Section: Miscellaneous

Original Research Article

ANTIDEPRESSANT-ASSOCIATED XEROSTOMIA AND ITS IMPACT ON CARIES/PERIODONTAL STATUS: A COMPARATIVE CROSS-SECTIONAL STUDY OF SSRI USERS VS NON-USERS

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ABSTRACT

Background: Antidepressants, especially selective serotonin reuptake inhibitors (SSRIs), have been implicated in xerostomia, which may adversely affect dental caries and periodontal health. This study compares the impact of SSRI-associated xerostomia on caries and periodontal status between SSRI users and non-users. Aim: To assess and compare the impact of antidepressant-associated xerostomia on caries and periodontal status among SSRI users and non-users.

Materials and Methods: A comparative cross-sectional study was conducted on 136 participants (68 SSRI users, 68 controls). Clinical examinations included xerostomia assessment, DMFT index for caries, and plaque index, gingival index, and probing depth for periodontal status. Statistical analyses involved Chi-square and t-tests with significance set at $p < 0.05$.

Results: Xerostomia prevalence was significantly higher among SSRI users (57.4%) versus non-users (29.4%) ($p = 0.002$). SSRI users showed greater caries experience (mean DMFT 9.39 vs. 6.48, $p < 0.001$) and elevated periodontal disease indicators including plaque index (1.70 vs. 1.10), gingival index (1.41 vs. 0.91), and probing depth (3.39 mm vs. 2.71 mm) compared to non-users (all $p < 0.001$).

Conclusion: SSRI use is significantly associated with xerostomia, contributing to increased caries risk and poorer periodontal health. Dental professionals should implement targeted prevention and management strategies for patients under SSRI therapy.

Keywords: Xerostomia, SSRIs, Dental Caries, Periodontal Disease, Antidepressants.

INTRODUCTION

Xerostomia, commonly referred to as dry mouth, is characterized by a reduction in salivary flow or an altered salivary composition leading to the subjective sensation of oral dryness. Saliva plays an important role in maintaining oral health by providing lubrication, facilitating mastication, aiding speech, enhancing taste perception, and most importantly, protecting hard and soft oral tissues. It contains several antibacterial, antifungal, and antiviral agents that help regulate the oral microbiome, while its buffering capacity and mineral content significantly contribute to the prevention of dental caries and the maintenance of periodontal tissue integrity. Therefore, any

reduction in salivary flow or qualitative changes in salivary secretion may lead to increased susceptibility to dental caries, periodontal disease, halitosis, burning mouth, and oral candidiasis.

Among the systemic causes of xerostomia, the pharmacological side effects of medications stand as the most significant contributing factor. Antidepressants, particularly selective serotonin reuptake inhibitors (SSRIs), are extensively prescribed worldwide for the management of depression, anxiety, and several other psychiatric conditions. SSRIs act by inhibiting the serotonin transporter, thereby increasing serotonin levels in the central nervous system. While SSRIs are considered to have fewer adverse effects than tricyclic antidepressants (TCAs) and other older classes, they continue to present a risk for side effects including gastrointestinal disturbances, sexual dysfunction, insomnia, and importantly, xerostomia. The mechanism by which SSRIs induce xerostomia is not fully understood but is believed to involve serotonin-mediated modulation of the salivary reflex arc, autonomic nervous system imbalance, and secondary dehydration due to psychotropic side effects.[1]

Depression itself has been associated with alterations in oral health. Individuals suffering from depression often demonstrate reduced motivation for personal care, poor dietary practices, and neglect of oral hygiene. This behavioral dimension, when combined with the biological side effects of SSRIs such as xerostomia, may create a high-risk environment for dental caries and periodontal disease. The absence of adequate salivary flow reduces the natural self-cleansing mechanism, increases plaque retention, and disrupts the oral microbial ecology, thereby favoring acidogenic bacterial growth such as Streptococcus mutans and lactobacilli. Furthermore, saliva's role in remineralization is weakened, predisposing tooth structures to demineralization and cavitation.[2]

