

Association of Stress, Depression and Anxiety with Periodontal Health Indicators among Professional Students

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ABSTRACT

Background: Stress is known to result in the development of depression and anxiety. This is commonly thought to have a net-negative effect on the efficacy of the immune response, subsequently resulting in periodontal breakdown.

Aim: The aim of this study is to assess the association of depression, anxiety and stress with periodontal health indicators among professional students.

Materials and Methods: The study was conducted amongst 50 undergraduate professional students visiting to private dental clinics. The stress and anxiety levels were assessed using Depression, Anxiety and Stress scale (DASS) and the clinical examination was done to assess the plaque index, gingival index, probing depth and clinical attachment level.

Results: A total of 31 women and 19 men participated in this study. Out of the 50 distributed and collected questionnaires, all 50 were complete and hence used for final analysis. DAS score shows moderate positive correlation with plaque score ($rs=0.617$), high positive correlation with gingival score ($rs=0.840$) and high positive correlation with periodontal score ($rs=0.814$) respectively. There was a significant relationship between DAS score and periodontal parameters score ($P < 0.05$). It was also found that there is no significant correlation among gender and psychological factors.

Conclusion: Psychological factors have an adverse effect over the plaque levels and gingival status among the students.

Keywords: Stress, periodontal health, plaque index

INTRODUCTION

Oral health is a major concern that not only influences the teeth and mouth, but also physical health, appearance and self-esteem. Periodontitis is a multi-factorial infection characterized by destructive inflammatory process affecting tooth supporting tissues thereby induces elevation of pro-inflammatory cytokines causing the tissue destruction.

Mental disorders such as depression and anxiety are ubiquitous problems worldwide. Although there are psychological and medical therapist of these disorders, half of the patients do not follow up the treatment and other half seek the treatment do not receive suitable treatment. It is proved that these conditions can influence the physical health by several pathophysiological mechanisms. It is proposed that these conditions can cause oral and dental problems since emotional changes can influence oral mucosa.¹

Due to their reduced defensive capability, stress plays an important role in immune response modulation. The body becomes more vulnerable to psychosomatic and inflammatory disorders as a result of this process. Since stressors may aggravate damage to the supporting and protecting tissue, this modulation can benefit the onset or development of periodontal disease.^{1,2}

Even though student's life is most desirable, it also imposes stresses that are inevitable. Due to various factors such as tight academic schedule, competitions among the students who are designated as professional students and also they being the future of professional suffer from the burden of achieving various targets amongst them contributing to the development of psychological stress. This excessive stress in turn increases the prevalence of psychological factor such as depression, anxiety and substance abuse and suicidal thoughts. Taking into consideration the prevalence of stress in different professionals this study was aimed to evaluate the association of depression, anxiety and stress on periodontal health indicators among the professional students.

MATERIALS AND METHODS

The observational study was conducted in 50 undergraduate professional students visiting to private dental clinics in Nagpur City. The study was approved by the Institutional Ethics Committee of VSPM's Dental College & Research Centre, Nagpur. A written informed consent was obtained from all the study participants. The inclusion criteria for the study were systemically healthy students, with no history of mental disorder or illness, no previous history of periodontal therapy. Students having diabetes, respiratory infection and/or on antibiotic treatment within the previous 3 months and those with habits of smoking and alcohol consumption were excluded from the study.

Questionnaire

The DAS Scale (DASS) is a self-report questionnaire designed to measure the severity of a range of symptoms common to DAS (Depression, Anxiety and Stress). Each question has four specified alternative answers giving scores ranging from 0 to 3: score 0 indicating that the participant "strongly disagree," score 1 indicating that the participant "disagree," score 2 indicating that the participant

"agree," and score 3 indicating that the participant "strongly agree". Scale to which each item belongs is indicated by the letters D (depression), A (anxiety), and S (stress). Higher scores indicate greater DAS levels in individuals. The questionnaire has total 20 questions (6 questions related to stress, 7 questions related to anxiety and 7 questions related to depression).

Clinical Parameters

Clinical examination, wherein Plaque index, Gingival index, Periodontal pocket depth and clinical loss of attachment were assessed. The questionnaire that was duly filled by the participants was collected from the study participants once the clinical examination was completed.

Statistical Analysis

Data was collected and analysed through the Statistical Package for the Social Sciences Package Version 20 Software. Correlations were made using the Spearman correlation test and post hoc test. Chi-square test was used to compare differences in periodontal diseases associated with general characteristics. $P < 0.05$ was considered to be statistically significant.

