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Original Research Article

Prevalence and Presentation of Pharyngeal Malignancies among Head and Neck Malignancies

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Abstract: Pharyngeal malignancies are primary tumors arise in the head and neck. These tumors involves part of nasopharynx, oropharynx and hypopharynx Method. All patients with histologically proven malignant lesions in the head and neck region attended the Otorhinolaryngology and dental department of MNH between 1st April 2015 and 31st December 2015 were enrolled. Special designed questionnaire was used. ***Results:*** A total 438 patients with head and neck malignancies were recruited. Ones with the pharyngeal malignancies were 114. Male were 79 (69.3%) and ratio of Male to female was 2.3 to 1. Majority of the patients presented at 61yrs and above with mean age of 55.7. Tobacco use alone were 16(14%); Male were 75%. Alcohol alone was consumed by16.7% of the patients consumption was equal among the sexes. The patients did both smoking and alcohol consumption were 49(43%). On combine the risk factors alcohol, tobacco or both (alcohol and tobacco) were 84(73.7%). This was noted to be high in relation to other risk factors. The ones nether smoked nor take alcohol were 30 (26.3%). Leading involved area with malignant was oropharynx by 55.3%, hypopharynx 27.2% and nasopharynx 17.5%. Histological leading type was the squamous cell carcinoma by 77.2%, kaposis sarcoma 7.9%, lymphoma 5.3%, undifferentiated carcinoma 5.3%. ***Conclusion:*** This study shows that the prevalence of the pharyngeal malignancies among head and neck malignancies was 26%. Squmous cell carcinoma been the predominant histological diagnosis in both sexes and age.

Keywords: Head and neck, Pharyngeal malignancies, risk factors, tobacco, alcohol, familial, histology.

INTRODUCTION

Head and neck malignancies is a mixture variety of the primary malignancies that occurs in the upper aerodigestive tract or is a group of biologically similar cancers arising in the upper aero-digestive tract, that includes mouth (oral cavity), lip, paranasal sinuses, nasal cavity, larynx, and pharynx [1]. Pharyngeal malignancies are also classified as HNC. Pharyngeal malignancies includes those of the nasopharynx, oropharynx, hypopharnx and other sites in the pharynx. The pharynx is a musculomembranous tube that extends from the base of the skull to the level of the sixth cervical vertebra [2]. The nasopharynx is a roughly cuboidal muscular tube located behind the nose in the upper part of the pharynx. The most common site of origin for a cancerous tumor within the nasopharynx is the fossa of Rosenmüller. The oropharynx is posterior to the oral cavity and includes the posterior third of the tongue, also called base of tongue or lingual tonsil, palatine tonsil, soft palate, and posterior pharyngeal wall [3]. Hypopharynx is the lowest part of the pharynx and lies behind and partly on the sides of the larynx. Hypopharynx lies opposite the 3rd, 4th, 5th, 6th cervical vertebrae. Clinically, it is subdivided into three regions- the pyriform sinus, post-cricoid region and the posterior pharyngeal wall [4].

Worldwide, head and neck cancer accounts for more than 650,000 cases and 330,000 deaths annually [5]. In the United States, head and neck cancer accounts for 3 percent of malignancies, with approximately 66,000 patients developing head and neck cancer annually and 14,600 dying from the disease [6]. In Europe, there were approximately 250,000 cases (an estimated 4 percent of the cancer incidence) and 63,500

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deaths in 2012 [7]. Oral cancer is the sixth most common cancer and it is more common in the developing world [8].Worldwide, cancer of oral cavities and oropharyns account for about 220,000 new cases per year in men (5% of all cancers) and about 90,000 in women (2%of all cancers) [9]. Data from Africa are limited due to only few hospitals cancer registries existing. It is therefore difficult to extrapolate the true incidence from these countries, though the reported rates do not show that oral cancer as a serious problem in the African continent. There are descriptive studies from the Sudan that suggest oral cancer rates in males are high, linking this high incidence to toombak, a product of oral snuff mixed with sodium bicarbonate[10].

