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Clinicopathological Characteristics of Sinonasal Tumours at A National Referral Hospital in Tanzania

Aveline A. Kahinga[1]*, Zephania Abraham[2], Daudi C. Ntunaguzi[1], Aslam G. Nkya[3], John C. Kimario[3], Enica Richard[1]

[1]Department of Otorhinolaryngology, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania
[2]Department of Surgery, College of Health and Allied Sciences, University of Dodoma, Dodoma, Tanzania
[3]Otorhinolaryngologist, Department of Otorhinolaryngology, Muhimbili National Hospital, Dar es Salaam, Tanzania

***Corresponding author:**

Dr. Aveline A. Kahinga

Muhimbili University of Health and Allied Sciences,

P. O. Box 65001,

Dar es Salaam, Tanzania

Email: Avelynek@Yahoo.Co.Uk

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Abstract

Background
Sinonasal tumours are rare, with an annual incidence of approximately 1 case per 100,000 inhabitants worldwide. Despite their rarity, they cause deleterious effects especially in countries with limited access to health services.

Broad objective
This study aimed at determining the proportion, clinicopathological characteristics and stage at diagnosis of sinonasal tumours among patients attending Otorhinolaryngology department at Muhimbili National Hospital Dar es Salaam Tanzania.

Methodology
A hospital-based descriptive cross-sectional study was conducted among 6630 patients who attended Otorhinolaryngology department at Muhimbili National Hospital, which is the national referral hospital in Tanzania from June 2015 to February 2016. Structured questionnaire and clinical examination forms were used to interview the study participants. Computed tomography scan of the nose and paranasal sinuses and chest X-Ray were done to all patients with clinical presentation of sinonasal tumours and biopsy was done to confirm the diagnosis. Data analysis was done using Statistical Package for Social Science version 20.

Results
Of the 6630 study participants 38(0.57%) had histopathological confirmed sinonasal tumour. Among them 23(60.5%) were males with M: F ratio of 1.5:1. Their ages ranged from 9 to 87 years with a mean age of 47.63 ±19.7 years. Most patients 37 (97.4%) presented with rhinological features for sinonasal tumours. Of the 38 patients with sinonasal tumours, 30(78.9%) had malignant tumour and peak age of occurrence was 50 years and above 19(50%) followed by 30 to 39 years 8(21.1%). Squamous cell carcinoma was the most common histological type seen in 14(42.9%) patients followed by adenocarcinoma 4(13.3%). Inverted papilloma was the most common benign tumour accounting 6(62.5%) with peak age of occurrence at 50 years and above. All patients with malignant sinonasal tumours had stage III and IV disease. Among them, 6 (20%) had neck node metastasis to the level I and II and one had metastasis to the lungs.

Conclusion and recommendation
Malignant sinonasal tumours are the most predominant in our setting with male preponderance at the age of 50 years and above. Most patients presented with advanced disease, which warrant further studies to identify and address factors contributing to advanced stage at presentation.

Keywords: *Sinonasal, Tumours, Magnitude, Muhimbili National Hospital, Tanzania.*

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Introduction

Sinonasal tumours are rare, with an annual incidence of approximately 1 case per 100,000 inhabitants worldwide (1). World Health Organisation (WHO) classifies them as benign or malignant and they can either be epithelial or non- epithelial according to tissue of origin. Majority of the sinonasal tumours are malignant and account for 3% of the head and neck cancers (2,3). Histologically, epithelial tumours are the predominant form of malignancies representing more than 80% of all sinonasal tumours and the most common subtype being squamous cell carcinoma accounting for 50–80% of all sinonasal malignancies. (1,4) Benign epithelial tumours include papilloma and salivary gland type adenomas in which pleomorphic adenoma is the most common one. Papillomas are the most frequently encountered benign epithelial tumours and inverted papillomas are the most common subtype (4).

Sinonasal tumours affect all races and have male preponderance. The peak age at diagnosis is the sixth decade (4,5). Clinical presentation of sinonasal tumours are non - specific and mimic those of common benign disorders, such as chronic rhinosinusitis. The presenting features depend on the site and extent of tumours involvement. Nasal obstruction is the most common symptom of sinonasal tumours. Other symptoms include nasal discharge, epistaxis, nasal mass, loss of smell, cheek swelling and proptosis. Patients may also present with neck masses which is due to metastatic spread to the regional lymph nodes. The most commonly involved lymph nodes are the upper jugulodigastric nodes (2,6,7).

