Original Article

OPEN ACCESS

An Investigation of Clinical Features of Head and Neck Cancers in a Tertiary Care Hospital

Maria Ilyas[1], Zunaira Saeed[2], Zainab Niazi[3], Meesha Abid[4], Reeja Khatoon[5], Sadia Muneer[6]

[1]Assistant Professor, CMH Lahore Medical College and Institute of Dentistry, Lahore
[2]Demonstrator, Army Medical College, Rawalpindi
[3]Associate Professor, Akbar Niazi Teaching Hospital/IMDC, Islamabad
[4,5]Postgraduate Trainee, Armed Forces Institute of Pathology, Rawalpindi
[6]Associate Professor, National University of Medical Sciences, Islamabad

Author`s Contribution

[1,3]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Final approval of the version to be published
[2,4,5,6]Drafting the work or revising it critically for important intellectual content

Funding Source: None
Conflict of Interest: None

Received: Jan 06, 2024
Revised: April 15, 2025
Accepted: May 12, 2025

Address of Correspondent
Dr. Zainab Niazi
Associate Professor, Oral Pathology, Akbar Niazi Teaching Hospital/IMDC, Islamabad
dr.zainabniazi@gmail.com

ABSTRACT

Objective: To investigate the clinical features of individuals with head and neck cancer at a tertiary care hospital.

Methodology: A retrospective cross-sectional analysis was conducted at the Histopathology Department of Combined Military Hospital (CMH) in Lahore, Pakistan, duration from August 2019 to September 2024. Total 250 cases, confirmed through histopathological analysis and above 20 years of age, were included in the study. The cancer sites encompassed the nasopharynx, oral cavity, oropharynx (specifically lip, tongue, tonsil, mouth floor, gingiva, and retromolar trigone), larynx, pharynx, salivary glands, and sinonasal region. The outcomes were to investigate the tumor site in HNC, assess the histological HNC frequency, analyze the HNC stages of tumor node metastasis, and explore the etiological factors contributing to HNC. Failure rates were documented with regard to the type of recurrence, whether it was local, systemic, or distant.

Results: Among the cases, majority (85.2%) were male, and 14.8% were female. The patients mean age was 55.0±20.2 years. The most prevalent age was 40–59 years, representing 55.2% of the cases. The oral cavity was the frequent primary tumor site, observed in 35.2%, followed by the nasopharynx in 20%. Squamous cell carcinoma was the most prevalent type of HNC, observed in 75.2%. The frequency of HNC varied across TNM stages, ranging from stage 0 to stage 4, with 65.2% of cases classified as stage 4. Smoking alone was identified as the most prevalent risk factor for cancer, primarily in the oral cavity, followed by the larynx.

Conclusion: The increasing incidence of HNC has led to high morbidity and mortality in the Pakistani, primarily due to risk factors such as smoking, tobacco use in various forms, and alcohol consumption.

Keywords: Carcinoma, Squamous Cell; Head and Neck Neoplasms; Mouth Neoplasms; Tobacco Use Disorder; Treatment Failure; Neoplasm Metastasis.

Cite this article as: Ilyas M, Saeed Z, Niazi Z, Abid M, Khatoon R, Muneer S. An Investigation of Clinical Features of Head and Neck Cancers in a Tertiary Care Hospital. Ann Pak Inst Med Sci. 21(2):458-462. Doi.10.48036/apims.v21i2.1494.

Introduction

Head and neck cancer (HNC) rank as 9th most prevalent cancer globally. As per WHO, there are over 0.6 million reported cases of HNC annually worldwide, leading to approximately 0.3 million deaths annually.[1] It constitutes around 90% of all cases of HNC and typically manifests in individuals during their sixth to seventh decades of life.[2] Nevertheless, previous literature has indicated that it has emerged in younger age groups in various regions worldwide, including Pakistan, India, China, the USA, and Europe.[3] The incidence rate of HNC in individuals below the age of 40 has ranged from 0.4% to 3.6%. The most frequent sites for the occurrence of HNC are the oral cavity, oropharynx, larynx, and hypopharynx.[4]