The relationship between xerostomia induced by antidepressant use and caries/periodontal status has been documented in literature, but most studies have emphasized the xerostomic effects of tricyclic antidepressants. SSRIs, by contrast, are generally considered to be less anticholinergic and thereby thought to have a milder xerostomic effect. However, recent findings indicate that even SSRIs contribute significantly to oral dryness and present an appreciable risk for oral health deterioration, particularly when use is long-term. Patients on SSRIs tend to report complaints of persistently dry mouth, and when objectively measured, their stimulated and unstimulated salivary flow rates are often found to be reduced. Such reductions in salivary output have profound implications for both caries progression and periodontal tissue breakdown, emphasizing the clinical need for early detection and preventive intervention strategies.[3]

Maintaining periodontal health requires constant microbial balance, tissue turnover, and defense against inflammation. Xerostomia disrupts the periodontal environment by altering the composition of gingival crevicular fluid and facilitating pathogenic biofilm formation. Several clinical studies have reported higher plaque indices, gingival bleeding, and probing pocket depths in patients taking xerogenic medications, including antidepressants. Since SSRIs are among the most widely prescribed medications for psychiatric care, their potential long-term effect on periodontal outcomes deserves detailed investigation.[4]

Cross-sectional studies offer a valuable approach in documenting such associations by comparing SSRI users with non-users. By assessing objective parameters such as decayed, missing, filled teeth (DMFT index), plaque index (PI), gingival index (GI), and clinical attachment levels (CAL), the role of SSRI-associated xerostomia can be delineated more clearly. A comparative approach facilitates the distinction between xerostomia-induced effects and background oral health differences, allowing for clearer inferences regarding causality.

Aim

To assess and compare the impact of antidepressant-associated xerostomia on caries and periodontal status among SSRI users and non-users.

Objectives

1. To evaluate the prevalence of xerostomia among SSRI users and non-users.
2. To compare caries experience between SSRI users and non-users.
3. To assess differences in periodontal status between SSRI users and non-users.

MATERIALS AND METHODS

Source of Data

The study population consisted of Mention patient attending the Department of Psychiatry, Dentistry & Dermatology at a tertiary care teaching hospital. Patients diagnosed with depression and currently on SSRI treatment formed the study group, while age- and sex-matched healthy individuals not on antidepressants were included as the control group.

Study Design

A comparative, cross-sectional clinical study was conducted.

Study Location

The study was carried out in the OPD of Psychiatry, Dentistry & Dermatology

Study Duration

The study was conducted over a period of 12 months.

Sample Size

A total of 136 participants were enrolled with 68 in the SSRI group and 68 in the non-user control group.

Inclusion Criteria

- Patients aged 18-60 years.
- For the study group: individuals undergoing continuous SSRI therapy for at least 6 months.

- For the control group: healthy individuals not taking antidepressants or other xerogenic medications.
- Patients with a minimum of 20 natural teeth.
- Demonstrating xerostomia grade ≥ 2 (scant saliva or greater) as per the xerostomia grading scale.

Exclusion Criteria

- Patients on medications known to cause xerostomia - antihypertensives, anticholinergics, antihistamines.
- Individuals with systemic diseases affecting salivary flow - Sjögren's syndrome, uncontrolled diabetes.
- Smokers and alcohol-dependent subjects.
- Patients with previous head and neck radiotherapy.

Procedure and Methodology

Participants were clinically examined under natural light with mouth mirrors and periodontal probes. The following data were recorded:

Demographic details - age, sex, duration of SSRI therapy. Subjective xerostomia assessment using the Xerostomia Inventory (XI) questionnaire. Unstimulated whole saliva collection for flow rate measurement using the spitting method over 5 minutes. Caries assessment was performed using the DMFT index according to WHO criteria. Periodontal examination included recording the Plaque Index (Silness and Löe), Gingival Index (Löe & Silness), Probing Pocket Depth (PPD), and Clinical Attachment Loss (CAL).