LITERATURE REVIEW

Age and Sex

Pharyngeal cancers are related to lifestyle and lower socioeconomic status, and they occur more often in the developing countries [14]. As age increases, the risk for oral and pharyngeal cancer also increases. Among USA men aged 40-59 years, the risk for developing oral cancer is 11 times that of men under the age of 40 years. For men above 60 years, this risk increases to 21 times. Women have lower risk for developing oral cancer as compared to men. For women aged above 40 years and 60 years, the risks are 5 and 12 times higher, respectively, than women under the age of 40 years[11].

It is believed that the majority of oral cancers and pharyngeal cancers are diagnosed at an older age because of accumulated lifelong exposure to carcinogens, which leads to parmanent DNA damage. Studies in African countries has found slightly lower mean ages at presentation with peak incidences in the 20 to 29 years and 40 to 49 years age groups [12, 13].

Astudy done about the pattern of head and neck cancer among patients attending Muhimbili national hospital between 1st July 2012 and 31st January 2013 found that total number of 3,658 patients were attended at the Department of Otorhinolaryngology. Of these, 113 (3%) patients had histological diagnosis of various head and neck malignant tumors. The study subjects consisted of 75 (66.3%) males and 38(33.7%) females, with a male to female ratio of 2:1. The age at the time of diagnosis ranged from 16years to 88 years (mean age= 51 years ± [18]. Those aged 41-60 years accounted for the majority of cases (42%). Patients above 40 years of age accounted for 72.6% while patients below 40years accounted for 28.4%. Patients with head and neck cancer below 20 years constituted 5.3% [14].

Alcohol and Tobacco use

24% of oral and pharyngeal cancers could be attributed to tobacco use among those who have never consumed alcohol, while approximately 7% of cases can be attributed to alcohol use among those who have never used Tobacco [15]. A dose effect was also observed by Menvielle *et al.* for both alcohol and smoking and ifboth factors were present the effect was multiplicative an [16].

Alcohol

Alcohol use is a risk factor associated with pharyngeal cancers. Consumption of all types of alcoholic beverages increases a person's risk for pharyngeal cancer; however the type of spirit does impact the level of risk. As total alcohol consumption increases so does the risk for pharyngeal cancers. Those who consume 3-4 drinks a day are at a 2.1 times higher risk for pharyngeal cancer, 5-7 drinks 5 times higher, 8-11 drinks 12.2 times higher, and 12 or more drinks a day 21.1 times higher risk. There is a significant trend across the levels of drinking ($p<0.0001$) [17]. However, among those who consume beer or spirits, and no wine, the increase in risk is markedly lower, with the highest risk being for those who consume three or more beers a day,with a 2.3 times higher risk. Wine has the most significant single effect on oral pharyngeal cancer risk, with those who consume 3-4 drinks a day are at a 2.2 times higher risk, 5-7 drinks 7.1 times higher, 8-11 drinks 11.8 times higher, and 12 or more drinks a day 16.8 times higher risk. There is again a significant trend across the levels of drinking ($p<0.0001$)[17].

Tobacco

In Tanzania, the literature review indicate that most of the studies conducted on tobacco use were on prevalence of smoking.Few studies has investigated on prevalence of oral snuff and none on chewing tobacco. The reported prevalence for tobacco smoking ranged from 1.0%-8.7% among adolescents and 5% -27% among adults [18, 19].

Gender and Genetic Factors

The incidence rate of oral and pharyngeal cancers among men and womenis nearly 4:1 [20]. There is increasing evidence to suggest that female hormones may play a role in oral and pharyngeal cancers. Gallus *et al.* found a significant trend between age of menopause onset and risk for oral cancer ($P<0.01$). Women who experience menopause later in life (>50 years of age) have a decreased risk for oral and pharyngeal cancer [21]. Among cases of oral and pharyngeal cancer, the odds were 2.36 times higher for a woman to experience early menopause (<= 45 years of age) (20). Among cases of oral and pharyngeal cancer, the risk is 2.6 times higher when a family member also has oral and pharyngeal cancer. The risk jumps to7.1 times higher when two or more family members are affected, whether therelatives are immediate family or not [22]. Among current smokers

who consume 21 or more alcoholic drinks per week with a family history of oral and pharyngeal, 17 the risk is 46.2 times higher when compared with a nonsmoker nondrinker with no family history [22].

