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ORIGINAL ARTICLE

Clinico-epidemiologic review of 91 cases of non-odontogenic sarcomas of the orofacial region in a Nigerian population

Przegląd kliniczno-epidemiologiczny 91 przypadków niezębopochodnych mięsaków okolicy ustnej i twarzy w populacji nigeryjskiej

Authors' Contribution:
A – Study Design
B – Data Collection
C – Statistical Analysis
D – Manuscript Preparation
E – Literature Search
F – Funds Collection

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ABSTRACT:

Introduction: Sarcomas are a rare group of malignant tumours. This study highlights important findings in 91 cases of non-odontogenic sarcomas of the orofacial region.

Materials and Methods: Patients who presented with orofacial sarcoma at the Oral and Maxillofacial Surgery Department of a regional University Teaching Hospital between January 1997 and June 2017 were retrospectively studied. Excluded were cases of Kaposi and odontogenic sarcomas. Data obtained were analyzed using Statistical Package for Social Sciences (SPSS) version 16 (SPSS Inc., Chicago, IL, USA). Results from descriptive statistics were represented in the form of charts.

Results: A total of 91 cases were reviewed and consisted of 51 (56.0%) males and 40 (44.0%) females, with a male to female ratio of 1.3:1. The mandible (n = 47; 51.6%) and the maxilla (n = 26; 28.6%) were the major sites involved. Osteogenic sarcoma (n = 44; 48.4%) and rhabdomyosarcoma (n = 16; 17.6%) occurred more frequently. A total of 41 (45.1%) patients had surgery and the common hard tissue procedures were mandibulectomy (n = 26; 28.6%) and maxillectomy (n = 10; 11.0%).

Discussion: Most recurrences were noted less than one year post treatment. There is a tendency for patients to present late and compliance with follow-up review is poor in this environment.

KEYWORDS: delayed presentation, health resources, jaw, osteosarcoma, patient compliance, sarcoma

STRESZCZENIE:

Wprowadzenie: Mięsaki są rzadką grupą nowotworów złośliwych. W badaniu podsumowano 91 przypadków niezębopochodnych mięsaków okolicy ustnej i twarzy.

Materiały i metody: Do badania retrospektywnego włączono pacjentów, którzy zgłosili się do Kliniki Chirurgii Stomatologicznej i Szczękowo-twarzowej regionalnego uniwersyteckiego szpitala klinicznego w okresie od stycznia 1997 r. do czerwca 2017 r. Wyłączono przypadki mięsaków Kaposiego i mięsaków zębopochodnych. Uzyskane dane analizowano przy użyciu pakietu Statistical Package for Social Sciences (SPSS) wersji 16. (SPSS Inc., Chicago, IL, USA). Wyniki statystyk opisowych przedstawiono w formie wykresów.

Wyniki: Analizie poddano ogółem 91 pacjentów, w tym 51 (56,0%) mężczyzn i 40 (44,0%) kobiet, ze stosunkiem mężczyzn do kobiet wynoszącym 1,3:1. Nowotwór występował zazwyczaj w żuchwie (n = 47; 51,6%) i szczęce (n = 26; 28,6%). Najczęściej obserwowano kostniakomięsaka (n = 44; 48,4%) i mięsaka prążkowanokomórkowego (n = 16; 17,6%). W sumie 41 (45,1%) pacjentów poddano leczeniu zabiegowemu, a najczęstszymi operacjami tkanek twardych były: mandibulektomia (n = 26; 28,6%) i maksillektomia (n = 10; 11,0%). Leczeniem uzupełniającym objęto 32 (35,2%) chorych, w 8 (8,8%) przypadkach jako jedyną formą leczenia. Okres obserwacji wynosił od 1 do 43 miesięcy. W tym czasie stwierdzono 7 (17,1%) nawrotów z 1 przypadkiem przerzutów do płuc.

