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Incidence of Squamous Cell Carcinoma of the Oral cavity and Oropharynx in Ghanaians: - A Retrospective Study of Histopathological Charts in a Teaching Hospital

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Introduction: Oral cancer presents a variety of challenges to all involved in their management. Though there are reports of its rising incidence trend, there is limited published data on this subject amongst Ghanaians. This study aims to determine the incidence of Squamous Cell Carcinoma of the oral cavity and Oropharynx, (OSCC).

Study Design: A retrospective study.

Materials and methods: The sample comprised pathology charts of all malignant head and neck tumours recorded at Korle Bu teaching hospital, Accra, Ghana, from 1989 to 2008 (twenty years). All cases of OSCC were selected, reclassified using the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10), and studied in detail. Statistical analysis was carried out using Microsoft Excel* spreadsheet.

Findings: There were 248 OSCC. Male to female ratio was 2.35:1. The Commonest site was the tongue (N=64)25.81%, followed in descending order by the upper gum (N=51)20.56%, oral mucosa (N=37)14.92%, palate (N=30)12.1%, lower gum (N=24)9.68%, oropharynx (N=18)7.26%, lip (N=9)3.63%, parotid (N=7)2.82%, cheek (N=5)2.02% and floor of the mouth (N=3)1.21%. The peak incidence was in the fifth decade (74/248) 29.84%. OSCC was 12.15% (248/2041) of all head and neck malignancies, 33.02% (248/751) of all HNSCC and 85.52 %(248/290) of all oral malignancies or 91.64% (241/263) excluding salivary gland malignancies.

Conclusions: OSCC is the most predominant oral malignancy in Ghana, with its highest incidence in the 5th decade. The tongue is the most prevalent site; it is uncommon in the floor of the mouth and affects males more than twice as females.

Keywords: Squamous cell; Carcinoma; Oral cavity; Oropharynx; Ghana.

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Introduction

Oral tumors present a variety of challenges to all health workers who are involved in their management. Oral malignancy is more prevalent in the developing world, but has not received satisfactory attention as other cancers such as lung, breast, or colon which are

Table 1: Age and Sex Incidence of the study sample

Age range (years)	M	F	All	%
21-30	5	7	12	4.84
31-40	24	7	31	12.50
41-50	38	7	45	18.15
51-60	51	11	62	25.00
61-70	37	24	61	24.60
71-80	15	15	30	12.10
81-90	3	2	5	2.02
91-100	1	1	2	0.81
All Ages	174	74	248	100.00

commoner in the developed world [1]. Knowledge of its incidence is very important in health care planning in all societies in which they occur. In the third world the challenges are even more extensive [1-4]. That the incidence is on the rise has been published in more recent work all over the world [1-4].

To understand the pattern of these diseases and help improve a successful outcome in their management, a comprehensive knowledge of their frequency, common sites, geographic distribution and histological type are important tools for all health workers involved in the management of this disease [4].

The aim of this study is to investigate the incidence, age distribution, localization, and gender preferences of OSCC in a tertiary hospital in Ghana. It is hoped that findings from this study will serve as a benchmark against which future studies can be measured, and also demonstrate the need for an active cancer register to promote surveillance and prevention of this and other cancers in Ghana in particular and Africa as a whole.

Material and Methods

This is a retrospective study, and as such was exempt from ethical approval. The study was based on histopathological reports of tumour specimens of the head and neck region received at the department of Pathology of the Korle Bu teaching hospital (KBTH) Accra, over a 20-year period (1989 to 2008). An attempt was made to reclassify the distribution of different anatomical sites of oral cancers using the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) Version for 2010. Parameters such as age, sex, site of pathology, the date sample was received and the histological diagnosis and grading were recorded. After thorough cleaning and scrutiny, the data was analyzed using Microsoft Excel spread sheet.