Histological type

The most common malignant cancer among HNC is squamous cell carcinoma, rare onces are lymphomas, minor salivary gland tumours (adenocystic carcinoma, mucoepidermoid carcinoma, adenocarcinoma) [23]. In a study done at MNH in Tanzania on pattern of head and neck malignancies, it was found that 94.7% were carcinoma and 3.5% sarcoma and 1.8% lymphoma. The most frequent was squamous cell carcinoma 74.3%, followed by mucoepidemoid 6.2%, adenoid cystic carcinoma 5.3, and adenoma 3.5% [14].

Site of occurrences

In the study done in India at the Civil Hospital the most commonly affected site was oropharyngx and oral cavity.Oropharyngx has a prevalence of 24.2% in both males and females, with a ratio of 8:1 and oral cancers have prevalences of 23.9% in both males and females, with a ratio of 1:1. Hypopharyngx constitutes 18.4% of HNC in both males and females, with a ratio of 8:1 followed by larynx cancers, which have a prevalence of 15.6% and a male to female ratio of 7:1. Lastly, nasopharyngx canecers have a prevalence of 5.2% with maale to female ratio of 1:1 [24].

In the study done in Maiduguri Nigeria found that Oropharyngeal cancers constituted 15% of all ear, nose and throat /head and neck cancers during the study period. Thirty one (68.9%) were males and 14 (31.1%) females. The patients' ages ranged from 21 years to 73 years. The overall mean age of the patients was 48.5(±11.6) years; there was no statically significant sex difference (P>0.05). The peak age group presentation was 41-50 years [25].

In the study done in Tanzania at MNH of the pattern of head and neck malignancies the following cancer prevalences were found: sino-nasal 24.7%, laryngeal 20.4% nasopharngx and hypopharngx 14.2%, oropharnynx 9.7%, and 6.2% [14].

Study design and participants

This was a hospital based descriptive cross-sectional study was carried out from April 2015 and December 2015 and included all patients with histological diagnosis of malignant lesions in head and neck who attended the Otorhinolaryngology MNH and Dental department at MNH in Tanzania.

Data collection and laboratory analyses

The socio-demographic data, the clinical examination findings, Computerized Tomography (CT)/Magnetic Resonance Imaging (MRI) reports and histological results of all patients with histological diagnosis of head and neck cancer were obtained through hospital registries, computerized database and patient files. All the information was counterchecked and correctedwhere necessary by using special designated coded questionnaire to interview the patient about socio-demographic data. The clinical examination findings from the files were further discussed and reviewed by otorhinolaryngologist, head and neck surgeon then filled in special form which consisted of different head and neck anatomical sites, the CT-scans/MRI were reviewed by otorhinolaryngologists, the histology was done and reviewed by a pathologist and filled in another special form comprising of histological diagnosis.

DATA ANALYSIS

Continuous variables were summarized by medians and interquartile ranges and categorical variables were summarized by frequency and percentage. Data was analyzed using SPSS software for Windows version 16.0.

Ethical considerations

Patients were provided with an informed consent and then asked to provide written consent to participate in the study. This study was approved by the Research and Publication Committee of the Muhimbili University of Health and Allied Sciences.

RESULTS

The total number of patients involved in the study with head and neck malignancies were 438.244 (55.7%) were male and 194 (44.3%) were female. Age ranged from 3 – 92 years. Those with the pharyngeal malignancies were 114 (26%).

Table-1: Demographical distribution of patients with head and neck malignancies by age and sex

Age	Sex		Total
	Male	Female	
0-10yrs	1(0.2%)	0(0%)	1(0.2%)
11-20yrs	8(1.8%)	4(0.9%)	12(2.7%)
21-30yrs	16(3.7%)	10(2.3%)	26(6%)
31-40yrs	26(6%)	17(3.9%)	43(9.8%)
41-50yrs	44(10%)	40(9%)	84(19%)
51-60yrs	64(14.6%)	63(14%)	127(29%)
>61yrs	85(19.4%)	60(13.7%)	154(33%)
Total	244(55.7%)	194(44.3%)	438(100%)

Total number of patients having pharyngeal malignancies were 114. Male were 79 (69.3%) and female were 35 (30.7%).The ratio of Male to female is 2.3 to 1. Age ranged from 11yrs to 92yrs. Majority of the patients presented at 61yrs and above as in table 2. The mean age been 55.7 and SDA is 17.6.

