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Prevalence of Oral Submucous Fibrosis in Individuals with history of Tobacco Chewing : Current vs Former users

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Introduction

Oral Submucous Fibrosis (OSMF) is a chronic, progressive, and potentially malignant disorder that predominantly affects the oral cavity, especially among individuals who consume smokeless tobacco. First described by Schwartz in 1952, OSMF has become a major public health concern, particularly in South Asia where the use of areca nut, often combined with tobacco, is prevalent (1). OSMF is characterized by the progressive fibrosis of the oral mucosa, which can lead to restricted mouth opening (trismus), difficulty in swallowing, and in some cases, malignant transformation into oral squamous cell carcinoma (2, 3).

The pathogenesis of OSMF is multifactorial, with tobacco use being the primary risk factor. Areca nut, a component of many smokeless tobacco products like gutka and pan masala, is recognized as a Group 1 carcinogen by the International Agency for Research on Cancer (4). It contains alkaloids such as arecoline, which stimulates fibroblast proliferation and collagen synthesis, leading to the fibrotic changes seen in OSMF (5). Additionally, the consumption of tobacco and other co-carcinogens present in smokeless tobacco products exacerbates the condition, accelerating the progression of fibrosis (6).

Studies indicate that OSMF predominantly affects younger individuals, with the highest prevalence seen in men aged 30-45 years (7). Gupta et al. (2018) reported a strong correlation between the duration of tobacco use and the severity of OSMF, with individuals who have been using tobacco for more than 10 years showing advanced stages of the disease (8). The development of OSMF is dose-dependent, with both the frequency and duration of tobacco consumption playing significant roles in disease severity (9).

Epidemiological studies have shown that the prevalence of OSMF varies by region, with the highest rates observed in India, Pakistan, and other Southeast Asian countries (10). A study by Mehrotra et al. (2019) highlighted the widespread use of smokeless tobacco products in rural and semi-urban areas, where limited awareness and poor healthcare access contribute to delayed diagnosis and management of OSMF (11). The cultural and social acceptability of areca nut and smokeless tobacco use in these regions further complicates public health efforts aimed at reducing their consumption (12).

Cessation of tobacco use has been shown to have a significant impact on the course of OSMF. Individuals who quit tobacco have a lower risk of progressing to advanced stages of the disease, and in some cases, partial regression of fibrosis has been observed (13). Tadakamadla et al. (2018) found that tobacco cessation led to a reduction in symptoms such as burning sensation and trismus, though complete reversal of the condition remains rare (14). This underscores the importance of early intervention and cessation programs as a means of controlling the progression of OSMF and improving quality of life for affected individuals (15).

Given the rising burden of OSMF and its association with smokeless tobacco, there is a critical need for targeted public health interventions. Increasing awareness of the risks associated with smokeless tobacco use, coupled with comprehensive cessation programs, can play a pivotal role in reducing the incidence and severity of OSMF. Moreover, further research is required to develop effective biomarkers for early detection and to explore novel therapeutic approaches for managing this debilitating condition.

Methodology:

Study Design:

A retrospective cross-sectional study was conducted using digital case records from June 2023 to June 2024.

Population and Sample Size:

The study included a total of 1,028 participants, among which 322 individuals were diagnosed with OSMF. The participants were categorized based on their tobacco use history: current users and former users who had quit.

Data Collection:

Data was collected from clinical records, which included demographic information (age and gender), type of smokeless tobacco used, duration of the habit, and status of quitting. The severity of OSMF was assessed using clinical grading systems (Grades 1, 2, and 3).