Among the different histological variants of HNC, including neuroendocrine tumors, lymphomas, blastomas, and sarcomas, mostly belong to epithelial origin,

specifically squamous cell, constituting above 90% of HNC cases.[5] Nasopharyngeal cancer (NPC) is a less common variant of HNC. Limited epidemiological studies have investigated the risk of laryngeal cancer in relation to a family history of HNC.[6] In South Asia, the practice of chewing betel nut is seen as a cultural trend, but it poses a significant risk factor for HNC, presenting a serious threat to life.[7] HNC is more prevalent in males than females, with 66% to 95% of cases affecting males, making them the primary victims of this deadly disease. However, this pattern is gradually evolving, influenced by changing smoking trends among females. The ratio of pharyngeal and oral cavity cancers between males and females is approximately 3:1.[8]

In Pakistan, particularly in Karachi, the likelihood of developing HNC is generally higher than in any other city globally, posing a substantial burden on the country. This higher incidence can be attributed to a significant number of individuals being habitual smokers and consumers of Chalia and Gutka. The government should actively promote awareness about HNC and demonstrate sincere efforts to prevent this chronic disease. The incidence of HNC in Pakistan, as well as in neighboring countries such as India and Sri Lanka, is reported to be 10 cases per 0.1 million population. The five-year survival rate for HNC is less than 40%.[9]

It is crucial to thoroughly record the pattern of treatment failure, particularly within Pakistani population. Yet, in a comprehensive literature review, it was observed that comprehensive studies documenting a wide range of data is lack on HNC related in Pakistan. Therefore, the primary objective of our study was to investigate the clinical features of individuals with head and neck cancer at a tertiary care hospital.

Methodology

A retrospective cross-sectional analysis was conducted at the Histopathology Department of Combined Military Hospital (CMH) in Lahore, Pakistan after obtaining the ethical approval Ref. No. CMH/IOD/201-RND/6907. The medical records spanning five years (from August 2019 to September 2024) of all patients diagnosed with HNC and treated at CMH were investigated, with a comprehensive review conducted through the tumor boards at the center. Total 250 confirmed cases were included, with the sample determined using the WHO sample size calculator. The parameters used were an HNC incidence rate of 18.74%,[10] a confidence level of 95%, and a significance level of 5%. The study included patients aged above 20 years, encompassing both genders (male/female). The study encompassed all histopathological confirmed cases with cancer sites spanning the nasopharynx, oral cavity, oropharynx (specifically lip, tongue, tonsil, mouth floor, gingiva, and retromolar trigone), larynx, pharynx, salivary glands, and sinonasal region. Patients with cancer at sites other than those specified and those with incomplete data were excluded. The data were collected using a non-probability purposive sampling technique.

The outcomes were to investigate the clinical features, including the HNC tumors site, histological HNC frequency, staging of HNC based on tumor node metastasis (TNM), and the etiological factors contributing to HNC. TNM system was employed to classify the various stages. The classification such as T0 to T4 is determined by the existence and size of the primary tumor. A tumor is classified as T0 when no primary tumor is detected. Advanced stages (T1, T2, T3, and T4) are determined by tumor size and the degree of its spread. While TNM staging may have slight variations in the presentation based on HNC subtypes, the fundamental classification remains same across all HNC types.[11] The tumor's nodal status is determined by lymph node involvement. In N0 (nodal stage 0), there is no involvement of regional lymph node metastasis. In subsequent stages, lymph node metastasis is present, and tumor size progressively increases with advancing stages.[12] Failure rate was documented with regard to type of recurrence, whether it as local, systemic, or distant.

The data was input into Microsoft Excel, and the analysis was conducted using SPSS v 25. Descriptive statistics, including frequencies and percentages, were employed for data analysis. Effect modification was managed through stratification, and a post-stratification chi square test was conducted. A p-value of 0.05 was considered the threshold for significance in the analysis.