Table-2: The distribution of patients with pharyngeal malignancies according to age and sex

	Sex		Total
Age	male	female	
11-20yrs	4(3.5%)	1(0.9%)	5(4.4%)
21-30yrs	5(4.4%)	1(0.9%)	6(5.3%)
31-40yrs	10(8.8%)	4(3.5%)	14(12.3)
41-50yrs	7(6.1%)	6(5.3%)	13(11.4%)
51-60yrs	14(12.3%)	15(13.2%)	29(25.4%)
>61	39(34.2%)	8(7.0%)	47(41.2%)
Total	79(69.3%)	35(30.7%)	114(100%)

Males were more in age group above 61yrs 39(34.2%) and few in age group between 31yrs to 40yrs 4(3.5%). Most female were in age group between 51 to 60yrs 15(13.2%) and least in 11 to 20yrs been 1(0.9%).

Table-3: The distribution of patients with pharyngeal malignancies according to the risk factors by sex.

		Sex		Total
isk		male	female	
	Tobacco use	12(75%)	4(25%)	16(14%)
	alcohol consumption	10(52.6%)	9(47.4%)	19(16.7%)
	Tobacco and alcohol consumption	40(81.6%)	9(18.4%)	49(42.9%)
	famlilial hx	0(0%)	2(100%)	2(1.7%)
	Others	17(60.7%)	11(39.3%)	28(24.6%)
Total		79(69.3%)	35(30.7%)	114(100%)

Sixteen (14%) patients used tobacco only of which 12(75%) were males while 49(42.9%) patients used both tobacco and alcohol. Alcohol consumption was equal in both sexes in ratio of 1:1.P value is <0.02 which is statistical significant.

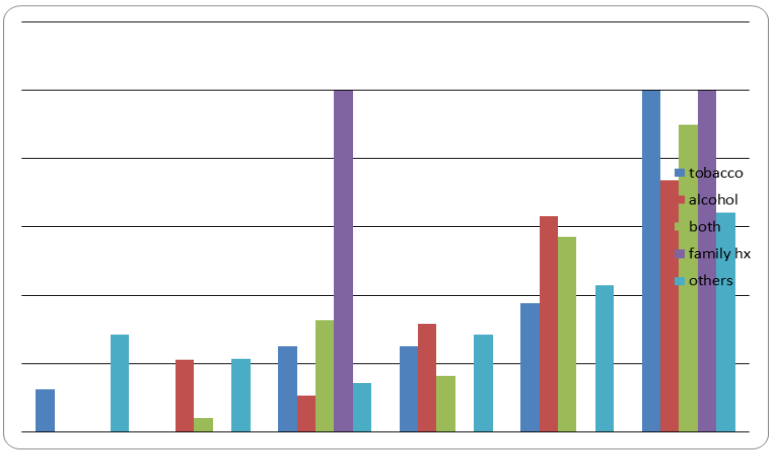

Fig-1: Distribution of risk factors in pharyngeal malignancies according to age

Tobacco use was noted in the age group above 61yrs by 50% followed by age group between 51 to 60yrs by 18.8%. Leading age group in alcohol consumption was61yrs and above by 36.8% the least age group was 11yrs to 20 yrs. Familial history was present in age group31 to 40 yrs and above 61yrs by 50%.

Table-4: The distribution of patients with pharyngeal malignancies according to combine risks factors of alcohol, tobacco and both (alcohol and tobacco use) by sex

		Sex		Total
		male	female	
	YES	62(73.8%)	22(26.2%)	84(73.7%)
	NO	17(56.7%)	13(43.3%)	30(26.3%)
Total		79(69.3%)	35(30.7%)	114(100%)

More than half of the patients 84 (73.7%) used either tobacco or alcoholor both. The majority of them were male (73.8%). The P value was < 0.02

The leading site been affected by malignancy was oropharynx (55.3%) followed hypopharynx (27.2%) and nasopharynx (17.5%) as in table 5.

