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PREVALENCE OF CHEWING TOBACCO AND ARECA-NUT USE AMONG PATIENTS ATTENDING DENTAL OPD AND ASSOCIATED ORAL MUCOSAL LESIONS.

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ABSTRACT

BACKGROUND: Chewing tobacco (smokeless tobacco) and areca nut (Areca catechu derivative) are widely consumed psychoactive substance in South Asian region, including Pakistan. **OBJECTIVE:** To determine the prevalence of chewing tobacco and areca-nut use among patients attending dental hospital and associated oral mucosal lesions **METHODS:** This descriptive cross sectional study was carried out at Oral biology department of Bhittai Dental and Medical College Mirpurkhas from April 2024 to September 2024. Individuals of chewing tobacco and areca-nut users, aged 18 years or older of either gender who visited the dental OPD for routine dental examinations or treatment were included. After taking demographic information patients underwent a comprehensive intraoral examination under adequate lighting, and review the medical record to assess the oral lesions. Expected lesions were further evaluated using toluidine blue staining and, where clinically indicated, subjected to incisional biopsy for histopathological confirmation. All patients were interviewed about their chewing tobacco and areca nut consumption habits, including the type of product used frequency, quantity, and duration of use. Data entry and analysis was done by SPSS version 23. **RESULTS:** Total of 139 participants were studied, with most aged 31–60 years (49.6%) and predominantly male (56.8%). Gutka was the most commonly used substance (66.2%), followed by mainpuri (12.9%), a mix of betel and tobacco (8.6%), betel nut (7.2%), and naswar (4.3%). Over half of the users (55.4%) had been consuming these products for less than one year, while 36.0% reported use for more than five years. Pigmentation was the most common lesion (84.9%), among gutka users, followed by white patches (48.9%, p=0.027) and ulcers (36.0%, p=0.001). Erosive lesions (28.8%) and growths (24.5%) were also significantly associated with tobacco chewing p-0.001. additionally, white patches linked with oral submucous fibrosis (48.9%), whereas OSF features (20.9%) and other OPMDs (8.6%) did not show significant associations (p->0.05), while only 14.4% of participants had no mucosal changes (p=0.054). **CONCLUSION:** Gutka observed as the most commonly used smokeless tobacco product, predominantly among middle-aged males, with a considerable proportion using it for prolonged duration. Chewing of Tobacco observed significantly linked to oral lesions, particularly pigmentation, white patches, ulcers, and erosive changes. However, the findings highlighted the urgent need for targeted awareness, early screening, and preventive strategies to reduce the burden of oral potentially malignant disorders in high-risk populations.

KEY WORDS: Oral lesion, Areca nut, Smokeless tobacco, Gutka Mainpuri

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INTRODUCTION

Chewing tobacco (smokeless tobacco) and areca nut (Areca catechu derivative) are widely consumed psychoactive substance in South Asian region, including Pakistan.[1] Areca nut chewing, ranking 4th in most addictive and 2nd in most carcinogenic substances, has been indicated to exist as old as 2000 years, with estimated 600 million current areca nut consumers globally.[2,3] Tobacco, on the other hand, is a serious global health concern and consumed in smokeless form by 4.72% of global population, with prevalence as high as 51.4% in Myammer and as low as 3.5% in United States, along with around 1billion global population of smokers, and associated annual death among 5.4 million individuals globally.[4,5]

Published studies revealed serious detrimental effects of chewing areca nut and tobacco on nearly all the body organs, specially linked with risks of oral cancers, esophageal cancers, and lung cancers.[6] A recent cross-sectional study conducted by Ruparelia et al.[7] involved 14000 subjects and revealed 47.9% consumers of smokeless tobacco, with tobacco pouch keratosis being the most common lesion observed in 20.37% of cases, and buccal mucosa in 41% of cases was identified as the most frequent site of lesions. Similarly, another Sri Lankan cross-sectional study by Sumithrarachchi et al.[8] involving 368 patients showed 23.9 % prevalence of tobacco use, of these, smokeless-tobacco was most common form of tobacco in 41.1 % of patients, followed by smoking in 22.2 % and both habits in 36.7 % individuals. Furthermore, areca-nut consumption was in 25.3 % and large proportion of them (72.8 %) used areca-nut with tobacco. Oral lesions were more frequent (>90 %) among areca-nut and tobacco consumers, with pigmentation (10.6 %) being most frequent lesion, followed by lobulated tongue (4.6 %), white patches, de-pigmentation, ulcers, Oral Submucous Fibrosis (OSF), and growths (2.4 % each), and erosive lesions (1.4 %). Age, male gender, and lower education were significantly associated with tobacco and areca-nut consumption ($p < 0.05$).