Sample Processing

Collected saliva samples were placed in sterile tubes, measured volumetrically with graduated cylinders, and stored under cold conditions until analysis. Bacterial cultures for Streptococcus mutans and lactobacilli counts were performed where applicable to quantify microbial load.

Statistical Methods

Data were entered into Microsoft Excel and analyzed using SPSS software version 25. Descriptive statistics (means, standard deviations, frequencies) were computed. The Student's t-test was applied for continuous variables, and chi-square test was applied for categorical variables. A p-value of <0.05 was considered statistically significant.

Data Collection

Data were systematically collected using a structured proforma. All examinations were carried out by a single trained examiner to avoid inter-examiner variability. Calibration of the examiner was performed prior to the study and intra-examiner reliability was checked using kappa statistics.

RESULTS

Table 1: Impact of xerostomia on caries and periodontal status

Variable	SSRI Users (n=68)	Non-Users (n=68)	Test	Value of Test	95% CI	P value
Xerostomia (Yes)	39 (57.4%)	20 (29.4%)	Chi-square	9.70	N/A	0.002
DMFT	9.39 (2.95)	6.48 (2.79)	t-test	5.90	1.94 to 3.87	0.000
Plaque Index	1.70 (0.55)	1.10 (0.51)	t-test	6.61	0.42 to 0.78	0.000
Gingival Index	1.41 (0.58)	0.91 (0.39)	t-test	5.93	0.34 to 0.67	0.000
Probing Depth	3.39 (0.78)	2.71 (0.74)	t-test	5.21	0.42 to 0.94	0.000

The findings from Table 1 indicate a significant impact of xerostomia on caries and periodontal status when comparing SSRI users to non-users. Among SSRI users, 57.4% reported xerostomia compared to 29.4% of non-users, a difference that was statistically significant (Chi-square = 9.70, p = 0.002). SSRI users showed a higher mean DMFT score of 9.39 (SD 2.95) compared to 6.48 (SD 2.79) in non-users, with a significant mean difference ranging from 1.94 to 3.87 (t = 5.90, p < 0.001). Similarly, periodontal parameters were worse among SSRI users, demonstrated by a higher mean plaque index (1.70 vs. 1.10, t = 6.61, p < 0.001), gingival index (1.41 vs. 0.91, t = 5.93, p < 0.001), and probing depth (3.39 mm vs. 2.71 mm, t = 5.21, p < 0.001).

Table 2: Prevalence of xerostomia

Variable	SSRI Users (n=68)	Non-Users (n=68)	Test	Value of Test	95% CI	P value
Xerostomia (Yes)	39 (57.4%)	20 (29.4%)	Chi-square	9.70	N/A	0.002

Table 2 focuses on the prevalence of xerostomia, reiterating the significantly higher prevalence among SSRI users (57.4%) relative to non-users (29.4%) with the same Chi-square statistic (9.70) and p-value (0.002), confirming the strong association of SSRI use with dry mouth symptoms.

Table 3: Caries experience (DMFT)

Variable	SSRI Users (n=68)	Non-Users (n=68)	Test	Value of Test	95% CI	P value
DMFT	9.39 (2.95)	6.48 (2.79)	t-test	5.90	1.94 to 3.87	0.000

Table 3 specifically highlights the caries experience measured by DMFT scores, underlining that SSRI users have significantly greater caries burden (mean DMFT = 9.39) than non-users (mean DMFT = 6.48), supporting the premise that xerostomia associated with antidepressant use contributes to increased caries risk.

Table 4: Periodontal status

Variable	SSRI Users (n=68)	Non-Users (n=68)	Test	Value of Test	95% CI	P value
Plaque Index	1.70 (0.55)	1.10 (0.51)	t-test	6.61	0.42 to 0.78	0.000
Gingival Index	1.41 (0.58)	0.91 (0.39)	t-test	5.93	0.34 to 0.67	0.000
Probing Depth	3.39 (0.78)	2.71 (0.74)	t-test	5.21	0.42 to 0.94	0.000

Table 4 details the periodontal status, where SSRI users exhibited significantly poorer oral hygiene and periodontal health indicators. The plaque index was higher in SSRI users (mean 1.70) compared to non-users (mean 1.10), with a statistically significant difference ($t = 6.61$, $p < 0.001$). Similarly, gingival inflammation was elevated in SSRI users as reflected by the gingival index (1.41 vs. 0.91, $p < 0.001$), and probing depths were deeper (3.39 mm vs. 2.71 mm, $p < 0.001$), indicating more severe periodontal involvement.