Table-5: The distribution of patient with pharyngeal malignancies according to site by sex

	Site			Total
sex	nasopharyngx	oropharynx	hypopharynx	
male	13(16.5%)	38(48%)	28(35.4%)	79(69.3%)
female	7(20%)	25(71.4%)	3(8.6%)	35(30.7%)
	20(17.5%)	63(55.3%)	31(27.2%)	114(100%)

Commonly involved sites was oropharyngx (55.3%), with 48% in males. In female it was the leading part in involvement by 71.4%. In males the second most involved site was hypoharynx, by 35.4% and in females it was nasopharynx by 20%. The P value was<0.011.

Leading pattern of histological malignancy was squamous cell carcinoma (77.2%) followed by kaposis sarcoma (7.9%) lymphoma (5.3%), undifferentiated carcinoma (5.3%) other (2.6%).

Table-6: The histological distribution of patients with pharyngeal malignancies by sex

sex	Histological type							
	Squamous cell carcinoma	Adenocarcinoma	Lymphoma (nh)	Adenocystic carcinoma	Kaposis sarcoma	undifferentiated carcinoma	others	Total
Male	63(79.7%)	1(1.3%)	2(2.5%)	1(1.3%)	6(7.6%)	4(5.1%)	2(2.5%)	79(69.3%)
Female	25(71.4%)	0(0%)	4(11.4%)	0(0%)	3(8.6%)	2(5.7%)	1(2.9%)	35(30.7%)
Total	88(77.2%)	1(0.9%)	6(5.3%)	1(0.9%)	9(7.9%)	6(5.3%)	3(2.6%)	114(100%)

Squamous cell carcinoma was the leading histological type in both sexes. In males the second most common histological type was Kaposi's sarcoma with by7.6% and for females was lymphoma, by11.4%. The P value was 0.56.

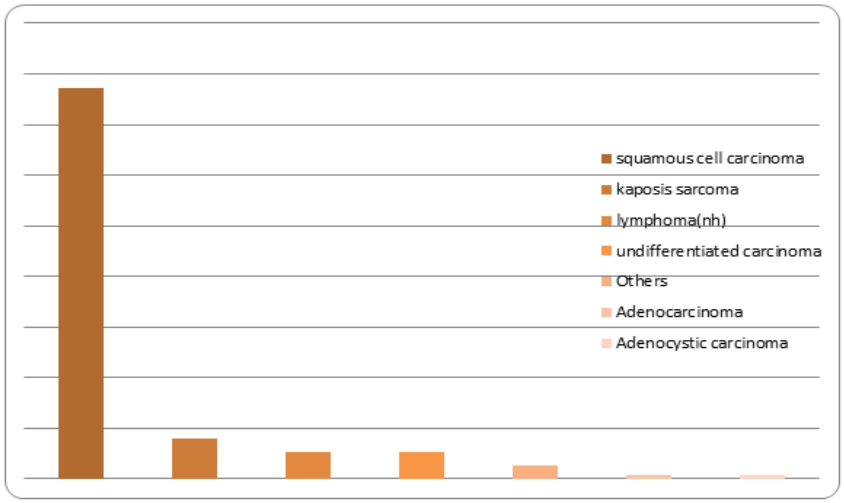

Fig-2: The distribution of pharyngeal malignancies according to histological type

DISCUSSION

Demographical

Pharyngeal malignancies are among the rapidly increasing cancer of HNC in Tanzania and the rest of the world. The most affected age group are patients above 61 years. Patients less than 40 years were 22% involved and those above 40yrs were 78% marking the majority. Male were involved by 69.3%making the ratio of male to female been 2.3 by 1. This finding are almost the same with study done by Mwansasu et that found 66.3% males and the rest females with a male to female ratio 2:1 were involved in the study. The mean age at the time of diagnosis was 51±18. Patients below age of 40 years accounted for 28.4% of all head and neck cancer patients and above 40year were 71.6% [14].