The diagnosis of sinonasal tumour is confirmed by histopathology finding from the tissue taken at the tumour site. This is either taken transnasal if the tumour is visible through the nose. Other approaches include Caldwell-Luc or intranasal antrostomy if confide in the maxillary sinus. Endoscopic approach is done if confined to the sphenoid or frontal sinus. Other investigations include computed tomography scan (CT SCAN) and Magnetic resonance imaging (MRI) of the nose and paranasal sinuses (PNS), which are the best modalities for accurate localisation of tumour extent and to ensure appropriate surgical planning. Chest X-Ray provide evidence of metastasis to the lungs. Positron emission tomography scan (PET SCAN) play a role in evaluating for the presence of distant metastasis and provides the optimal baseline for post treatment decision making (8).

There are two systems which are commonly used in staging malignant sinonasal tumours which are Union for International Cancer Control (UICC) and American Joint Committee on Cancer staging (AJCC) These systems focus on the nasal cavity and common sinuses affected which are the maxillary and ethmoid sinuses. They use TNM Classification where T stands for Primary tumour, N stands for regional lymph node involvement and M stands for distant metastasis (9). Treatment of sinonasal tumours and prognosis depend on the site, histological type and stage of the disease. The mainstay of treatment for benign sinonasal tumours is surgery while for malignant ones involve variety of modalities which include surgery, radiotherapy and chemotherapy alone or in combination (2,3). Benign tumours have better prognosis than malignant tumours. Male sex, old age, differentiation of the tumour, status of the primary tumour and regional lymph node involvement are all factors independently related to the prognosis of malignant tumours. Studies have reported the five year survival rate for squamous cell carcinoma to be 50% and the recurrent rate is 56% and the prognosis is poor if there is invasion of multiple subsites (7).

In Muhimbili National Hospital (MNH) sinonasal tumours are among the top ten diseases seen in the Otorhinolaryngology (ORL) department. The study done by Mwansasu et al on the pattern of head and neck cancer at MNH showed that, nasal and paranasal sinuses were the commonest site for head and neck cancer (10). From observations, patients with sinonasal tumours in our settings present late to otorhinolaryngologists. Due to late presentation treatment becomes challenging thus leading to poor prognosis and mortality. This study aimed at determining the proportion, clinicopathological characteristics and stage at diagnosis of sinonasal tumours among patients attending otorhinolaryngology (ORL) department at MNH. The information obtained from this study will form the corner stone for educating health care workers who see patients in the primary health care centres, on early diagnosis and referral to otorhinolaryngologists for definitive management.

Methodology

Study design, setting and participants

This was a cross-sectional study conducted at Otorhinolaryngology (ORL) clinics and wards of MNH, which is the national referral hospital in Tanzania. The ORL department of the hospital receives public patients referred from all regional referral hospitals in the country as well as private patients. A total of 6630 patients who attended the ORL department for a period of nine months (June 2015 to February 2016), were included in the study.

Data collection

The study participants were interviewed using structured questionnaires and clinical examination forms designed by the authors after consenting to the study. A detailed history was taken considering the patients' complaints and information filled in the questionnaire together with the sociodemographic data. Ear, nose and throat, head and neck examination were done using headlight, tongue depressor, nasal speculum, nasal endoscope, otoscope and tuning fork. Examination findings, histopathological results and staging information were recorded in the clinical examination forms. Patients with clinical features such as nasal discharge, nasal blockage, sneezing and absence of nasal mass, which did not suggest a sinonasal tumour were treated accordingly. Patients with clinical features suggested a sinonasal tumour apart from those mentioned earlier such as nasal bleeding, nasal mass with involvement of adjacent structures which include, eye and oral cavity underwent baseline investigations (Full blood picture, urinalysis and chest x-ray) and specific investigations (trans nasal biopsies and CT scan of the nose and paranasal sinuses) to confirm the presence and extent of the disease, respectively and staging malignant tumours. CT scan could also provide information on lymph nodes status especially those not accessible by clinical examination. In the staging of the malignant tumours, TNM classification modified by the American Joint committee on cancer staging (AJCC) was used (9). In cases where both maxillary and ethmoid sinuses were affected, T status for maxillary sinus was used. Information obtained from the CT scan of the nose and paranasal sinuses that is extent of opacification and bone erosion was used for T category, information obtained from the clinical examination of neck lymph nodes (size, consistency, and side affected) was used for N category while information from chest X-

Ray was used for M category. The sinonasal tumours were classified according to WHO classification as benign or malignant and further classified as epithelial or non-epithelial according to tissue of origin.

