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Correlation of Oral Health Status and Stress – A Cross-Sectional Study

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Abstract:
Objective: *To study the correlation of oral health status and stress. To evaluate patients for the symptoms of stress and then to correlate these symptoms with oral findings.*
Material and Method: *This study was carried out in the Department of Oral Medicine and Radiology, V.S.P.M's Dental College & Research Centre, Nagpur. Study group comprised of a total of 400 patients with age group 18-70 years of both sexes. Patients were asked to answer 20 questionnaires related to stress symptoms based on the George Washington University Stress Symptom Checklist. Then the correlation of oral health status and stress was assessed. The association between oral disease and the stress was studied by statistical analysis.*
Result: *34.25% of the cases observed were having Caries followed by Gingivitis (20.75%) and Soft tissue lesion (14.25%). Cases with more than one disorder were nearly 13.25%. The mean and standard deviation of total score for the two groups were 12.38 ± 10.42 and 14.28 ± 11.61 respectively. The resulting p-value was 0.1366 ($p > 0.05$) indicating that there is insignificant difference in the mean scores of male and female patients. The difference between the proportions of Gingivitis and Soft tissue lesion was statistically insignificant with p-value of 0.999 ($p > 0.05$). Chi-square test showed a p-value of 0.000002 ($p < 0.001$) indicating high significance of association between oral disease and stress.*
Conclusion: *The result suggested that there was strong correlation of stress with gingivitis and soft tissue lesions. However, there was no strong evidence for association between stress and dental caries.*
Keywords: *Stress, Gingivitis, Soft tissue lesion, Caries.*

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I. Introduction

As said by Williams Osler- "Mouth is the mirror of the body which reflects many systemic diseases along with oral diseases."[1] Proper history, essential investigations and correlation of various etiologic factors can ensure correct diagnosis of the disease, thus resulting in successful treatment.

In today's fast paced lifestyle, stress is an inevitable part.Stress is defined as a physical, mental or emotional response to events that causes bodily or mental tension.[2] Stress can affect the mind and the body of an individual, including oral cavity if it is not identified and treated. During stressful situations, hypothalamus causes increase secretion of corticotrophin releasing factor (CRF) which stimulates the release of ACTH. ACTH activates adrenocortical cells to produce steroids especially cortisol. Long term exposure to cortisol diminishes body's immune response.[3]

Previous studies had proved stress as a cause or a contributing factor to many oral diseases. Shwartz observed stress as a significant cause for clenching & grinding habits resulting in spasm of muscles of mastication which may lead to TMJ disorders.[4] Lichen planus, an immunologically mediated mucocutaneous disorder have shown significantly higher levels of stress particularly with erosive OLP.[5] For recurrent oral ulcers, along with Vit. B_{12} deficiency stress is considered as a predisposing factor.[1] Burning mouth syndrome

which is most commonly seen in post menopausal women has shown a positive rating scale for stress association in its lesions.[6] A recent study has also noted that people under stress are prone to elevated biofilm plaque levels and high levels of stress increases the likelihood of gingivitis and periodontitis.[7]

Every organ in the human body is affected by various types of diseases caused either by microbes or by immunological, metabolic, endocrinal disturbances. Etiopathogenesis of most of the diseases is known and therefore they can be managed at an early stage. Stress plays a major role in the pathogenesis of a wide range of systemic diseases. Many authors had proved stress in relation to hypertension, gastric ulcers, diabetes mellitus, rheumatoid arthritis & systemic lupus erythematosus.[8] Similarly stress may be a causative agent in oral diseases and since various studies have shown a strong correlation of stress with various oral manifestations, in this study, we have evaluated for symptoms of stress and then these symptoms have been correlated with oral findings.

II. Materials Method

This study was carried out in the Department of Oral Medicine and Radiology, V.S.P.M's Dental College &Research Centre Nagpur. The study was conducted over a period of 3 months from April 2012 to June 2012. Study group comprised of all OPD patients above 18 years of age of both sexes. Participation of patients was voluntary.

The patients were subjected to complete oral examination as per the proforma for examination of dental patients. All the clinical subjects were asked to answer 20 questionnaires based on stress symptoms. A stress symptom rating scale which includes: 0=never, 1=sometimes, 2=often, 3=more often, was applied to all stress symptoms according to the reply of the subjects.[9] The sum of this stress symptom scale score of 20 symptoms give a standard total score which has a rating as follows:

Score	Rating
0-9=	Lower than average
10-19=	Average
20-24=	Moderately higher than average
25<=	Much higher than average

This score which is calculated from the number and frequency of stress related symptoms measures the stress level of each patient. All the informative data obtained in terms of oral findings and stress symptoms was analysed statistically to evaluate the correlation of oral health status and stress.