Also this findings shows the aspects of lifestyle and lower socioeconomic status, as the contributory factors in the developing countries than in the developed world [11]. As in the study done by Silverman *et al*. in the USA, which found that men aged 40-59 were at an 11 times greater risk of developing oropharyngeal cancer than men under 40.For men above 60 the risk increases to 21 times. Women have a lower risk compared to men. Above 40years and 60years the risks are 5 and 12 times higher respectively compared to women below 40years [17]. The prevalence of pharyngeal malignancies in this study is 26% with a mean age of 55.7 years and median age is 57.5years (SD17.63). This is comparable to a study by Wahid *et al*. which found a mean age of 57.26 years(SD 0f 14.01) with majority presenting in the 6th and 7th decade followed by those in there 4th and 5th decades.

Tobacco use, alcohol consumption and genetics

Patients involved in tobacco use only were 14%.Male comprised 75% of this group and female just 25%. Most of our patients were smoking tobacco not passive users. Some other patients reported to be smoking untill onset of illness and diagnosis. In the study done by Siziya *et al*. in Tanzania, reported prevalence for tobacco smoking ranged from 1% to 8.7% among adolescents and 5% to 27% among adult [18], This results lie within these ranges. Also men are involved more possibly due to their daily work routine which can be contrally different from the women; as they are required to house and work. Those consuming alcohol alone were 16.7% of the total patients; male being 52.6% and female 47.4%. Alcohol consumption was almost equal between the sexes.Hashibe M *et al*. found that consumption of all types of alcoholic beverages increases a person's risk for pharyngeal cancer; however the type of spirit does impact the level of risk [15].

The percentage of patients using both alcohol and tobacco was 43%. The state of a person been exposed two risk factors increases the magnitude of having the malignancies. A dose effect was also observed by Menvielle *et al*. for both alcohol and smoking and if both factors were present the effect was multiplicative on cancer development [16].

Those involved in using either tobacco, alcohol, or both comprised were 73.7% of the total patients.This shows that the majority contributing risk factors were tobacco use and alcohol consumption followed by other factors by 24.6%. Other studies has to be done to be able to analyise critical what are this risk factors and if preventive or management measures can be taken at high alert.

In this study familial factor was only found to be 1.7% of the patients enrolled in the study. Studies has shown that having first degree relatives with HNC increases one's own risk, though it is generally agree upon that genetics do not act alone [21].

In the study done by Garavellol *et al*., the risk of develoing oral and pharyngeal cancer was 2.6 times higher when a family member also had one of the diseases. The risk jumps to 7.1 times higher when two or more family members are affected, whether the relatives are immediate family or not [22].

Common site

Commonly involved site was oropharynx (55.3%) followed by hypopharynx (27.7%) and lastly nasopharynx (17.5%). In a study done in India at the Cival Hospital the commonly involved site was the oropharynx. In this study, the oropharynx cancers comprised 24.2% of all HNC and had a male to female ratio of 8:1, oral cancers comprised 23.9% and a ratio of 1:1, hypopharynx cancers comprised 18.4% and had a ratio of 8:1, larynx cancers comprised 15.6% and had a ratio of 7:1, and nasopharynx cancers comprised 5.2% with a ratio of 1:1 [24]. The finding in order of sequence is almost the same.Oropharynx has been leading possibly due to increase rates of oral sex and poor hygine of oral plus the social economic status been poor.This also correlates with the economy of the country.

Histological type

The leading histological type was the squamous cell carcinoma by 77.2%, followed by kaposis sarcoma 7.9%, lymphoma 5.3%, undifferentiated carcinoma 5.3%, angiosarcoma 1.8%, adenocarcinoma 0.9%, adenocystic carcinoma 0.9%. This shows similarity in the finding when relate it with other study.

With the study done by Garandawa *et al*. found histological prevalences of squamous cell carcinoma (73.3%), non-hodgkin's lymphoma (13.4%), salivary malignancy(8.9%), and Kaposi"s Sarcoma (4.4%)[25].

CONCLUSION AND RECOMMENDATIONS

This study shows that the prevalence of the pharyngeal malignancies among head and neck malignancies is 26%. The oropharynx is the most common site of the pharynx been affected with malignancies (55.3%), followed by hypopharynx (27.2%) and nasopharynx (17.5%).