From the perspective of Pakistan, a recent study conducted by Chughtai N[9] assessed OSF prevalence in Karachi. They revealed that OSF was more common among youth (aged 26 to 35 years), especially in male gender (81.6%), with areca nut chewing being most common chewing habit in 81.5%, followed by betel quid in 52%, Gutka in 49%, manpuri in 33%, smokeless tobacco in 19%, and niswar in 7% was least common chewing habit. They argued that individuals with these chewing habits are more likely to develop OSF, which can further deteriorate into OSCC.

Potentially malignant disorders (OPMDs) including OSCC and OSF are frequently encountered in regions with high frequency of betel nut chewing habit. OSF was previously confined to the subcontinent of India, however currently it is frequently observed in USA, United Kingdom, and other regions of developed world. OSF has potential to transform into malignant lesion, which makes it a serious public health concern, with a reported incidence of 7.6% during last 17-year.[10]

Given the prevalent use of chewing tobacco and areca nut, and substantial burden of oral mucosal lesions linked to these habits, a comprehensive study focusing on patients attending dental hospitals are essential to quantify the prevalence of these chewing habits, which will ultimately help developing effective prevention and intervention strategies. Thus, this study intended to assess the prevalence of chewing tobacco and areca-

nut use among patients attending dental hospital and associated oral mucosal lesions

MATERIAL AND METHODS

A descriptive cross sectional study was carried out at Oral biology department of Bhittai Dental and Medical College Mirpurkhas. Duration of the study was six months from April 2024 to September 2024. Individuals of chewing tobacco and areca-nut users, aged 18 years or older of either gender who visited the dental outpatient department (OPD) for routine dental examinations or treatment were included in the study. Individuals with a history of tobacco smoking, alcohol consumption, oral trauma, or those unwilling to participate were excluded. All participants were informed about the objectives of the study and assured that their personal information would be kept confidential. They were also informed that there would be no direct benefit or harm to them from participating in the study and that they had the right to withdraw at any time without any consequences. After taking demographic information regarding age, gender, SES, educational status and residential status, all the patients underwent a comprehensive intraoral examination conducted by trained oral diagnosticians using disposable instruments under adequate lighting, and review the medical record to assess the oral lesions including leukoplakia, erythroplakia, oral submucous fibrosis (OSMF), lichen planus and other suspicious lesions. Criteria for the diagnosis were based on WHO guidelines for oral mucosal lesion classification. Expected lesions were further evaluated using toluidine blue staining and, where clinically indicated, subjected to incisional biopsy for histopathological confirmation. All patients were interviewed about their chewing tobacco and areca nut consumption habits, including the type of product used frequency, quantity, and duration of use. All the informations were entered and analyzed using SPSS version 23. Descriptive statistics like as means and standard deviations were used for continuous variables, and frequencies and percentages were used for categorical variables. Chi-square tests were employed to assess associations between the use of chewing substances and the presence of oral mucosal lesions. Logistic regression analysis was applied to identify independent predictors of lesion development while controlling for potential confounders. A p-value of <0.05 was considered statistically significant.

RESULTS

Out of all 139 participants, nearly half were aged 31–60 years (49.6%), followed by 28.8% aged 61–75 years, while only 21.6% were in the 15–30 years' age group. Males made up a slightly higher proportion (56.8%) compared to females (43.2%). Regarding education, 30.9% were uneducated, 39.6% had education up to ordinary level or below, 19.4% had completed advanced level, and only 10.1% had tertiary education. In terms of ethnicity, almost half of the participants were Sindhi (49.6%), followed by Punjabi (37.4%) and Pathan (12.9%). Most of the cases (66.2%) had reported using gutka, followed by mainpuri (12.9%), a mix of betel and tobacco (8.6%), betel nut alone (7.2%), and naswar (4.3%). Only one participant (0.7%) had used a combination of betel, tobacco, and gutka, indicating that gutka was the most commonly consumed substance among the study population.