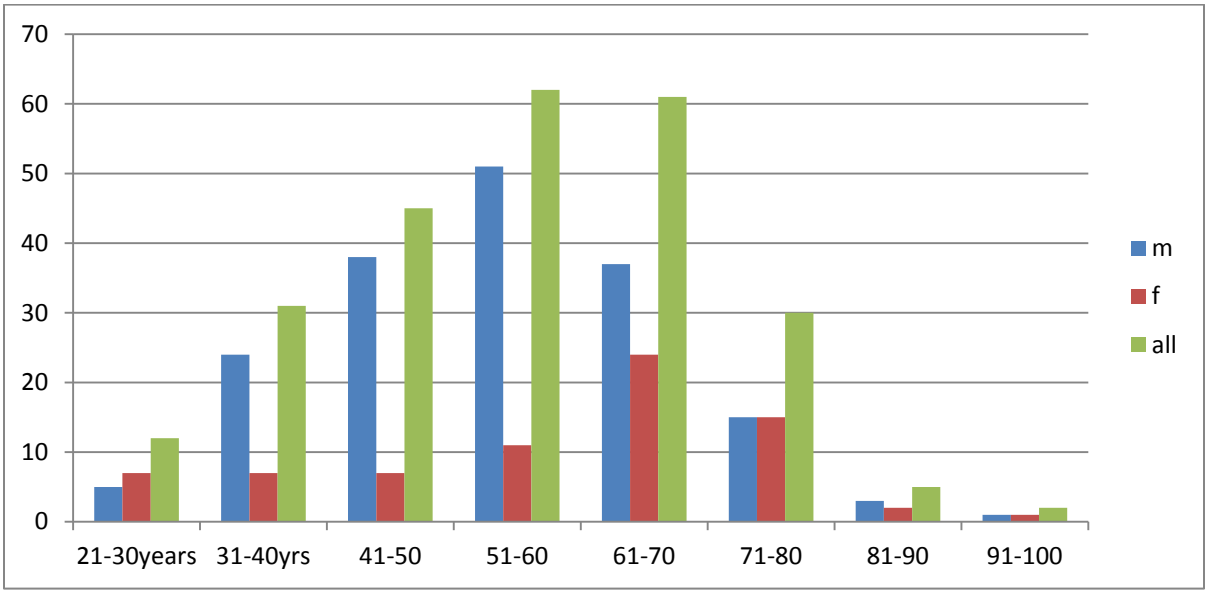

Figure 1: Graph of Age and Sex Incidence of the study sample

Table 2: Site and Sex Incidence of the study sample

Site (ICD-10)	M	F	TOTAL	%
tongue(C02.9)	42	22	64	25.81
Upper gum (C03.0)	35	16	51	20.56
Mouth (oral mucosa) (C06.9)	30	7	37	14.92
Palate (C05.9)	22	8	30	12.1
Lower Gum C03.1	13	11	24	9.68
Oropharynx (C10.9)	16	2	18	7.26
lip (C00.9)	7	2	9	3.63
Parotid(C07)	6	1	7	2.82
Cheek(C06.0)	1	4	5	2.02
Floor of the Mouth(C04.9)	2	1	3	1.2
Total OSCC	174	74	248	100

Total HNSCC: 751
Total Oral Malignancies: 290
Total Head Neck: 2041

Result

2,041 reports of malignant head and neck tumors were recorded over the study period. 290 (including 27 salivary gland tumors) were reports of Oral malignancies. There were 751 head and neck squamous cell carcinomas (HNSCC), out of which 248 were Oral Squamous Cell Carcinoma (OSCC), and these were examined in detail. There were 174 males and 74 females, giving male to female (M: F) ratio of 2.35: 1. Table 1 shows the frequency of tumour occurrence in the different age groups. 49.6% of OSCC occurred in the age group 51-70 years; with the highest incidence in the fifth decade (62/248) 25% (Figure 1). There was no record of OSCC in the first and second decades of life.

Table 2 shows the incidence of OSCC at the various sub-sites of the oral cavity, classified using ICD-10. The commonest site was the tongue (C02.9) N=64, 25.81%, followed in descending order, by the upper gum (C03.0) N=51 or 20.56%, the oral mucosa (C06.9) N= 37 or 14.92%, palate (C05.9) N=30 or 12.1%, lower gum (C03.1) N=24 or 9.68%, oropharynx (C10.9) N=18 or 7.26%, then the lip **(**C00.9) N=9 or 3.63%, parotid (C07) N=7 or 2.82%, cheek (C06.0) N=5 or 2.o2% and floor of the mouth (C04.9) N=3 or 1.21%. This is further illustrated in figure 2. Over the period of study, the incidence of OSCC was 33.02% (248/751) of all HNSCC, 85.52% (248/290) of all oral malignancies or 91.64% (241/263) excluding salivary gland malignancies, and 12.15 %(248/2041) of all head and neck malignancies. The tumours were graded as shown in Table 3 using Border's classification.