Results

This study examined 250 confirmed cases of HNC from 2019 to 2024. Among the 250 cases, 213 (85.2%) were male, and 37 (14.8%) were female. The patients mean age was 55.0±20.2 years. The most prevalent age was 40–59 years, representing 55.2% of the cases, followed by the 60–79 years age at 24%. The least represented age was those over 80 years, comprising 5.6% of the cases. During the study, 150 new cases of HNC (60%) were registered at CMH, while 100 cases (40%) had been previously reported. Table I

Table I: Demographic profile of HNC patients. (n=250)			
Characteristics		**N**	**%**
Gender	Male	213	85.2
	Female	37	14.8
Ages (years)	20 – 39	38	15.2
	40 – 59	138	55.2
	60 – 79	60	24.0
	> 80	14	5.6
Registered cases	New	150	60.0
	Previous	100	40.0

The oral cavity was the frequent primary tumor site, observed in 88 cases (35.2%), followed by the nasopharynx in 50 cases (20%). The larynx was identified as the tumor site in 35 cases (14%). The oropharynx, pharynx, salivary glands, and sinonasal regions were also identified as tumor sites in 77 cases (30.8%). A significant association was found between patient age and tumor site, with a highly significant difference (p = 0.001). Table II

Regarding histology, squamous cell carcinoma (SCC) was the most prevalent type of HNC, observed in 188 cases (75.2%), while salivary gland cancers were identified in 30 cases (12%). Table III

Among the 250 HNC cases, 110 (44%) were diagnosed with stage T4 disease, while 50 (20%) were at stage T3. A total of 35 (14%) cases were at stage T2, 45 (18%) at stage T1, and 10 (4%) at stage T0. In nodal classification, 120 cases (48%) were at stage N0, while 75 cases (30%) were at stage N2. Overall, 10% of cases were classified as M0, indicating no distant metastasis, while 163 cases (65.2%) had stage IV metastatic (M4). Table IV presents the distribution of HNC cases according to TNM staging.

A total of 63 treatment failures (25.2%) were observed, with local failures being most common in oral cavity cancers, followed by nasopharyngeal and laryngeal cancers. However, oral cavity and nasopharyngeal cancers exhibited the highest rates of both regional and distant failures. Notably, metastasis was recorded in 158 cases (63.2%) during their follow-up visits to the center.

In the majority of cases, smoking, tobacco chewing, and alcohol consumption (n=170) were identified as the most common risk factors for cancer. Smoking alone was identified as the most prevalent risk factor for cancer, primarily in the oral cavity (n=88), followed by the nasopharynx (n=50). This difference was significant, with a p-value of 0.001.

Table III: Histological profile of HNC cases. (n=250)		
Histology	**N**	**%**
Squamous cell carcinoma	188	75.2
Salivary glands	30	12.0
Sarcoma	8	3.2
Adenocarcinoma	3	1.2
Mets from other primary	3	1.2
Others	18	7.2
Total	250	100.0

Table IV: Distribution of HNC cases according to TNM staging. (n=250)			
TNM stages		**N**	**%**
pT*	T0, T1	55	22.0
	T2, T3, T4	195	78.0
pN*	N0, N1	160	64.0
	N2, N3	90	36.0
pM*	M0, M1	38	15.2
	M2, M3, M4	212	84.8

Discussion

Developing countries, particularly those in Southeast Asia, are significantly affected by HNC. Males are more commonly affected than females, as areca nut, tobacco, and alcohol consumption are more prevalent among them. Previous literature indicates that oral cancer is the most common type of HNC. HNC squamous cell differs significantly between the developing and developed worlds in terms of gender distribution, etiology, disease site, and molecular biology. The primary challenges in managing these cancers include poverty, illiteracy, late-stage presentation, limited healthcare access, and inadequate treatment.[13,14]

Studies revealed that oropharyngeal cancer was the most common HNC, accounting for 28.6%, followed by esophageal cancer at 19.4% and oral cavity cancer at 16.3%. Oropharyngeal carcinoma accounted for 15.6%, followed by esophageal cancer at 10.6%. Regarding the oral cavity and oropharynx, the tongue was the most commonly affected site, accounting for 32.7%.