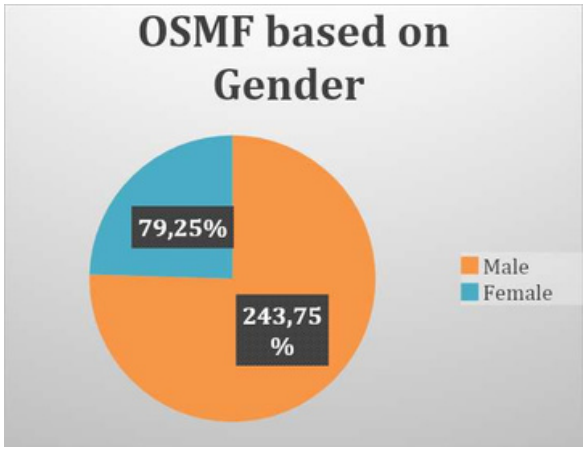
Statistical Analysis:

Descriptive statistics were used to analyze the distribution of OSMF based on gender, age, type of tobacco, and duration of the habit. Comparative analyses between current and former users were performed to assess the impact of tobacco cessation on the severity of OSMF.

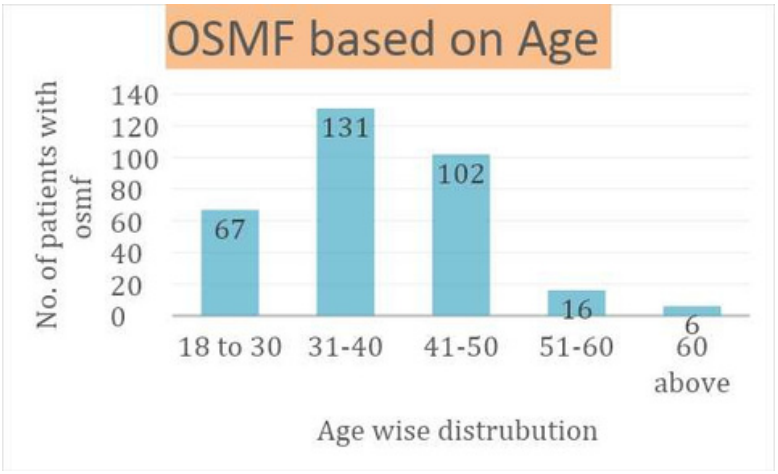
Results:

Demographic Distribution:

The prevalence of OSMF was higher among males (75%) compared to females (25%). The majority of individuals with OSMF were aged between 31-40 years, consistent with previous studies that report a higher prevalence of smokeless tobacco use in this age group [Graph 1 ,2].



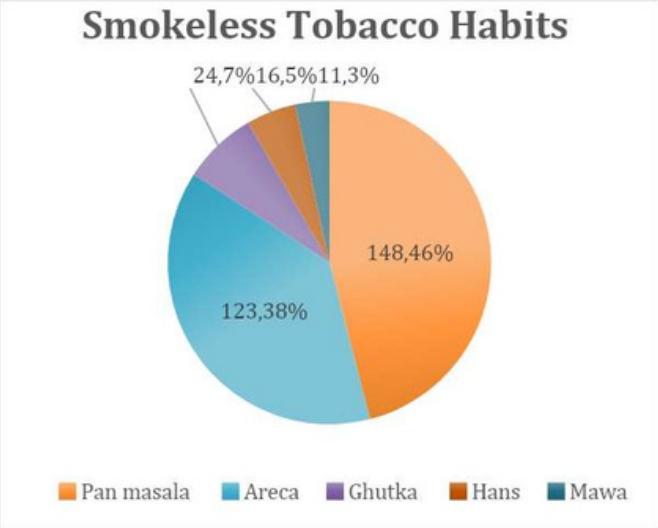
Graph 1: Gender based distribution of OSMF



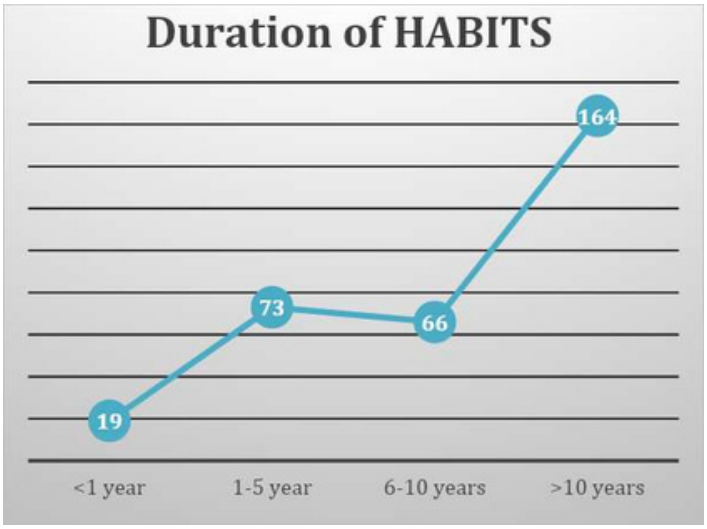
Graph 2: Age wise distribution of OSMF

Tobacco Use:

The most commonly used tobacco product was pan masala (46%), followed by areca nut (38%), ghutka (8%), and others such as hans and mawa. The duration of tobacco use was a significant factor, with the majority of individuals having a habit history of more than 10 years [Graph 3,4].



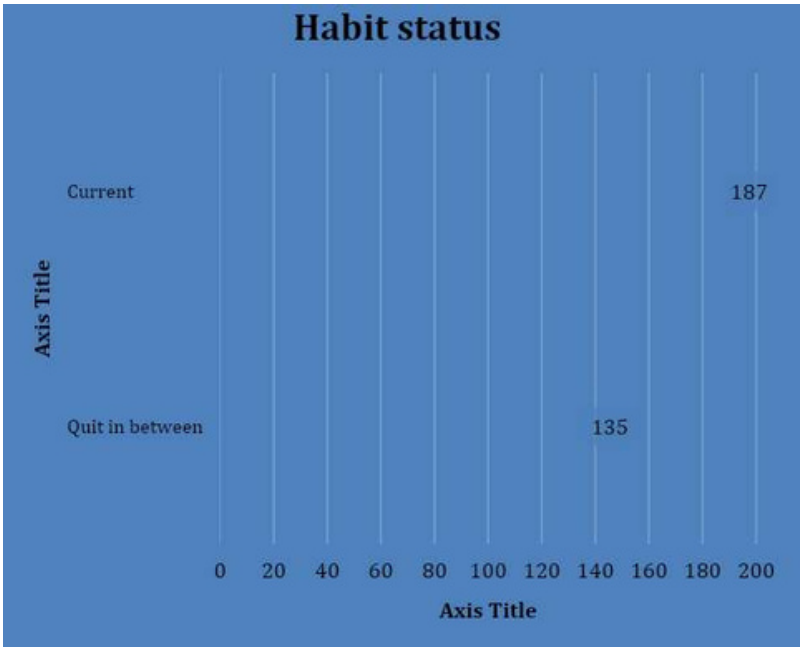
Graph 3: Habit wise distribution of OSMF



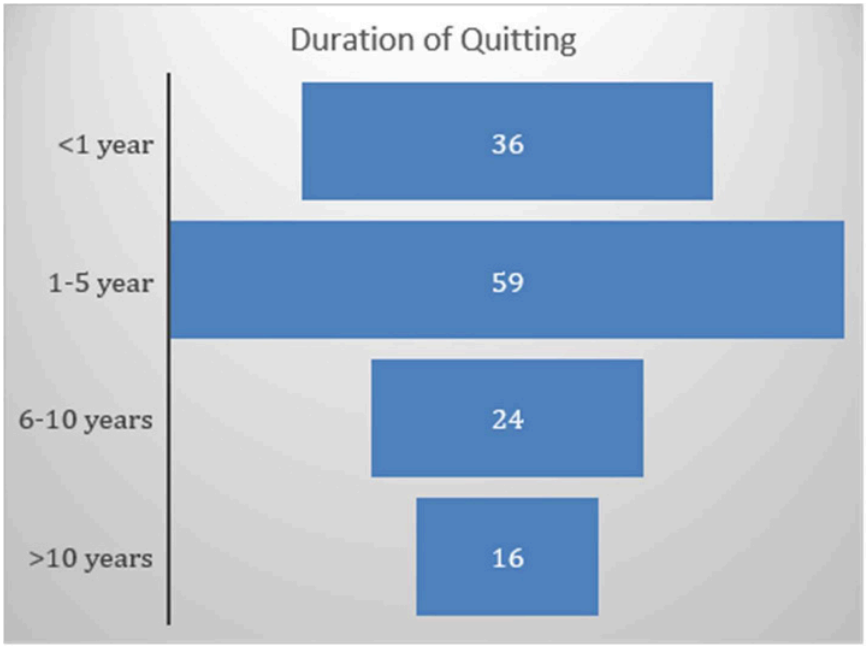
Graph 4: Duration of Tobacco habit

Prevalence of OSMF:

The prevalence of OSMF was notably higher in individuals who had used smokeless tobacco for more than 10 years. Among those who had quit, 41.9% showed some regression in OSMF severity, a figure notably higher than previously reported cessation rates [Graph 5,6].



Graph 5: Status of Tobacco habit



Graph 6: Duration of habit quitting

Impact of Cessation:

Former users who had quit tobacco showed a lower grade of OSMF compared to current users. Specifically, individuals who had quit for more than five years exhibited a lower risk of progression to advanced grades of OSMF (Grade 3) [Table 1].

Grade of OSMF based on Habit status	
<1 year	Grade 2 & 3
1-5 year	Grade 2
6-10 years	Grade 2
>10 years	Grade 1
Current	Grade 3

Table 1: Grade of OSMF based on Habit status

Discussion:

The findings of this study provide valuable insights into the prevalence and severity of Oral Submucous Fibrosis (OSMF) among tobacco users, and they align with and expand upon previous research. The prevalence of OSMF in this study was notably higher among individuals with a history of long-term smokeless tobacco use, particularly among men aged 30-45, a trend that has been widely documented in the literature (16). Gupta et al. (2018) similarly found a high prevalence of OSMF in individuals with prolonged tobacco use, which underscores the chronic nature of this condition (17).

In this study, the majority of OSMF cases were seen in individuals with a history of more than 10 years of tobacco use, supporting previous findings by Shah and Sharma (1998) who demonstrated that the severity of OSMF is directly correlated with the duration and frequency of tobacco use (18). This is consistent with the progressive fibrosis of oral tissues associated with long-term exposure to areca nut and other constituents of smokeless tobacco (19). The predominant use of pan masala in our cohort is in line with regional consumption trends, as highlighted by Mehrotra et al. (2019), who noted a preference for this product in South Asia, where smokeless tobacco use is culturally ingrained (20).

One of the key findings of this study is the significant impact of tobacco cessation on the severity of OSMF. Individuals who had quit using tobacco exhibited a lower grade of OSMF compared to current users. This is consistent with the work of Tadakamadla et al. (2018), who reported that cessation not only prevents the progression of OSMF but can also result in partial regression of symptoms such as trismus and mucosal rigidity (21). In our study, the quitting rate was 41.9%, a figure higher than that reported in the literature, such as the 20-30% cessation rate observed by Nethan et al. (2018) (22). This higher rate of cessation may be attributed to increased awareness and access to tobacco cessation programs in recent years.

The lower grades of OSMF observed in former users in this study further reinforce the importance of early intervention. A study by Ranganathan et al. (2004) also highlighted that earlier stages of OSMF respond better to cessation and intervention strategies, with a reduced risk of malignant transformation in individuals who cease tobacco use early (23). Our findings suggest that targeted public health interventions focusing on cessation, particularly among younger tobacco users, could significantly reduce the burden of OSMF.

However, the study also acknowledges certain limitations that are consistent with challenges faced in similar research. The cross-sectional design limits the ability to infer causality or observe long-term outcomes, as highlighted by Joshi and Somashekar (2015) in their study on the rural prevalence of OSMF (24). Additionally,

self-reporting bias and the lack of control for confounding factors such as nutritional deficiencies or genetic predisposition may have influenced the results, as noted by Thomas and MacLennan (1992) (25). These limitations highlight the need for longitudinal studies to better understand the natural history of OSMF and the long-term benefits of cessation.

The future scope of research should focus on developing biomarkers for early detection and assessing the quality of life in individuals with OSMF, as suggested by Mehrotra et al. (2019) (26). Moreover, integrating cessation programs with educational campaigns on the dangers of smokeless tobacco could play a vital role in reducing the prevalence of OSMF, particularly in high-risk populations (27).