Discussion

SCC is the commonest oral malignant pathology worldwide [1-4] accounting for more than 90% of all oral malignant tumours [3, 5-7]. Some recent publications suggest a rise in its incidence in some societies while in others there is a decline [1, 8-10]. The trend is important in monitoring, planning resources and developing strategies for prevention and treatment.

The search for its etiology still continues [11]. The accepted molecular theory concerning genetic alterations of SCC is that of a "multihit" tumorigenesis, ultimately leading to unregulated cell growth and function [11, 12]. Lifestyle plays an important role and this appear to be a recurring theme in most reported data from all five continents [9, 10, 13-16]. It is thought that multiple or different

Table 3: Histological Grading of Charts Studied (Broder's)

Histological Grading	Number	%
Well differentiated	98	39.52
Moderately well differentiated	28	11.29
Poorly differentiated	122	49.19
Total	248	100

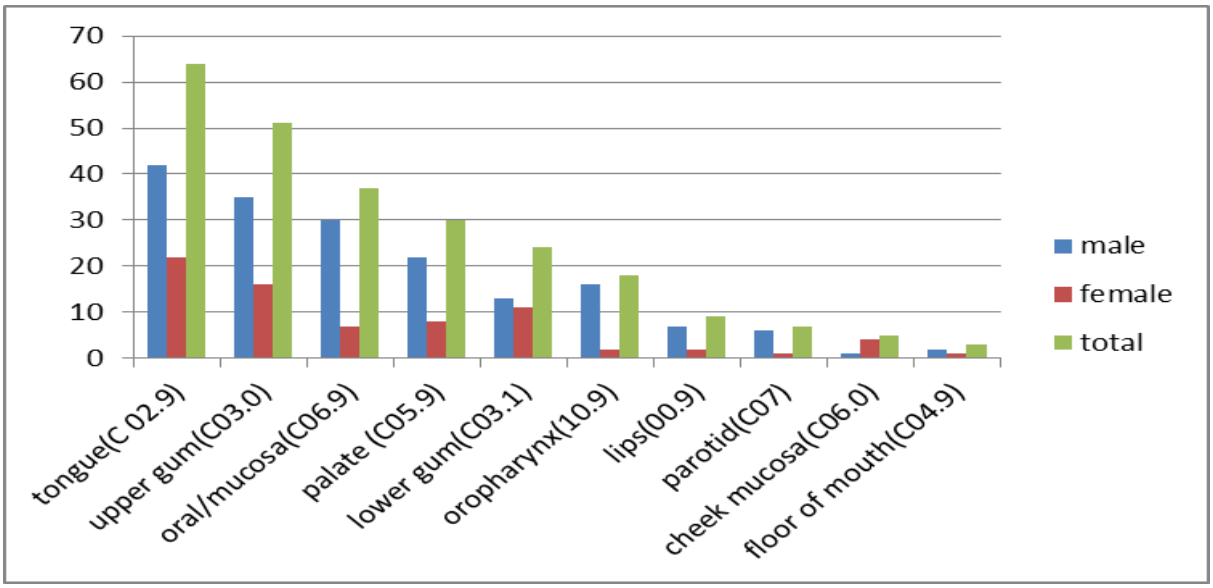

Figure 2: Graph of Site and Sex Incidence of the study sample

external insults usually from lifestyle or habits commonly recognized ones being use of betel quid, tobacco and, or alcohol and viral infections, an example being Human Papillomavirus [HPV] can lead to activation of oncogenes or inactivation of tumour suppressor genes [11, 12]. The change in lifestyle may be an important contribution to the decline or the increase in the incidence [17, 18].

The epidemiology of OSCC in African societies is not adequately documented [3, 19-21]. In Ghana, to the best of our knowledge, there is limited published data on this subject [22, 23]. It is therefore difficult to measure any trend, develop strategies, educate the public on preventive measures or decide on resource allocation.