III. Results

Based upon inclusion and exclusion criteria and patient's consent, 400 patients became part of this study. Out of 400 patients, 137 patients were having dental caries, 83 patients with gingivitis/ periodontitis, 57 showing soft tissue lesions like oral submucous fibrosis, oral liche planus, leukoplakia, oral ulcers, candidiasis etc, 26 patients showing caries and gingivitis/periodontitis both, 11 patients with caries and soft tissue lesions, 10 with gingivitis and soft tissue lesions, 6 with combination of caries, gingivitis and soft tissue lesions and 70 patients showed other findings like malocclusion, pericoronitis, stains+, partial or complete edentulous arches etc. The distribution of patients according to the disorder is shown in figure 1.

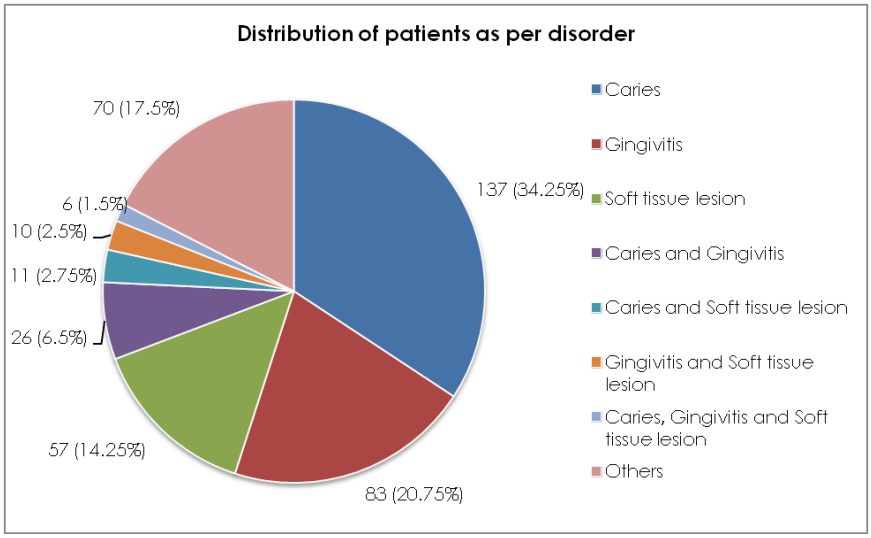


Figure 1: Pie chart showing the distribution of patients according to disorder.

Age of the included patients ranged from 18 to 70 years with 50% of patients belonging to group 20-40 years. Patients with caries and soft tissue lesion were mostly ranged in the age group of 20 to 40 years. For patient with gingivitis and with more than one disorder, the age distribution was almost uniform (Fig. 2). The correlation of age of patient and total score was obtained using Pearson's correlation coefficient by which statistically significant results were obtained, indicating a positive relationship between age and total score of stress symptoms. As age increases the total score also increases implying that there is increase in the frequency of stress symptoms with age.(Fig.3)