Dyskusja: Większość wznów odnotowano mniej niż rok po leczeniu. Pacjenci mają tendencję do późnego zgłaszania się do lekarza, a następnie do nieprzestrzegania zaleceń.

SŁOWA KLUCZOWE: kostniakomięsak, mięsak, późne rozpoznanie, przestrzeganie zaleceń, szczęka, zasoby zdrowotne

INTRODUCTION

The orofacial region is composed of all the basic tissue types and these are epithelial, connective, muscular and nervous tissues. Similar to other regions of the body, various types of benign and malignant tumours such as fibroma, osteoma, sqamous cell carcinoma, neurofibroma, rhabdomyosarcoma, etc, may arise from these tissues leading to functional and aesthetic problems.

Sarcomas are a rare group of malignant tumours arising in mesenchymal tissue or its derivatives. They are generally designated based on the cell type of which they are composed (i.e. their histogenesis) and may be soft tissue or hard tissue (bone) sarcomas. Sarcomas account for 1–2% of all cancers [1]. Soft tissue sarcomas (STS) account for approximately 80% of all sarcomas while the remaining are osseous sarcomas [2]. All race and age groups are affected although there are variations in incidence among different age groups and geographic regions. Generally, sarcomas are more common with increasing age (with a median age of 65 years) although certain types of STS are more common in the pediatric age group [3]. Sarcoma of bone commonly affects the extremities in both the pediatric and adult populations, and the common histological types seen are osteosarcoma, chondrosarcoma and Ewing's sarcoma [4].

Generally, sarcomas of the head and neck region are less common when compared to other sites and account for less than 1% of head and neck malignancies [5]. Reported sites of involvement in head and neck sarcomas (HNS) include the jaws, tongue, scalp, larynx and parotid gland [6] and the sites of involvement in HNS have prognostic significance [7]. Orofacial sarcomas (OFS) which are a component of HNS may be odontogenic (e.g. ameloblastic fibrosarcoma and myxosarcoma) or non-odontogenic (e.g. osteosarcoma and chondrosarcoma). Non-odontogenic orofacial sarcomas show a greater predilection for males than females with reported male to female ratio ranging from 1.1:1 to 3:1 [8, 9]. The overall mean age of occurrence ranges from 29 to 33 years [8, 10] although higher mean ages have been reported [9, 11].

The etiology of OFS is similar to that of sarcomas in other regions of the body. Implicated factors include genetic defects, exposure to ionizing radiation, occupational exposures as seen in carpenters and blacksmiths, and viral infections particularly in the setting of immunosuppression. However, most cases appear to be sporadic and idiopathic in occurrence [4]. Orofacial hard tissues, as compared to soft tissues, are more commonly affected by sarcomas, with the mandible accounting for the highest number of cases [8, 11]; while the cheek appears to be the most common site in soft tissue sarcoma [12]. The clinical presentation in OFS depends on several factors such as the site affected, presence of metastases and possible associated paraneoplastic syndromes. Soft or hard tissue swelling and pain are the most common presentation [10]. Other presentations include odontalgia, ulcerations and tooth mobility. Various imaging modalities assist in patient's evaluation both preoperatively and during follow-up review. Histological examination of tissue specimen provides definitive diagnosis and the most common histological type differs in the literature and this is influenced by factors such as age of the patients, regional variations and range of tumours studied [9, 11, 12]. Surgery combined with chemotherapy and/or radiotherapy is the main modality of treatment [9, 11, 13] and prognosis following treatment depends on factors such as gender, tumour size and location, presence of distant metastasis, histological variant, and treatment type [11, 13].

This retrospective study shows findings in 91 cases of non-odontogenic sarcomas of the orofacial region in a Nigerian population.

