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IMPACT OF PSYCHOACTIVE SUBSTANCE USE ON DENTAL CARIES, PERIODONTAL HEALTH, AND ORAL MUCOSAL LESIONS AMONG PATIENTS ATTENDING RINPAS

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ABSTRACT

Background: Psychoactive substance use is associated with multiple systemic and behavioral changes that adversely affect oral health. Individuals with substance use disorders often present with neglected oral hygiene, altered salivary flow, and increased exposure to chemical irritants, predisposing them to dental and periodontal diseases and oral mucosal lesions.
Aim: To assess the impact of psychoactive substance, use on dental caries experience, periodontal health, and oral mucosal lesions and to compare these findings with non-substance-using individuals.
Materials and Methods: A cross-sectional comparative study was conducted among 100 participants, including 50 psychoactive substance users and 50 age- and gender-matched controls. Dental caries was assessed using the Decayed, Missing, and Filled Teeth (DMFT) index. Periodontal status was evaluated using the Community Periodontal Index (CPI), and oral mucosal lesions were recorded through clinical examination. Data were analyzed using appropriate statistical tests, with a p-value <0.05 considered statistically significant.
Results: The mean DMFT score was significantly higher in substance users compared to controls. Periodontal disease indicators, including calculus and periodontal pockets, were more prevalent among substance users. Oral mucosal lesions were observed in more than half of the substance-using participants, with leukoplakia and oral submucous fibrosis being the most common. Longer duration of substance use was significantly associated with increased caries experience, periodontal disease severity, and mucosal lesions.
Conclusion: Psychoactive substance use is significantly associated with poor oral health outcomes. Early dental intervention and incorporation of oral health care into substance abuse management programs are crucial for preventing long-term oral complications.

Keywords*: Psychoactive substance use; Dental caries; Periodontal disease; Oral mucosal lesions; Substance abuse; Oral health.*

INTRODUCTION

Psychoactive substance use is a major public health problem worldwide and includes the consumption of substances such as tobacco, alcohol, cannabis, opioids, and stimulants. These substances act on the central nervous system and can lead to dependence, behavioral changes, and long-term health consequences. According to the World Health Organization, substance use disorders contribute significantly to global disease burden and are associated with both physical and mental health complications [1].

Substance abuse has a well-documented negative impact on oral health. Individuals using psychoactive substances often show higher prevalence of dental caries, periodontal disease, and oral mucosal lesions when compared to the general

population. These oral conditions arise due to a combination of factors including poor oral hygiene practices, neglect of dental care, dietary habits rich in fermentable carbohydrates, xerostomia, and the direct effects of substances on oral tissues [2]. In addition, many psychoactive drugs reduce salivary flow and alter salivary composition, which compromises the natural protective mechanisms of the oral cavity.

Dental caries is commonly reported among substance users due to reduced salivary buffering capacity, increased intake of sugary foods and beverages, and prolonged exposure to acidic environments. Periodontal disease is also prevalent, particularly among tobacco and alcohol users, owing to impaired immune response, altered inflammatory mechanisms, and poor plaque control [3]. Furthermore, oral mucosal lesions such as leukoplakia, erythroplakia, candidiasis, and traumatic ulcers are frequently observed in individuals with substance use disorders, especially those using tobacco and alcohol [4].

Behavioral and psychosocial factors further contribute to oral health deterioration in substance users. Many individuals with addiction experience poor motivation for self-care, irregular lifestyles, coexisting mental health disorders, and limited access to dental services. These factors often result in delayed diagnosis and progression of oral diseases to advanced stages [5,6].

Despite increasing awareness of the oral consequences of substance abuse, limited studies have comprehensively evaluated dental caries, periodontal status, and oral mucosal lesions together in individuals using psychoactive substances. Understanding the overall oral health impact of substance use is essential for early identification, preventive planning, and integrated care involving dental and medical professionals. Therefore, the present study aims to assess the impact of psychoactive substance use on dental caries, periodontal health, and oral mucosal lesions.

MATERIALS AND METHODS

Study Design and Setting

The present study was conducted as a cross-sectional analytical study to assess the impact of psychoactive substance use on dental caries, periodontal health, and oral mucosal lesions. The study was carried out in dental and psychiatry OPD of Ranchi Institute of Neuro-Psychiatry and Allied Sciences, Kanke. Ethical clearance was obtained from the Institutional Ethics Committee prior to the commencement of the study. Written informed consent was obtained from all participants. Participant confidentiality was maintained throughout the study.

