A 10-YEAR REVIEW OF ORAL SQUAMOUS CELL CARCINOMA AT THE ORALPATHOLOGY LABORATORY, UNIVERSITY OF GHANA DENTAL SCHOOL

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ABSTRACT

Background: Oral Squamous cell carcinoma accounts for about 90% of all tumors in the head and neck region. It is a cause of cancer mortality among Africans. There is limited information and documentation on Oral Squamous Cell Carcinoma (OSCC) in Africa. Only a few studies in Ghana have evaluated the clinicopathological features of OSCC. This study reported the prevalence, age, sex distribution, common presentation sites, and degree of differentiation of oral squamous cell carcinoma patients presenting to the Oral Pathology Diagnostic Laboratory over 10 years.

Method: This was a retrospective analysis of cases of OSCC diagnosed at the Oral Pathology Diagnostic Laboratory, Ghana Dental School, Ghana, between January 2011 and December 2020.

Results:
A total of 3526 cases were diagnosed in the study period; 167 cases were oral squamous cell carcinoma. The prevalence of OSCC was 4.74%. The gender distribution was 2.86% among males, and 1.87% among females. The mean age of patients was 60.08 ± 16.207; the median age was 61. Peak incidence was in the 51-60- and 61-70-year groups in both sexes. Male to female ratio was 1.5:1. The commonest site of the presentation was the tongue (26.7%), followed by the buccal mucosa (19.2%), alveolus (11.0%), palate (11.0%), the mandible (8.7%), floor of the mouth (6.4%), lower lip (5.8%), Maxilla (4.1%), retromolar pad (2.3%) and upper lip (0.6%). Most of the lesions were well differentiated (58.10%).

Conclusion: The present data highlight the reduced ratio of males to females presenting with OSCC, the increasing number of OSCC cases in the young and middle-aged adult population, the tongue as the most common site, and most lesions being well-differentiated lesions. This study will help improve public health education and documentation of lesions for future studies.

Keywords: Oral squamous cell carcinoma, Histopathological reports, Age, Sex, Site distribution, Degree of differentiation.

INTRODUCTION

Oral Cancer is a malignant neoplasm that arises from the mucosa and the glandular tissues of the lip and the oral cavity[1]. Oral cancer encompasses malignant neoplasms from multiple sites, including oral epithelium (squamous cell, verrucous, spindle cell, adenoid squamous, basal cell, malignant melanoma), odontogenic epithelium, primary bone tumors, salivary gland tumors, hemopoietic, lympho-reticular and metastasis from distant sites[2]. Among the various types of oral cancers, oral squamous cell carcinoma (OSCC) is the most common, accounting for 80-90% of all malignant neoplasms of the oral cavity[3].

It is defined as "a malignant epithelial neoplasm exhibiting squamous differentiation as characterized by the formation of keratin and or the presence of intercellular bridges"[4].
The incidence of oral cancer is higher in developing countries, India, and South/ Eastern Asia, particularly[5].
According to GLOBOCAN 2012, oral cavity and lip cancer is Africa's 15th most common Cancer. The oral cavity ranges from the 6th to the 9th most common location for cancer, mostly depending on the country and the gender of the patients. In some regions of South Eastern Asia, it is the most common cancer seen[6].

In 2012, an estimated value of 17,276 new cases of lip and oral cavity cancer were diagnosed in Africa[3]. The reported standard incidence rate in Africa is 2.6 per 100,000 population, which ranges from 1.5 in West Africa to 4.0 in South Africa[7]. Data from Africa is limited mainly due to only a few regional registers, thus making it difficult to determine the true incidence of OSCC[8].
Important risk factors of OSCC include excessive use of tobacco, alcohol, and betel quid[9]. Oral Squamous cell carcinoma development is also influenced by viruses, diet and nutrition, ethnicity, radiation, and genetic and familial predisposition: oral candidiasis, use of mouthwash, syphilis, dental factors, and occupational risks[10].
Generally, OSCC occurs more commonly in older age groups than the youth and is mainly found after the fourth decade of life[11]. The likelihood of developing OSCC increases with the duration of exposure to risk factors; increasing age comes with the accumulation of mutagens and carcinogens and possible epigenetic changes[12].