Of the 290 oral malignant pathologies reported on in this study, 248 (85.52%) were OSCC. This figure is close but short of the 90% widely reported [5, 6]. If salivary tumors are exempted, the percentage rises to 91.64. Studies from Zimbabwe [21] and Nigeria [17] recorded incidence of 71.3% and 65.1% of all oral malignancies respectively. The incidence of OSCC expressed as a percentage of all head and neck malignancies in the latter study was 15.4%. This value was 12.15% in our study. Kamanger [24], in a study of patterns of cancer incidence, mortality, and prevalence across five continents, found that OSCC is the commonest head and neck malignant pathology; and in a big global study by Parkin *et al* the figure was 24% [25]. The reasons for these variations need to be investigated. However, it could be due to data collection procedural errors and the possibility that disease classification is not uniform. It is hoped that universal adoption of the ICD-10 [26] will make comparisons more accurate. One other possible reason could be due to under-reporting, with many patients unable to gain access to centers where the pathology can be diagnosed. The incidence reported here is consistent with most others, which suggests OSCC as the most predominant of all head and neck malignancies [20].

There were more than twice as many men as women (M: F=2.35:1). This is similar to most studies which suggest that the incidence in men is more than twice as many as in women [8, 24-26]. However the gap between the two sexes varies more widely in some other reports - from a male to female ratio of 3:4 [17] to a ratio of 15:1 [10]. The variations tend to be narrower in the African studies [20, 21] and are even

reversed in one [17]. This wide range has been attributed to several co-factors such as betel quid chewing, smoking, alcohol, HPV, and chronic mucosal irritation [10-12, 28, 29]. In our study the search for the cause of this variation was not part of our objective. Lifestyle influence could however be an important factor. "Tawa", is a traditional smokeless tobacco used in some parts of Ghana [30] in a manner similar to betel quid use in South East Asia. This oral habit could play an etiological role similar to that played by other oral habits in some societies [10, 15, 31].

The two age groups 51-60 years and 61-70 years were responsible for 49.9% of all the reports of OSCC seen. This is similar to findings in other African, Asian and South American studies [10, 17, 19, 21]. Studies from North America and Europe suggest an older peak age group [9, 14]. The youngest was 21 years old and the oldest 95 among the males and 23years to 98 among the females with an overall average of 55.82 years (female 58.8 and male 54.50 years). Apart from the age group 21-30 years, each group displayed a higher incidence of male patients. The general trend in recent reports show a gradual shift towards an increase in incidence in younger age groups with a decrease in gender variation [4, 9]. In our study, the incidence of OSCC is low in the youngest age group, 21-30; we however notice a reversal in gender variation compared to the other age groups. This observation was also made in a study from South America [4] and in others from the USA [9, 29]. This is significant, and may be an important finding. The reason for this needs investigation, and may lie in life style changes involving alcohol and tobacco use, and sexual habits because of the effect of HPV. The importance of oral habits has always been emphasized as a crucial co-factor [1, 10]. However in a Taiwan study [10] there were more patients without habits than with smoking and drinking habits. Betel quid users however stood out as the most susceptible group. This demonstrates the importance of different factors in different societies.

The most common site was the tongue 25.81% (N=64). This is similar to findings in Europe [16, 23, 26] USA [9], Australia [25] and Kenya [21]. However the mandibular gingivae are the commonest sites in published reports from Brazil [4], Nigeria [17] and Zimbabwe [21]. The buccal mucosa is the commonest site in most of South East Asia [10]. In the report from Taiwan, when betel quid chewers were excluded from the study the commonest site was the tongue. The next common sites in our study, in descending order of incidence were the upper gum, oral mucosa and palate. (Figure 2). As in an earlier report from Nigeria [19], OSCC was very rare in the floor of the mouth in this study too. The site variation is related to some known etiological factors. In the USA HPV has been closely related to the OSCC of the tongue [27] whilst betel quid use is linked to the higher incidence in the buccal mucosa in South East Asia [10], At all sites there was a higher incidence in males except in the buccal mucosa where a higher incidence in females was observed. The possibility of an oral habit being a co-factor could be explored here. These causal links suggest that the incidence of these pathologies could be reduced sharply with public health measures. The search for such a link will be important in Ghana as well.

The incidence of the different grades of OSCC using the Broder classification in this study (Table 3) is similar to the findings in Nigeria [19]. The prognostic value of histopathologic grading of oral squamous cell carcinomas (SCC) has varied from not any to highly significant [32]. Its lack of correlation to the prognosis of oral squamous cell carcinoma is explained by the fact that OSCC exhibit a heterogeneous cell population with probable differences in invasiveness [33, 34].

