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An audit of oral diseases at a Nairobi centre, 2000-2004

E A O Dimba, J Gichana, A K Limo, K A Wakoli, M L Chindia and D O Awange
Nairobi, Kenya

Objectives: To describe oral diseases diagnosed in an urban referral centre in Kenya in terms of age, gender and anatomical distribution and to compare this with reports in the literature. **Methodology:** A retrospective histopathological audit. **Setting:** Oral Pathology Laboratory at the University of Nairobi Dental Hospital, a tertiary referral centre in Kenya. **Results:** 548 (53.83%) patients were diagnosed with oral and maxillofacial tumours. Benign tumours (mean age ± SD = 29.93 ± 18.27 years) peaked in the third decade and tended to affect men at a younger age ($p = 0.001$). The most common benign tumour was the ameloblastoma (50.23%: n = 109), which predominantly affected the mandible, and also occurred in male patients at a younger age ($p = 0.023$). Peak incidences for malignant disease were observed in the sixth decade (mean age ± SD = 46.94 ± 18.99 years). Oral squamous cell carcinoma (OSCC) was the most common malignant tumour (59.55 %; n = 187); occurring in the tongue, floor of the mouth, buccal mucosa and palate. 10.30 % of OSCC occurred in patients under 40 years of age. 147 patients presented with cysts, which were mainly (68.10%) of odontogenic origin. Reactive lesions, infections, salivary gland diseases and autoimmune conditions constituted 26.60% of the case load. **Conclusion:** The tendency of oral squamous cell carcinoma to occur in younger age groups may be an indication of carcinogenic factors that could be peculiar to this population. There is an urgent need for the expansion of reporting systems for oral diseases as an integral part of development of appropriate strategies in the improvement of general health in Kenya.

Key words: Oral diseases, ameloblastoma, oral squamous cell carcinoma, Kenya

Current paradigms in health prioritisation maintain that oral health has a significant impact on nutrition and overall quality of life[1]. Dental caries and periodontal disease have to date been considered to be the most important oral health problems globally due to their historical predominance in Europe and America; but the situation in many developing countries is different from that reported in Western countries. In Africa, conditions such as cancrum oris, oral cancer, maxillofacial trauma and diseases associated with HIV/AIDS continue to have high prevalences, particularly among low socio-economic groups[2]. Oral health care systems which are based on Western paradigms have, therefore, been largely ineffective in combating the morbidity and mortality caused by these conditions[3].

The health profile in Africa is heterogeneous and dynamic. Rapid urbanisation has resulted in widespread adoption of potentially harmful habits such as cigarette smoking and alcohol consumption, which are risk factors for oral cancer particularly when combined[4]. The HIV pandemic has also had a significant impact in the past two decades, with increasing incidences of oral candidiasis, herpes zoster, necrotising periodontitis and Kaposi's sarcoma in the orofacial region[5]. As accessibility of anti-retroviral therapy improves, oral health workers are further challenged with the long term management of patients suffering from HIV in the context of multidisciplinary teams.

There is, therefore, a clear need for the development of realistic, evidence-based oral health care policies that are integrated into general health care within the region. For this reason, the development of reporting systems for current, reliable and comparable data on oral diseases is essential. The present study is a report on oral diseases diagnosed at the University of Nairobi Oral Pathology Laboratory in the five year period between 2000 and 2004.

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Materials and methods

Study site

The University of Nairobi Oral Pathology Laboratory provides diagnostic services for the School of Dental Sciences and acts as a national referral centre serving Kenyatta National Hospital, the Ministry of Health and various private hospitals both within and outside Nairobi.

Methods

Histology reports for the five year period between January 2000 and December 2004 were reviewed retrospectively. Data extracted from the records included age at initial presentation, gender, site of lesion and histopathological diagnosis. The case definition for this study was any oral lesion diagnosed for the first time at the Oral Pathology Laboratory at the University of Nairobi Dental Hospital (UNDH). Recurrent diseases and those with a previously diagnosed primary site were excluded. Cancer cases were coded according to the International Classification of Diseases[6], and for practical purposes, the 1992 WHO classification[7] was retained for the categorisation of the keratocystic odontogenic tumour, which was formerly known as odontogenic keratocyst[7,8]. Due to late presentation of patients, it was difficult in many instances to clinically determine the exact site of origin of some disease conditions. In these cases, the anatomical area that was most affected at the time of diagnosis was indicated as the site of origin. Parameters of interest were analysed with SPSS Version 12.0.1 and Sigma Plot 8.0. Relationships between age and gender distributions for the various disease entities were investigated using the t-test, with *P*-values of 0.05 or less considered statistically significant. Detailed analyses of age, gender and site distributions were conducted for ameloblastomas and oral squamous cell carcinomas (OSCCs), which were the most common benign and malignant tumours in this study respectively. Other tumours occurred in small numbers that did not permit conclusive analyses in the selected parameters.