Oral Squamous cell carcinoma affects males much more than females globally[13]. This trend may be due to more males than females adopting habits such as smoking and alcohol consumption, predisposing them to oral Cancer.
Although oral Cancer may occur at any oral site, certain sites are more frequently involved than others. OSCC usually affects the tongue, floor of the mouth, gingiva, palate, and oral mucosa14. This distribution varies from one location to another; the tongue is the most common site for intraoral Cancer among the European and US population and accounts for 40-50% of oral cancers[14]. The buccal mucosa is the commonest site among the Asian populations due to tobacco/betel quid chewing habits; 40% of oral cancers in Sri Lanka are found on the buccal mucosa[8]. In Zimbabwe, Nigeria, and Brazil, the mandibular gingivae are the most common sites in published reports[15].
This study aims to describe the demographic pattern of OSCC histopathologically diagnosed at the Oral Pathology Diagnostic Laboratory, University of Ghana Dental School, Ghana, from January 2011 to December 2020.

METHODOLOGY:

This was a retrospective study of histopathological reports from the University of Ghana Dental School's Oral Pathology Diagnostic Laboratory of patients whose biopsy was submitted to the laboratory for histological diagnosis between January 2011 and December 2020. The World Health Organization Histological Classification for OSCC was used to classify the histological differentiation of the cases[23].

All samples with completed laboratory request forms with tumor specimens sent to the Oral Pathology Laboratory and specimens diagnosed as OSCC between January 2011 and December 2020 were included in the study. Requests within the inclusion criteria with incomplete records were excluded.

A data extraction form was used to record data from retrieved records from the Oral Pathology Laboratory.

DATA PROCESSING AND ANALYSIS:

The data collected were entered into Microsoft Excel 2019 and exported to Statistical Package for Social Sciences (SPSS) version 26 for analysis.

A descriptive summary (mean and standard deviation) was used for normally distributed continuous variables and median and interquartile range for skewed variables. Categorical variables were summarized as frequencies, proportions, and percentages.

Pearson's Chi-square test was used to compare proportions between the demographic variables. Also, Independent t-tests were used to compare the means of the continuous variables between the positive and negative outcomes. The significance level was set at $p<0.05$ $\alpha=0.05$

Ethical approval was sought from the Ethical Review Board of the College of Health Sciences and the University of Ghana Dental School Oral Diagnosis Department.

No subjects were directly involved in the study; as such, there was no anticipated risk or harm from the study.

RESULTS:

A total of 3526 specimens/cases were received and diagnosed in the Oral Pathology department during the study period; 167 cases were oral squamous cell carcinoma. This consisted of 66(39.5%)females and 101(60.5%) males.

The prevalence of OSCC was found to be 4.7% of the total number of cases(3526) diagnosed; the prevalence of OSCC among males was (101, 2.9%) and that among females was (66,1.87%).

Table 1: Sex distribution among different age groups.

Age Group	Female	Male	Total	Percentage
<20	1	1	2	1.2%
21-30	1	2	3	1.8%
31-40	5	13	18	10.8%
41-50	6	14	20	12.0%
51-60	18	21	39	23.4%
61-70	13	25	38	22.8%
71-80	11	20	31	18.6%
81-90	10	4	14	8.4%
91-100	1	1	2	1.2%
Total	66	101	167	100%

The mean age of the patients was 60.1 (Table 2), and the median age was 61 years. The mean age for males was 58.6 years, and that for females was 62.4 years. (Table 2) The mean age for females was 3.7 years higher than that of the males, but this value was not statistically significant (p=0.132) (Table 1). Records showed that cases were seen in people aged from 11 to 95 years (Table 2).

SITE DISTRIBUTION OF OSCC LESIONS

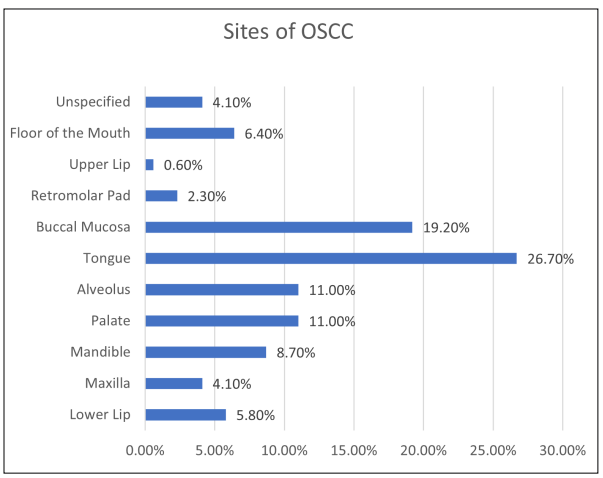

Figure 1: Sites of SCC Lesions

The commonest sites of OSCC recorded in this study were the tongue (26.7%) and the buccal mucosa (19.2%). The rest of the cases were recorded on the alveolus (11.0%), palate (11.0%), the mandible (8.7%), floor of the mouth (6.4%), lower lip (5.8%), Maxilla (4.10%), retromolar pad (2.3%) and upper lip (0.6%). The location of the remaining 4.1% of cases was not specified (figure 1)

Table 2: Gender distribution of the different sites of OSCC.