Figure: 1

More than half of the cases (55.4%) had been using the substances for less than one year, 8.6% for 1–5 years, and 36.0% for more than 5 years. Regarding frequency, 41.0% reported occasional use, 5.0% used 1–5 quid per week, another 5.0% used one quid per day, 21.6% used up to five quid per day, and 27.3% consumed more than five quid daily. Majority of the cases (77.0%) kept the substance in the mouth for 30 minutes or less, while 23.0% kept it for longer. During the study, 54.0% were current users, 25.9% had last used within

three months, and 20.1% had last used more than three months earlier. **Table: 1**.
In this study the pigmentation was the most frequent oral lesion, affecting 84.9% of participants, followed by white patches and OSF-related white patches in 48.9% of cases. Ulcers (36.0%), erosive lesions (28.8%), and growths (24.5%) were also common, while lobulated tongue (23.7%) and OSF features (20.9%) were less frequent. Depigmentation (15.1%), other non-malignant lesions (16.5%), no mucosal changes (14.4%), and other OPMDs (8.6%) were observed few individuals. **Table: 2**.

Based on the stratification most frequent lesion observed was pigmentation (84.9%, p=0.001), mainly in gutka users, followed by white patches (48.9%, p=0.027) and ulcers (36.0%, p=0.001). Erosive lesions (28.8%, p=0.001) and growths (24.5%, p=0.001) were also significantly associated with tobacco chewing. White patches linked with oral submucous fibrosis (48.9%, p=0.001) showed a strong correlation, whereas OSF features (20.9%, p=0.133) and other OPMDs (8.6%, p=0.243) did not show significant associations. Only 14.4% of participants had no mucosal changes (p=0.054). **Table: 3**.

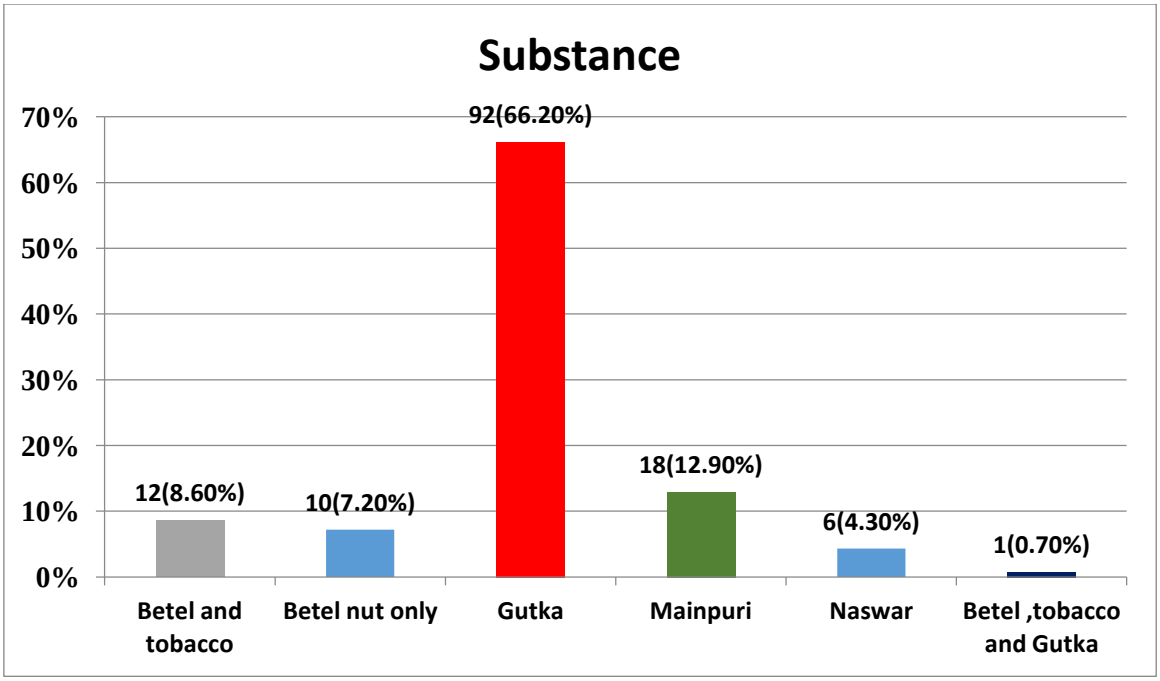

Figure 1: Frequency of different types of substance used n=139

Table 1: Duration frequency and time kept in used n=139

Variables	Frequency	Percent
Duration use		
less than 1 year	77	55.4
1-5 years	12	8.6
more than 5 years	50	36.0
Frequency		
occasional	57	41.0
1-5 per quids week	7	5.0
1 quid per day	7	5.0
upto 5 quid per day	30	21.6
more than 5 per day	38	27.3
Time kept		
30 min or less	107	77.0
more than 30 min	32	23.0
Last Use		