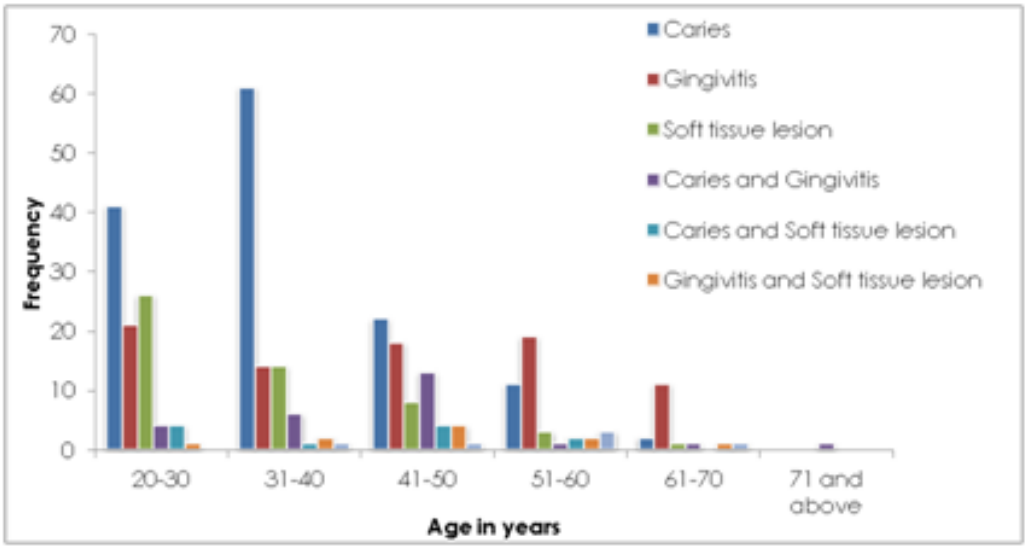


Figure 2: Bar chart showing the distribution of patients as per age and disorder

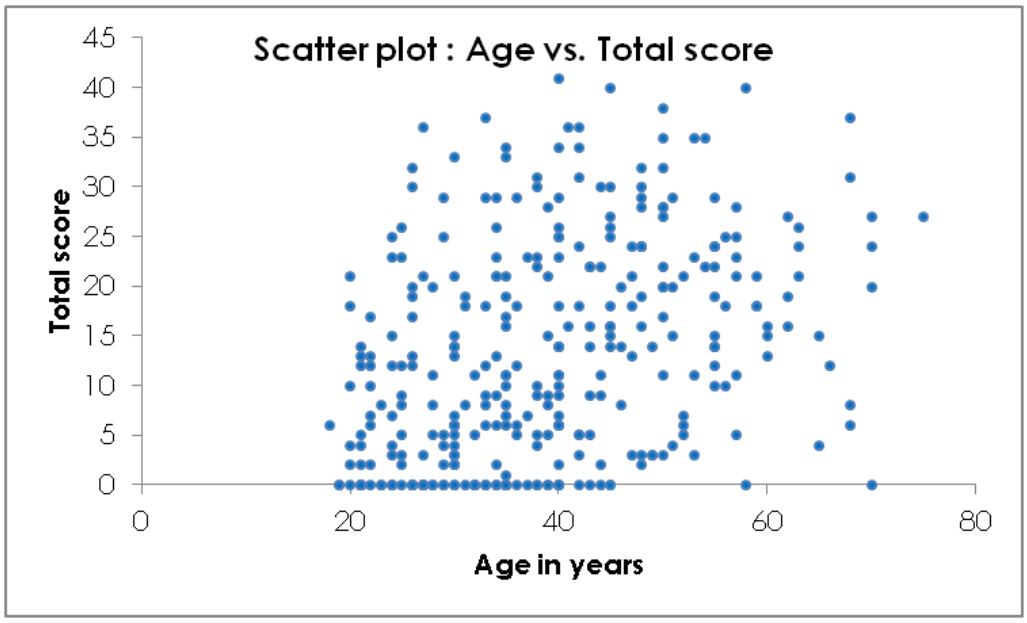


Figure 3: Scatter plot showing the relationship between age and total score.

Proportion of male and female in the Caries and Caries with Gingivitis group was nearly same. In patient groups with Gingivitis and Soft tissue lesion, the male cases were higher than that of female (Fig.4). There is insignificant difference in the mean stress symptom scores of male and female patients. In other words, mean symptom frequency is the same between genders (Fig. 5)

