

ORIGINAL ARTICLE

Frequency, Clinical Presentation and Risk Factors of Carcinoma of Cheek in Patients Presenting at JPMC Karachi

Muhammad Razzaq Dogar,¹ Abdul Waheed,² Ikram Ullah,³ Hurtamina Khan,¹ Ghulam Shabir Mahar,⁴ Zubair Anwar¹

1. Department of ENT, Jinnah Sindh Medical University / Jinnah Postgraduate Medical Centre Karachi, Pakistan.

2. Department of ENT, Sir Syed College of Medical Sciences, Karachi, Pakistan.

3. Department of ENT, BMC Hospital Quetta, Pakistan.

4. Department of ENT, Ghulam Mohd Mahar Medical College Sukkur, Pakistan.

Correspondence to: Dr. Muhammad Razzaq Dogar, Email: dogarent1@gmail.com, ORCID: [0000-0002-7188-8786](https://orcid.org/0000-0002-7188-8786)

ABSTRACT

Objective: To assess the frequency, clinical presentation, and associated risk factors of carcinoma cheek in patients presenting at Ear, Nose, and Throat (ENT) department at Jinnah Postgraduate Medical Centre (JPMC), Karachi.

Methods: A descriptive cross-sectional study was carried out at ENT outpatient department of JPMC, Karachi, Pakistan. Two years data of patients with complain of non-healing ulcer of buccal mucosa for more than 4 weeks duration irrespective of age and gender were retrieved from medical record. Biopsy confirmed cases of carcinoma of cheek were noted along with the treatment history of the positive patients. The detailed history of the patients regarding demographic characteristics, smoking habits, and chewable tobacco habits were noted.

Results: Of 330 patients, the mean age of the patients was 44.36 ± 7.32 years. There were 251 (76.1%) males and 79 (23.9%) females. Carcinoma of cheek was observed in 277 (83.9%) patients. A significant association of carcinoma of cheek was observed with age (p-value < 0.001), occupation (p-value 0.004), residence (p-value < 0.001), marital status (p-value 0.031), and addiction of chewable tobacco (p-value < 0.001). The chances of cheek carcinoma were 9 times significantly higher among addicted chewable tobacco patients as compared to those patients' who did not addict of chewable tobacco (aOR 9.48, 95% CI 1.88 – 47.6).

Conclusion: The study revealed that carcinoma of cheek was considerably higher among patients presented with non-healing ulcer of buccal mucosa for more than 4 weeks duration.

Keywords: Carcinoma, Cheek, Risk Factors, Tobacco.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Oral cancer constitutes a major form of malignancy in Asia and second most common malignancy in Pakistan.^{1,3}

A number of etiological factors are involved in the causation of this malignancy including tobacco chewing, alcohol consumption, syphilis, chronic trauma, and nutritional deficiencies.⁴

It is reported that carcinoma of cheek affects men more than women, commonly occurring in the older age group and the most common in subcontinent communities, in Africa and South-East Asia.^{5,6} In this region, the chewing of betel nut and reverse smoking are common habit because of which leukoplakia and submucosal fibrosis are more common in this region of world leading to increase incidence of carcinoma of cheek.⁷

As Pakistan is among one of the Asian countries with highest addiction to chewable tobacco and related stuff that have significant association with the higher risk of occurrence of oral carcinoma, particularly buccal carcinoma.⁸ Therefore, there is a need to report the current magnitude of the problem along with the clinical presentation and associated risk factors. Though previous studies have also reported buccal cancer burden from our region. However, most of the previous studies have reported prevalence of overall oral cancer and from them the particular anatomical region involved. The current study is different in a nature that the study population is all patients reporting with mass or non-healing ulcer in buccal cavity. The findings of this study would be helpful in the understanding of the risk factors associated with buccal carcinoma in our cohort.

METHODS

This descriptive cross-sectional study was conducted at Ear, Nose, and Throat (ENT) outpatient department of Jinnah Postgraduate Medical Centre, Karachi, Pakistan. The study approval was obtained from the Institutional Review Board of Jinnah Postgraduate Medical Centre.

