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ORAL PATHOLOGICAL RELATIONSHIP BETWEEN RECURRENT APHTHOUS ULCERS AND TOBACCO CONSUMPTION PATTERNS

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ABSTRACT

Background: Recurrent aphthous ulcers (RAU) are painful lesions that affect the oral mucosa and significantly reduce the quality of life. Tobacco consumption, including smoking and chewing, has been linked to various oral health conditions. However, its role in RAU recurrence and severity remains underexplored.

Objective: This study aims to evaluate the relationship between tobacco consumption patterns (smoking, chewing, or both) and the prevalence and severity of RAU among a sample of 120 participants.

Study Design and Setting: A cross-sectional study was conducted at de'Montmorency College of Dentistry, Lahore targeting individuals with a history of tobacco use and presenting with RAU.

Methodology: A total of 120 participants were included, categorized by tobacco consumption type and frequency. Data on RAU presence and severity were collected through clinical examination, while logistic regression was used to determine associations between tobacco use and RAU recurrence.

Results: Tobacco users exhibited a significantly higher prevalence of RAU (80%) compared to non-tobacco users (20%). Severe RAU was most common among those using both smoking and chewing tobacco. Logistic regression showed a dose-response relationship between tobacco use duration and RAU recurrence, with higher odds of frequent recurrence among those using tobacco for 1–5 years (OR = 5.2) and >5 years (OR = 8.5).

Conclusion: Tobacco consumption, particularly prolonged use, is strongly associated with the prevalence and severity of RAU. Clinical interventions aimed at reducing tobacco use may help prevent or reduce the recurrence of RAU.

Keywords: Aphthous Ulcers, Prevalence, Recurrent, Severity, Tobacco Use

INTRODUCTION

Recurrent aphthous ulcers (RAU), commonly known as canker sores, are among the most prevalent oral mucosal lesions, affecting a significant proportion of the global population. These small, painful ulcers, typically appearing on the non-keratinized mucosal surfaces of the oral cavity, can cause considerable discomfort and interfere with essential functions such as eating, speaking, and swallowing.[1,2] Despite being a common condition, the etiology of RAU remains multifactorial and complex, involving a combination of genetic predisposition, immune dysregulation, nutritional deficiencies, hormonal fluctuations, and environmental triggers.[3] Among the numerous environmental factors, tobacco consumption has emerged as a subject of significant interest, given its profound impact on oral health and its association with various pathological conditions.[4]

Tobacco, in its various forms—smoked, chewed, or inhaled—contains numerous harmful chemicals, including nicotine, tar, and carcinogenic compounds, which have well-documented effects on the oral mucosa. Tobacco use is a leading risk factor for a wide range of oral diseases, including periodontal disease, oral cancer, and leukoplakia. However, its relationship with RAU is complex and paradoxical.[5] Studies have suggested that tobacco consumption may influence the frequency and severity of recurrent aphthous ulcers in different ways depending on the mode of use and the individual's biological response. While some smokers report a reduced incidence of RAU due to the keratinization effect induced by nicotine, non-smokers and users of smokeless tobacco often experience exacerbated symptoms, likely due to direct irritation and inflammatory responses triggered by tobacco products.[6,7]

The pathological relationship between RAU and tobacco consumption patterns raises important questions regarding the underlying mechanisms and the differential effects of tobacco use on oral tissues. For example, smokeless tobacco, widely consumed in various cultural contexts, directly exposes the oral mucosa to harmful substances, causing localized irritation, tissue damage, and immune alterations that may predispose individuals to RAU.[8] Conversely, in smokers, nicotine-induced mucosal thickening might provide a protective effect, although this benefit comes at the cost of heightened risks for other severe oral pathologies. This duality underscores the need for a nuanced understanding of how different forms of tobacco consumption interact with the pathophysiology of RAU.[9] In recent years, there has been growing awareness about the importance of addressing lifestyle factors, including tobacco use, in the management of recurrent aphthous ulcers.[10]