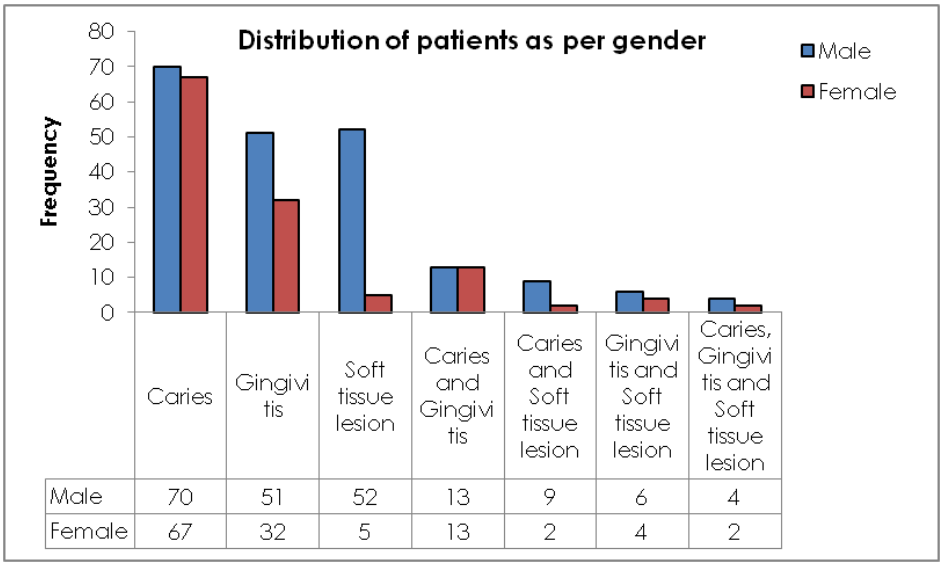


Figure 4: Bar chart showing distribution of patients as per gender and disorder

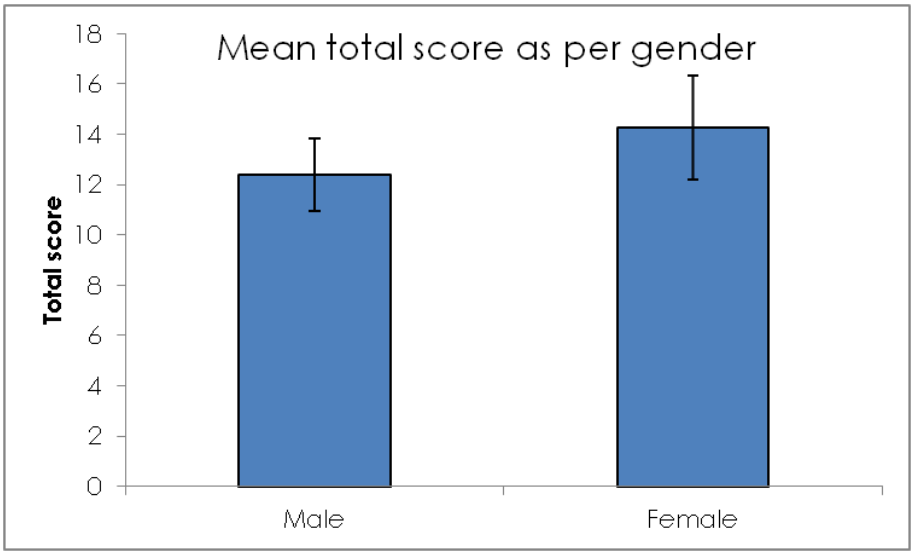
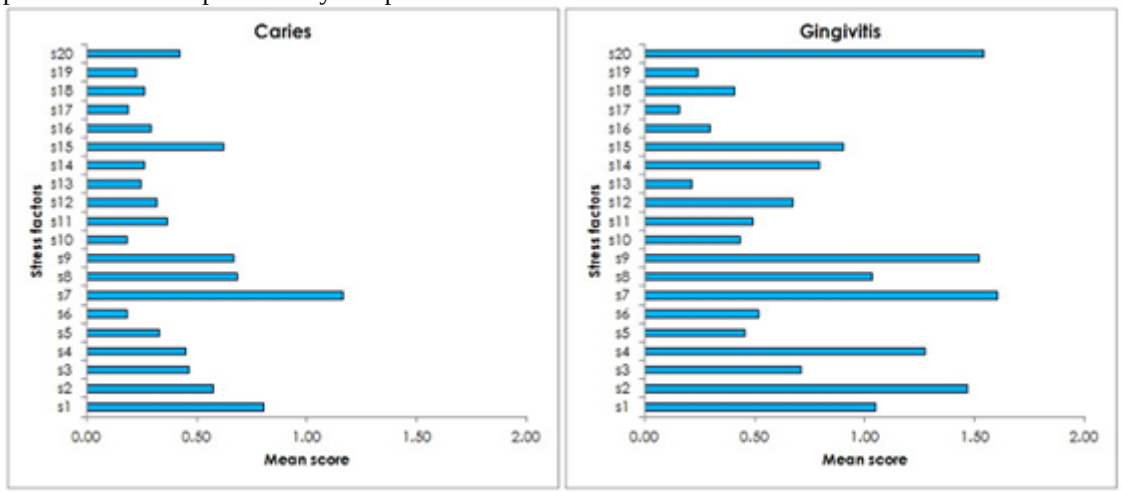


Figure 5: Bar chart showing the mean total score according to gender.