Results

A total of 1,018 patients (male: female ratio 1:1.07) utilised the histopathology diagnostic services at the University of Nairobi School of Dental Sciences (UON-SDS) in the period under study. A total of 548 (53.83%) patients were diagnosed with oral and maxillofacial tumours; 152 (14.93%) presented with reactive lesions and 147 (14.41%) with cysts of the craniofacial region; 75 (7.38%) patients presented with fibro-osseous lesions and 62 (6.09%) presented with infectious or inflammatory conditions and autoimmune diseases. Notably, 3.34% (n = 34) of biopsies received were non diagnostic.

Tumours

Of the 548 patients diagnosed with oral and maxillofacial tumours; 331 (60.51%) presented with malignancies and 217 (39.49%) presented with benign tumours. The most common site of origin for benign tumours was the mandible, which may partly be attributed to the predominance of ameloblastomas (50.23%; n = 109) in this study (*Tables 1 and 2*). Malignancies showed a more diverse range of sites, frequently occurring in the tongue, floor of the mouth, palate, buccal mucosa, mandible and maxilla (*Table 1*). Oral squamous cell carcinoma (OSCC) was the most commonly diagnosed malignant tumour (59.55%; n = 187); occurring in the tongue, floor of mouth, buccal mucosa and palate (*Table 1*). The remaining 40.45% of malignancies were primary tumours of bone, while glandular neoplasms, sarcomas and epithelial malignancies accounted for the other sites (*Tables 1 and 3*).

Orofacial malignancies generally occurred more in men than in women with male: female ratios of 1: 1.5 and 1:0.85 observed for benign and malignant tumours respectively (*Table 1*). Benign tumours (mean age = 29.93 ± 18.27 years) peaked in the third decade (*Figure 1*) and tended to affect men at a younger age, with a statistically significant difference (p = 0.001) in the overall mean age at first presentation for men (23.39 ± 12.11 years) and women (33.74 ± 20.14 years). The overall mean age at diagnosis was 29.81 ± 12.92 years for patients presenting with ameloblastomas, and a statistically significant difference (p = 0.023) was observed between the mean age at first presentation in men (26.59 ± 12.75 years) and women (32.89 ± 12.47 years).

The highest incidences for malignant disease were observed in the sixth decade, with a smaller peak in the fourth decade (mean age = 46.94 ± 18.99 years). Specific analyses for OSCC showed a similar peak in the sixth decade (*Figure 2*). In the overall analysis of malignant tumours, there was no statistically significant difference in the ages of male and female patients at first presentation. The mean age at first diagnosis for OSCC was 53.76 ± 15.95 years with no statistically significant differences observed in the ages of men and women at first diagnosis. Approximately 10% of oral cancers occurred in patients under 40 years of age while 89.68% occurred in patients aged 40 years and above.

Cysts

Orofacial cysts (n = 147) were comparatively fewer than tumours in this study. Due to the small numbers involved only the broadest trends in terms of numerical frequency, age, sex and site distribution are described (*Table 4*). The odontogenic keratocyst was the most common cyst, constituting 21.80% (n = 29) of all cysts diagnosed; followed by dentigerous cysts, radicular cysts and salivary mucocoeles which respectively constituted 18.05% (n = 24), 16.54% (n = 22) and 12.78% (n =

Table 1 Sex and site distribution of benign and malignant tumours, with specific reference to ameloblastoma and oral squamous cell carcinoma (OSCC).