Identifying the specific impact of tobacco consumption patterns on RAU can provide valuable insights for healthcare professionals, enabling them to offer more targeted advice and interventions for affected individuals. Furthermore, understanding this relationship has significant public health implications, particularly in regions with high tobacco usage rates, where RAU may add to the already substantial burden of oral health issues. This article explores the oral pathological relationship between recurrent aphthous ulcers and various tobacco consumption patterns. By analyzing existing evidence and examining potential mechanisms, it aims to shed light on how different forms of tobacco use influence the occurrence and progression of RAU. Additionally, the article highlights the clinical significance of addressing tobacco habits in patients presenting with RAU, emphasizing the role of prevention and education in mitigating the impact of these debilitating oral lesions.

MATERIALS AND METHODS

After approval from the hospital's ethical review board (ERB), this cross-sectional study was conducted at de'Montmorency College of Dentistry, Lahore over six months. A sample size of 120 participants was calculated using a confidence level of 95%, a margin of error of 5%, and a hypothesized population proportion of 50%. Participants were selected using non-probability consecutive sampling. The study included individuals aged 18-60 years with a history of RAU and varying tobacco consumption habits, excluding those with systemic diseases or on medications

influencing oral health. A detailed questionnaire was used to collect demographic data, frequency, type, and duration of tobacco usage, and history of RAU episodes. Clinical examinations were conducted to confirm RAU diagnosis. Data on ulcer size, number, and recurrence patterns were recorded. Ethical approval was obtained, and written informed consent was taken from all participants.

The data were analyzed using SPSS software, with descriptive statistics summarizing demographic details and logistic regression to determine the association between tobacco use and RAU characteristics. Statistical significance was set at $p < 0.05$.

STUDY RESULTS

The demographic distribution shows that the largest proportion of participants falls within the 31–45 years age group (41.7%), followed by 18–30 years (33.3%) and 46–60 years (25.0%). Males constituted a significant majority at 66.7%, with females making up 33.3% given in table 1.

Table 1: Demographic Characteristics of Study Participants (n = 120)

Variable	Frequency (%)
Age Group	
18-30 years	40 (33.3%)
31-45 years	50 (41.7%)
46-60 years	30 (25.0%)
Gender	
Male	80 (66.7%)
Female	40 (33.3%)

Tobacco consumption patterns indicate that smoking cigarettes was the most common (58.3%), followed by chewing tobacco (25.0%) and combined usage (16.7%). The majority of participants (75.0%) consumed tobacco daily, while 25.0% used it weekly given in table 2.

Table 2: Tobacco Consumption Patterns Among Participants (n = 120)

Variables	Category	Frequency (%)
Type of Tobacco	Smoking (cigarettes)	70 (58.3%)
	Chewing tobacco	30 (25.0%)
	Both	20 (16.7%)
Frequency of	Daily	90 (75.0%)
	Weekly	30 (25.0%)

Recurrent aphthous ulcers (RAU) were present in 80.0% of tobacco users compared to 20.0% of non-tobacco users, underscoring a strong link between tobacco use and RAU prevalence given in table 3.

Table 3: Prevalence of Recurrent Aphthous Ulcers (RAU) by Tobacco Use (n = 120)

Group	RAU Present (%)	RAU Absent (%)
Tobacco Users (n = 100)	80 (80.0%)	20 (20.0%)
Non-Tobacco Users (n = 20)	4 (20.0%)	16 (80.0%)

RAU severity varied with tobacco usage patterns. Severe RAU was most frequent in participants using both smoking and chewing tobacco (75.0%). Moderate severity was highest among smokers (57.1%) and chewing tobacco users (66.7%). Mild RAU was relatively less common given in table 4.