In comparison with previous studies, our research emphasizes the chronicity of OSMF and its strong association with long-term smokeless tobacco use. The results support existing evidence that cessation can lead to significant clinical improvement, although complete reversal of fibrosis remains unlikely. As highlighted in studies by Ranganathan et al. (2004) and Tadakamadla et al. (2018), public health policies must focus on early detection and intervention to prevent the progression of OSMF and reduce the risk of malignancy (28, 29).

Limitations:

The study's cross-sectional design limits the ability to establish causality. Self-reporting bias may have influenced the accuracy of tobacco use history. OSMF severity was assessed at a single time point, and the study did not control for all confounding factors.

Future scope:

Further longitudinal studies are needed to explore the long-term outcomes of tobacco cessation on OSMF. Research should focus on biomarker analysis to understand the biological changes that occur with cessation, as well as intervention strategies to support quitting efforts. Quality of life assessments in individuals with OSMF will provide deeper insights into the impact of this condition.

Conclusion:

This study reveals a strong association between smokeless tobacco use and the severity of OSMF. Cessation programs and public health policies aimed at reducing smokeless tobacco consumption are crucial for improving health outcomes. Former tobacco users exhibit lower grades of OSMF, underscoring the importance of quitting as a preventive measure. Targeted interventions, particularly among populations with long-term tobacco use, will be vital in combating the rising burden of OSMF. Future research should focus on longitudinal studies and the development of effective public health strategies to curb smokeless tobacco use.

REFERENCES

1. Schwartz J. Atrophia Idiopathica (Tropica) Mucosae Oris: Demonstrated at the 11th International Dental Congress, London, 1952. Journal of Indian Dental Association. 1952;24:195-197.

2. Rajendran R. Oral submucous fibrosis: Etiology, pathogenesis, and future research. Bulletin of the World Health Organization. 1994;72(6):985-996.

3. Pindborg JJ, Sirsat SM. Oral submucous fibrosis. Oral Surgery, Oral Medicine, Oral Pathology. 1966;22(6):764-779.

4. Sawhney, Hemant & Bhargava, Deepak & Kashwani, Ritik & Mishra, Richa. (2023). Artificial intelligence as a tool for improving oral cancer outcomes. Archives of Dental Research. 13. 15-19. 10.18231/j.adr.2023.003.

5. Arakeri G, Brennan PA. Role of areca nut in the causation of oral submucous fibrosis: A review. Oral Oncology. 2013;49(9):809-814.

6. Nair UJ, Obe G, Friesen M, Goldberg MT, Bartsch H. Role of lime in the generation of reactive oxygen species from areca nut and its implication in oral carcinogenesis. Journal of Oral Pathology & Medicine. 1992;21(9):370-374.

7. Gupta PC, Ray CS. Epidemiology of betel quid usage. Annals of the Academy of Medicine, Singapore. 2004;33(4 Suppl):31-36.

8. Evanjelin, P. & Maheswari, T & Salam, Sajjad & Tripathi, Shubham & Pandey, Abhishek & Bahadure, Pranali & Kashwani, Ritik. (2024). Prevalence Of Different Stages Of Oral Submucous Fibrosis In India: A Cross Sectional Study. Educational Administration: Theory and Practice. 30. 10.53555/kuey.v30i5.3516.

9. Shah N, Sharma PP. Role of chewing and smoking habits in the etiology of oral submucous fibrosis (OSMF): A case-control study. Journal of Oral Pathology & Medicine. 1998;27(10):475-479.

10. Kashwani, Ritik & Sawhney, Hemant. (2023). Assessing the Sensitivity and Specificity of Toluidine Blue Staining in Oral Cancer Screening Among Inmates: A Prison-Based Study. Journal Of Advanced Zoology. 44. 450-456. 10.17762/jaz.v44iS-3.618.

11. Mehrotra R, Yadav S, Sinha DN, Singh RJ. Prevalence of smokeless tobacco use in Asian countries and associated oral lesions: A systematic review and meta-analysis. Tobacco Control. 2019;28(5): 513-520.