Study Population

The study population consisted of adult individuals aged 18 years and above. Participants were divided into two groups:

- Study group: Individuals with a history of psychoactive substance use
- Control group: Age- and gender-matched individuals with no history of psychoactive substance use

Inclusion Criteria

- Individuals aged 18 years and above
- Study group participants had current or past use of psychoactive substances (tobacco, alcohol, cannabis, opioids, or stimulants) for a minimum duration of one year
- Control group participants had no history of psychoactive substance use
- Individuals who provided written informed consent

Exclusion Criteria

- Individuals with systemic diseases known to affect oral health (e.g., diabetes mellitus, immunodeficiency disorders)
- Individuals undergoing chemotherapy or radiotherapy
- Participants who had received periodontal therapy within the previous six months
- Individuals who were unwilling to participate or unable to cooperate during the oral examination

Sample Size

The sample size was calculated based on previous studies comparing oral health parameters between substance users and non-users. A minimum of 50 participants in each group was included to ensure adequate statistical power.

Data Collection

Data were recorded using a structured proforma. Demographic details such as age, gender, and socioeconomic status were documented. Detailed substance use history, including type of substance, duration of use, frequency, and route of administration, was also recorded.

All participants underwent a comprehensive oral examination performed by a single calibrated examiner under natural light using a sterile mouth mirror and explorer. Dental caries was assessed using the Decayed, Missing, and Filled Teeth (DMFT) index. Periodontal status was evaluated using the Community Periodontal Index (CPI). Oral mucosal lesions were identified based on clinical appearance and recorded according to standard diagnostic criteria.

Prior to the study, the examiner was calibrated by examining 10 individuals who were not included in the main study. Intra-examiner reliability was assessed using kappa statistics to ensure consistency in clinical assessments.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using Statistical Software for Social Sciences 26.0 version. Descriptive statistics were used to summarize demographic and clinical variables. The independent t-test was applied to compare mean DMFT scores between the study and control groups. The Chi-square test was used to assess differences in periodontal status and oral mucosal lesions. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 100 participants were included in the study, comprising 50 individuals with psychoactive substance use (study group) and 50 non-substance users (control group). All participants completed the clinical oral examination and were included in the final analysis.

Demographic Characteristics

The mean age of participants in the study group was 34.6 ± 8.2 years, while that of the control group was 33.9 ± 7.9 years. Males predominated in both groups. There was no statistically significant difference between the groups with respect to age and gender distribution, indicating comparability of the study population as seen in Table 1.

Table 1. Demographic Distribution of Study Participants

Variable	Study Group (n = 50)	Control Group (n = 50)	p-value
Mean age (years)	34.6 ± 8.2	33.9 ± 7.9	0.68 (NS)
Males	38 (76%)	36 (72%)	0.65 (NS)
Females	12 (24%)	14 (28%)	

NS = Not Significant

The mean DMFT score was significantly higher among psychoactive substance users (5.42 ± 2.31) compared to controls (2.18 ± 1.46). This difference was statistically significant, indicating greater caries experience among substance users as seen in Table 2.

Table 2. Comparison of Mean DMFT Scores Between Groups

Group	Mean DMFT ± SD	p-value
Study group	5.42 ± 2.31	<0.001*
Control group	2.18 ± 1.46	

* = Significant

Periodontal examination revealed a significantly higher prevalence of periodontal disease among substance users. Bleeding on probing, calculus, and periodontal pockets were more frequently observed in the study group compared to the control group as observed Table 3.

Table 3. Distribution of CPI Scores Between Groups

CPI Score	Description	Study Group n (%)	Control Group n (%)	p-value
0	Healthy	6 (12%)	22 (44%)	
1	Bleeding	10 (20%)	14 (28%)	
2	Calculus	18 (36%)	10 (20%)	<0.001*
3	Pocket 4–5 mm	12 (24%)	4 (8%)	
4	Pocket ≥6 mm	4 (8%)	0 (0%)	

* = Significant

Oral mucosal lesions were observed in 56% of participants in the study group, whereas only 10% of control subjects exhibited mucosal changes. The most common lesions among substance users were leukoplakia, oral submucous fibrosis, and nicotine stomatitis as seen in Table 4.

Table 4. Prevalence of Oral Mucosal Lesions

Lesion Type	Study Group n (%)	Control Group n (%)	p-value
No lesion	22 (44%)	45 (90%)	
Leukoplakia	12 (24%)	2 (4%)	
Oral submucous fibrosis	8 (16%)	0 (0%)	<0.001*
Nicotine stomatitis	6 (12%)	1 (2%)	
Aphthous ulcers	2 (4%)	2 (4%)	

* = Significant

Participants with a longer duration of substance use (>5 years) demonstrated significantly higher DMFT scores and greater periodontal destruction compared to those with shorter duration of use as seen in Table 5.