Data analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS) version 20 for descriptive analysis and results were presented in frequency tables, cross-tabulations and figures. Fisher's exact test to determine the associations between age, sex and occurrence of sinonasal tumour was done. A p-value of <0.05 was considered statistically significant.

Results

This study involved 6630 participants out of which 38 (0.57%) were confirmed to have sinonasal tumours by histopathology. Among the 38 patients with sinonasal tumours 23(60.5%) were males with M: F ratio of 1.5:1. Their ages ranged from 9 to 87 years with a mean age of 47.63 years, median age of 49 years and standard deviation ±19.7 years. The peak age of occurrence of sinonasal tumour was 50 years and above 19(50%) followed by 30 to 39 years 8(21.1%).

Rhinological features were the most common clinical presentations 37(97.4%) among patients with sinonasal tumors, while Otological features were the least 10 (26.3%) (Figure 1). The most common rhinological features were nasal mass, nasal obstruction, nasal discharge and epistaxis. Other clinical presentations such as neurologic 31(81.6%) (headache and facial numbness), ophthalmic 28 (73.7%), (visual impairment, eye discharge and eye protrusion) facial 27(71.1%), (facial pain, asymmetry and ulceration) and dental 18(47.4%) (Loosening of maxillary teeth, alveolar swelling, toothache, gingival bleeding, bulging hard palate, trismus) were as well observed.

Majority of the sinonasal tumours were malignant 30(78.9%). The peak age for occurrence of malignant tumours was 50 years and above followed by 30 -39 years while for benign sinonasal tumours was 50 years and above followed by 20 to 39 years. These findings were not statistically significant (p=0.21). The male to female ratio for malignant sinonasal tumours was 1.5:1 while for benign sinonasal tumour was 1.7:1 but they were not statistically significant (p=1.0), (**Table 1**)

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Inverted papilloma was the predominant histological type 5 (62.5%) among the 8 benign sinonasal tumours. The remaining three were everted papilloma, papillary adenoma and fibrous dysplasia. Squamous cell carcinoma was the predominant 14(46.7%) type among the 30 malignant tumours followed by adenocarcinoma 4(13.3%). Others included transition cell carcinoma and lymphoma each 3(10%), adenoid cystic carcinoma, undifferentiated carcinoma, and sarcomas each accounting 2(6.7%) (**Table 2**).

Most of patients with malignant sinonasal tumours 22(73.3%) had stage IV disease (IVA 7, IVB 14, IVC1) while none was in stage I or II. This was evident from CT scan findings of the nose and paranasal sinuses done to all patients which showed extensive disease and in all patients more than one sinus group was involved with 12(40%) extending out of the sinuses. Ethmoid sinus 29(96.9%), nasal cavity 28(93.3%), maxillary sinus (27(90%) were most sites involved while frontal sinus was least 6(20%) Among regions outside the sinuses orbital apex12 (40%) was the most involved while cribriform plate and middle cranial fossae were least each 3.3%. Local regional lymph node involvement was found in 6(20%) patients at level I and II where by three had squamous cell carcinima, two had lymphoma and one had transitional cell carcinoma. Distant metastasis to the lungs was diagnosed by ches X- Ray in a 38 year old female with adenocarcinoma.