WHO sample size calculator is used for the estimation of sample size considering previously reported burden of buccal carcinoma as 67.8%,⁹ margin of error 5%, and confidence interval 95%. The estimated sample size came out to be 330. Sampling technique was non-probability convenience sampling.

Data were retrieved for all patients aged above 15 years of both genders with mass or non-healing ulcer in oral cavity, patients with submucosal fibrosis diagnosed as Leukoplakia or Erythroplakia of cheek. Whereas patients with incomplete/missing data were excluded.

A structural questionnaire/performa was used to collect information regarding the clinical examination and demographic characteristics such as age, gender, occupation, addiction, duration of complain, and symptoms associated with oral cavity ulcer. Information regarding the drugs or other medical history and co-morbidities were also noted.

Investigations such as blood ceruloplasmin, erythrocyte sedimentation rate, computerized tomography scan with contrast, orthopantomogram x-ray and biopsy was noted.

Data entry and analysis were done using a Statistical Package for Social Sciences (SPSS) version 20.0. Mean \pm SD were computed for quantitative variables like age. While frequency and percentages were computed for categorical variables like gender, occupation, residence, marital status, monthly income, smoking habit, chewable tobacco, and family history of carcinoma. Chi-square/Fisher Exact test was applied to compare carcinoma of cheek with baseline and clinical characteristics. The p-value of ≤ 0.05 was considered statistically significant. All those variables found significant in contingency table were included in binary logistic regression analysis. Both univariate and multivariable logistic regression were applied.

RESULTS

Of 330 patients, the mean age of the patients was 44.36 \pm 7.32 years. There were 251 (76.1%) males and 79 (23.9%) females. Most of the patients were employed 250 (75.8%), married 276 (83.6%), and had monthly income of \leq 35000 Rs 166 (50.3%). There were 151 (45.8%) urban residence whereas 179 (54.2%) rural residence. Smoking

was observed in 250 (75.8%) patients. Family history of carcinoma was noted in 123 (37.2%) patients.

Carcinoma of cheek was observed in 277 (83.9%) patients. A significant association of carcinoma of cheek was observed with age (p-value < 0.001), occupation (p-value 0.004), residence (p-value < 0.001), marital status (p-value 0.031), and addiction of chewable tobacco (p-value < 0.001) (Table 1 and 2). Out of 330, 316 (95.8%) patients were found addicted chewable tobacco. Of these 316 patients, a significant association of cheek carcinoma was found with gutka (p-value < 0.001), mawa (p-value 0.011), betel quid (p-value < 0.001), and frequency of chewable tobacco (p-value 0.003). (Table 3)

The findings of the multivariable analysis showed that after adjusting the variables mention in table 4. The risk of cheek carcinoma was 15 times significantly higher among patients who had age ≤ 45 years as compared to patients who had age > 45 years (aOR 14.7, 95% CI 6.07 – 35.7). Similarly, the likelihood of cheek carcinoma were 20 times significantly higher among urban residence patients as compared to rural residence patients (aOR 20.0, 95% CI 5.88 – 69.7). The chances of cheek carcinoma were 9 times significantly higher among addicted chewable tobacco patients as compared to those patients' who did not addict of chewable tobacco (aOR 9.48, 95% CI 1.88 – 47.6). (Table 4)

DISCUSSION

The finding of this study has reported that carcinoma of cheek was found in 83.9% patients presented with non-healing ulcer of buccal mucosa for more than 4 weeks. The current prevalence is considerably higher when compared with a previous study conducted in Karachi evaluating the clinicopathological features and associated risk factors among diagnosed cases oral squamous cell carcinoma. According to their study findings, carcinoma of cheek was observed in 68.8% confirmed cases.⁸ Khan et al in their study also reported buccal mucosa as the most common anatomical site among all cases of oral cancer.¹⁰ In another study conducted in India it was reported that among all patients with oral cancer, buccal mucosa was the most common site.¹¹ Another study from South India reported that buccal mucosa carcinoma was the most common oral subsite, and about 70% of the cases were presented at advanced stage of disease.¹²

The most common reason for the higher prevalence of buccal mucosa as reported in the current and previous studies is the highest usage of chewable tobacco in our region. According to the current study findings, the