MATERIAL AND METHODS

Patients managed for sarcoma of the orofacial region at the Oral and Maxillofacial Surgery department of a regional University Teaching Hospital between January 1997 and June 2017 were retrospectively studied. To use this data, institutional ethics committee approval was not required. Information was sourced from patient's case notes and operating theatre records and details recorded included age, sex, site of tumour, duration, histological diagnosis, treatment given, complications and follow-up period. Excluded were patients with histological diagnosis of Kaposi and odontogenic sarcomas. Classification of patient's socio-economic class was done using the United Kingdom national statistics socio-economic classification (2010). Patient's presentation was classified as early (if within 1 month of onset of symptoms) or delayed (if greater than 1 month following the onset of symptoms). Data obtained were analyzed using Statistical Package for Social Sciences (SPSS) version 16 (SPSS Inc., Chicago, IL, USA). Results from descriptive statistics were represented in the form of charts.

RESULTS

Age and sex distribution

A total of 91 patients were reviewed and this consisted of 51 (56.0%) males and 40 (44.0%) females, giving a male to female ratio of 1.3:1. Analysis of sarcomas based on tissue type and age showed a male dominance for bone sarcomas (64.0%) while a slight female dominance was noted for soft tissue sarcomas (57.1%). More males presented with osteosarcoma, malignant fibrous histiocytoma, fibrosarcoma and chondrosarcoma while more females (n = 13) compared to males (n = 3) presented with rhabdomyosarcoma.

Patients' age ranged from 2 to 67 years with a mean of 32.9 ± 16.0 (range 4–65 with a mean of 34.1 ± 15.6 for males; range of 2–67 with a mean of 31.2 ± 16.5 for females). The 20–29 years age group (Fig. 1.) accounted for the highest (27.5%) number of patients studied,

followed by the 50–59 years age group (17.6%). Adults accounted for 76 (85.5%) cases while the pediatric age group accounted for 15 (14.5%) cases. Analysis of tumour type and age range showed that malignant fibrous histiocytoma was common in the 5th decade of life, osteosarcoma in the 3rd decade of life (but common between the 2nd and 4th decade), rhabdomyosarcoma in the 1st and 2nd decade, chondrosarcoma in the 3rd and 4th decade of life while fibrosarcoma showed two peaks of incidence – in the 2nd and 6th decade of life respectively.

Marital status, socio-economic class, site and side of tumour occurrence

The marital status of the adult patients was documented in 32 of the cases studied, and of these, 24 (26.4%) patients were married while 8 (8.8%) were not married. The socioeconomic class of the adult patients based on the United Kingdom national statistics socio-economic classification 2010 was documented in 39 cases and analytical classes 7 (n = 17; 18.7%) and 8 (n = 16; 17.6%) were the most frequent ones. The mandible (n = 47; 51.6%) followed by the maxilla (n = 26; 28.6%) were the major sites of tumour occurrence with the left side of the facial region accounting for most cases.

Duration of symptoms, tumour occurrence and histological diagnosis

The duration of the main presenting complain (facial swelling) ranged from 1 to 120 months and most of the tumours were primary tumours (n = 47; 51.6%) with 7 (7.7%) cases reported as recurrent tumours. The remaining 37 (40.7%) cases had no documentation. One adult with rhabdomyosarcoma (Fig. 2a.) presented with pulmonary metastases (Fig. 2b.) preoperatively. Based on histological diagnosis, osteogenic sarcoma (n = 44; 48.4%) accounted for the highest number of cases followed by rhabdomyosarcoma (n = 16; 17.6%) (Tab. I.).

Treatment, complications and follow-up

Patients had different modalities of treatment namely surgery, chemotherapy and radiotherapy either alone or as a combination therapy. A total of 41 (45.1%) patients had surgery and the common hard tissue procedures were mandibulectomy (n = 26; 28.6%) and maxillectomy (n = 10; 11.0%) (Tab. II.). Soft tissue procedure in the form of excision was undertaken in 4 (4.4%) patients while a combination of hard and soft tissue procedure was performed on 1 (1.1%) patient.