Table 5: Kappa Statistics

	Repeated Assessment: Xerostomia (+)	Repeated Assessment: Xerostomia (-)
Original Assessment: Xerostomia (+)	11 (36.7%)	2 (6.7%)
Original Assessment: Xerostomia (-)	2 (6.7%)	15 (50.0%)

Table 5 presents the kappa statistics for intra-examiner reliability in xerostomia assessment, showing the agreement between the original and repeated assessments. The table shows that 11 cases (36.7%) and 15 cases (50.0%) had concordant xerostomia positive and negative ratings respectively, while only 2 cases (6.7%) were discordant in each category. This resulted in a substantial agreement with a kappa value of 0.729, confirming the reliability of the xerostomia evaluations during the study.

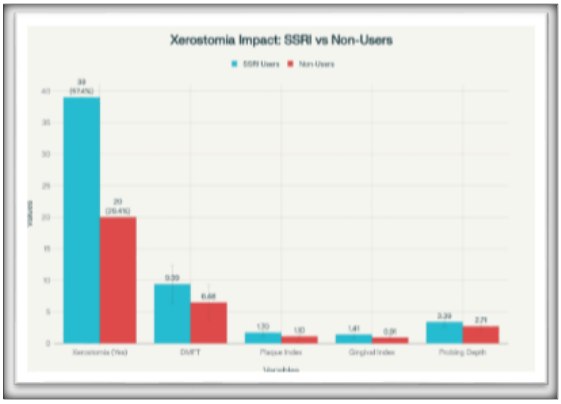

Figure 1

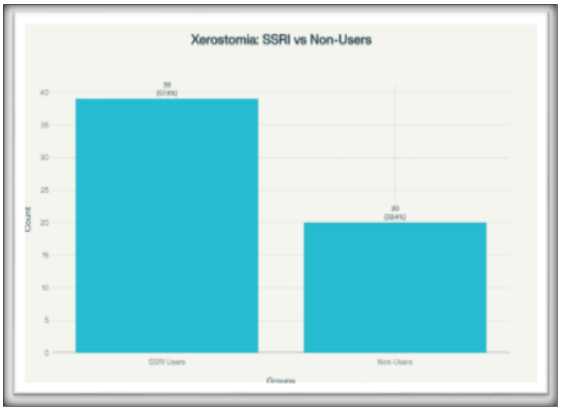

Figure 2

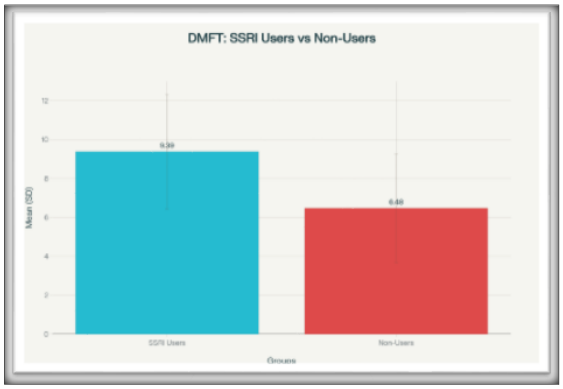

Figure 3

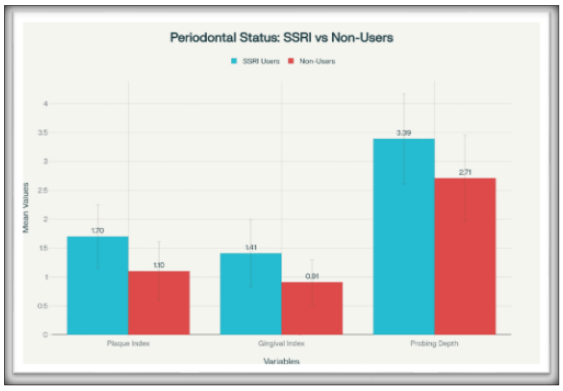

Figure 4

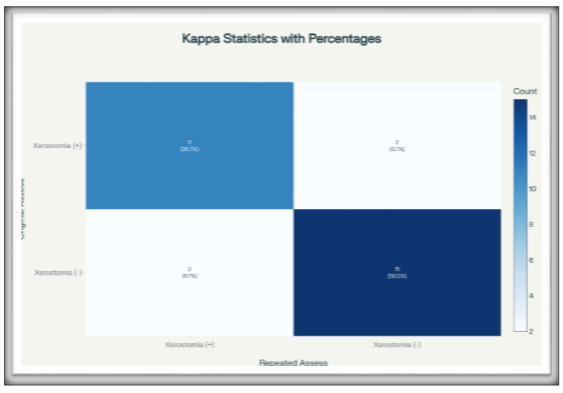

Figure 5

DISCUSSION

Table 1 highlights that xerostomia was reported in 57.4% of SSRI users compared to 29.4% in non-users, with a statistically significant difference ($p = 0.002$). This finding corroborates the work of Shah KS et al. (2017),[7] and Mosaddad SA et al. (2024),[8] who noted a higher frequency of xerostomia symptoms in patients undergoing antidepressant therapy, including SSRIs. The reduction in salivary flow resulting from SSRI use is well-documented as a xerogenic side effect, contributing to diminished oral clearance and increased susceptibility to dental caries and periodontal disease.

The caries experience, reflected through significantly higher DMFT scores in SSRI users (mean 9.39) versus non-users (mean 6.48), supports the assertion that xerostomia increases cariogenic risk. This is consistent with findings by Yousefi H et al. (2018),[9] who linked medication-induced hyposalivation with escalated dental caries prevalence. Similarly, Yumuk V et al. (2015),[10] emphasized that reduced salivary flow compromises the protective role of saliva in enamel remineralization and antimicrobial defense, leading to increased decay.