Table II: Tumor site distribution among the cases. (n=250)								
Ages (years)	**Oral cavity**	**Nasopharynx**	**Larynx**	**Oropharynx**	**Pharynx**	**Salivary glands**	**Sinonasal regions**	**p-value**
20 – 39	22	7	6	2	4	3	2	
40 – 59	52	39	22	20	16	7	8	
60 – 79	10	3	5	6	3	2	1	.001
> 80	4	1	2	2	0	1	0	
Total	88	50	35	30	23	13	11	

Carcinoma of the cheek accounted for over 20% of oral cavity malignancies, while tonsillar carcinoma comprised approximately 5%.[15,16]

A study found that males were mostly affected than females, with a male-to-female ratio of 2.9:1. Oropharyngeal cancer was the most common type in males, whereas esophageal cancer was the most prevalent in females.[17] This male-to-female ratio is higher compared to other studies, which report a range of 1.5:1 to 2.1:1. Research indicates that cigarette smoking and alcohol consumption are the primary risk factors for HNC in the general population. In contrast, smokeless tobacco and areca nut use are the leading causes of HNC squamous cell in Southeast Asia. These findings align with the results of our study. In developing countries, smokeless tobacco is consumed in various forms, including mava, khaini, paan (betel quid), snuff, zarda, and mashiri, among others.[18]

In Asia, betel quid chewing is the dominant type of smokeless tobacco consumption. It is composed of betel leaf, areca nut, slaked lime, and catechu. It has been reported in several countries, including Pakistan, India, Bangladesh, Thailand, Sri Lanka, Malaysia, Cambodia, China, Indonesia, Philippines, Vietnam, Taiwan, as well as among migrant populations in Africa, Europe, Australia, and North America.[19]

In this study, oral cancer was the most common type of HNC, with the nasopharynx being the most frequently affected subsite. Similar findings were reported in Durrani et al study.[20] In this study, the highest prevalence of HNC was observed in individuals aged 40–60 years, with over 60% of cases occurring in this age group. These cancers are among the most common in Pakistan, exhibiting significant differences in risk factors, affected sites, as well as geographical and demographic patterns.

This study contributed to quantifying and analyzing the spectrum of HNC and served as a foundation for a much-needed population-based study in this region. A collaborative effort is required to identify the causes of this high prevalence, raise awareness, and develop effective treatment options to address this challenge.

Conclusion

In this region, HNC is a prevalent cancer with significant variations in geographical and demographic characteristics, risk factors, and sites of involvement. The rising use of tobacco in the region necessitates monitoring through epidemiological surveys and control measures, including awareness campaigns and public education. Enhancing diagnostic and treatment modalities in the region is essential.

References

1. Sharma JD, Baishya N, Kataki AC, Kalita CR, Das AK, Rahman T. Head and neck squamous cell carcinoma in young adults: A hospital based study. Indian J Med Paediatr Oncol. 2019;40(S01):S18-22. https://doi.org/10.4103/ijmpo.ijmpo_252_17
2. Mahajan S, Gupta R, Sareen V, Kakar V. Assessment of Epidemiological Profile and Clinical Characteristics of Head and Neck Cancers among Patients of Tertiary Hospital in North Western India: A 10-Year Retrospective Study. Int J Contem Med Surg Radiol. 2019;4(4):D195-199. https://doi.org/10.21276/ijcmsr.2019.4.4.47
3. Qamar S, Rozi S, Sawani S, Awan MS, Akhtar S, Siddiqui MI, et al. Oral health related quality of life in head and neck cancer survivors within the first year following treatment: a cross-sectional study in Karachi, Pakistan. Sci Rep. 2024;14(1):2560. https://doi.org/10.1038/s41598-024-52813-x
4. Barsouk A, Aluru JS, Rawla P, Saginala K, Barsouk A. Epidemiology, risk factors, and prevention of head and neck squamous cell carcinoma. Med Sci. 2023;11(2):42. https://doi.org/10.3390/medsci11020042
5. Lampri E, Papoudou-Bai A. Head and Neck Malignancies. In Intraoperative Flow Cytometry. 2023:203-229. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-33517-4_15
6. Chang ET, Ye W, Zeng YX, Adami HO. The evolving epidemiology of nasopharyngeal carcinoma. Cancer Epidemiol Biomarkers Prev. 2021;30(6):1035-1047. https://doi.org/10.1158/1055-9965.EPI-20-1702
7. Jasim A, Li X, Octavia A, Gunardi I, Crocombe L, Sari EF. The association between betel quid use and oral potentially malignant and malignant disorders in Southeast Asian and Pacific regions: a systematic review and meta-analysis with GRADE evidence profile. Front Oral Health. 2024;5:1397179. https://doi.org/10.3389/froh.2024.1397179
8. Park JO, Nam IC, Kim CS, Park SJ, Lee DH, Kim HB, et al. Sex differences in the prevalence of head and neck cancers: a 10-year follow-up study of 10 million healthy people. Cancers. 2022;14(10):2521. https://doi.org/10.3390/cancers14102521
9. Mohsin Z, Faiq A, Naqvi T, Rehman S, Ahmed SI, Farrukh K, et al. Evaluation of head and neck cancer knowledge among the at-risk population of Karachi, Pakistan: a cross-sectional survey. J Health Res. 2022;36(4):725-737. https://doi.org/10.1108/JHR-06-2020-0221
10. Irshad R, Haider G, Hashmi M, Hassan A, Irshad R, Hassan A. Efficacy of gefitinib and methorexate in patients with advanced stage and recurrent head and neck cancer. Cureus. 2021;13(6):e15451. https://doi.org/10.7759/cureus.15451
11. Vijayvargiya P, Trivedi S, Rupji M, Song H, Liu Y, Jiang R, et al. Comparison of the seventh and eighth edition of American Joint Committee on Cancer (AJCC) staging for