Conclusion

OSCC is the most predominant oral malignancy in Ghana with the highest incidence in the 5th decade. The tongue is the most prevalent site; it is uncommon in the floor of the mouth. Gender variation is similar to the findings in Europe and the USA, affecting males more than twice as females, but much narrower compared with reports from South East Asia.

Authors' Contribution

A.E.A: Conceived and contributed to the design, analysis and data interpretation, drafting and writing the manuscript.
I.K.N: Contributed to the analysis, interpretation of data and was involved in drafting and writing the manuscript.

Conflict of Interests

The authors declare that there is no conflict of interest in this study.

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References

[1]. Mehrotra R, Yadav S. Oral squamous cell carcinoma: Etiology, pathogenesis and prognostic value of genomic alterations. Indian J Cancer 2006; 43:60-6. [Pubmed].
[2]. Landis SH, Murray T, Bolden S, Wingo PA, Cancer statistics, 1999. CA Cancer J Clin 1999; 49:8-31. [Pubmed].
[3]. Lawoyin JO, Lawoyin DO, Aderinokun G. Intra-oral squamous cell carcinoma in Ibadan: a review of 90 cases. Afr J Med Med Sci. 1997 Sep-Dec; 26(3-4): 187-8. [Pubmed].
[4]. Perez RS, Freitas SM, Dedivitis RA, Rapoport A, et al. Epidemiologic Study of Squamous Cell Carcinoma of the Mouth and Oropharynx. Int. Arch. Otorhinolaryngol. 2007;11(3):271-277
[5]. Hille JJ, Shear M. Epidemiology of oral cancer in South Africa 1988–1995. Oral Oncol 2001; 17:7–12.
[6]. Krutchkoff DJ, Chen JK, Eisenberg E, Katz RV. Oral cancer: a survey of 566 cases from the University of Connecticut oral pathology biopsy service, 1975–1986. Oral Surg Oral Med Oral Pathol 1990; 70:192–8. [Pubmed].
[7]. Chen JK, Katz RV, Krutchkoff DJ. Intraoral squamous cell carcinoma. Epidemiologic patterns in Connecticut from 1935 to 1985. Cancer 1990; 66:1288–96. [Pubmed].
[8]. Patel SC, Carpenter WR, Tyree S, Couch ME, et al. Increasing incidence of oral tongue squamous cell carcinoma in young white women, age 18 to 44 years. J Clinical oncology. 2011; 29(11):1488-94. [Pubmed].
[9]. Howlader N, Noone AM, Krapcho M, Neyman N, et al. SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations), National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2009_pops09/, based on November 2011 SEER data submission, posted to the SEER web site, 2012.
[10]. Chen YK, Huang HC, Lin LM, Lin CC. Primary oral squamous cell carcinoma: an analysis of 703 cases in southern Taiwan Oral Oncology 1999: 35 (2): 173-179. [Pubmed].
[11]. Califano J, van der Riet P, Westra W, Nawroz H, Clayman G, Piantadosi S, et al. Genetic progression model for head andneck cancer: implications for field cancerization. Cancer Res1996;56 (11):2488–92. [Pubmed].
[12]. Tsantoulis PK, Kastrinakis NG, Tourvas AD, Laskaris G, Gorgoulis VG. Advances in the biology of oral cancer. Oral Oncology 2007; 43: 523–534. [Pubmed].
[13]. Ng KH, Siar CH, Ramanathan K, et al. Squamous cell carcinoma of the oral mucosa in Malaysia - any change? Southeast Asian Journal of Tropical Medicine and Public Health. 1985; 16:602-6. [Pubmed].
[14]. Chattopadhyay A. Epidemiologic study of oral cancer in Eastern India. Indian Journal of Dermatology 1989; 4:59-65. [Pubmed].
[15]. Thomas SJ, MacLennan R. Slaked lime and betel nut cancer in Papua New Guinea. Lancet 1992; 340:577-8. [Pubmed].
[16]. Oral cancer risk factors: Cancer Research UK info.cancerresearchuk.org/cancerstats/types/oral/incidence/uk-oral-cancer.
[17]. Otoh EC, Johnson NW, Olasoji HO, Danfillo IS, Adeleke OA Intra-oral carcinomas in Maiduguri, north-eastern Nigeria.. Oral Dis. 2005 Nov; 11(6):379-85. [Pubmed].
[18]. Lambert R, Sauvaget C, de Camargo Cancela M, Sankaranarayanan R. Epidemiology of cancer from the oral cavity and oropharynx. Eur J Gastroenterol Hepatol. 2011 Aug:23 (8) 633–641. [Pubmed].
[19]. Effiom OA, Adeyemo WL, Omitola OG, Ajayi OF, et al. Oral squamous cell carcinoma: a clinicopathologic review of 233 cases in Lagos, Nigeria.. J Oral Maxillofac Surg. 2008 Aug; 66(8):1595-9. [Pubmed].
[20]. Onyango, JF, Omondi BI, Njiru A and Awange OO. Oral cancer at Kenyatta National Hospital, Nairobi, East African Medical Journal 2004; 81: 318-321. [Pubmed].
[21]. Chidzonga MM, Mahomva L. Squamous cell carcinoma of the oral cavity, maxillary antrum and lip in a Zimbabwean population: a

