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Original Research Article

Assessing the psychological impact on periodontal health in a cohort of dental students in varying levels of academic sessions - A questionnaire based study

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Abstract

Background: Psychosocial variables like stress, depression, loneliness and anxiety act as a confounding factor in increasing the severity of Chronic Periodontitis which are common among college students for a variety of Reasons. It is a condition of physiological or psychological strain brought on by unfavorable internal or external physical, mental, or emotional stimuli.
Aim: Assessing the psychological impact on periodontal health in a cohort of dental students in varying levels of academic sessions.
Objective: A dichotomous self-structured questionnaire with Kappa testing with 10 explicit statements and questions were given to the subjects in which UCLA loneliness scale (Russell et al. 1980), the Spielberger et al. (1970) state-trait anxiety inventory (STAI) and DASS score was applied.
Materials and Methods: The questionnaire was pertinent to Stress, Anxiety, Depression and Loneliness in the two groups of students- Students appearing for exams (Test group) and Regular going students (Control group) subjects between 18-30 years to the students of ITS Dental College, Hospital and Research Centre, Greater Noida.
Result: 80.8% of the exam going students showed a positive co-relation between psychological state and their periodontal status.
Conclusion: This questionnaire-based study highlights a significant correlation between psychological stress and periodontal health among dental students at different academic levels. Elevated stress, anxiety, and emotional distress—especially during exams—were associated with poorer periodontal conditions. The findings emphasize that psychological well-being is not just a supplementary concern but a critical factor in maintaining oral health. These results reinforce the importance of a holistic approach to health in academic settings, advocating for strategies that prioritize both mental and periodontal well-being.

Keywords: Stress, Anxiety, Depression, Loneliness, Periodontitis, Students, Delhi-NCR, Oral Health

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1. Introduction

Periodontitis is one of the most prevalent non-communicable diseases globally and presents a major public health challenge due to its impact on oral and overall health. As a multifactorial inflammatory condition, periodontitis not only affects the tooth-supporting tissues but is also strongly linked with a variety of systemic conditions.[1] Increasing evidence indicates that aggressive periodontitis may be a significant risk factor for conditions such as cardiovascular disease, diabetes mellitus, chronic obstructive pulmonary disease, hypertension, and certain cancers.[2] Basically, periodontitis is an inflammatory infectious disease that occurs chronically due to the host's immune response against dental plaque microbial flora.[3,4]

Chronic inflammation of the periodontal tissues is elicited by persistent pathogens. This inflammation, mediated by the immune system, results in destruction of the tooth-supporting structures, clinically manifesting as loss of attachment, formation of periodontal pockets, and alveolar bone resorption. In advanced stages, patients present with mobility of teeth, gingival recession, and tooth loss.[5,6] In an effort to standardize the diagnosis and grading of the severity and progression of periodontitis, Tonetti et al. suggested a classification system in 2018 that was developed jointly by the European Federation of Periodontology and the American Academy of Periodontology.[7] This staging system classifies periodontitis based on clinical presentation and extent of periodontal support destruction, using clinical loss of

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attachment, radiographic evidence of bone loss, and tooth loss secondary to the disease as major criteria for staging.

Psychosocial factors like stress, depression, social isolation, and anxiety have been reported to be important confounding variables in the etiology and progression of Chronic Periodontitis, particularly in college students. These mental states can impair the immune system, rendering people more vulnerable to inflammation and compromising the body's capacity to resist periodontal infection.

Chronic periodontitis is an inflammatory condition of the tooth supporting tissues caused primarily by bacterial plaque. Psychosocial stressors, though, worsen the severity of the condition by affecting health habits like poor oral hygiene, smoking, inappropriate nutrition, and irregular dental check-ups.

Among university students, academic pressures, lifestyle alterations, financial stresses, and social adaptation lead to higher levels of psychological and emotional distress. Stress, more specifically, is a condition of mental or physical tension that occurs in response to undesirable internal or external stimuli. Its prolongation brings about physiological alterations like an elevated level of cortisol, which compromises the immune function and encourages periodontal tissue destruction.