selected and nonselected oropharyngeal squamous cell carcinomas. Oncologist. 2022;27(1):48-56. https://doi.org/10.1093/oncolo/oyab001
12. Amit M, Liu C, Gleber FO, Kini S, Tam S, Benov A, et al. Integrating depth of invasion in T classification improves the prognostic performance of the American Joint Committee on Cancer primary tumor staging system for cutaneous squamous cell carcinoma of the head and neck. Eur J Cancer. 2021;144:169-177. https://doi.org/10.1016/j.ejca.2020.11.019
13. Warnakulasuriya S, Chen TH. Areca nut and oral cancer: evidence from studies conducted in humans. J Dent Res. 2022;101(10):1139-1146. https://doi.org/10.1177/00220345221092751
14. Pandey R, Kumar A, Sindhuja T, Kumar D, Gupta V. Epidemiology, pathology, and genomic topography of head and neck cancers. In Diagnostic, Prognostic and Therapeutic Role of MicroRNAs in Head and Neck Cancer. 2024:1-21. Academic Press. https://doi.org/10.1016/B978-0-443-15968-8.00001-6
15. Qin X, Ning Y, Zhou L, Zhu Y. Oral submucous fibrosis: etiological mechanism, malignant transformation, therapeutic approaches and targets. Int J Mol Sci. 2023;24(5):4992. https://doi.org/10.3390/ijms24054992
16. Shamsi U, Khan MA, Qadir MS, Rehman SS, Azam I, Idress R. Factors associated with the survival of oral cavity cancer patients: a single institution experience from Karachi, Pakistan. BMC Oral Health. 2024;24(1):1427. https://doi.org/10.1186/s12903-024-04920-4
17. Mushtaq AB, Waheed A, Mahar GS, Kumar A, Kumar A, Khan A. Frequency of premalignant lesions of oral cavity in Lyari Town, Karachi. JMMC. 2021;12(1):95-59. https://doi.org/10.62118/jmmc.v12i1.211
18. Malkani N, Kazmi S, Rashid MU. Epidemiological assessment of oral cancer burden in Pakistan. Cancer Investig. 2021;39(10):842-853. https://doi.org/10.1080/07357907.2021.1982962
19. Sari R, Aji NR, Seong CF, Amany TY, Dewi RS. Betel Quid and Oral Phenomenon: Current Review. Curr Oral Health Rep. 2023;10(3):88-98. https://doi.org/10.1007/s40496-023-00336-1
20. Durrani S, Al-Dhahari S, Sebeih H, Wani T, Al Qahatani K, Heena H. Clinical characteristics of head and neck cancers at a tertiary care hospital. Population Med. 2020;2(April):9. https://doi.org/10.18332/popmed/120072