Table 1: Comparison of carcinoma of cheek with demographic characteristics of the patients (n=330)

Variables	Total	Cheek Carcinoma		p-value
		Yes (n=277)	No (n=53)	
Age, years				
≤ 45	200	193 (96.5)	7 (3.5)	<0.001 ^{^*}
> 45	130	84 (64.6)	46 (35.4)	
Gender				
Male	251	212 (84.5)	39 (15.5)	0.645 [^]
Female	79	65 (82.3)	14 (17.7)	
Occupation				
Employed	250	218 (87.2)	32 (12.8)	0.004 ^{^*}
Unemployed	80	59 (73.8)	21 (26.3)	
Residence				
Urban	151	147 (97.4)	4 (2.6)	<0.001 ^{^*}
Rural	179	130 (72.6)	49 (27.4)	
Marital status				
Married	276	237 (85.9)	39 (14.1)	0.031 ^{^*}
Unmarried	54	40 (74.1)	14 (25.9)	
Monthly income, Rs				
≤ 35000	166	138 (83.1)	28 (16.9)	0.765 [^]
> 35000	164	139 (84.8)	25 (15.2)	

[^]Chi-Square test applied, *p-value ≤ 0.05 considered as significant

Table 2: Comparison of carcinoma of cheek with clinical characteristics of the patients (n=330)

Variables	Total	Cheek Carcinoma		p-value
		Yes (n=277)	No (n=53)	
Smoking Status				
Smoker	250	211 (84.4)	39 (15.6)	0.687 [^]
Non-Smoker	80	66 (82.5)	14 (17.5)	
Addict able chewable tobacco				
Yes	316	271 (85.8)	45 (14.2)	<0.001 ^{^*}
No	14	6 (42.9)	8 (57.1)	
Family history of Carcinoma				
Yes	123	97 (78.9)	26 (21.1)	0.053 [^]
No	207	180 (87.0)	27 (13.0)	

[^]Chi-Square test applied, *p-value ≤ 0.05 considered as significant

usage of addiction of chewable tobacco was considerably higher among patients with carcinoma of cheek as compared to those who were not addicted to chewable tobacco. Moreover, the findings of the current study also reported that gutka addiction, mawa addiction, and betel quid addiction were the significant type of chewable tobacco addiction that were associated with cheek carcinoma. The significantly higher presence of chewable tobacco addiction in patients with buccal carcinoma was also reported in

previous studies from Pakistan, India, Taiwan and Sri Lanka.^{8,11,13-15} Moreover, the current study finding also revealed that the risk of carcinoma of cheek significantly increases with frequency of chewable tobacco per day. This finding also matched with the previous study finding as well.^{8,15} In recent years, addiction of chewable tobacco is also reported to have significant adverse effect on other clinical condition as well.^{16,17}

The findings of this study could be observed in the light

Table 3: Comparison of carcinoma of cheek with different type of chewable tobacco (n=316)

Variables	Total	Cheek Carcinoma		p-value
		Yes (n=271)	No (n=45)	
Gutka				
Yes	178	169 (94.9)	9 (5.1)	<0.001 ^{^*}
No	138	102 (73.9)	36 (26.1)	
Mawa				
Yes	93	87 (93.5)	6 (6.5)	0.011 ^{^*}
No	223	184 (82.5)	39 (17.5)	
Areca nut				
Yes	179	159 (88.8)	20 (11.2)	0.075 [^]
No	137	112 (81.8)	25 (18.2)	
Betel Quid				
Yes	121	118 (97.5)	3 (2.5)	<0.001 ^{^*}
No	195	153 (78.5)	42 (21.5)	
Naswar				
Yes	24	23 (95.8)	1 (4.2)	0.142 [~]
No	292	248 (84.9)	44 (15.1)	
Tobacco				
Yes	62	56 (90.3)	6 (9.7)	0.251 [^]
No	254	215 (84.6)	39 (15.4)	
Frequency of chewable tobacco				
≤ 5 times a day	36	26 (72.2)	10 (27.8)	0.003 ^{^*}
6-20 times a day	231	197 (85.3)	34 (14.7)	
> 20 times a day	49	48 (98.0)	1 (2.0)	

