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Research

Citation: Wijesingha WJ¹, Gunasena C², Atygalla AM³, Piyarathne NS⁴, 2023. Characteristics of patients presented with primary oral cavity malignancies to the Tertiary Dental Teaching Hospital Peradeniya Sri Lanka during 2020-2022. Sri Lanka Journal of Medicine, pp 38-43. DOI: <https://doi.org/10.4038/sljmv32i2.461>

Characteristics of Patients Presenting with Primary Oral Cavity Malignancies to the Tertiary Dental Teaching Hospital, Peradeniya, Sri Lanka

WJ Wijesingha¹, C Gunasena², AM Atygalla³, NS Piyarathne⁴

¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka.

²Department of Oral Medicine and Periodontology, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka.

³Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka.

⁴Center for Research in Oral Cancer, Department of Basic Sciences, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka

Correspondence:

NS Piyarathne

E mail: piyarathnenadisha@dental.pdn.ac.lk

 <https://orcid.org/0000-0001-5834-6854>

ABSTRACT

Introduction: Malignancies in the oral cavity poses significant health burden in Sri Lanka and demonstrate an increasing trend. The aim of this study was to analyze the characteristics of patients with oral cavity malignancies presenting to a tertiary care center during 2020-2022.

Methodology: Hospital records of patients diagnosed with primary oral cavity malignancies presenting to the Dental Teaching Hospital Peradeniya were entered by two investigators to Microsoft Excel spreadsheet according to the National Cancer Control Program format. Descriptive data analysis was conducted using Microsoft Excel software.

Results: A total of 193 patients were reported during this period, approximately 9 patients per month. Mean age and standard deviation of the cohort were 61±13 years. The male to female ratio was 2.8:1. There were a total of 17 histological types of malignancies, the commonest being squamous cell carcinoma 74.1%. From the total, 50.8% were diagnosed at advanced clinical stages. The commonest anatomical locations of malignancies were buccal mucosa 36.5% followed by border of the tongue 18.8%. Surgical resection was offered for 163 (84.4%) patients, while 5 (2.6%) received surgery and radiotherapy, and one (0.5%) received surgery and chemotherapy.

Conclusions: Male gender, older age group and low socio-economic status were common among patients with oral cavity malignancies in Sri Lanka. The commonest location was buccal mucosa while commonest histological type was squamous cell carcinoma. Late diagnosis remains a major barrier in managing oral malignancies in the country.

Keywords: *oral malignancies, buccal mucosa, oral cancer, oral squamous cell carcinoma*



INTRODUCTION

The oral cavity is bounded anteriorly by the lips, laterally by the cheeks, posteriorly by the faucial arches anterior to tonsils, the upper border is the hard and soft palate, and the lower border is demarcated by the floor of the mouth. Its contents can broadly be grouped into hard and soft tissues. The hard tissues include teeth, alveolus, and hard palate. The soft tissues consist of tongue, floor of the mouth, gingivae, and the oral mucosa lining the palate and cheek areas. According to the International Codes for Diseases by the World Health Organization, the oral cavity is identified by C00-C06 codes [1].

Among different disease conditions affecting the oral cavity, malignancies are most disastrous, as they compromise various functions that are vital to overall health and wellbeing of individuals [2]. Specifically, mastication, phonation, speech, appearance, food intake, nutrition, emotional and psychosocial health are compromised [3]. Different tissues can give rise to malignancies in the oral cavity, most common being the squamous cells of the oral epithelium [1]. In addition, intra-oral melanomas, lymphomas, and malignant tumors arising from the salivary glands and bones. When considering the risk factors, tobacco in both smoking and smokeless forms, alcohol consumption and synergistic actions of the combinations of the above are prominent risk factors [4].

The Ministry of Health, Sri Lanka together with the National Cancer Control Program (NCCP) maintains an island wide cancer registry including data from all the oral and maxillofacial units in the country using a standardized format. The latest report issued by the NCCP on lip, tongue, and mouth cancer for 2019, denotes that it is the commonest cancer in males (14.6% of total cancers) and the 8th most frequent cancer in females accounting for 3.4% of total cancers [5]. The number of new cases reported in the year 2019 was 2173 for males and 586 for female's island wide [5]. Further, a recent analysis reported an increasing trend in the age standardized incidence rates for lip and oral cavity cancers in Sri Lanka [6].