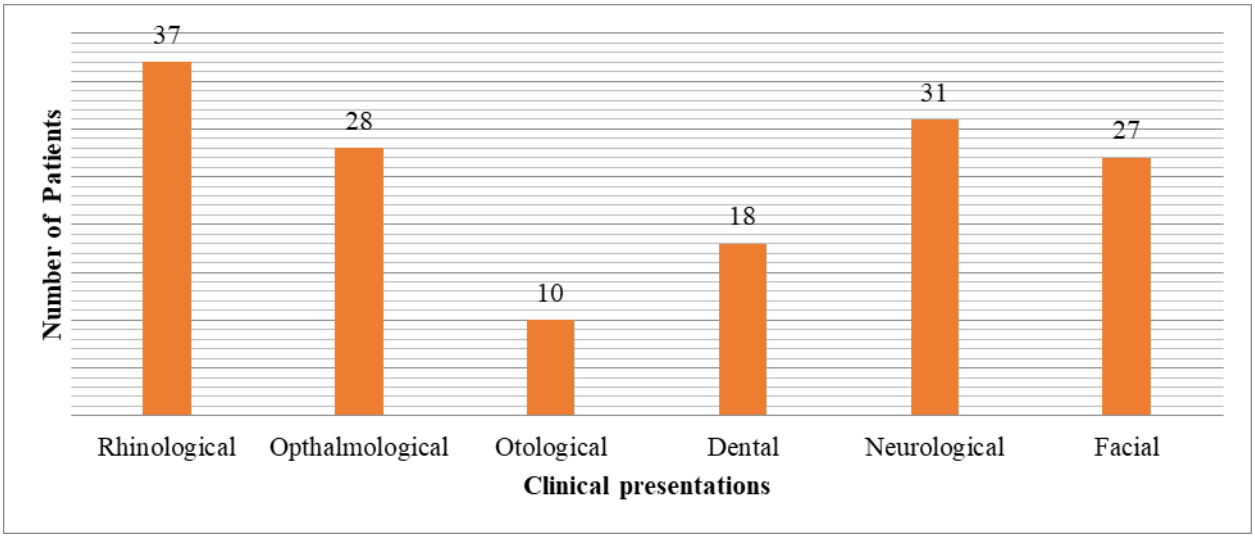

Figure 1: Clinical presentations of sinonasal tumours (N=38)

Table 1: Age and sex distribution of sinonasal tumours (N=38)

Age Group(Years)	Type Of Sinonasal Tumour		Total N (%)	P Value
	Benign N (%)	Malignant N (%)		
0-9	0 (0.0)	1 (3.3)	1 (2.6)	0.21
10-19	0 (0.0)	1 (3.3)	1 (2.6)	
20-29	1 (12.5)	4 (13.3)	5 (13.2)	
30-39	1 (12.5)	7 (23.3)	8 (21.1)	
40-49	0 (0.0)	4 (13.3)	4 (10.5)	
≥50	6 (75.0)	13 (43.3)	19 (50.0)	
Total	**8(21.1)**	**30(78.9)**	**38(100)**	
Sex				
Male	5 (62.5)	18 (60.0)	23 (60.5)	1.0
Female	3 (37.5)	12 (40.0)	15 (39.4)	
Total	**8(21.1)**	**30(78.9)**	**38(100)**	

Table 2: Histological distribution of malignant sinonasal tumours (N=30)

Histology	Frequency (%)
Epithelial origin(None glandular)	
Squamous cell carcinoma	14(46.7)
Undifferentiated carcinoma	2(6.7)
Transition cell carcinoma	3(10)
Epithelial origin(glandular)	
Adenocarcinoma	4(13.3)
Adenoid cystic carcinoma	2(6.7)
Non epithelial origin	
Lymphoma	3(10)
sarcoma	2(6.7)
Total	**30(100)**

Discussion

The findings from this study showed that the proportion of sinonasal tumours was 0.57% among otorhinolaryngology conditions seen in our setting. This shows the rarity of the tumour as reported in literature (3,8). Malignant sinonasal tumours being most occurring than benign tumours in our setting is similar to the study done in Nigeria (11) but not in agreement with findings from studies done in Nepal where benign tumours were predominant (12). This dissimilarity could be due to racial and geographical differences of the studied population as this is the disease of racial and geographical distribution.