The most involved age group was participants over 61 years of age. This shows malignancies occur at old ages due to consideration of the risk factors and time duration it takes although there is still a number that can occur in younger age groups.

Male were affected more by 69.3% with the ratio of 2.3 to 1. In Tanzania majority of men are involved in the usage of the predisposing factors which is quietly low as compared to female. As it has come clear in the risk factors.

The majority of the patients either used tobacco or alcohol, showing that these habits are likely contributing factors in the development of pharyngeal malignancies.

Recommendations

Other studies should be done mainly on the risk factors relating to finding labbed others apart from the tobacco usage, alcohol and familial in order to understand, take precaution or for easy management.

Government within the ministry of health should provide knowledge and awareness of the increase burden of head and neck cancers.

ABBREVIATIONS

BC - Before Christ
CT-SCAN - Computer tomography scan
CXR - Chest X Ray
DNA - Deoxyribonucleic acid
EBV - Epstein Barr Virus
ENT - Ears, Nose and Throat
FBP - Full Blood Picture
FNAC - Fine Needle and Aspiration Cytology
HIV - Human Immunodeficiency Virus
HNC- Head and Neck Cancer
HPV - Human Papilloma Virus
HKSV - Human Kaposi`s Sarcoma Virus
KMIO - Kidwai Memorial Institute of Oncology
MNH - Muhimbili Nation Hospital
OPC - Oropharyngeal Cancer
OR - Odds Ratio
ORL - Otorhinolarngology
SPSS - Statistical Package for Social Sciences
SCC - Squmous Cell Carcinoma
UK - United Kingdom
USA - United State of America
YRS- Years

DECLARATION

I Olivia M Kimario declare that this is my original work has not been copied nor presented to any other journal.

Study protocol was approved by the Ethics committee

Muhimbili University of heathy and allied sciences with Ref no.HD/MUH/T.228/2013

Ethical approval: Informed consent was verbal and was approved by the ethical committee

Consent for publication: Information to be used for publication.

Availability of data and material: Available anytime needed.

Funding: Not applicable

Competing Interest: The authors declare no competing interest

Authors contribution

ERM-Involved in discussing the results
EOL-Helped during data collection
LFM-Helped in gathering the histopathology results
AD-Preparation of the manuscript
LW-Assisted in publishing

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REFERENCES

1. Pai, S.I., & Westra, W.H. (2009). Molecular Pathology of Head and Neck Cancer: Implications

for Diagnosis, Prognosis, and Treatment. Annual Review of Pathology, 4, 49-70http://dx.doi.org/10.1146/annurev.pathol.4.110807.092158