Tumour type(s)	Benign tumours	Ameloblastoma	Malignant tumours	Oral squamous cell carcinoma
Sex:*				
Male	73	56	167	105
Female	111	53	142	70
Site:				
Lip	11	0	10	10
Tongue	8	0	39	35
Gingivae, alveolus	6	2	26	5
Floor of mouth	0	0	48	32
Palate	32	0	47	25
Buccal mucosa, retromolar	19	0	37	32
Major salivary glands	11	0	11	0
Tonsils	0	0	5	0
Pharynx	0	0	3	1
Ill defined oral sites	23	11	34	21
Mandible	87	82	32	17
Maxilla	20	14	40	9

NB*: Due to missing data entries on patient's gender (10.40%: n = 57) in the records, the number of male and female patients indicated is less than the total number of tumours.

Table 2 Histological distribution of benign tumours

Histological diagnosis	No.	%
Ameloblastoma	109	50.23
Pleomorphic salivary adenoma	22	10.14
Squamous papilloma	11	5.07
Lipoma	11	5.07
Odontogenic myxoma	10	4.61
Fibroma	7	3.23
Osteoma	7	3.23
Ameloblastic fibroma	6	2.76
Odontoma	5	2.30
Haemangioma	5	2.30
Others	24	11.06

Table 3 Histological distribution of malignant tumours

Histological diagnosis	No.	%
Squamous cell carcinoma	187	59.55
Osteogenic sarcoma	26	8.28
Adenoid cystic carcinoma	24	7.64
Lymphoma	19	6.05
Kaposi's sarcoma	12	3.84
Epithelial dysplasia	12	3.84
Adenocarcinoma	9	2.86
Mucoepidermoid carcinoma	7	2.22
Rhabdomyosarcoma	6	1.91
Ameloblastic carcinoma	5	1.59
Verrucous carcinoma	5	1.59
Others	19	6.07

Table 4 Histological and age distribution of orofacial cysts.

Histological diagnosis	Number	%	Mean age (yrs ± S.D.)*
Odontogenic keratocyst	29	21.80	27.85 ± 14.83
Dentigerous cyst	24	18.05	20.92 ± 14.62
Radicular cyst	22	16.54	21.20 ± 12.49
Mucocoeles	17	12.78	15.75 ± 12.50
Nasopalatine cyst	15	11.28	23.11 ± 11.31
Epidermoid cyst	13	9.77	29.50 ± 11.64
Dermoid cyst	10	6.80	19.86 ± 11.83
Traumatic bone cyst	4	2.72	12.73 ± 9.91
Others	13	8.84	-

NB*: 19.05% of diagnostic records on cysts had missing or incomplete data on the patient's age at the time of diagnosis.

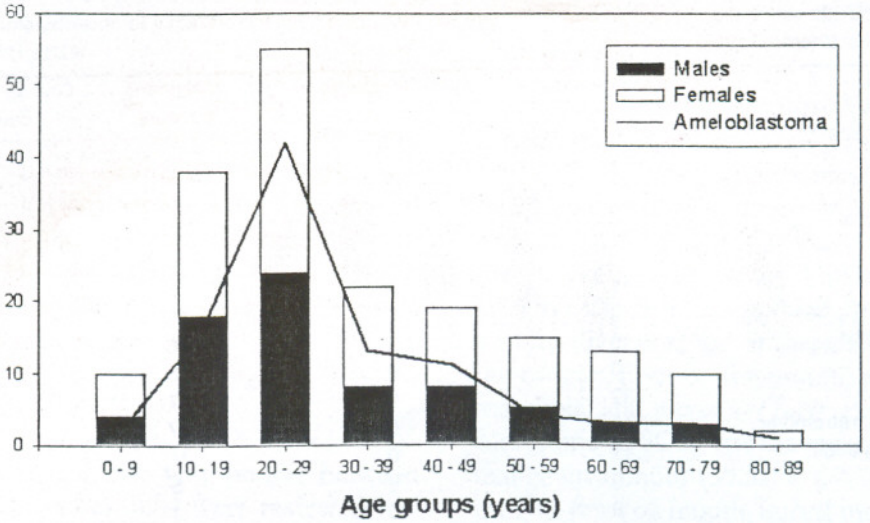

Figure 1. Age distribution of benign tumours with specific reference to ameloblastomas