The dental hospital at Peradeniya is the only dental tertiary care center in the country attached to a university dental teaching unit. It is well equipped

with a state-of-the-art centre to perform surgical procedures covering the full scope of oral and maxillofacial surgeries with intensive care unit facilities and trained personnel. The dental hospital attracts patients from around the island with varying oral pathologies. The objective of the present research was to analyse the sociodemographic and clinico-pathological characteristics of patients presenting with primary malignancies of the oral cavity during the years of 2000-2022.

METHODOLOGY

This study is a retrospective analysis of secondary data of hospital records collected as a requirement to maintain an island-wide cancer registry by the Ministry of Health, Sri Lanka. Hospital records of patients who were diagnosed with primary malignancies in the oral cavity during November 2020 to July 2022, presented to the Dental Teaching Hospital Peradeniya were gathered. Patients with secondary or recurrences of malignancies were excluded. Data from hospital records was entered by two investigators to Microsoft Excel spreadsheet according to the NCCP format. Descriptive analysis and data visualization was conducted using Microsoft Excel software.

RESULTS

A total of 193 patients with oral cavity malignancies were presented to the Oral and Maxillofacial unit, Dental Teaching Hospital Peradeniya, during the twenty-one-month period from November 2020 to July 2022. The average number of patients per month was 9.1. The age range of the patients varied from 2 years to 87 years. The mean age and standard deviation of the cohort was 61 ± 13 years. There were 142 (73.6%) males and 51 (26.4%) females, the male to female ratio was 2.8:1. For $n=188$ (97.4%) histopathological report of the primary tumor was used for diagnosis, for 2 patients (1.0%) histology of the metastasis was used while in $n=3$ (1.6%) only the clinical diagnosis was available.

Sociodemographic characteristics

The cohort of patients represented four main religious groups in Sri Lanka, namely 67.4% Buddhists, 25.4% Hindu, 6.7% Islam and 0.5% Christian. Regarding the ethnic groups, 67.4% (130) patients were Sinhalese, followed by 25.9% (50) Tamil and 6.7% (13) Muslim. Among them, n=141 patients (73%) were unemployed at the time of diagnosis. Among the employed, the most common were farmers (n=15), and drivers (n=6). The highest number of patients were from the Kandy district (36.8%) followed by Nuwaraeliya (13.5%). The distribution of patients among different districts is presented in Table 1.

Table 1: Distribution of patients according to the district of permanent residence

District	Number of cases	% from the total
Ampara	1	0.52
Anuradhapura	4	2.07
Badulla	7	3.63
Colombo	2	1.04
Kalutara	4	2.07
Kandy	71	36.8
Kegalle	8	4.15
Kurunegala	8	4.15
Mannar	1	0.52
Matale	5	2.59
Matara	2	1.04
Monaragala	1	0.52
Nuwara Eliya	26	13.5
Polonnaruwa	2	1.04
Puttalam	3	1.55
Trincomalee	1	0.52
Missing data	47	24.4

Clinicopathological characteristics

There were 17 different histological types of malignancies reported in the oral cavity. The distribution of histological types of the malignancies are described in Table 2, according to the results, 74.1% were squamous cell carcinomas.

Table 2: Histological types of the malignancies in the oral cavity

Histological category	Number of cases	% from total
Squamous cell carcinoma	143	74.1
Spindle cell carcinoma	2	1.0
Verrucous carcinoma	2	1.0
Adenocarcinoma	2	1.0
Mucoepidermoid carcinoma	2	1.0
Malignant lymphoma	2	1.0
Epithelioma, malignant	1	0.5
Carcinoma, undifferentiated	1	0.5
Papillary squamous cell carcinoma	1	0.5
Basaloid squamous cell carcinoma	1	0.5
Neuroendocrine carcinoma	1	0.5
Cystadenocarcinoma	1	0.5
Embryonal rhabdomyosarcoma	1	0.5
Malignant myoepithelioma	1	0.5
Malignant lymphoma, non-Hodgkin	1	0.5
Unspecified malignancy	20	10.4
Carcinoma, NOS	11	5.7
NOS: not otherwise specified, % was calculated from the total cohort n=193.		

There were six main differentiation patterns of malignancies, namely well differentiated (WD), moderately differentiated (MD), poorly differentiated (PD), undifferentiated (UD), B cells, and not specified. The distribution of malignancies according to the differentiation pattern is depicted in Figure 1.