[^]Chi-Square/ Fisher-Exact test applied, *p-value ≤ 0.05 considered as significant

of limitation that this was a single center and was conducted on a limited number of samples. Moreover, retrospective nature of the study also limits the weightage of the study. Despite of these limitations, this study has highlighted burden and associated risk factors of patient with cheek carcinoma. As the burden is highly prevalent in Pakistan, the study findings would be helpful for the identification of at-risk population. Further large-scale longitudinal studies are recommended that not only studies the burden, associated risk factors, and therapeutic profile but also report the long-term follow-up of the patients as well. According to the current study findings, a significantly higher proportion of individuals with cheek carcinoma were employed, had lower age, married, and belonged to urban residence. The nature of employment and educational status was not observed in the current study. However, it is hypothesized that individuals with illiterate or poor educational status and manual workers are prone to have addiction with the chewable tobacco and thus cheek carcinoma as well. This is also supported by previous studies findings as well.¹⁸⁻²⁰

CONCLUSION

The study revealed that carcinoma of cheek considerably higher in the patients presenting with non-healing ulcer of buccal mucosa for more than 4 weeks duration. Large scale clinical studies and awareness in local population to promote prevention and early recognition and diagnosis of oral cavity carcinoma to improve prognosis of patients with carcinoma of buccal mucosa.

ETHICAL APPROVAL: Study was approved by the Jinnah Sindh Medical University Institutional Review Board Committee (No: F.2-3/2020-GENL/49113/JMPC).

AUTHORS' CONTRIBUTION: MRD & AW: Conception & design of the study and approved the manuscript for final submission. IU, HK & GSM: Assisted in data collection and drafting of the manuscript. ZA: Critically reviewed the manuscript and approved for final submission. All authors approved final version of the manuscript to be published.

CONFLICT OF INTEREST: The authors declared no

conflict of interest.