Table 5. Association Between Duration of Substance Use and Oral Health Parameters (Study Group)

Parameter	≤5 years (n = 22)	>5 years (n = 28)	p-value
Mean DMFT	4.12 ± 1.85	6.43 ± 2.18	0.002*
CPI ≥3 (%)	27.3%	57.1%	0.01*
Mucosal lesions (%)	36.4%	71.4%	0.004*

* = Significant

The results demonstrated that individuals with psychoactive substance use had significantly poorer oral health status compared to non-users. Higher dental caries experience, increased periodontal disease severity, and a greater prevalence of oral mucosal lesions were consistently observed among substance users. The severity of oral manifestations increased with longer duration of substance use.

DISCUSSION

The present study evaluated the impact of psychoactive substance use on dental caries experience, periodontal health, and oral mucosal status. The findings demonstrated that individuals using psychoactive substances exhibited significantly poorer oral health compared to non-users, with higher caries experience, increased periodontal destruction, and a greater prevalence of oral mucosal lesions. These results support the hypothesis that psychoactive substance use has a detrimental effect on multiple aspects of oral health.

Dental Caries Experience

The study group showed significantly higher mean DMFT scores compared to the control group. This finding is consistent with previous reports indicating that substance users are at greater risk of dental caries due to a combination of xerostomia, poor oral hygiene practices, high intake of refined carbohydrates, and irregular dental visits [7,8]. Many psychoactive substances, including opioids, cannabis, and stimulants, are known to reduce salivary flow either directly or indirectly through dehydration and sympathetic stimulation, thereby reducing the protective buffering and cleansing actions of saliva [9].

Additionally, lifestyle factors such as neglect of oral hygiene, limited access to dental care, and prioritization of substance use over health-seeking behaviors further contribute to the increased caries burden observed among substance users. The progressive increase in DMFT scores with longer duration of substance use observed in this study highlights the cumulative effect of chronic exposure on dental hard tissues.

Periodontal Health Status

Periodontal assessment revealed significantly worse periodontal status among psychoactive substance users, with a higher prevalence of calculus, bleeding on probing, and periodontal pockets. These findings are in agreement with earlier studies that reported increased periodontal disease severity among individuals with substance use disorders [10,11]. Poor plaque control, altered immune responses, and vasoconstrictive effects of certain drugs are known contributors to periodontal tissue breakdown.

Substances such as tobacco, alcohol, and stimulants impair neutrophil function and reduce gingival blood supply, which compromises host defense mechanisms and accelerates periodontal destruction [12]. The higher proportion of CPI scores indicating periodontal pockets in long-term users in the present study suggests that duration of substance use plays a critical role in periodontal disease progression.

Oral Mucosal Lesions

A significantly higher prevalence of oral mucosal lesions was observed among substance users compared to controls. Leukoplakia, oral submucous fibrosis, and nicotine stomatitis were the most frequently encountered lesions. These findings align with established literature demonstrating strong associations between substance use—particularly tobacco, areca nut, and alcohol—and potentially malignant oral disorders [13].

The frequent exposure of oral mucosa to chemical irritants, thermal injury, and carcinogens in psychoactive substances leads to chronic epithelial irritation and dysplastic changes. The presence of a higher number of mucosal lesions among individuals with longer duration of substance use further reinforces the dose- and time-dependent nature of these oral manifestations.

Clinical and Public Health Implications

The results of this study emphasize the importance of integrating oral health assessment into substance abuse management programs. Early identification of dental and periodontal disease, along with screening for oral mucosal lesions, can

facilitate timely intervention and reduce long-term morbidity. Dental professionals should be actively involved in multidisciplinary care teams managing individuals with substance use disorders.

From a public health perspective, targeted oral health education, preventive strategies, and accessible dental services are essential for this vulnerable population. Addressing oral health needs may also improve overall quality of life and treatment adherence in individuals undergoing rehabilitation.

Limitations and Future Directions

Although the study provided valuable insights, its cross-sectional design limits causal interpretation. Self-reported substance use patterns may also be subject to reporting bias. Future longitudinal studies incorporating salivary biomarkers, microbial profiling, and substance-specific analyses could provide deeper understanding of the biological mechanisms linking psychoactive substance use and oral disease.

CONCLUSION

The present study demonstrated that psychoactive substance use has a significant adverse impact on oral health. Individuals using psychoactive substances showed higher dental caries experience, poorer periodontal health, and a markedly increased prevalence of oral mucosal lesions compared to non-users. The severity of oral disease was greater among participants with a longer duration of substance use, indicating a cumulative harmful effect. These findings highlight that oral health deterioration among substance users is multifactorial, influenced by behavioral neglect, altered salivary function, immune compromise, and direct toxic effects of psychoactive agents on oral tissues. Early identification of oral disease and routine dental screening should be integrated into substance abuse treatment and rehabilitation programs.

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