Tracheostomy was required in 4 cases while soft tissue reconstruction using forehead flap was undertaken in 3 cases. Non-surgical oncological treatment was administered to 32 (35.2%) patients and this was in the form of adjuvant therapy in 22 (24.2%) patients, neoadjuvant therapy in 1 (1.1%) patient, and the sole modality of treatment in 8 (8.8%) patients. Chemotherapy was used in 15 (16.5%) patients, chemotherapy and radiotherapy in 1 (1.1%) patient. In the remaining 16 patients, the type of oncologic treatment was not specified. Complication was noted in 1 patient in the form of osteoradionecrosis. The period of follow-up in 27 patients who had surgery and other oncological treatment ranged from 1–43 months, and within this period, local recurrence was noted in 7 (17.1%) patients with 71.4% occurring less than one year post surgery.

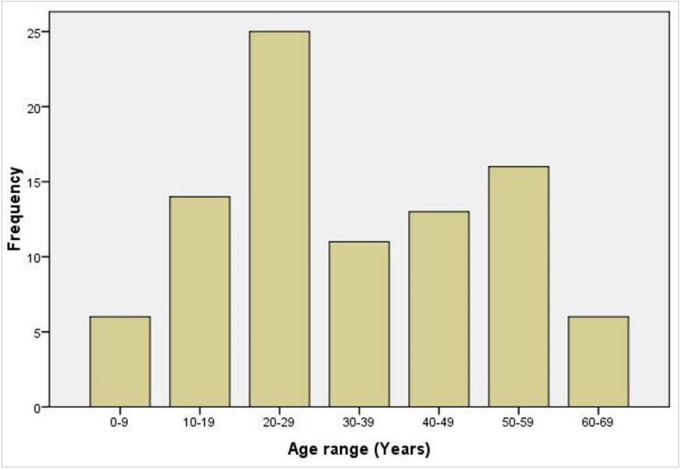

Fig. 1. Distribution of patients based on age range.

DISCUSSION

In this study there were more males compared to females and this is similar to previous reports [6, 8, 9]. However, the male to female ratio reported in this present study is lower than previous values [6, 9] and this may be related to the larger sample size when compared to previous studies. A female predominance has also been reported in sarcomas of the jaw [14].

More cases of adult sarcomas compared to pediatric sarcomas were recorded and this is consistent with the findings in the literature [10, 12]. The 20–29 years age group in general accounted for the highest number of cases reviewed although a variable age group predilection for sarcoma of the orofacial region is reported in the literature [6, 12]. Similar to other studies [15, 16], the 20–29 years age group included a higher number of osteosarcomas while rhabdomyosarcoma was more common in patients less than 17 years of age and this is in agreement with the previous findings [8, 17].

Marital status of the patients has been found to influence the incidence of sarcoma as well as treatment/survival outcome [18, 19]. The marital status of the patients in this present study was poorly (only 35.2%) documented and therefore no definite relationship could be deduced. There is paucity of literature on the relationship of marital status and orofacial sarcoma. However, it should be borne in mind that spousal support has been noted to provide a survival advantage in patients with cancers. Therefore, social support system should be taken into consideration when treating single patients.

The incidence of head/neck cancers in any region has been found to be influenced by the socioeconomic class of the population [20]. It has been noted to be higher in individuals from a low socioeconomic class even after controlling for associated health behaviors such as smoking and alcohol consumption. In the present study, all the 39 patients who had their socioeconomic class documented based on the United Kingdom national statistics socio-economic classification (2010) were of low socioeconomic class. It is probable that individuals in the higher socioeconomic class were more likely to be literate and well nourished and this may influence the disease onset and progression.