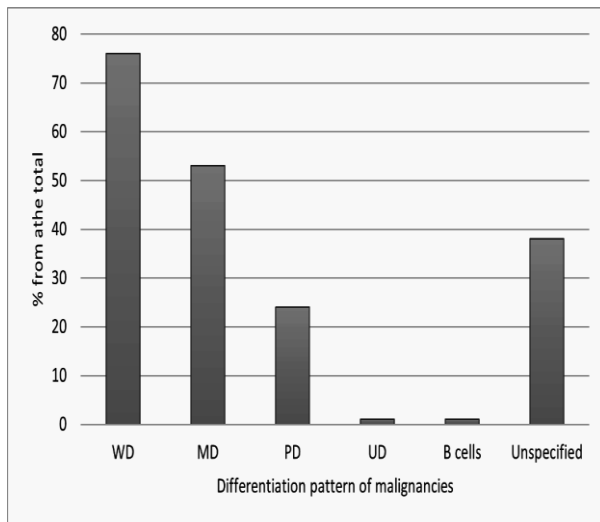


Figure 1: Differentiation pattern of malignancies. WD: well, differentiated, MD: moderately differentiated, PD: poorly differentiated, UD: undifferentiated.

Regarding the anatomical location, 99% were in the skin and mucosa of the oral cavity and only 1% were present in the oropharynx (tonsils and anterior wall of the nasopharynx). Of the malignancies of the oral cavity, cheek mucosa (36.5%) was the commonest location followed by border of the tongue (18.8%). The precise anatomy of malignancies is detailed in Table 3.

Table 3: Anatomical locations of oral cavity malignancies

Anatomical location	Number of Cases	% from total
External upper lip	1	0.5
Mucosa of upper lip	2	1.0
Mucosa of lower lip	2	1.0
Mucosa of the lip	1	0.5
Commissure of the lip	1	0.5
Base of the tongue	4	2.1
Tongue-dorsum	2	1.0
Tongue-border	36	18.8
Anatomical location (ctd)	Number of Cases	% from total
Tongue-NOS	1	0.5
Lower gum	4	2.1

Anterior floor of the mouth	4	2.1
Lateral floor of the mouth	8	4.2
Floor of the mouth - NOS	2	1.0
Hard palate	12	6.3
Soft palate	6	3.1
Overall palate	1	0.5
Palate-NOS	4	2.1
Buccal mucosa	70	36.5
Vestibule of the mouth	9	4.7
Retromolar area	9	4.7
Mouth-NOS	4	2.1
Parotid gland	3	1.6
Tonsils	1	0.5
Anterior wall of nasopharynx	1	0.5
Skin of face	1	0.5
Skin of scalp and neck	2	1.0
Head, face, or neck-NOS	1	0.5
NOS: Not otherwise specified		

The clinical stage of the malignancies was determined based on the Tumor Nodes and Metastasis classification of the 8th American Joint Committee on Cancer classification system. Of the total cohort of 193 patients, clinical stage of 32.1% were not determined, 22.3% were diagnosed at stage 3, and 28.5% at clinical stage 4. The details of clinical stages at the time of diagnosis are presented in Table 4, and the distribution of patients at 0-4 major clinical stages are presented in Figure 2.

Table 4: Clinical staging of malignancies at the time of diagnosis

Clinical Stage	Number of cases	% from total
Stage 0	3	1.6
Stage 1	13	6.7
Stage 2	17	8.8
Stage 3	41	21.2
Stage 3A	1	0.5
Stage 3B	1	0.5
Stage 4A	17	8.8
Stage 4B	17	8.8
Stage 4	21	10.9
Unspecified	62	32.1

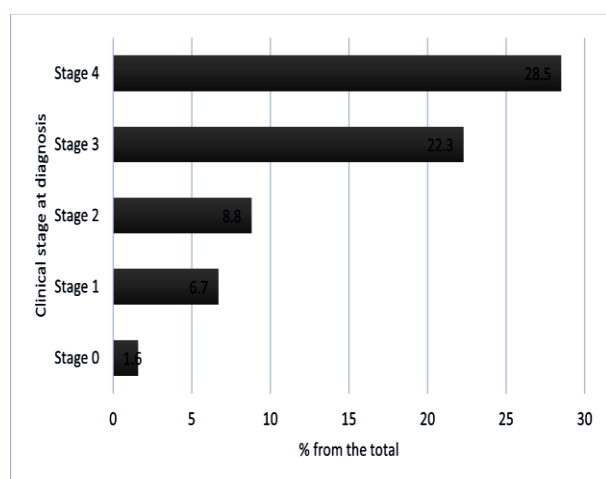


Figure 2: Percentage of patients diagnosed at 0-4 major clinical stages. The cancer staging was based on 8th American Joint Committee on Cancer classification system.

Surgical excision was the primary treatment of choice. The majority (84.4%) were offered surgical management only, while 5 patients (2.6%) received surgery and radiotherapy, and one patient received surgery and chemotherapy (0.5%), the remaining patients (n=24, 12.4%) had missing data due to loss to follow up.