Current user	75	54.0
within 3 month	36	25.9
more than 3 months	28	20.1

Table 2: Types of oral lesions n=139

	Frequency	Percent
Pigmentation		
Yes	118	84.9
No	21	15.1
Depigmentation		
Yes	21	15.1
No	118	84.9
White patches		
Yes	68	48.9
No	71	51.1
Erosive Lesions		
Yes	40	28.8
No	99	71.2
Ulcer		
Yes	50	36.0
No	89	64.0
Growth		
Yes	34	24.5
No	105	75.5
White patches		
OSF		
Yes	68	48.9
No	71	51.1
OSF Features		
Yes	29	20.9
No	110	79.1
Lobulated Tongue		
Yes	33	23.7
No	106	76.3
Other OPMD		
Yes	12	8.6
No	127	91.4
Other non-malignant		
Yes	23	16.5
No	116	83.5
No mucosal		
Yes	20	14.4
No	119	85.6

Table 3: Different oral lesions association with different types of tobaccos chewing

ORAL LESIONS	SUBSTANCE						Total	P-value
	Betel and tobacco	Betel nut	Gutka	Mainpuri	Naswar	Betalnut+gutka+ mainpuri		
Pigmentation								
Yes	9(6.5%)	4(2.9%)	86(61.9%)	12(8.6%)	6(4.3%)	1(0.7%)	118(84.9%)	0.001
No	3(2.2%)	6(4.3%)	6(4.3%)	6(4.3%)	0(0%)	0(0%)	21(15.1%)	
Depigmentation								
Yes	0(0%)	0(0%)	21(15.1%)	0(0%)	0(0%)	0(0%)	21(15.1%)	0.001
No	12(8.6%)	10(7.2%)	71(51.1%)	18(12.9%)	6(4.3%)	1(0.7%)	118(84.9%)	
White patches								
Yes	12(8.6%)	4(2.9%)	36(25.9%)	12(8.6%)	3(2.2%)	1(0.7%)	68(48.9%)	0.027
No	0(0%)	6(4.3%)	56(40.3%)	6(4.3%)	3(2.2%)	0(0%)	71(51.1%)	
Erosive lesions								
Yes	12(8.6%)	3(2.2%)	15(10.8%)	3(2.2%)	6(4.3%)	1(0.7%)	40(28.8%)	0.001
No	0(0%)	7(5%)	77(55.4%)	15(10.8%)	0(0%)	0(0%)	99(71.2%)	
Ulcer								
Yes	12(8.6%)	3(2.2%)	28(20.1%)	3(2.2%)	3(2.2%)	1(0.7%)	50(36%)	0.001

No	0(0%)	7(5%)	64(46%)	15(10.8%)	3(2.2%)	0(0%)	89(64%)	
Growth								
Yes	8(5.8%)	4(2.9%)	13(9.4%)	9(6.5%)	0(0%)	0(0%)	34(24.5%)	0.001
No	4(2.9%)	6(4.3%)	79(56.8%)	9(6.5%)	6(4.3%)	1(0.7%)	105(75.5%)	
White patches OSF								
Yes	9(6.5%)	4(2.9%)	36(25.9%)	12(8.6%)	6(4.3%)	1(0.7%)	68(48.9%)	0.001
No	3(2.2%)	6(4.3%)	56(40.3%)	6(4.3%)	0(0%)	0(0%)	71(51.1%)	
OSF Features								
Yes	3(2.2%)	0(0%)	23(16.5%)	3(2.2%)	0(0%)	0(0%)	29(20.9%)	0.133
No	9(6.5%)	10(7.2%)	69(49.6%)	15(10.8%)	6(4.3%)	1(0.7%)	110(79.1%)	
Lobulated tongue								
Yes	7(5%)	4(2.9%)	15(10.8%)	0(0%)	6(4.3%)	1(0.7%)	33(23.7%)	0.001
No	5(3.6%)	6(4.3%)	77(55.4%)	18(12.9%)	0(0%)	0(0%)	106(76.3%)	
Other OPMD								
Yes	0(0%)	0(0%)	12(8.6%)	0(0%)	0(0%)	0(0%)	12(8.6%)	0.243
No	12(8.6%)	10(7.2%)	80(57.6%)	18(12.9%)	6(4.3%)	1(0.7%)	127(91.4%)	
No mucosal								
Yes	0(0%)	3(2.2%)	11(7.9%)	6(4.3%)	0(0%)	0(0%)	20(14.4%)	0.054
No	12(8.6%)	7(5%)	81(58.3%)	12(8.6%)	6(4.3%)	1(0.7%)	119(85.6%)	