Site	Female(n=66)	Male(n=101)
Lower Lip	60.00%	40.0%
Maxilla	71.40%	28.6%
Mandible	46.70%	53.3%
Palate	63.20%	36.8%
Alveolus	31.60%	68.4%
Tongue	30.40%	69.6%
Buccal Mucosa	36.40%	63.6%
Retromolar Pad	25.00%	75.0%
Upper Lip	0.00%	100.0%
Floor of the Mouth	0.00%	100.0%
Unspecified	71.40%	28.6%

The site distribution of OSCC varied among the sexes. The lower lip (60%), Maxilla (71.4%), and palate (63.2%) showed higher preponderance in females while lesions in the mandible (53.3%), alveolus (68.4%), tongue (69.6%), buccal mucosa (63.6%), retromolar pad (75%) and the upper lip (100%) all showed a higher male preponderance. (Table 3)

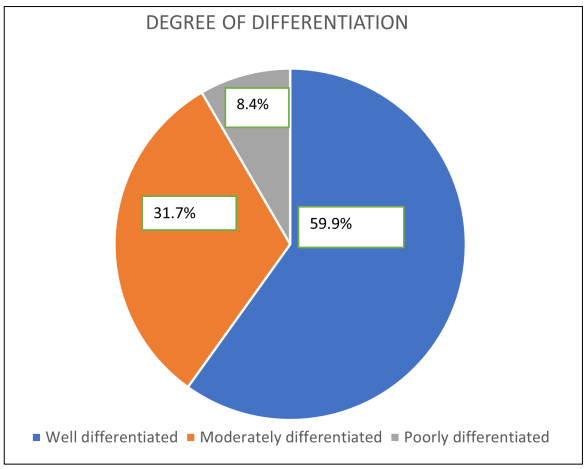

Figure 2 Differentiation of SCC lesions

Most of the lesions recorded in this study were well differentiated (59.9%). The remaining were moderately differentiated (31.7%) and poorly differentiated (8.4%), (Figure 2)

DISCUSSION

The total number of cases seen at the Oral Pathology Laboratory within the study period was 3526; 167 were oral squamous cell carcinoma. The prevalence of OSCC was found to be 4.74% in this study which is low compared to that of a study done in Nigeria by Effiom et al.[16] in 2008, which was 10.8%. This could be accounted for by the differences in social and cultural practices between these two different populations. This difference could also suggest a geographic variation in risk factors and the larger ethno-variation population size. However, it was high compared to a study by Onyango et al.[22] in Kenya, which showed a prevalence of OSCC in a 20-year retrospective survey of 3.6%.

Age and sex distribution

In this retrospective study, the age of presentation was between 11 to 95 years; peak incidence was in the 51-60- and 61-70-year groups in both sexes.

The mean age of presentation in the sixth decade (60.08 ± 16.207 years) is similar to 62.3 years recorded by Fabio Ramoa et al. [6] in an 8-year retrospective study in Rio de Janeiro state university's School of Dentistry and 61.5 years in a 40-year study in the United States by Osazuwa-Peters et al.[17].

According to a study by Johnson et al.[18] in 2011, the mean age of presentation in the Asian population was in the fifth and early sixth decades, and among North Americans were in the seventh and eighth decades. A study done in Zimbabwe by Chidzonga and Mahomva[15] in 2006 had their peak incidence within the fourth and fifth decades. In a Ghanaian study by Abdulai and Nuamah[19] in 2013, the fifth decade, they had the highest incidence (62 out of 248 cases, 25%).

The mean age for males was 58.55 ± 15.387, and that for females was 62.42 ± 17.245. The difference between the mean ages of females and males was 3.8. This value was not statistically significant, implying the age difference cannot be accounted for. The higher mean age of presentation in females may be due to a cumulative risk of developing OSCC. The relatively lower age of presentation in males may be attributed to indulgence in multiple high-risk habits over a short period making them more susceptible to OSCC.

Generally, there is an older age of [24] presentation which could be due to the accumulation of carcinogens over time and the relative risk of Cancer increasing as age increases. The lowest age of presentation was 11. OSCC in an 11-year-old could result from hereditary factors or a family history of OSCC. In 1987 WHO reported that OSCC was rare in individuals below the age of forty. However, as Tandon et al.[9] reported, up to 35.7% of cases are in the 0-40 age group. This study recorded 13.8% of OSCC cases in this age group. Dietary changes, early indulgence in the implicated risk factors, and exposure to high-risk HPV, among other reasons, could be the reason for this trend.