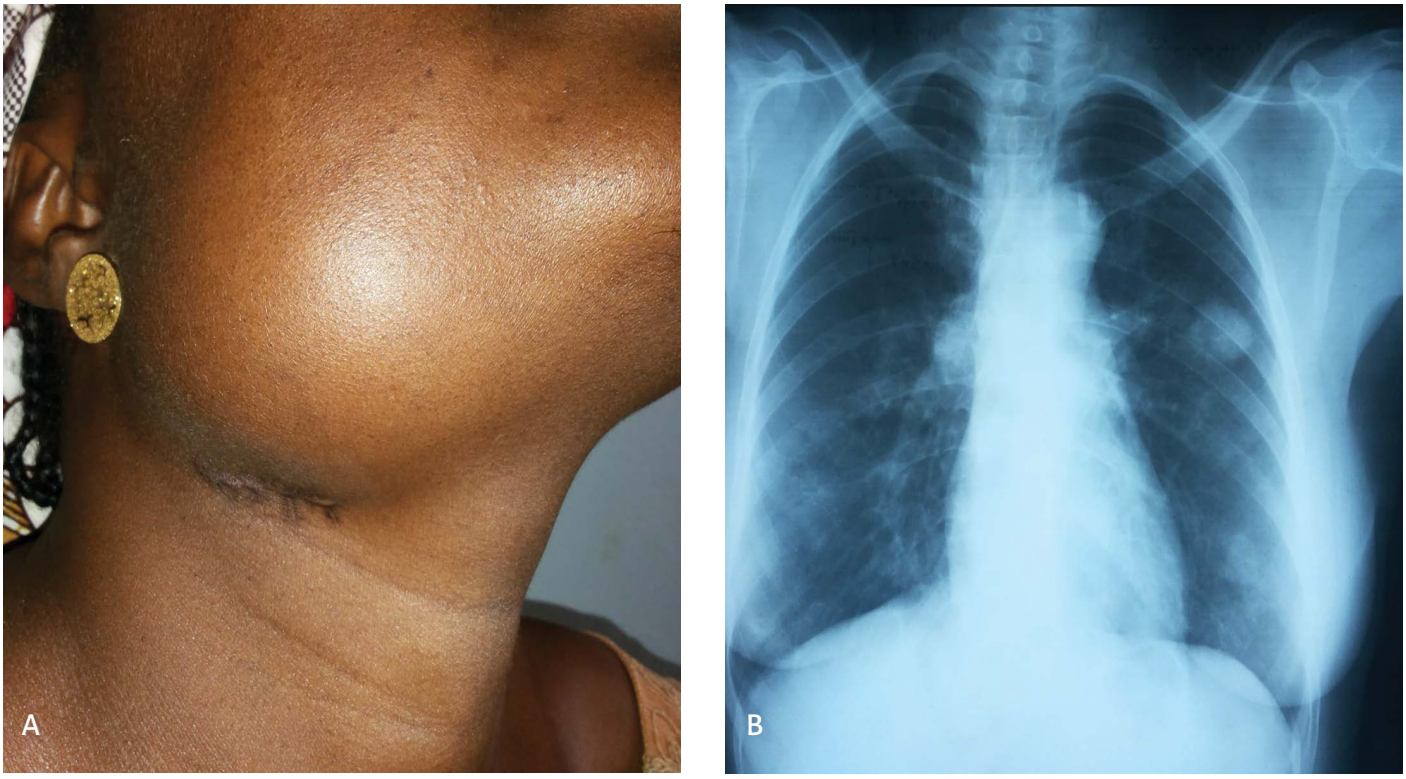

Fig. 2. A case of rhabdomyosarcoma of the parotid and submandibular region. (a) Lateral view (b) chest radiograph showing pulmonary metastases.

Tab. I. Distribution of sarcoma types based on histology.

HISTOLOGICAL TYPE	FREQUENCY
Osteogenic Sarcoma	44
Rhabdomyosarcoma	16
Fibrosarcoma	8
Chondrosarcoma	6
Malignant Fibrous Histiocytoma	5
Unspecified Sarcoma	4
Dermatofibrosarcoma	2
Ewing's Sarcoma	1
Alveolar Soft Part Sarcoma	1
Hemangiopericytoma	1
Malignant Schwannoma	1
Liposarcoma	1
Poorly differentiated Sarcoma	1
Total	91

* Sarcoma based on histological types.