DISCUSSION

Chewing tobacco and areca nut contain carcinogenic properties, and are linked to precancerous conditions of oral cavity. Buccal mucosa cancers are 16th most frequently reported cancers globally, with 389,846 fresh cases recorded during 2022.[11] OSMF patients are highly inclined to develop malignant transformations than individual without OSF.[12] The mechanisms of Oral submucous fibrosis (OSMF) development and progression is multifactorial including nutritional deficiencies, genetic defects, chronic candidiasis, virological responses (human papilloma virus, herpes simplex viruses), and immuno-metabolic dysregulation, and consuming areca nut, lime, chilies, tobacco, and betel quid.[13]. According to published data, Pakistan ranks second among the countries exposed to higher rates of carcinogenic products consumption, with male predominance (21.3%) in comparison to females (19.3%). On the other hand, tobacco addiction associated cancers were observed among >90% of all cancer cases.[14]

In this study assessed the prevalence of chewing tobacco and areca nut use and associated oral mucosal lesions among 139 enrolled participants. The demographic findings revealed majority of age group 31–60 years (49.6%), males (56.8%), with education up to the ordinary level or below (39.6%), and Sindhi ethnicity (49.6%), followed by 37.4% Punjabi and 12.9% Pathan. These demographic data are comparable with a previous study published by Mazahir S, [15] where chewing habits were prevalent in a multi-ethnic group in Pakistan, including Punjabi (40.0%), Pathan (27.0%), Sindhi (16.0%) and Mohajir (9.6%) ethnic groups, with equal participation of both genders, and mean age was 28.3 ± 12.9 years.

In our cohort of 139 participants, Gutka was most frequently used substance (66.2%). Followed by Mainpuri was used by 12.9%, while 8.6% used a mix of betel and tobacco. About 7.2% used only betel nut, and 4.3% used Naswar. Only one person (0.7%) used a mix of betel, tobacco, and Gutka. In line with these findings, in the study of Mazahir S, [15] Gutka (29.69%) was the most frequently observed chewing habit, followed by Tobacco (14.86%), Paan (13.56%), Niswar (6.22%), and Chaalia (0.85%) among male and female genders. Similar findings were reported in several previous studies conducted by Qidwai et al.,[16] Mahmood,[17] and Khawaja et al.[18]

In present study, most participants (55.4%) had been using chewing substances for less than one year, while 36% had used them for more than five years, and 8.6% for 1–5 years. In terms of frequency, 41% used the substances occasionally, 21.6% used up to 5 quids per day, and 27.3% reported using more than 5 quids per day. A small percentage used 1–5 quids per week (5%) or one quid per day (5%). Regarding the time, the substance was kept in the mouth, 77% of users kept it for 30 minutes or less, while 23% kept it for more than 30 minutes. When asked about the timing of their last use, 54% were current users, 25.9% had used within the last 3 months, and 20.1% had not used for more than 3 months. In agreement with these findings, in the study of Almalki et al,[19] documented majorities of (36.9%) individuals with chewing tobacco frequently of 4-35 times per day, large proportion of participants kept tobacco 16–70 minutes in mouth (45.7%), and most participant (49.3%) had tobacco history of 24–108 months, with high chewing frequency and longer retention time were associated with increased severity of lesions and OMLs development ($p<0.01$). In another study by Nasir et al.,20 the most commonly consumed smokeless tobacco product was gutka (28.6%), followed by paan (23.3%) and naswar (17.8%). Majority of individuals (55.43%) consumed these products for ≥ 5 years, 60.5% consuming ≥ 5 times per day, and most kept SLT of any type in mouth for ≤ 5 minutes (50.9 %). These results are further supported by the findings stated in the studies conducted by Lee et al.[21]and Chou et al.[22], where OMLs were more prevalent among males who used quid, emphasizing that higher risk of OMLs among men are attributed to longer durations and higher consumption frequency of quid chew habits.