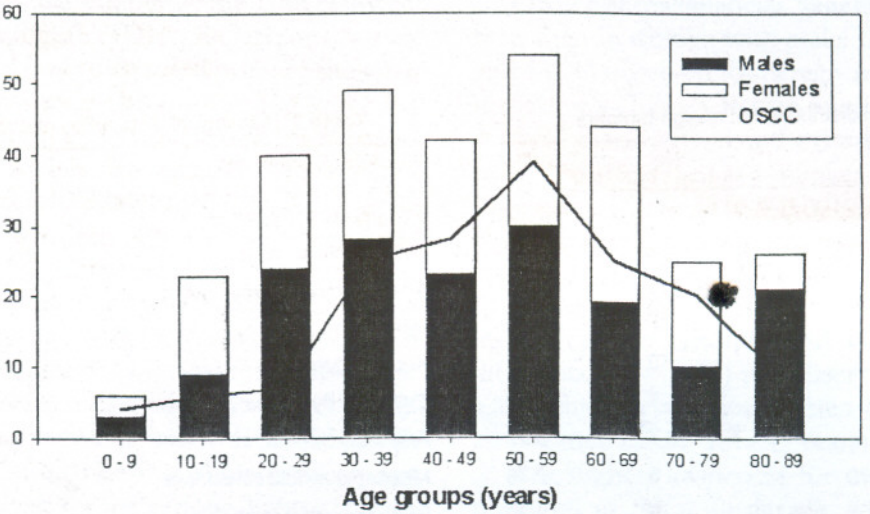

Figure 2. Age distribution of malignant tumours with specific reference to oral squamous cell carcinoma. (Graph Key: OSCC = Oral Squamous Cell Carcinoma)

17) of the total. Of the cystic lesions, 68.03% had their anatomical origin in the jaws, which is consistent with numerous cysts of odontogenic and non-odontogenic origin as well as pseudocysts. Soft tissue cysts, which were mainly salivary mucocoeles, constituted 31.29% of all cysts diagnosed. On investigation of the gender distribution of cysts, there was no clear pattern of male or female predilection in both the overall and individual cyst analyses.

Hyperplasias, fibro-osseous lesions and other diseases

Hyperplastic conditions in the oral and perioral tissues were mainly reactive lesions (n = 152). A total of 64 patients presented with gingival epulides; 37 had focal fibrous hyperplasia; 33 had pyogenic granulomas; 11 had keloids; 4 had denture induced fibrous hyperplasia; 2 had generalised gingival hyperplasia and 1 had oral submucous fibrosis. Apart from denture induced fibrous hyperplasias which were mainly observed in geriatric patients, reactive lesions tended to occur in young adults (mean age = 30.64 ± 12.89 years). The only lesion that had a clear gender predilection in this category was the pyogenic granuloma, which was found predominantly (>80%) in female patients.

Cemento-ossifying fibroma was the most commonly diagnosed fibro-osseous lesion (n = 39); followed by fibrous dysplasia of bone (n = 27); while periapical cemental dysplasia (n = 7) and cherubism (n = 2) were comparatively rare diagnoses. Of the 54 cases diagnosed with infectious or inflammatory conditions, 8 were diagnosed with osteomyelitis, 6 had lesions associated with *Candida Albicans*, 1 had a syphilitic chancre and the rest

had chronic bacterial infections due to untreated carious lesions or periodontal diseases. Auto-immune diseases were rare, with only 8 patients having presented with oral vesicullobullous ulcers due to pemphigus, pemphigoid and lichen planus.

Discussion

The oral diseases reported in this survey were characterised by late patient presentation and the occurrence of ameloblastomas and OSCCs in younger age groups. High relative frequencies of tumours in this study are comparable to previous reports by Onyango and co-authors on the occurrence of oral tumours and tumour-like conditions in Kenya[9]. The histological distribution of benign tumours also bears some similarities with reports from other parts of Africa with ameloblastomas being the most commonly diagnosed tumour[10-12]. The pleomorphic adenoma or mixed tumour was the most common benign salivary gland neoplasm, while other odontogenic and non-odontogenic tumours were relatively uncommon. Re-classification of the odontogenic keratocyst as the keratocystic odontogenic tumour (KCOT)[7,8] however increases the significance of the disease burden resulting from benign neoplasms.