Both malignant and benign sinonasal tumours showed male preponderance with M: F =2:1 and mostly found in those aged 50 years and above. The age of occurrence for the benign tumour was similar to study in Kathmandu Nepal (12) but not the sex. Several other studies showed it to occur in younger age (6,13,14). The age of occurrence for the malignant tumour from this study is similar to that reported in several studies (11–13). Also patients aged 30 – 39 years were the second mostly affected from this study which is similar to what has been shown in other studies (6,11,13,14). The male predilection for sinonasal malignancies observed in this study has also been reported in other studies (4,5,11,12) but differs from one study where female predilection was reported (15). The similarity in males' predilection could be explained by the fact that, males in these areas are more exposed to occupational risk factors for the disease compared to females.

Rhinological features predominated in our patients than other clinical features. These findings were similar to those from India and Nigeria (6,11–15) but differ from the study done in Pakistan which found facial swelling as the most frequent feature (16). The difference could be due to variability in sites of tumour involvement. The maxillary sinus was the most sinus involved in the Pakistan study and facial swelling is its characteristic while in our study ethmoid sinus was the most sinus involved followed by nasal cavity and maxillary sinus.

Majority of sinonasal tumours in our study were of epithelial origin for both benign and malignant types. Inverted papillomas were the most common benign sinonasal tumour observed in this study similar to study done by Panchal et al (17). However Lathi et al reported haemangioma as the most common benign sinonasal tumour (13) and several other studies reported low incidence of inverted papilloma (6,14).

Squamous cell carcinoma was predominant among malignant sinonasal tumours followed by adenocarcinoma in our study as reported in several other studies worldwide (4–6,11,13,14,17,18). The predominance of squamous cell carcinoma followed by adenocarcinoma could be due to environmental exposure to the risk factors such as wood and leather dust, aflatoxins and pesticides which are not excluded in our environment though identification of risk factors was not part of this study. Studies on identification of risk factors for sinonasal tumours in our setting are necessary for the preventive measures of the disease.

In this study all patients with malignant sinonasal tumours were diagnosed at stage III and IV which was slightly differ from some studies (11,16) where few patients had stage I and II. Despite majority being in advanced stage of the disease only six (20%) had neck node metastases at the level I and II and one had distant metastasis to the lungs. The rare distant metastasis is supported in literature (7). This advanced stage at presentation is an alarming to the health system, which needs to be intervened. Health education to the community through social media and outreach services on symptoms of the disease and on importance of early health seeking behaviour is of paramount importance for early detection of the disease. Nevertheless, education to health personnel's working in the primary level health facilities on the symptoms and early detection of the disease through focused patient history, thorough clinical examination and use of available investigations is very important for early diagnosis and referral to the otorhinolaryngologists for optimal management.

Conclusion and recommendation

Sinonasal tumours are among head and neck tumours with male preponderance especially at the age of 50 years and above as seen at our hospital. Malignant sinonasal tumours were predominant and patients presented at advanced stage of the disease. We recommend further studies to identify and address factors contributing to advanced stage at presentation so as to improve prognosis and reduce mortality.

Study limitation

Despite this study being able to point out the proportion of sinonasal tumours among otorhinolaryngology conditions seen in our department and its clinicopathological characteristics, these findings cannot be a representative of all patients with sinonasal tumours in the country. Only chest X-Ray was used to detect distant metastasis to all patients with malignant sinonasal tumours hence only lungs could be assessed and other possible areas for metastasis such as liver could be missed.

Ethical consideration

This study was ethically cleared by the Senate Research and Ethics Committee of the Muhimbili University of Health and Allied Sciences and permission to conduct the study at the hospital was granted by the hospital administration. All authors consented for the study.

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Competing interests

Authors declare no conflict of interest.

Authors' contributions

AAK designed the study, collected data, performed data analysis and prepared this manuscript. ZB, DCN, AGK contributed to study design, analysis and comments to the manuscript drafts. JCK and. ER supervised and contributed to study design, data collection and analysis, reviewed this manuscript. All authors have read and approved this manuscript.

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Abbreviations

AJCC	American Joint Committee on Cancer Staging
CT-SCAN	Computed tomography scan
MNH	Muhimbili National Hospital
MRI	Magnetic resonance imaging
ORL	Otorhinolaryngology
PET SCAN	Positron Emission tomography scan
PNS	Paranasal sinuses
SPSS	Statistical Package for Social Sciences
UICC	Union for International Cancer Control

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