More of osseous than soft tissue sarcomas were noted and the mandible was the most commonly affected site, while the cheek and submandibular region were most involved in soft tissue sarcoma, similar to previous reports [6, 10–12]. The gingiva, tongue, and facial skin/scalp were reported as common sites in other studies [6, 7].

The interval between the onset of symptoms and hospital presentation in orofacial sarcoma is variable, and it may be short or prolonged. Duration of disease at presentation in this study ranged from 1 to 120 months with a majority of them presenting as delayed cases. This finding is higher than the interval reported in other studies [17, 21]. Delayed presentation has been shown to be associated with higher one-year mortality [21]. The longer interval reported in this study may be related to genetic or environmental factors. It is also possible that some of these tumours were initially benign but transformed over time due to factors such as repeated trauma from use of corrosive traditional medications which is common in this environment. Poverty, inadequate number of oral/maxillofacial surgeons, cultural and religious belief/practices, and poorly designed national health insurance scheme are some of the factors encouraging late presentation. Our finding of higher number of primary compared to recurrent tumours is consistent with the literature [14, 17].

Imaging modality used in assessing patients was poorly documented. However, different imaging modalities have been used to aid diagnosis, preoperative planning and for follow-up review. They include conventional radiograph, panoramic radiography, ultrasound (USS), computed tomography (CT) scan, magnetic resonance imaging (MRI), nuclear medicine (NM), and angiography. Plain radiography in the orofacial region has some limitations due to superimposition of structures. However, in resource limited settings, plain radiography when combined with good clinical assessment is fairly sufficient. Findings include mixed radiolucency and radiopacity, cotton wool appearance of bone, widening of periodontal ligament space, periosteal bone reaction giving a "sunray"appearance [22]. A Codman triangle may be visualized on radiograph when the overlying periosteum is raised away from bone by subperiosteal new bone formation. CT may be used in image-guided needle biopsy or for tumour assessment in terms of nature, extent and presence of metastases. CT findings in bone sarcoma include osteoblastic, osteolytic or mixed appearances, tu-

Tab. II. Surgical procedures used in treating patients with orofacial sarcoma.

HISTOLOGICAL TYPE	FREQUENCY
Soft tissue excision + flap reconstruction	1
Mandibulectomy + soft tissue excision	1
Soft tissue excision only	3
Extended maxillectomy	3
Total (bilateral) maxillectomy	3
Hemi-maksillektomia	4
Total mandibulectomy	4
Segmental mandibulectomy	5
Hemi-mandibulectomy	8
Subtotal mandibulectomy	9
Total	41

*Types of surgical procedure used in 41 patients.

mour matrix mineralization, periosteal reaction, and adjacent soft tissue calcification [23]. MRI has superior soft-tissue contrast, excellent spatial resolution, multiplanar imaging, useful in local staging and it is safe due to its non-ionizing nature [24]. Findings in soft tissue sarcomas are largely non-specific and include intermediate signal intensity on T1-weighted images (T1WI) when compared to skeletal muscles, high signal intensity on T2-weighted images (T2WI), peritumoural edema on fat-suppressed T2-weighted sequence, intra-/peritumoural tubular areas of flow void on both T1WI and T2WI, representing rapid blood flow in distended vessels [25]. The limited use of CT scan (and MRI) in this study is due to their high cost especially since most of these patients are poor and pay out of pocket for their treatment.