The mean scores for all stress symptoms according to the disorder were calculated to determine which symptoms occur more prominently in a particular oral disease.



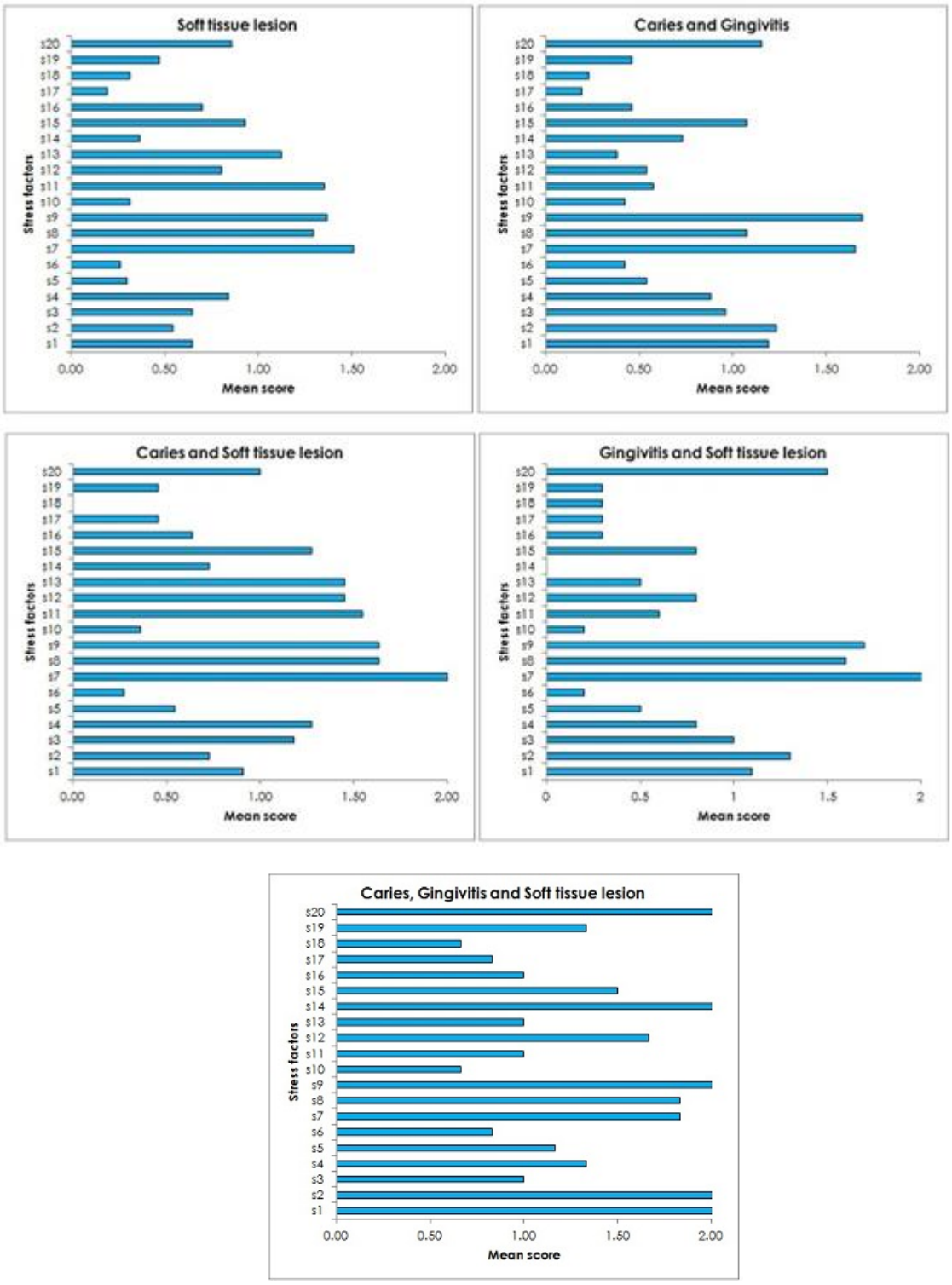


Figure 6: Bar chart showing the mean scores for each stress symptom for each disorder.

Caries: The mean scores for all the stress symptoms were less than 1 except symptom s7 indicating that in general in this group the frequency of occurrence of symptoms is rare.