In our study, among the 139 participants, the most common oral lesion was pigmentation, found in 84.9% of individuals. White patches were present in 48.9%, while 36% had ulcers, and 28.8% showed erosive lesions. Depigmentation was seen in 15.1% of participants. Oral submucous fibrosis (OSF) features were identified in 20.9%, with the same percentage showing white patches related to OSF. Lobulated tongue was observed in 23.7%, and 24.5% had abnormal growths. Other oral potentially malignant disorders (OPMDs) were noted in 8.6%, and 16.5% had other non-malignant lesions. Only 14.4% had no visible mucosal changes, indicating that a majority of users had at least one type of oral lesion. Consistent with our results, a hospital-based study by Patil et al.[23] reported lesions of oral mucosa among 26.8% of individuals with tobacco smoking and chewing habits, and out of these oral lesions, leukoplakia and submucousal fibrosis were among the most frequently observed lesions (8.2% and 7.1% respectively). They further estimated that oral lesions development risk is around 12 times higher among individuals with tobacco smoking and chewing habits. In another research by Choudhary et al.,[24] oral mucosal lesions (58.2%) were most common tobacco associated lesions and most frequent lesion type was tobacco pouch keratosis (46.1%), followed by Oral sub mucus fibrosis in16.1%, Lichenoid reaction in 14.1%, hyperkeratosis in 12.2%, Leukoplakia in 7.2%, Erythroplakia in 2.3%, and Ulceroproliferative changes in 2.0% of

tobacco users. Similar findings on OSMF were reported in the studies of Alshayeb et al. (14.5%),[25] and Priya et al. (12.2 %)[26].
In this study, pigmentation was the most common oral lesion, observed in 84.9% of users, particularly among gutka users (61.9%), with a highly significant association (p = 0.001). Depigmentation was seen in 15.1% of participants, exclusively among gutka users (p = 0.001). White patches were present in 48.9%, mainly among gutka (25.9%) and mainpuri (8.6%) users, showing a significant link (p = 0.027). Erosive lesions affected 28.8% of individuals, significantly associated with gutka and naswar use (p = 0.001). Ulcers were reported in 36% of participants, mostly among gutka (20.1%) and betel with tobacco users (8.6%), also with a significant association (p = 0.001). Growths were found in 24.5%, primarily among gutka and mainpuri users (p = 0.001). Lobulated tongue was noted in 23.7%, significantly linked to gutka and naswar use (p = 0.001). White patches with OSF appeared in 48.9%, especially in gutka users (p = 0.001), while OSF features alone were seen in 20.9%, but without a statistically significant association (p = 0.133). Other potentially malignant disorders (OPMDs) were found in 8.6%, with no significant relation to specific substances (p = 0.243) and, 14.4% of users had no mucosal lesions, slightly more common among those using betel nut only or gutka, though the association was marginal (p = 0.054). The findings of are study on prevalence of various oral lesions among users of smokeless tobacco products are higher than those reported in literature, as in the study of Rotbeh et al.[27] oral pigmentations was much lower observed in 27 20.8% of participants, with males in majority.

CONCLUSION

Study revealed that the chewing tobacco and areca nut use observed highly prevalent among patients attending the dental Hospital, with a significant majority of various oral mucosal lesions. Gutka emerged as the most commonly used substance and was strongly associated with a range of oral lesions, including pigmentation, depigmentation, white patches, erosive lesions, ulcers, growths, and lobulated tongue. The high frequency of potentially malignant disorders, such as white patches with OSF, further highlights the serious oral health risks linked to these habits. Statistically significant associations between specific types of chewing substances and particular oral lesions Based on findings there is urgent need for targeted public health interventions to reduce chewing tobacco and areca nut use and to promote early detection and management of oral lesions to prevent progression to malignancy. However there is urgent need for targeted awareness, early screening, and preventive strategies to reduce the burden of oral potentially malignant disorders in high-risk populations.

ETHICS APPROVAL: The ERC gave ethical review approval. NO:BDMC/R&D/ERC/2023-01 DATED: JANUAR 02 2023.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

CONFLICT OF INTEREST: No competing interest declared.

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