As such, psychosocial health should be addressed in preventing and managing chronic periodontitis. The inclusion of stress management techniques, mental health assistance, and oral hygiene practice education can minimize the susceptibility and effect of periodontal diseases in this high-risk group.

2. Objective

A dichotomous self-structured questionnaire with Kappa testing with 10 explicit statements and questions were given to the subjects in which UCLA loneliness scale (Russell et al. 1980),[23] the Spielberger et ai. (1970)[24] state-trait anxiety inventory (STAI) and DASS score was applied.

3. Materials and Methods

A questionnaire consisting of 10 explicit statements and questions to assess Stress, Anxiety, Depression and Loneliness was prepared. The cohort consisted of students of ITS Dental College, Hospital and Research Centre, Greater Noida, belonging to the age group of 18-25 years. Students were divided into two groups- Exam-going (Test group) and Non- exam going (Control group). The questionnaire was filled 3 days prior to the first examination. This dichotomous self-structured questionnaire was given to 200 students using online Google forms out of which 193 responses were received, which underwent Kappa testing. Parameters assessed were UCLA loneliness scale (Russell et al. 1980),[23] STAI- State-Trait Anxiety Inventory (Spielberger et al. 1970) [24] and DASS score.(**Figure 1**,**2**)

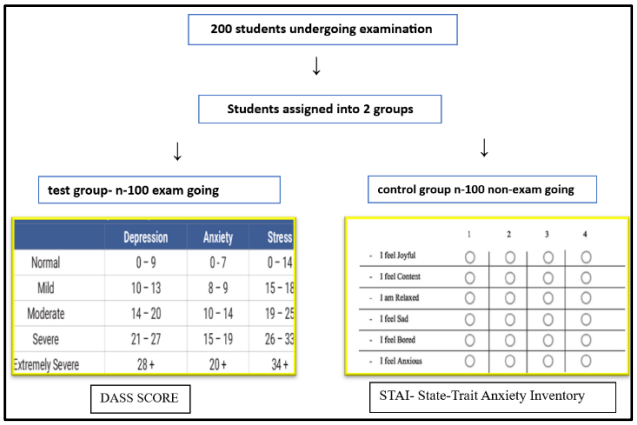

Figure 1: Study design flow diagram showing 200 students assigned into two groups: a test group (n = 100) undergoing examination assessed using the DASS (Depression, Anxiety, and Stress Scale), and a control group (n = 100) not undergoing examination assessed using the STAI (State–Trait Anxiety Inventory).

	M	SD	Corrected item-total correlations
1. I lack companionship	2.25	0.91	0.56
2. I feel part of a group of friends[a]	1.77	0.82	0.45
3. I feel left out	1.68	0.85	0.63
4. I feel isolated from others	1.89	0.95	0.69
5. I am unhappy being so withdrawn	2.20	0.85	0.62
6. People are around me but not with me	2.20	0.85	0.54

[a] Item should be reversed before scoring

Figure 2: Ucla loneliness scale

3.1. Questionaire

A self-structured questionnaire consisting of 10 questions was developed to assess the physical and psychological changes experienced by students during examination and non-examination phases. The items focused on identifying variations in bodily sensations, perceived stress levels, sleep patterns, appetite, and other relevant changes reported by students in both academic contexts.

3.2. Data collection

The questionnaires were distributed to the students via Google Forms through their respective university email addresses.

3.3. Statistical analysis

The data was tabulated and collected using Google Docs. The analysis and comparison were also done by google docs software.