12. Thomas SJ, MacLennan R. Slaked lime and betel nut cancer in Papua New Guinea. The Lancet. 1992;340(8822):577-578.

13. Ranganathan K, Devi MU, Joshua E, Kirankumar K, Saraswathi TR. Oral submucous fibrosis: A case-control study in Chennai, South India. Journal of Oral Pathology & Medicine. 2004;33(5):274-277.

14. Tadakamadla J, Kumar S, Agarwal P, Tibdewal H, Tadakamadla SK. Effect of tobacco cessation on the clinical outcomes of oral submucous fibrosis: A 2-year follow-up study. Journal of Oral Pathology & Medicine. 2018;47(5):436-442.

15. Nethan S, Sinha DN, Mehrotra R. Tobacco cessation and its health benefits: Indian perspectives. Indian Journal of Medical Research. 2018;148(6):694-704

16. Gupta PC, Ray CS. Smokeless tobacco and health in India and South Asia. Respirology. 2003;8(4):419-431.

17. Bhagat, Nitin, Sajjad Salam, Abhinav Garg, Vijayanandhan Venkatesan, Shetty Hardik, H. G. Gaganashree, Sumana Kumar, and Ritik Kashwani. "Use of Liposomal Curcumin for Oral Cancer Treatment: A Systematic Review and Meta Analysis." Nanotechnology Perceptions (2024): 342-359.

18. Shah N, Sharma PP. Role of chewing and smoking habits in the etiology of oral submucous fibrosis (OSMF): A case-control study. Journal of Oral Pathology & Medicine. 1998;27(10):475-479.

19. Arakeri G, Brennan PA. Role of areca nut in the causation of oral submucous fibrosis: A review. Oral Oncology. 2013;49(9):809-814.

20. Mehrotra R, Yadav S, Sinha DN, Singh RJ. Prevalence of smokeless tobacco use in Asian countries and associated oral lesions: A systematic review and meta-analysis. Tobacco Control. 2019;28(5):513-520.

21. Tadakamadla J, Kumar S, Agarwal P, Tibdewal H, Tadakamadla SK. Effect of tobacco cessation on the clinical outcomes of oral submucous fibrosis: A 2-year follow-up study. Journal of Oral Pathology & Medicine. 2018;47(5):436-442.

22. Nethan S, Sinha DN, Mehrotra R. Tobacco cessation and its health benefits: Indian perspectives. Indian Journal of Medical Research. 2018;148(6):694-704.

23. Ranganathan K, Devi MU, Joshua E, Kirankumar K, Saraswathi TR. Oral submucous fibrosis: A case-control study in Chennai, South India. Journal of Oral Pathology & Medicine. 2004;33(5):274-277.

24. Joshi SG, Somashekar L. Prevalence of oral submucous fibrosis among tobacco chewers in rural Maharashtra, India: A cross-sectional study. Journal of Cancer Research and Therapeutics. 2015;11(3):707-710.
25. Thomas SJ, MacLennan R. Slaked lime and betel nut cancer in Papua New Guinea. The Lancet. 1992;340(8822):577-578.
26. Mehrotra R, Yadav S, Sinha DN, Singh RJ. Prevalence of smokeless tobacco use in Asian countries and associated oral lesions: A systematic review and meta-analysis. Tobacco Control. 2019;28(5):513-520.
27. Thomas SJ, MacLennan R. Slaked lime and betel nut cancer in Papua New Guinea. The Lancet. 1992;340(8822):577-578.
28. Ranganathan K, Devi MU, Joshua E, Kirankumar K, Saraswathi TR. Oral submucous fibrosis: A case-control study in Chennai, South India. Journal of Oral Pathology & Medicine. 2004;33(5):274-277.
29. Tadakamadla J, Kumar S, Agarwal P, Tibdewal H, Tadakamadla SK. Effect of tobacco cessation on the clinical outcomes of oral submucous fibrosis: A 2-year follow-up study. Journal of Oral Pathology & Medicine. 2018;47(5):436-442.