Periodontal parameters including plaque index, gingival index, and probing depths were significantly elevated among SSRI users ($p < 0.001$) as shown in Table 4. This aligns with reports from Jaffe A et al. (2016),[11] who described how xerostomia promotes plaque accumulation and gingival inflammation due to impaired salivary cleansing action. The increased probing depths observed correspond with progressive periodontal breakdown possibly mediated by xerostomia-related shifts in the oral microbiome. Azorin JM et al. (2016),[12] This study reaffirms those results with quantitative clinical indices showing more severe periodontal involvement in SSRI patients compared to controls.

The reliability of xerostomia assessment is supported by Table 5's kappa statistics showing substantial intra-examiner agreement ($\kappa = 0.729$), confirming consistency in clinical evaluations - a factor stressed by Makwana MN et al. (2017),[13] to be essential for valid xerostomia research.

CONCLUSION

This comparative cross-sectional study demonstrates a significant association between SSRI use and increased prevalence of xerostomia, which adversely impacts both caries experience and periodontal health. SSRI users exhibited higher DMFT scores and poorer periodontal parameters including plaque accumulation, gingival inflammation, and probing depth compared to non-users. These findings highlight the importance of recognizing antidepressant-associated xerostomia as a contributory factor to oral diseases. Clinicians should monitor oral health proactively in patients on SSRIs and incorporate preventive and therapeutic strategies to mitigate xerostomia's detrimental effects.

Limitations

The study's cross-sectional design limits causal inference between SSRI use, xerostomia, and oral health outcomes. The relatively modest sample size of 68 per group may limit generalizability. Self-reported xerostomia symptoms were not complemented by detailed salivary flow rate measurements for all participants, which could refine assessment accuracy. Potential confounders such as diet, oral hygiene habits, and socioeconomic status were not comprehensively controlled. Longitudinal studies are needed to better establish temporal relationships and the long-term impact of SSRIs on oral health.

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