4. Result

The results showed 80.8% of the exam going students showed a positive co-relation between psychological state and their periodontal status. Thereby implying that

psychological state impacts the periodontal health, and the overall quality of life of an individual.(**Figure 3**)

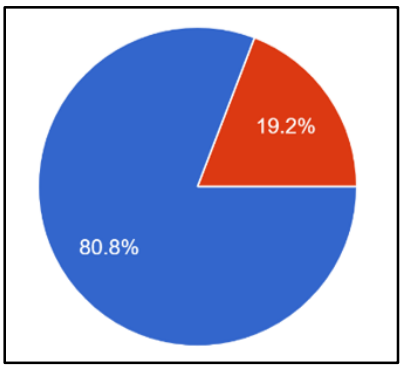

Figure 3: Exam going Students showed a positive under pie chart Co-relation between psychological state and their periodontal status

5. Discussion

The current study attempted to assess psychological burden among dental students during academic exams and its relationship with periodontal status. The results support the postulation that increased psychological stress can significantly influence oral health, especially periodontal status. More than 60% of the exam-attending students presented with high psychological distress, which was matched by worse periodontal health parameters compared with their non-exam peers.[8-12]

This correlation of psychological measures and periodontal status is in line with the literature, where stress, anxiety, and depression have been identified as major modifiers of host immune responses. Psychological stress has the potential to affect behavior, endocrine balance, and immune response. Increased levels of cortisol and catecholamines upon stress have been demonstrated to change immune regulation, inhibit antimicrobial action, and increase production of inflammatory cytokines, all of which could play a role in periodontal tissue destruction. Furthermore, neuroendocrine mechanisms may directly impact the vasculature and connective tissue that sustains the periodontium and compromise tissue integrity.[13-16]

Our research also identifies the behavioral effects of psychological stress. Stress resulting from exams is known to affect cognitive and executive abilities, compelling students to compromise on personal health habits such as oral hygiene routines. Irregular brushing, enhanced intake of comfort foods, poor sleep hygiene, and decreased motivation for regular checks are frequently seen under exam-related stress. These kinds of behavioral aspects are feasible causative factors for the enhanced intensity and prevalence of periodontal symptoms noted in the exam-seeking group.

Notably, the employment of established psychometric measures like the DASS-21, STAI (State-Trait Anxiety Inventory), and UCLA Loneliness Scale contributes to the legitimacy of students' psychological profiling in our cohort. These measures provide a multifaceted view of every psychological domain, enabling more precise correlation with outcomes of oral health. Our dichotomous approach—contrasting students receiving examinations and those not being actively involved in exams—brings further distinction by separating examination-associated psychological stress as a pivotal influencing variable.[17,18]

The novelty of the current study is in its thorough psychological evaluation through combined administration of the UCLA Loneliness Scale, State-Trait Anxiety Inventory (STAI), and Depression Anxiety Stress Scales (DASS-21)—a combination of instruments seldom used in tandem in periodontal investigations. Although DASS-21 has been used more frequently in clinical and educational environments to measure emotional distress, there has been little published literature regarding the use of the UCLA and STAI scales in assessing psychological effects on periodontal health. The UCLA scale alone assesses perceived social isolation, a variable that is frequently not addressed despite its established connection to mental and systemic health. Likewise, the STAI differentiates between transient state anxiety and more stable trait anxiety, providing a subtle understanding of an individual's stress profile. Integrating these indices, our study allows us to have a multi-dimensional perspective of psychological well-being, going beyond overall stress evaluation. This methodological strategy deepens the assessment of psychosocial influences and their effects on periodontal condition, distinguishing our research from what has been done before and opening the door to more integrative mental health screening in the field of oral health research. Interestingly, though earlier research such as that of Khalil et al. (2020) has shown the occurrence of psychosomatic oral symptoms under chronic stress, our research is different in methodology with its focus on an acute, academically triggered period of stress and its particular effect on periodontal health. This difference introduces a new aspect to previous studies and denotes the temporal effect of stress on the oral environment.[9]

Another research by Kaur[10] investigated the epidemiological prevalence of stress-related oral manifestations among the general population of Ludhiana and revealed a significant relation between psychological stress and the occurrence of aphthous ulcers, burning mouth syndrome, and periodontal disease. The findings indicated that people with higher levels of stress were highly susceptible to oral disorders, especially the inflammatory diseases of gums and mucosa. These results are consonant with the findings of our research, and this further supports the evidence that psychological stress is a causative factor for worsening periodontal health.[9] Kandagal et al. (2012) investigated the effect of psychological stress on the oral mucosa and discovered a direct relationship between increased levels of stress and the occurrence of oral lesions like recurrent aphthous ulcers, lichen planus, and burning mouth syndrome.[11]