descriptive epidemiological study. Oral Oncol. 2006 Feb; 42(2):184-9. Epub 2005 Oct 25. [Pubmed].
[22]. Parkins GE, Armah G, Ampofo P.Tumours and tumour-like lesions of the lower face at Korle Bu Teaching Hospital, Ghana--an eight year study. World J Surg Oncol. 2007 May 7;5:48. [Pubmed].
[23]. Parkins GE, Armah GA, Tettey Y. Orofacial tumours and tumour-like lesions in Ghana: a 6-year prospective study. Br J Oral Maxillofac Surg. 2009 Oct; 47(7):550-4. [Pubmed].
[24]. Kamangar F, Dores GM, Anderson WF. Patterns of cancer incidence, mortality, and prevalence across five continents: defining priorities to reduce cancer disparities in different geographic regions of the world. J Clin Oncol. 2006 May 10; 24(14):2137-50. [Pubmed].
[25]. Parkin DM, Pisani P, Ferlay J: Global cancer statistics. CA Cancer J Clin 1999, 49(1):33-64. [Pubmed].
[26]. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) Version for 2010. http:\\www.who.int\classifications\icd\en\.
[27]. Oliver AJ, Helfrick JF, Gard D. Primary oral squamous cell carcinoma. A review of 92 cases. Journal of Oral and Maxillofacial Surgery 1996; 54:949-54.[Pubmed].
[28]. Pinholt EM, Rndum J, Pindborg JJ. Oral cancers: a retrospective study of 100 **Danish** cases. British Journal of Oral and Max-illofacial Surgery 1997;35:77-80. [Pubmed].
[29]. Linda Morris Brown, David P. Check, Susan S. Devesa. Oral Cavity and Pharynx Cancer Incidence Trends by Subsite in the United States: Changing Gender Patterns [Internet]. Journal of Oncology. 2012 .Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3345247/
[30]. Doku David Teye. Socioeconomic Differences in Tobacco Use among Ghanaian and Finnish Adolescents. Acta Electronica Universitatis Tamperensis; 1073. Tampere University Press. 2011. http://urn.fi/urn:isbn:978-951-44-8450-6.
[31]. Idris AM, Ahmed HM, Mukhtar BI, Gadir AF, El-Beshir EI. Descriptive epidemiology of oral neoplasms in Sudan 1970–1985 and the role of toombak. Int J Cancer 1995; 61:155–8. [Pubmed].
[32]. Bryne M, Koppang HS, Lilleng R, Stene T, Bang G, Dabelsteen E. New malignancy grading is a better prognostic indicator than Broders' grading in oral squamous cell carcinomas. J Oral Pathol Med. 1989 Sep;18(8):432-7. [Pubmed].
[33]. Akhter M, Hossain S, Rahman QB, Molla MR. A study on histological grading of oral squamous cell carcinoma and its co-relationship with regional metastasis. J Oral Maxillofac Pathol. 2011 May-Aug; 15(2): 168–176. [Pubmed].
[34]. Anneroth G, Batsakis J, Luna M. Review of the literature and a recommended system of malignancy grading in oral squamous cell carcinomas. Scand J Dent Res 1987;95:229-49. [Pubmed].

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