RESULTS

The study included 50 undergraduate professional students (31 females and 19 males).

Table 1 shows the gender based comparison of the presence of periodontal disease among the study population. It was found that 9 females and 4 males had terminal periodontal disease while 5 females and just 1 male had established destructive periodontal disease. Also 12 students displayed just the beginning of destructive periodontal disease and 9 of them had just simple gingivitis. Table 2 depicts association between stress and gender which was found to be non-significant. ($p=0.12$) Similar association was found between gender and depression and that with anxiety. ($P > 0.05$) (Table 3,4)

Table 1: Presence of periodontal disease gender distribution

Periodontal Score	Males	Females	Total
0.0-0.2= clinically normal supportive tissue	3	7	10
0.3-0.9= Simple gingivitis	5	4	9
0.7-1.9=beginning destructive periodontal disease	6	6	12
1.6-5.0= established destructive periodontal disease	1	5	6
3.8-8.0=terminal periodontal disease	4	9	13
	19	31	50

Table 2: Association between stress and gender

		Stress score			Total	Chi square	p-value	Result
		0-6	7-13	14-20				
Gender	Female	7	15	9	31	4.24	.120	Here, pvalue>0.05. Therefore, Ho may be accepted and it may be concluded that stress is independent of gender.
	Male	5	13	1				
Total		12	28	10	50			

Table 3: Association between anxiety and gender

		Anxiety score			Total	Chi square	p-value	Result
		0-6	7-13	14-20				
Gender	Female	7	12	12	31	5.434	0.07	Here, pvalue> 0.05. Therefore, Ho may be accepted and it may be concluded that anxiety is independent of gender
	Male	4	13	2				
Total		11	25	14	50			

Table 4: Association between Depression and Gender

		Depression score			Total	Chi square	p-value	Result
		0-6	7-13	14-20				
Gender	Female	7	17	7	31	1.16	0.560	Here, pvalue> 0.05. Therefore, Ho may be accepted and it may be concluded that depression is independent of gender
	Male	5	12	2				
Total		12	29	9	50			

Table 5: Correlation between stress, anxiety and depression and Plaque Score, Gingival Score and Periodontal Disease score

	Plaque Score(PS)	Gingivitis score(GS)	Periodontal score(PDS)
Stress level	.767**	.867**	.843**
p-value	.000	.000	.000
Anxiety level	.672**	.800**	.772**
p-value	.000	.000	.000
Depression Level	.652**	.766**	.716**
p-value	.000	.000	.000
DAS	.070	-.005	-.041
p-value	.707	.979	.825
**= statistically significant			
DAS = total of stress level, anxiety level and depression level			

Table 5 depicts Correlation between stress, anxiety and depression and Plaque score, Gingival Score and, Periodontal disease score and its gender wise distribution. A highly significant relationship between DAS score and periodontal parameters score was found. The Table 5 indicates that the total score on DAS scale questionnaire correlates positively with scores on periodontal parameters.

Stress levels showed moderate positive association with plaque (rs=0.613), high positive association with gingival score (rs=0.817) and high positive association with periodontal score (rs=0.827). P< 0.05 shows a significant correlation of stress with periodontal parameters.

Anxiety levels show moderate positive association with plaque (rs=0.597), high positive association with gingival score

(rs=0.804) and high positive association with periodontal score (rs=0.779). P< 0.05 shows a significant correlation of anxiety with periodontal parameters. Depression levels show moderate positive association with plaque (rs=0.612), high positive association with gingival score (rs=0.732) and high positive association with periodontal score (rs=0.705). P< 0.05 shows a significant correlation of depression with periodontal parameters.

DAS score shows moderate positive correlation with plaque score (rs=0.617), high positive correlation with gingival score (rs=0.840) and high positive correlation with periodontal score (rs=0.814) respectively. There was a significant relationship between DAS score and periodontal parameters score (P< 0.05). That means as stress level increases PS, GS, PDS

also increase, as anxiety level increases PS, GS, PDS also increase, as Depression level increases PS, GS, PDS also increase as DAS score increases PS, GS, PDS also increase.