Gingivitis: In patients with this disorder, symptoms s1, s2, s4 had average score of more than 1, indicating that these symptoms occur sometimes in patients. Symptoms like s7, s9 and s20 even exceeded 1.5 indicating that the occurrence of these symptoms is much frequently.

Soft tissue lesion: In this group, symptoms like s7, s8, s9, s11 were close to 1.5 implying a frequent occurrence of these symptoms.

Caries and Gingivitis: In patients with these two disorders, symptoms s7 and s9 exceeded 1.5 indicating much frequent occurrence of these symptoms.

Caries and Soft tissue lesion: Here, symptom s7, s8, s9 and s11 were above mean score of 1.5 with s7 touching 2. This revealed that symptom s7 was most often experienced by patients having both these disorders.

Gingivitis and Soft tissue lesion: In patients with these disorders, again s7, s8 and s9 had high mean scores above 1.5 and symptom s7 was experience quite often by the patients.

Caries, Gingivitis and Soft tissue lesion: In patients with all three disorders, symptoms s1, s2,s7, s8, s9, s14 and s20 were present quite often and evident though the bar chart.
Thus it is evident that the stress symptom s7, s8, s9 are the most commonly experienced symptoms by majority of the patients irrespective of the disorder.

Total Stress Symptom Score:

The association between oral disease and the stress was studied by statistical analysis using chi-square test. The test resulted into a p-value of 0.000002 ($p < 0.001$) indicating high significance of association between oral disease and stress. The significance was mainly contributed by higher proportion of patients in moderate and higher average class for Gingivitis and Soft tissue lesions as compared to Caries. In other words, patients with Gingivitis and Soft tissue lesion have more frequent stress symptoms compared to that of Caries (Fig. 7).

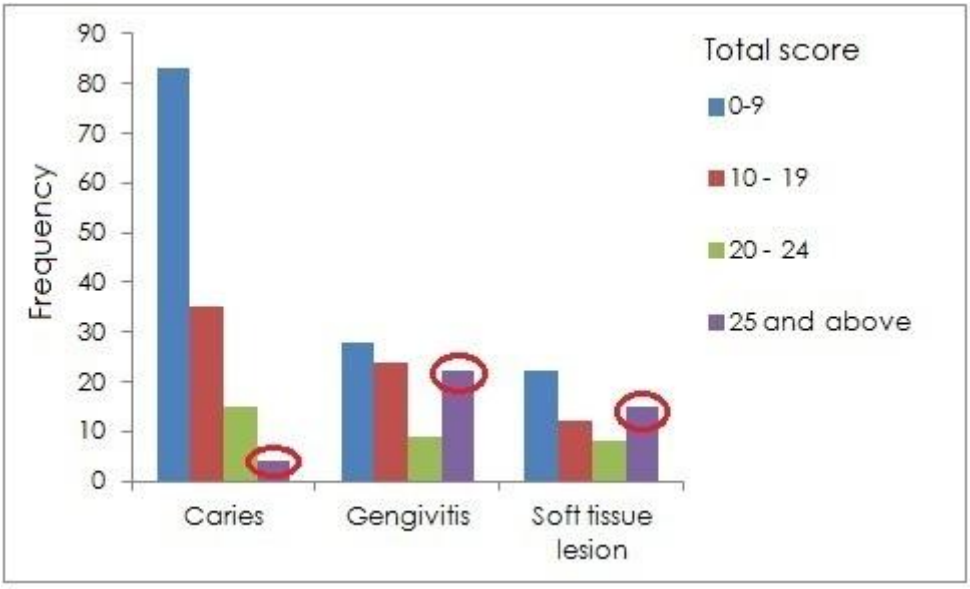


Figure 7: Higher number of patients with total score more than 25 in Gingivitis and Soft tissue lesion resulting in significant difference.

The total stress symptom score based on the frequency of occurrence of symptom was obtained for each of the patient by summing the scores across the twenty selected symptoms. Majority of the patients (147) had total score in the range 0-9 indicating lower than average total score, while 82 patients were in the average range (Fig 7).