2. Berkovitz, B. K., & Moxham, B. J. (2002). *Head and neck anatomy: a clinical reference*. Taylor & Francis.
3. Harrison, L. B., Sessions, R. B., & Hong, W. K. (Eds.). (2009). *Head and neck cancer: a multidisciplinary approach*. Lippincott Williams & Wilkins.
4. Sobin, L.H., Witterkind, C.H. (1997). TNM classification of malignant tumors, 5th edition. John Wiley and Sons, Inc. New York; 25-32.
5. Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*, *68*(6), 394-424.
6. Siegel, R. L., Miller, K. D., Fuchs, H. E., & Jemal, A. (2021). Cancer Statistics, 2021. *CA: a Cancer Journal for Clinicians*, *71*(1), 7-33.
7. Gatta, G., Botta, L., Sánchez, M. J., Anderson, L. A., Pierannunzio, D., Licitra, L., ... & Antunes, L. (2015). Prognoses and improvement for head and neck cancers diagnosed in Europe in early 2000s: The EUROCARE-5 population-based study. *European journal of cancer*, *51*(15), 2130-2143.
8. Watkinson, J. C., Gaze, M. N., & Wilson, J. A. (2000). Stell and Maran's head and neck surgery.
9. Parkin, D. M., Bray, F., Ferlay, J., & Pisani, P. (2005). Global cancer statistics, 2002. *CA: a cancer journal for clinicians*, *55*(2), 74-108.
10. Idris, A. M., Ahmed, H. M., Mukhtar, B. I., Gadir, A. F., & El- Beshir, E. I. (1995). Descriptive epidemiology of oral neoplasms in sudan 1970-1985 and the role of toombak. *International journal of cancer*, *61*(2), 155-158.
11. Silverman Jr, S. O. L. (2001). Demographics and occurrence of oral and pharyngeal cancers: the outcomes, the trends, the challenge. *The Journal of the American Dental Association*, *132*, 7S-11S.
12. Tadbir, A. A., Mehrabani, D., & Heydari, S. T. (2008). Primary malignant tumors of orofacial origin in Iran. *Journal of Craniofacial Surgery*, *19*(6), 1538-1541.
13. Effiom, O. A., Adeyemo, W. L., Omitola, O. G., Ajayi, O. F., Emmanuel, M. M., & Gbotolorun, O. M. (2008). Oral squamous cell carcinoma: a clinicopathologic review of 233 cases in Lagos, Nigeria. *Journal of Oral and Maxillofacial Surgery*, *66*(8), 1595-1599.
14. Mwansasu, C., Liyombo, E., Moshi, N., & Mpondo, B. C. (2015). Pattern of head and neck cancers among patients attending Muhimbili National Hospital Tanzania. *Tanzania Journal of Health Research*, *17*(1).
15. Hashibe, M., Brennan, P., Benhamou, S., Castellsague, X., Chen, C., Curado, M. P., ... & Boffetta, P. (2007). Alcohol drinking in never users of tobacco, cigarette smoking in never drinkers, and the risk of head and neck cancer: pooled analysis in the International Head and Neck Cancer Epidemiology Consortium. *Journal of the National Cancer Institute*, *99*(10), 777-789.
16. Menvielle, G., Luce, D., Goldberg, P., Bugel, I., & Leclerc, A. (2004). Smoking, alcohol drinking and cancer risk for various sites of the larynx and hypopharynx. A case–control study in France. *European Journal of Cancer Prevention*, *13*(3), 165-172.
17. Altieri, A., Bosetti, C., Gallus, S., Franceschi, S., Dal Maso, L., Talamini, R., ... & La Vecchia, C. (2004). Wine, beer and spirits and risk of oral and pharyngeal cancer: a case–control study from Italy and Switzerland. *Oral oncology*, *40*(9), 904-909.
18. Siziya, S., Ntata, P. R., Rudatsikira, E., Makupe, C. M., Umar, E., & Muula, A. S. (2007). Sex differences in prevalence rates and predictors of cigarette smoking among in-school adolescents in Kilimanjaro, Tanzania. *Tanzania Journal of Health Research*, *9*(3), 190-195.
19. Mnyika, K. S., Klouman, E., & Klepp, K. I. (2006). Cigarette smoking and use of smokeless tobacco in Moshi rural district in Northern Tanzania. *East African Journal of Public Health*, *3*(1), 24-27.
20. Suba, Z. (2007). Gender-related hormonal risk factors for oral cancer. *Pathology & Oncology Research*, *13*(3), 195-202.
21. Gallus, S., Bosetti, C., Franceschi, S., Levi, F., Simonato, L., Negri, E., & La Vecchia, C. (2001). Oesophageal cancer in women: tobacco, alcohol, nutritional and hormonal factors. *British journal of cancer*, *85*(3), 341-345.
22. Garavello, W., Foschi, R., Talamini, R., La Vecchia, C., Rossi, M., Dal Maso, L., ... & Negri, E. (2008). Family history and the risk of oral and pharyngeal cancer. *International journal of cancer*, *122*(8), 1827-1831.
23. Bradley, P.J. (2008). Scott-Brown's otorhinolaryngology, Head, Oropharyngeal tumours, and Neck Surgery. *Edward Arnold (Publishers) Ltd*, (2)6; 2577-2597.
24. Shunyu, N. B., & Syiemlieh, J. (2013). Prevalence of head and neck cancer in the state of Meghalaya: Hospital-based study. *Int J Head Neck Surg*, *4*(April), 1-5.
25. Garandawa, H., Isa, A., Nggada, H. (2008). A ten year review on clinical profile of orophararyngeal cancer in Maiduguri Jan 1999 to Dec 2008.

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