OSCC was consistently the most frequently diagnosed malignant orofacial neoplasm in previous and present data from this country[9,13]. Comparisons of the distribution of malignant tumours in the current study with data published in 1995 however revealed some interesting changes in the past decade (*Table 3*). Progression of the HIV pandemic has resulted in an increase in the percentage of patients presenting with Kaposi's sarcoma as compared to other malignancies. Conversely, the percentage of patients presenting with lymphoma, which is also an AIDS defining malignancy, appears to have decreased[13]. This paradoxical change may not reflect an actual reduction in incidence of lymphomas, but is perhaps due to the practice of immediate referral to designated oncology clinics on clinical suspicion of the Burkitt's and other lymphomas. The proportion of adenoid cystic carcinomas diagnosed has also increased with numbers approximating those of patients presenting with pleomorphic salivary adenoma or mixed tumour[13]. Concerning pre-malignant lesions, the small number of patients who sought treatment for conditions such as leukoplakia and erythroplakia is a reflection of low levels of public awareness concerning the risk factors of oral cancer.

Although analysis of age and site distributions in this study was hampered by the number of lesions whose site was not specified, some clear trends were also noted in this regard. Ameloblastomas had a predilection for the mandible, which is the most common localisation for this lesion[7]. Mean ages at first diagnosis for ameloblastomas in this study are consistent with data from other African studies[11,12], but lower than average ages of patients presenting with solid ameloblastomas globally[14-17]. Our data also shows that although there was no clear gender predilection, ameloblastomas tended to affect male patients at a younger age, which is in conformity with the literature from other parts of Africa[12,14].

High prevalence of cancers of the mouth and oropharynx in developing countries[18] and occurrence in patients below 40 years of age continue to be a cause for concern. The frequency of OSCC in patients below 40 years (10%) in this study is higher than rates reported in Caucasians (> 5%)[19]. Some of the common primary sites of OSCC observed in this study, namely the tongue and floor of the mouth were in accordance with primary sites commonly observed in American patients[20]. However, occurrence of oral cancer in sites such as the palate and buccal sulcus, particularly in patients under 40 years of age has been associated with shorter life expectancy and early exposure to culture-specific risk factors which increase the risk of development of cancer[21]. In Kenya, these risk factors include alcohol, smoked and smokeless tobacco and khat *(miraa)*. The tendency of malignant tumours and specifically OSCC to peak in the sixth decade (*Figure 2*) is in agreement with data from Nigeria and South Africa[21,22]. These findings are, however, in contrast with reports from other parts of the world where the peak ages of diagnosis occur in the seventh decade of life[19].

Although our reported mean ages at first diagnosis for keratocysts, dentigerous cysts, radicular cysts and mucocoeles are consistent with previously published age distributions for these particular cyst types (*Table 4*)[23,24]; more data is required to determine clear demographic trends for the cysts occurring in this population. Relative frequencies of cystic lesions excluding the odontogenic keratocyst were also in conformity with previous local data[13]. The observed relative increase in the percentage of mucocoeles diagnosed was, however, an interesting finding particularly when recent studies from Zimbabwe have suggested an association between HIV/AIDS and the development of sublingual ranulas[25]. Additional data on the specific sites of these salivary gland cysts and on patients' serostatus is however needed before similar conclusions can be made in this particular study. Occurrence patterns of the most common fibro-osseous lesions, namely cemento-ossifying fibromas and fibrous dysplasia of bone were similar to those described in the previous decade[13], but a larger study would be recommended for the reliable description of the comparatively rare fibro-osseous lesions. Also, since the majority of clinicians tend to rely on empirical treatment for oral and peri-oral infections, the number of infectious diseases in this report was insufficient for detailed analyses.

In conclusion, the findings of this report are intended to provide some insight on the occurrence of oral diseases in an urban population in Kenya. Incomplete socio-demographic data and failure to record clinical information on disease sites and cancer staging shows

the need for closer coordination of the management teams. Comprehensive epidemiological studies on oral diseases continue to present a challenge due to the lack of similar data from rural and urban centres outside of Nairobi. There is an urgent need for the expansion of reporting systems for oral diseases as an integral part of the development of appropriate strategies for improvement of health nationally and regionally[26].

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Correspondence to: Dr. Elizabeth A. O. Dimba, Department of Oral and Maxillofacial Surgery, Oral Pathology and Medicine, Faculty of Dental Sciences, University of Nairobi, P. O. Box 19676, 00202. Nairobi, Kenya. Email: eaodimba@yahoo.com