The seminal exploratory research by Minneman et al.[12] (1995) examined the interplay among personality factors, stress levels, and gingival or soft tissue oral health. According to their findings, individuals with greater stress levels and particular personality types—greater neuroticism, for example—had increased likelihoods of poor gingival health and stress-induced oral pathologies.[11] These findings concur with our research's outcomes, verifying the connection between psychological stress and periodontal deterioration, especially in groups that are exposed to extreme mental strain, like dental students. The results of this study also raise more general questions about the responsibility of academic institutions to protect not only the intellectual development of students, but their well-being in general. Dental students, because of the rigorous nature of their curriculum and clinical roles, are potentially at greater risk for psychological stress, which itself puts them at risk for systemic and oral diseases.[19-22]

6. Strengths

This research uniquely examines the interface of psychological stress and periodontal status in dental students, a somewhat neglected but important group. A standardized, validated questionnaire was used, allowing for standardization of data collection and increased internal validity. Having students from different years allowed comparison between different levels of stress and educational experience, making the data and interpretation richer. The research responds to a significant matter of public health by delineating psychological stress as a modifiable risk factor in periodontal health.

7. Limitations

The cross-sectional study design restricts the potential to conclude causal associations between psychological stress and periodontal outcomes. Self-reported information can be vulnerable to response and recall bias, particularly with regard to psychological evaluations and oral hygiene habits. The sample was restricted to one geographic area/institutional setting, limiting generalizability of the results to larger student populations. The sample size is small and further studies are required.

8. Future Scope

Future studies should take a longitudinal design to monitor alterations in psychological stress and periodontal status longitudinally, particularly through key academic milestones. Clinical assessment of periodontal health with indices like GI, PI, and PPD, as well as saliva biomarkers of stress (e.g., cortisol), would be more complete and objective. Comparative research involving students from other disciplinary or different institutions of study may be utilized to examine whether dental education singularly contributes to psychological stress and oral health. Interventional research examining the effectiveness of stress management interventions upon periodontal health outcomes in students may be investigated.

9. Recommendations

Include routine mental health screenings and counseling sessions for dental students, particularly during high-stress academic periods like exams and clinical postings. Curricula in education programs should include modules on stress management skills, time management, study habits, and mental health in addition to clinical competencies. Urge institutions to implement holistic student wellness programs to enhance positive mental and oral health results. They must be taught about the two-way association between periodontal disease and stress, encouraging self-care and early treatment.

10. Conclusion

This research offers strong evidence that psychological distress during academic examination periods has a significant impact on periodontal health in dental students. The evident co-relation of high stress levels, anxiety, depression, and loneliness with poor periodontal status indicates that psychosocial health is not merely an ancillary consideration in dental education but is a key factor that determines the quality of life and overall health of students.

Considering the excessive occurrence of stress disorders in health professions students, the study emphasizes the immediate necessity for integrative health models in schools. Stress management treatments, availability of psychological counseling, mindfulness-based relaxation training, and college policies that enhance mental health consciousness could significantly help prevent stress-related periodontal deterioration.

In addition, regular screening for oral health and mental well-being at academic milestones might make possible the early detection of at-risk individuals, enabling interventions in a timely fashion. Peer-support groups and faculty mentorship programs could also serve as a buffer against academic stress, promoting resilience and healthy coping strategies.

Finally, the relationship between psychologic health and periodontal status determined in this study not only adds to the expanding literature on mind-body interactions for health but also inspires a change in policy at the educational level—a one that respects mental health as a fundamental pillar of academic and professional achievement. Subsequent studies with greater sample sizes and longitudinal follow-up would offer greater insights into the extended influence of psychosocial tension on both oral and systemic health outcomes.

11. Data Availability

The data supporting the findings of this study are available within the article.

12. Conflict of Interest

None.

13. Conflict of Interest

None.

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