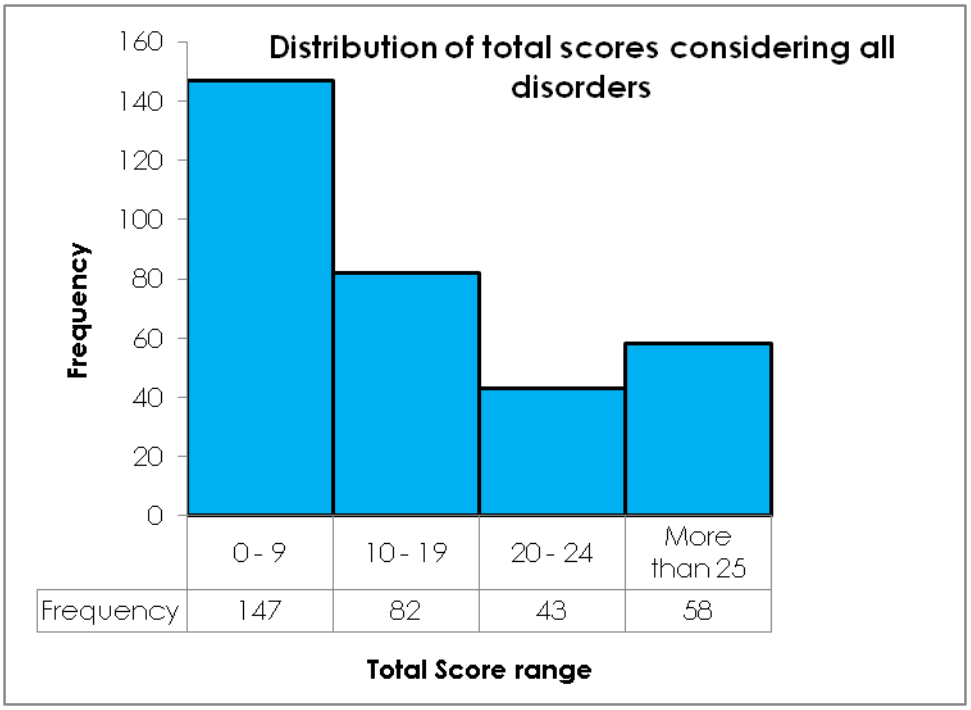


Figure 7: Histogram showing the distribution of total scores considering all disorders

IV. Discussion

Stress is a condition which affects us all. Stress has an enormous impact on physical health. As these effects are far- reaching, it is important to identify and manage the symptoms of mental stress in early stage. Many studies support and provide evidence that there is some association between stress and oral diseases.

A research study by Uma Maheshwari reported the association of stress with oral lesions like OLP, aphthous ulcers, burning mouth syndrome & MPDS. A review article by Dr. Sateesh stated that other than diminishing the immune system, stress also diminishes salivary flow & causes increase formation of dental plaque.[10] A recent study confirmed that the concentration of cortisol in gingival crevicular fluid is higher in person under stress.[7]

In previous studies, stress assessment of patients was studied in oral diseases in which already it has known that the disease has an association with stress. In this study all OPD patients irrespective of oral disease has examined and then assessed for presence of stress, after which evaluated for correlation between oral diseases and stress.

In this study we examined 400 patients. The chief oral findings seen were caries, gingivitis/periodontitis and soft tissue lesions. In our study we found that, some peculiar stress symptoms were more prominently seen in a particular disease. In patients with caries, symptom no. 7,1,8,9,15 were seen more. In gingivitis, symptom no. 7,20,9,2,1 were seen more and in patients with soft tissue lesion symptom no 7,9,11,8,13 were seen more.

The statistical analysis was done and it was found that gingivitis and soft tissue lesion had more correlation with stress as compared to caries since there was high proportion of stress symptom scores in gingivitis and soft tissue lesions than in caries patients. In patients with C+G, C+S, G+S, C+G+S, higher proportion of stress levels were present, but due to less number of patients in these groups, statistically significant results were not obtained.

Other than correlation of stress with oral diseases, we noticed that there was relation of stress with age and gender. The correlation of age and stress was found positive. So it was found that as age increases frequency of stress occurrence increases. The symptom frequency was same in both genders which was suggestive of insignificant difference in stress occurrence in male and female patients.

V. Conclusion

The result suggested that there was strong correlation of stress with gingivitis and soft tissue lesions. However, there was no strong evidence for association between stress and dental caries. The dentist, who treats patients with chronic oral diseases, must be able to recognize and obtain appropriate treatment for patients under stress, if the dentist is to succeed in managing the patients' oral problems.

According to these findings it is possible to assume that psychological factors should be taken into account when oral health wants to be maintaining as normal.

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