FUNDING: None

Received: September 18, 2021

Accepted: February 28, 2022

REFERENCES

- Shreshta AD, Vedsted P, Kallestrup P, Neupane D. Prevalence and incidence of oral cancer in low- and middle-income countries: A scoping review. *Eur J Cancer Care (Engl)* 2020; 29:e13207. [doi:10.1111/ecc.13207](https://doi.org/10.1111/ecc.13207)
- Sarode G, Maniyar N, Sarode SC, Jafer M, Patil S, Awan KH. Epidemiologic aspects of oral cancer. *Dis Mon* 2020; 66:100988. [doi: 10.1016/j.disamonth.2020.100988](https://doi.org/10.1016/j.disamonth.2020.100988)
- Javed A, Zahra G, Qureshi AM. Epidemiology of oral cancer in Pakistan. *Am Sci Res J Eng Technol Sci (ASRJETS)* 2020; 72:118-27.
- Kumar M, Nanavati R, Modi TG, Dobariya C. Oral cancer: Etiology and risk factors: A review. *J Cancer Res Ther* 2016; 12:458-63. [doi:10.4103/0973-1482.186696](https://doi.org/10.4103/0973-1482.186696)
- Shield KD, Ferlay J, Jemal A, Sankaranarayanan R, Chaturvedi AK, Bray F, et al. The global incidence of lip, oral cavity, and pharyngeal cancers by subsite in 2012. *CA Cancer J Clin* 2017; 7:51-64. [doi:10.3322/caac.21384](https://doi.org/10.3322/caac.21384)
- Ren ZH, Hu CY, He HR, Li YJ, Lyu J. Global and regional burdens of oral cancer from 1990 to 2017: Results from the global burden of disease study. *Cancer Commun (Lond)* 2020; 40:81-92. [doi:10.1002/cac2.12009](https://doi.org/10.1002/cac2.12009)
- Niaz K, Maqbool F, Khan F, Bahadar H, Hassan FI, Abdollahi M. Smokeless tobacco (paan and gutkha) consumption, prevalence, and contribution to oral cancer. *Epidemiol Health* 2017; 39:e2017009. [doi:10.4178/epih.e2017009](https://doi.org/10.4178/epih.e2017009)
- Anwar N, Pervez S, Chundrigger Q, Awan S, Moatter T, Ali TS. Oral cancer: Clinicopathological features and associated risk factors in a high risk population presenting to a major tertiary care center in Pakistan. *PLoS One* 2020; 15:e0236359. [doi:10.1371/journal.pone.0236359](https://doi.org/10.1371/journal.pone.0236359)
- Malkani N, Kazmi S, Rashid MU. Epidemiological assessment of oral cancer burden in Pakistan. *Cancer Invest* 2021; 39:842-53. [doi: 10.1080/07357907.2021.1982962](https://doi.org/10.1080/07357907.2021.1982962)
- Khan TZ, Ahmed Z, Junaid T. Prevalence of oral cavity cancer according to anatomical sites in Karachi, Pakistan. *Rawal Medical J* 2016; 41:450-3.
- Ajay PR, Ashwinirani SR, Nayak A, Suragimath G, Kamala KA, Sande A, et al. Oral cancer prevalence in Western population of Maharashtra, India, for a period of 5 years. *J Oral Res Rev* 2018; 10:11-4. [doi:10.4103/jorr.jorr_23_17](https://doi.org/10.4103/jorr.jorr_23_17)
- Padma R, Paulraj S, Sundaresan S. Squamous cell carcinoma of buccal mucosa: Prevalence of clinicopathological pattern and its implications for treatment. *SRM J Res Dent Sci* 2017; 8:9-13. [doi:10.4103/srmjfds.srmjfds_73_16](https://doi.org/10.4103/srmjfds.srmjfds_73_16)
- Khan Z, Suliankatchi RA, Heise TL, Dreger S. Naswar (Smokeless Tobacco) Use and the Risk of Oral Cancer in Pakistan: A Systematic Review With Meta-Analysis. *Nicotine Tob Res* 2019; 21:32-40. [doi:10.1093/ntr/ntx281](https://doi.org/10.1093/ntr/ntx281)
- Su CC, Yang HF, Huang SJ, Lian IeB. Distinctive features of oral cancer in Changhua County: high incidence, buccal mucosa preponderance, and a close relation to betel quid chewing habit. *J Formos Med Assoc* 2007; 106:225-33. [doi:10.1016/s0929-6646\(09\)60244-8](https://doi.org/10.1016/s0929-6646(09)60244-8)
- Amarasinghe AA, Usgodaarachchi US, Johnson NW, Warnakulasuriya S. High prevalence of lifestyle factors attributable for oral cancer, and of oral potentially malignant disorders in rural Sri Lanka. *Asian Pac J Cancer Prev* 2018; 19:2485-92. [doi:10.22034/APJCP.2018.19.9.2485](https://doi.org/10.22034/APJCP.2018.19.9.2485)
- Kumari B, Aslam SK, Zaheer S, Adil SO, Shafique K. Systemic inflammatory markers among waterpipe smokers, cigarette smokers, and nonsmokers. *J Addict Med* 2019; 13:55-60. [doi:10.1097/ADM.0000000000000446](https://doi.org/10.1097/ADM.0000000000000446)
- Karim MT, Inam S, Ashraf T, Shah N, Adil SO, Shafique K. Areca nut chewing and the risk of re-hospitalization and mortality among patients with acute coronary syndrome in Pakistan. *J Prev Med Public Health* 2018; 51:71-82. [doi:10.3961/jpmp.17.189](https://doi.org/10.3961/jpmp.17.189)
- Mugheri MH, Channa NA, Amur SA, Khuhro Q, Soomro NA, Paras M, et al. Risk factors for oral cancer disease in Hyderabad and adjoining areas of Sindh, Pakistan. *Rawal Medical J* 2018; 43:606-10.
- Azam MN, Shahjahan M, Yeasmin M, Ahmed NU. Prevalence of smokeless tobacco among low socioeconomic populations: A cross-sectional analysis. *PLoS One* 2016; 11:e0156887. [doi:10.1371/journal.pone.0156887](https://doi.org/10.1371/journal.pone.0156887)
- Myint SK, Narksawat K, Sillabutra J. Prevalence and factors influencing betel nut chewing among adults in West Insein township, Yangon, Myanmar. *Southeast Asian J Trop Med Public Health* 2016; 47:1089-97.