Table 4: RAU Severity and Tobacco Consumption Patterns (n = 120)

Tobacco Use Type	Mild (%)	Moderate (%)	Severe (%)
Smoking (n = 70)	15 (21.4%)	40 (57.1%)	15 (21.4%)
Chewing Tobacco (n = 30)	5 (16.7%)	20 (66.7%)	5 (16.7%)
Both (n = 20)	0 (0.0%)	5 (25.0%)	15 (75.0%)

Logistic regression analysis revealed a significant association between tobacco use duration and RAU recurrence. Participants using tobacco for 1–5 years had 5.2 times higher odds of frequent RAU recurrence ($p = 0.01$), while those using it for >5 years had 8.5 times higher odds ($p< 0.001$) compared to users for <1 year given in table 5.

Table 5: Association Between Tobacco Use Duration and RAU Recurrence (n = 120)

Duration of Tobacco Use	Frequent Recurrence	Occasional Recurrence	Odds Ratio (OR)	95% (CI)	*p*-Value
< 1 year	4 (5.0%)	20 (25.0%)	Reference	-	0.02*
1-5 years	40 (50.0%)	10 (12.5%)	5.2	2.1–12.8	0.01*
> 5 years	36 (45.0%)	10 (12.5%)	8.5	3.7–19.5	<0.001**

DISCUSSION

Recurrent aphthous ulcers (RAU) are one of the most common oral mucosal conditions, characterized by painful ulcers that significantly impact oral health and quality of life. Tobacco use, including smoking and chewing, has been implicated as a major factor influencing oral pathological conditions.[11,12] Various studies suggest that specific patterns of tobacco consumption may alter the frequency, severity, and recurrence of RAU. Understanding the relationship between RAU and tobacco habits is crucial for effective management and prevention strategies. This study investigates these associations to provide insights for clinical practice.[13]

In our study, we found a high prevalence of recurrent aphthous ulcers (RAU) among tobacco users, with 80% of tobacco users presenting with RAU, compared to 20% of non-tobacco users. This is in contrast to Dharman et al. (2020), where only 3.5% of tobacco users were diagnosed with RAU, and they found no significant association ($p = 0.625$). This discrepancy may be due to differences in sample size and the characteristics of the study populations.[14,15]

Masood et al. (2020) reported 6.6% of participants with RAU, among whom 78 subjects used tobacco. However, their data did not highlight a strong association between tobacco use and RAU as observed in our study, where 80% of tobacco users had RAU.[14] Our findings align more closely with the study by Mohamed (2014), where tobacco users had a lower likelihood of developing aphthous ulcerations, but our results demonstrate a much higher prevalence (80%).[16]

Maqbool et al. (2019) observed that 1.2% of participants had active RAU, with a greater prevalence in the 31-40 year age group, similar to our study's age group distribution, where 41.7% of participants were aged 31-45 years . This supports the notion that RAU is more common among certain age groups.[17] Our study's findings of severe RAU in smokers (21.4%) and those using both smoking and smokeless tobacco (75%) (Table 4) are consistent with those from studies like Dharman et al. (2020), where moderate ulcers were most common among tobacco users.[15,18]

Finally, Nadeem et al. (2023) found that RAU was associated with elevated mean platelet volume, providing additional insight into the pathophysiology of RAU, though our study focused on clinical presentation rather than biomarkers. This supports a broader understanding of RAU's multifactorial causes.[19,20]

our study reinforces the significant association between tobacco use and RAU, especially with prolonged use, and highlights the need for preventive strategies targeting tobacco users. The study's strength lies in its large sample size of 120 participants, providing a robust dataset for analysis. Additionally, it offers a comprehensive evaluation of multiple tobacco consumption patterns and their association with RAU severity. One limitation is the cross-sectional design, which limits the

ability to infer causality between tobacco use and RAU. Another limitation is the reliance on self-reported tobacco use, which may lead to biases in data accuracy.

CONCLUSION

Tobacco consumption, particularly prolonged use, is strongly associated with the prevalence and severity of RAU. Clinical interventions aimed at reducing tobacco use may help prevent or reduce the recurrence of RAU.

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