DISCUSSION

Sri Lanka is an island nation with a population of 22 million and classified as a low- and middle-income country by the World Health Organization. Cancer is a major cause of mortality from non-communicable diseases in our population, and lip and oral cavity cancers were the most common cancer in males with 20.6 % crude incidence rate [5]. The latest oral health report issued by the Ministry of Health, Sri Lanka reports that there was a total of 2046 newly diagnosed oral cavity cancers in the year 2021 [7].

Our results indicate that the average number of primary oral cavity malignancies diagnosed in this center was 9.1 per month, this was twice the average number of patients diagnosed by a single oral and maxillofacial unit in the country which was 4.6 per month [7]. Patients from 16 out of the 25 administrative districts in Sri Lanka were managed at this center, most likely due to this being a well-equipped tertiary referral center.

The age and gender profile of patients were similar to the previously reported. Squamous cell carcinoma of the oral cavity reported a higher prevalence in older age groups with a male predilection [6,8,9]. There were only two malignancies reported in patients under the age of 30 years, they were embryonal rhabdomyosarcoma and malignant myoepithelioma.

Oral cavity malignancies in Sri Lanka remains a disease in the low socioeconomic class in line with the previously reported literature [10], as the majority of patients in this cohort were either unemployed or belonged to lower economic groups. Farming and driving were prominent occupational groups in the cohort among the employed. The main risk factors in this population were betel quid chewing, including primary carcinogenic agents' smokeless tobacco and Areca nut [4]. This habit was prevalent in occupational groups which require nighttime labor due its stimulatory effect, and this habit also demonstrated a male predilection [11].

The differentiation of malignancies followed a similar pattern to previously reported, well differentiated was the most common type observed [12]. However, in the previous report by Siriwardena et al., 2015, only eight histopathological entities were identified among the oral cavity malignancies, they were well differentiated SCC, moderately differentiated SCC, poorly differentiated SCC, early invasive SCC, verrucous carcinoma, basaloid SCC, adenosquamous carcinoma, and spindle cell carcinoma [12]. In the current study, additional histopathological types were identified (Table 2). These may be due to updates in the classification systems and variation of disease presentation with time.

Previous studies reported that buccal mucosa was the most favorable site for oral cavity malignancies in this population, with 43% [8] and 41.9% [12]. In the current study, the percentage of buccal mucosa cancers was slightly lower with 36.5%, but still was the commonest anatomical location. Deposition of the betel quid in the oral vestibule is a primary reason to develop buccal mucosa cancers. Previous studies reported that tongue involvement was significant in oral cavity malignancies presenting below the age of 40 years [12]. In the current study cohort this phenomenon was not observed, as only three cases out of a total of ten malignancies (33%) reported in patients under the age of 40 years included the tongue.

Nearly 50% of oral cavity malignancies were diagnosed at the advanced clinical stage, this percentage was lower than the previously noted alarming rate of 86% in 2016 [8]. However, still our results demonstrate a substantial need to expand strategies for early detection of oral cavity malignancies. The economic burden of managing advanced stage oral cancer patient was estimated fivefold higher than to the management of an initial stage oral cancer patient [13]. To counteract these deficiencies and to facilitate early detection, novel technologies such as non-invasive salivary biomarkers [14] and digital and automated diagnostic modalities using artificial intelligence [15] can be employed. This will further reduce the socioeconomic inequalities identified in the diagnosis and management of oral cancer [9].

The data reported in this study was during the period of COVID-19 pandemic therefore it can be a reason for the notable percentage of missing data, and this was identified as a limitation of the current research.

CONCLUSIONS

Male gender, older age group and low socio-economic status were common among patients with oral cavity malignancies in Sri Lanka. The commonest anatomical location was buccal mucosa while commonest histological type was squamous cell carcinoma. Late diagnosis remains a major barrier in managing oral malignancies in the country, iterating the need to implement novel strategies for screening of high-risk groups and early diagnosis.

Author declaration

Authors' contributions:

Study concept and design and acquisition of data: W.J.W., and C.G.; Analysis and interpretation of data and drafting of the manuscript: W.J.W., C.G., and N.S.P; Critical revision of the manuscript for important intellectual content: A.M.A.; Supervision: N.S.P.

Conflicts of interest:

The authors declare that there is no financial or non-financial conflict of interest.

Funding statement:

Self-funded

Ethics statement:

This research involves secondary data collected from hospital records. This research was conducted according to standards of ethical conduct specified by the Declaration of Helsinki.

Statement on data availability:

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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