DISCUSSION

Oral health reflects the general health and overall health status of an individual. Periodontal disease and tooth decay are among the most common ailments of the oral cavity. Periodontitis which is a multifactorial disease, is modified by various systemic conditions and risk factors such as age, diabetes, genetics, and psychological stress. On the other hand, stress has shown a direct association to periodontal disease which stands proven in the literature.⁴

Stress experienced in day-to-day life varies among the individuals depending on the various factors they are subjected to. Similarly, there is a variation in stress between professionals and non-professionals, wherein professionals have shown higher levels of stress when compared to non-professionals.⁵ Among the various professionals, health professionals are the one who play a vital role in the society. Hence, this study was taken up in an attempt to find the association of DAS with periodontal health indicators among professional students.⁶

Education in the any Professional field intends an intensive preparation of graduates in an attempt to achieve a personally rewarding and socially meaningful career, and hence, strenuous medical programs may have physical and psychological effects on the well-being of professional students.⁷

On the other hand, the academic and professional outcomes, which can be attributed to lower grades and career dissatisfaction, are the reasons behind stress attributed to the various professional students in the population. Even though the previously identified stressors in students included were examinations, lack of English proficiency, overstressed workload, etc., the scarcity of research on stress and mental

health of professional students makes it difficult to identify the predisposing factors behind.^{8,9}

On the other hand, various undergraduate professional students like engineer, doctors, pharmacist, architecture etc. require demanding nature of the training itself evidenced from the research, it was shown that professional undergraduate students experience considerable amount of stress during training. However, the research confirms that the main effects of stress are attributed to low academic performance and psychoemotional well-being.¹⁰

The fear of failing in examinations has been the main stressor across the 4/5-year study period to be the underlying cause that can be attributed to the stress among undergraduate professional students, regardless of the year of the course, and the reason attributed to the stress experienced by student was the significant workload, and these findings of our study are in coincidence with the study conducted to compare stress levels among various undergraduate professional students.^{11,12} However, conflicting results were obtained from various studies, regarding the comparison of these psychological factors among undergraduate professional students. Chronic stress has been thought to have net-negative effect on immune response, leading to imbalance between host and parasites, thereby resulting in periodontal breakdown. Previous studies have shown that academic stress among students can cause gingival inflammation and diminution of the quality of oral hygiene.^{10,13,14}

It has become more apparent that stress can negatively influence the oral health status. The present study revealed the increase in periodontal parameters is in positive correlation with increasing stress values among various undergraduate professional students. As a result of an increase in stress values, increase in PI and GI values was also evident. This correlation may be due to the negligence of oral hygiene practice under stressful conditions.

A few studies suggested that under conditions of stress, students generally neglect their oral health care, thereby affecting the plaque and gingival scores.^{5,6} These findings are in coincidence with the findings of our study. Similarly, other studies conducted to observe the effect of examination stress on periodontal health status suggested that there is a strong evidence of association between examination stress and periodontal parameters.⁷

Since 1950s, the role of emotional factors with regard to periodontal disease has been elicited in the literature. The association of stress with periodontal disease is difficult to prove since some of the factors that are assumed in the causation of periodontal disease have not been identified.^{8,9}

In the present study, higher levels of GI were seen among the students with higher mean values of DAS. One of the probable factors that can lead the patient to neglect oral hygiene could be attributed to the psychological disturbances having an unfavorable effect on the periodontal tissues.

On the other hand, participants who are highly susceptible to depression had shown higher values of PI and GI, the reason behind this being attributed to the direct influence of stress on the immune system, thereby resulting in increased susceptibility to periodontal disease.⁸ Similarly, a direct correlation between the severity of periodontal disease and the severity of depression has been evidenced in the literature.^{1,2}

On the other hand, present study shows that association of stress, depression and anxiety with periodontal health indicator among professional undergraduate students is independent of gender.

Interestingly, the findings of our study are in coincidence with most of the studies in the literature that have shown a significant relationship between the effects of DAS over periodontal health indicator.

CONCLUSION

Professional undergraduate students depicted higher values of both psychological and periodontal parameters. Therefore, it can be concluded that the psychological factors have an adverse effect over the plaque levels and gingival status among the students. The worsening of plaque values and GI values could be attributed to the negligence nature of oral hygiene maintenance during stressful conditions. Hence, it can be recommended that students should be educated about their oral hygiene maintenance and stress-oral hygiene relationship, thereby avoiding the stress-induced factor behind the negligence of oral hygiene.

Acknowledgement: None

Conflict of Interest: None

Source of Funding: None

Ethical Approval: Approved

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How to cite this article: Mankar K, Bawankar P, Chavan P et.al. Association of stress, depression and anxiety with periodontal health indicators among professional students. *International Journal of Science & Healthcare Research*. 2021; 6(2): 82-87. DOI: <https://doi.org/10.52403/ijshr.20210416>