In most countries, oral Cancer is recorded in more men than women[8]. In this study, OSCC was recorded in 66 females (40%) and 101 males (60%), representing a Male: Female ratio of 1.5:1 which is lesser than the 2:1 reported by Abdulai and Nuamah[19] in 2013 and 2:1 reported by Chidzonga et al.[15] in their study. The ratio of 1.5:1 could be due to the fact that females attend the dental clinic more often and are likely to seek prompt medical attention for such conditions[25]. More women presenting with OSCC could be due to changes in social activities of modern women predisposing them to more carcinogens in the form of heavy alcohol drinking, smoking, and exposure to agents such as HPV. HPV-related OSCC has been said to increase by as much as 225% from 1988 to 2004 and is related to a younger age of diagnosis in studies conducted outside Africa[17].

Site distribution of OSCC lesions

The commonest site of presentation recorded in this study was the tongue (26.7%) which is consistent with a study done in Ghana by Abdulai et al.[19] who recorded 25.81%. Also, the tongue commonly accounts for 40-50% of cases presenting[8] among the European and US populations. In the Asian population, the Buccal mucosa is affected much more than in other areas due to tobacco and betel quid chewing habits[8]. The second most common presentation site was the buccal mucosa (19.20%). There is the possibility of an oral habit being a factor. Abdulai and Nuamah[19] reported that in certain places in Ghana, tawa, smokeless tobacco used in a manner like a betel quid could be an etiological factor that could be compared to other oral habits in other societies. This study could not explore this due to the paucity of information on risk factors and patient habits.

It is argued that the reason for tongue and buccal mucosa OSCC is a result of carcinogens mixing with saliva and pooling in the floor of the mouth, hence constant exposure of these sites, also these regions have thin mucosa, therefore easy diffusion of these cancerous agents[20].

Chronic irritation by the ill-fitting prosthesis and constant trauma could be causes of premalignant lesions, which eventually cause SCC of the tongue[20].

The least affected sites in this study were the Maxilla, retromolar pad, and upper lip. Studies in Nigeria reported the palate as the most commonly affected site and the alveolus, buccal mucosa, and gingiva as the least affected site[21]. Another study in Zimbabwe recorded the mandibular gingiva as the most commonly affected site[15].

The lower lip, Maxilla, and palate showed higher preponderance in females. In contrast, lesions in the mandible, alveolus, tongue, buccal mucosa, retromolar pad, and upper lip showed a higher male preponderance.

Lesions in the mandible and Maxilla are included because, most likely, the lesion started from the gingivae or a nearby soft tissue structure and invaded bone. This could be due to the late presentation of the cases.

Degree of differentiation of OSCC lesions

Most of the lesions in this study were well differentiated (59.9%), in contrast with a study by Abdulai and Nuamah[19]. The remaining were moderately differentiated (31.7%) and poorly differentiated (8.4%). Contrary to most studies reporting well-differentiated OSCC as the most common subtype, a study done in Nigeria reported the poorly differentiated subtype as the most common in both genders[16].

CONCLUSION

Analysis of demographic features, prevalence, site distribution, and degree of differentiation of OSCC lesions revealed that the peak ages of presentation of OSCC were in the 51-60 and 61-70-year groups in both sexes. The mean age of presentation was 60.08 years. There was a male predominance with a male-to-female ratio of 1.5: 1. The common presentation site was the tongue. Most lesions were of the well-differentiated subtype. The results of this study will add to the bank of information on OSCC available for subsequent studies in the future. It will also increase awareness of the pattern of OSCC, which will help in its early diagnosis and management to reduce its burden in Ghana.

REFERENCES

1. Rivera C. Essentials of Oral Cancer. International journal of clinical and experimental pathology. 2015;8(9):11884.

2. Zakrzewska JM. Oral cancer: Fortnightly review. BMJ. 1999;318(7190):1051-4.

3. Gupta N, Gupta R, Acharya AK, Patthi B, Goud V, Reddy S, Garg A, Singla A. Changing Trends in oral cancer-a global scenario. Nepal journal of epidemiology. 2016;6(4):613.

4. Shafer AW, Hine MK, Levy BM. Shafer's textbook of oral pathology. Elsevier, a division of Reed Elsevier India Private Limited; 2015.

