospitals for treatment. On the other hand, most of the edentulous patients visited to get dentures since they experienced change of dietary habits and the stress level in such patients was not found to be that significant with the corresponding p-value being 0.16.

In patients with acute peri-apical abscess, stress level was found to be 0.163 which was again not found to be statistically significant. Similarly, in case of the patients diagnosed with chronic irreversible pulpitis, the stress levels were not found to be statistically significant as the patients did not experience any symptoms of pain or, discomfort except while having food.

Correlation between the occupation and stress showed that stress levels were considerably lower in the professionals with the results being highly significant, p-value being 0.002 while higher in unskilled groups (farmers, labours and shop keepers), p-value being 0.804 and others, p-value being 0.925 showing the impact of education and social well-being affecting the same in a considerable manner with the conclusion that the patients who were well-educated were well-versed with the conditions and related problems of the oral cavity having lesser stress and better abilities to cope-up with the same.

Conclusion

From the present study, it could be concluded that in most of the cases, stress and dental problems are lying together as aggravating factors for one another like in case of oral submucous fibrosis, stress is induced in the patients because it alters a patient's normal physiological functions related to oral and para-oral structures while in case of lichen planus, stress is one of the etiological factors for the disease process to set-in. Furthermore, the burning sensation perceived in both the cases, further, aggravates a patient's stress. It becomes all the more important, therefore, to combat stress in an effective way by seeking support from loved ones, regular exercise, meditation and other relaxation techniques, structured time-outs and learning new coping strategies to create predictability in our lives. Many behaviours that increase in times of stress and maladaptive ways of coping with stress including drugs, pain medicines, alcohol, smoking and eating, actually worsen

the stress and can make an individual more reactive (sensitive) to further stress. Thus, also, while there are promising treatments for stress, the management of stress is mostly dependent on the ability and willingness of an individual to make necessary changes for a healthy lifestyle which, in turn, reduces the risk factors for further aggravating the vicious cycle of health-related issues. The present study, also, highlighted the significance of education and professional status on the perception of stress in the said individuals concluding that the patients who were well-educated were well-versed with the conditions and related problems of the oral cavity having lesser stress and better abilities to cope-up with the same.

Strengths of the Study

The present study revealed that higher Perceived Stress Scale (PSS) scores have been found to be associated with higher levels of stress and indicate a greater likelihood for stress interfering with the lifestyle patterns and the ability of the corresponding individuals to improvise. Also, higher scores have been found to be associated with an increase in an individual's vulnerability to compromised health, especially, if a big life stress had occurred in the near past.

Limitations of the Study

Though the present study highlighted the impact stress can have on the pathogenesis as well as the severity of the conditions affecting the oral and para-oral regions, the study focused only on the oro-dental complaints of the patients without taking into consideration the general medical condition. Furthermore, the conditions affecting the oral and para-oral regions might have some association in the form of common etiology as well as similar manifestations of the associated systemic disorder. Also, numerous systemic conditions affecting the general systems of the body have their manifestations in the oral cavity apart from similar etiologies. Treatment of various systemic diseases, also, has its adverse effects manifesting in the oral mucosa as well as the other oral and para-oral structures. Thus, the study could have been even stronger taking into consideration the associated medical disorders mandating the need for such studies in future for finding the correlation and the exact association between them. Another significant limitation of the study was the lesser representation of the patients affected with the various pre-cancerous and cancerous conditions of the oral and para-oral regions which actually potentially mound-up the stress even in educated patients. Further studies in this regard will largely benefit the management of stress in such patients because they are the main source of potential stress in such patients who are affected with conditions with poorer prognosis.

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