Osteosarcoma followed by rhabdomyosarcoma accounted for a higher number of tumours seen in this review. This is in agreement with some previous findings which reported a 14.9–50.3% incidence in osteosarcoma of the head and neck region in both adult and pediatric patients [6, 8, 9, 11, 14, 26] although other studies documented a higher incidence of soft tissue sarcomas over bone sarcomas [27, 28]. The prevalent histological pattern appears to be related to regional variations, number of cases reviewed, and exclusion criteria (whether Kaposi sarcoma was included or excluded).

Guidelines and recommendations for the treatment of sarcomas have been put forward by several groups. They include the Cancer care/Action care Ontario, The ESMO / European Sarcoma Network Working Group, British Sarcoma Group, North West Coast Strategic Clinical Networks, and the Spanish group for research in sarcomas (GEIS) (29, 30, 31, 32, 33). Treatment options are surgery, chemotherapy and radiotherapy in varying combinations depending on factors such as tumour size and stage. Gene therapy and immunotherapy are showing promising results for chemotherapy-resistant cancers and for advanced unresectable sarcomas. The West Coast Strategic Clinical Networks (WCSCN) Head/Neck treatment Guidelines 2016 are based on the recommendations of ENT UK (BAHNO), NICE Guidelines, SIGN and NCCN Guidelines. For localized (resectable) non-metastatic sarcoma, WCSCN recommends surgical resection followed by postoperative radiotherapy, or pre-operative radiotherapy (50 Gray in 20 fractions over 5 weeks) followed (4–6 weeks later) by surgery. For localized low volume (resectable) metastatic sarcoma, it recommends systemic chemotherapy prior to surgical resection followed by postoperative radiotherapy, or pre-operative radiotherapy (50 Gray in 20 fractions over 5 weeks) followed (4–6 weeks later) by surgery. In addition, metastasectomy should be performed. For irresectable localised tumour, radical radiotherapy with or without surgical resection (depending on response from radical radiotherapy) is recommended. Systemic therapy is recommended for metastatic disease. Patients in this review were managed using surgical and non-surgical oncological treatment. However, 46.2% of the total number of patients reviewed could not access treatment (surgery, non-surgical oncological treatment or both). This is principally due to their inability to afford cost of treatment. The financial burden of sarcomas in our environment is enormous since most patients lack a national health insurance scheme and for the few that have one, the range of treatment accessible is limited.

Multidisciplinary team management is generally advocated and should involve both core (surgeon, clinical oncologists, restorative dentists, speech and language therapist, etc.) and extended (anaesthetist with a special interest in head and neck cancer, pain management specialist, maxillofacial/dental technician, dental therapist/hygienist, physiotherapist, etc.) team members (2013/14 NHS standard contract for cancer: head and neck [adult]). Multidisciplinary approach is limited in our setting due to the paucity of specialists for both the core and the extended team. Although the International Atomic Energy Agency (IAEA) recommended 250,000 population per megavoltage machine [34], only ten radiotherapy centers presently exist in Nigeria to cater for a population of over 180 million people (National Population Commission's estimates, 2017).

Nearly half of the patients failed to present for post-treatment review and this may be due to financial constraint, feeling of wellbeing, and cultural influences. The absence of global satellite mobile telecommunication in some of these areas further hindered phone-mediated follow-up review. This poor attitude to follow-up review by patients in this environment may favor a radical rather than conservative treatment since conservative cases are unlikely to present for a review. The period of review ranged from 1 to 43 months and seven patients (17.7%) presented with local recurrence with 71.4% of these presenting less than one year post surgery. A recurrence rate of 22% over a 2–32-month follow-up period and a 31% recurrence over a longer follow-up period have been reported [9, 28]. Important prognostic factors for head/neck sarcomas include patient's age, surgical resection margin, tumour subtype, tumour size, and tumour site [6, 28]. The absence of frozen sections in most centres in this environment is a major limiting factor to the achievement of an adequate margin of resection. Preventive strategies, early detection, and radical surgery are more appropriate in this environment because of late presentation, poor compliance to follow-up, huge economic burden on patients and limited human/material resources.

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