5. Elaiwy O, El Ansari W, AlKhalil M, Ammar A. Epidemiology and pathology of oral squamous cell carcinoma in a multi-ethnic population: Retrospective study of 154 cases over 7 years in Qatar. Annals of Medicine and Surgery. 2020;60:195-200.

6. Pires FR, Ramos AB, Oliveira JB, Tavares AS, Luz PS, Santos TC. Oral squamous cell carcinoma: clinicopathological features from 346 cases from a single oral pathology service during an 8-year period. Journal of Applied Oral Science. 2013;21:460-7.

7. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians. 2018;68(6):394-424.

8. Warnakulasuriya S. Global epidemiology of oral and oropharyngeal Cancer. Oral oncology. 2009;45(4-5):309-16.

9. Tandon P, Dadhich A, Saluja H, Bawane S, Sachdeva S. The prevalence of squamous cell carcinoma in different sites of the oral cavity at our Rural Health Care Centre in Loni, Maharashtra–a retrospective 10-year study. Contemporary Oncology/Współczesna Onkologia. 2017;21(2):178-83.

10. Kumar M, Nanavati R, Modi TG, Dobariya C. Oral cancer: Etiology and risk factors: A review. Journal of cancer research and therapeutics. 2016;12(2):458.

11. Neville BW, Damm DD, Allen CM, Chi AC. Oral and maxillofacial pathology. Elsevier Health Sciences; 2015.

12. Liviu Feller, Johan Lemmer. Oral Squamous Cell Carcinoma: Epidemiology, Clinical Presentation and Treatment. J Cancer Ther. 2012;3(4): 526-534.

13. García-Martín JM, Varela-Centelles P, González M, Seoane-Romero JM, Seoane J, García-Pola MJ. Epidemiology of oral Cancer. InOral Cancer Detection 2019.

14. Hernández-Guerrero, J.C., Jacinto-Alemán, L.F., Jiménez-Farfán, M.D., Macario-Hernández, A., Hernández-Flores, F. and Alcántara-Vázquez, A., 2013. Prevalence trends of oral squamous cell carcinoma. Mexico City's General Hospital experience. Medicina oral, patología oral y cirugía bucal, 18(2), p.e306.

15. Chidzonga MM, Mahomva L. Squamous cell carcinoma of the oral cavity, maxillary antrum and lip in a Zimbabwean population: a descriptive epidemiological study. Oral oncology. 2006;42(2):184-9.

16. Effiom OA, Adeyemo WL, Omitola OG, Ajayi OF, Emmanuel MM, Gbotolorun OM. Oral squamous cell carcinoma: a clinicopathologic review of 233 cases in Lagos, Nigeria. Journal of Oral and Maxillofacial Surgery. 2008;66(8):1595-9.

17. Osazuwa-Peters N, Simpson MC, Massa ST, Boakye EA, Antisdel JL, Varvares MA. 40-year incidence trends for oropharyngeal squamous cell carcinoma in the United States. Oral Oncology. 2017;74:90-7.

18. Johnson NW, Jayasekara P, Amarasinghe AH. Squamous cell carcinoma and precursor lesions of the oral cavity: epidemiology and aetiology. Periodontology 2000. 2011 1;57(1):19.

19. Abdulai AE, Nuamah IK. Squamous Cell Carcinoma of the Oral cavity and Oropharynx in Ghanaians:-A study of Histopathological Charts over 20 years. World Journal of Surgical Medical and Radiation Oncology. 2013;2(7).

20. Dhanuthai K, Rojanawatsirivej S, Thosaporn W, Kintarak S, Subarnbhesaj A, Darling M, Kryshtalskyj E, Chiang CP, Shin HI, Choi SY, Lee SS. Oral cancer: A multicenter study. Medicina oral, patologia oral y cirugia bucal. 2018;23(1):e23.

21. Otoh EC, Johnson NW, Olasoji HO, Danfillo IS, Adeleke OA. Intra-oral carcinomas in Maiduguri, north-eastern Nigeria. Oral diseases. 2005;11(6):379-85.

22. Onyango JF, Omondi BI, Njiru A, Awange OO. Oral cancer at Kenyatta national hospital, Nairobi. East African medical journal. 2004;81(6):318-21.

23. Pindborg JJ, Reichart PA, Smith CJ and Van der Waal I: WHO International Histological Classification of Tumours Histological typing of Cancer and precancer of the oral mucosa. Springer-Verlag; New York: 1997

24. Horng WB, Lee CP, Chen CW. Classification of age groups based on facial features. Journal of applied

25. Pimentel A, Fernandes G. The relation between gender in the access. Rev Bras Promoç Saúde, Fortaleza, 2014;27, 381–388