Original Article

Awareness and Knowledge of Risk Factors Associated with Oral Cancer among Military Personnel in Nigeria

CC Uguru, O Chukwubuzor[1], U Otakhoigbogie[1], UU Ogu[2], NP Uguru[2,3]

Departments of Oral and Maxillofacial Surgery and [1]Oral and Maxillofacial Pathology, Faculty of Dentistry, University of Nigeria, [2]Health Policy Research Group, Department of Pharmaco-Therapeutics, College of Medicine, University of Nigeria, [3]Department of Preventive Dentistry, Faculty of Dentistry, College of Medicine University of Nigeria, Enugu Campus, Nigeria

ABSTRACT

Background: The military lifestyle has been reported to increase the risk of this population group to the development of oral cancer. **Aim:** This study aimed to determine the awareness and knowledge of oral cancer in a population of soldiers to acquire data for establishing an educational program for units of the Nigerian Army in oral cancer prevention and monitoring. The study was conducted in the dental center of 82 Division Military Hospital, Nigerian Army, Enugu, Nigeria. A cross-sectional survey was performed using a pre-tested self-administered questionnaire. **Materials and Methods:** Questions relating to oral cancer awareness, knowledge of causes, and relationship to certain habits, treatment options, and desirability of screening opportunities for oral cancer were asked. Soldiers attending the military hospital, dental center, were chosen randomly for the study. **Results:** Three hundred soldiers were surveyed. The mean age of those surveyed was 37.5 and had spent an average of 11–15 years in the Army. The majority of the soldiers (80.7%) have heard of cancer; the types most known were breast (75%), skin (30%), and lung cancer (28.3%). Of the 300 soldiers surveyed, 15.3% knew about oral cancer, with 41.3% of these able to identify cigarette smoking and (26%) alcohol consumption as possible risk factors associated with oral cancer. The majority believed that cancer was caused by some form of supernatural phenomenon. **Conclusion:** Oral cancer awareness is low among soldiers in the Nigerian Armed Forces, and strategies to increase awareness should be developed.

KEYWORDS: *Awareness for oral cancer, Enugu, knowledge of oral cancer, oral cancer*

INTRODUCTION

Oral cancer is the 11th most common cancer in men globally and makes up 90% of malignancies affecting the oral and maxillofacial region.[1] It accounts for approximately 2–10% of all new cases of cancer in the body worldwide.[2] The overall incidence on the African continent varies considerably from country to country. In Nigeria, oral cancer accounts for 36.8% of head and neck malignancies,[2] with 1146 new cases and 764 mortality cases annually.[3] A study at the University of Nigeria Teaching Hospital (UNTH), Enugu, reported that oral cancer accounted for 2.7% of all cancer cases seen at the facility.[4] Oral cancer mortality is observed to be strongly correlated with stages at diagnosis.[5]

The etiology of oral cancer, although mostly unknown, has been attributed to a complex interplay of various genetic and environmental factors, including exposure to various carcinogens. It is believed to be associated with the use of betel quid or pan, consumption of nitrosamine-rich foods (such as salted fish), human papillomavirus (HPV) infections, nutritional deficiencies, and environmental carcinogens.[3,6–8]

Many studies have also shown that the major risk factors for the development of oral cancer are the

Access this article online

Quick Response Code:

Website: www.njcponline.com

DOI: 10.4103/njcp.njcp_322_22

use of tobacco and alcohol.[9,10] Ninety per cent of oral cancers are because of preventable causes, which include smoking, use of smokeless tobacco (SLT) products, and excessive alcohol consumption.[1] Alcohol consumption is persistently cited as one of the principal risk factors for oral cancer across the world. The actual percentage of oral cancer cases attributable to alcohol consumption is unclear, and numerous figures have been reported relating to quantity consumed, duration of consumption, and gender.[11,12] The carcinogenic effect of a combination of both tobacco use and excessive alcohol consumption seems to be enhanced when compared to either of the two as independent risk factors in oral cancer.[13,14] Nigeria reported in 2019 the highest alcohol consumption rate at 13 liters per capita in Africa.[15]

Although actinic radiation, because of exposure to sunlight, is a known risk factor for carcinoma of the lips in Caucasian populations, melanin pigmentation of the skin in African population (Fitzpatrick V and VI) confers some protection to actinic radiation.[6,16-17]

Some studies across Nigeria have shown a high prevalence between low socio-economic status, poor diet, ageing, male gender, and oral cancers.[6,18] This could be attributed to early exposure of males to risk factors such as greater alcohol consumption and tobacco use.[6,16]

Advances in diagnosis and treatment protocols have not significantly changed the mortality outcome of oral cancers in the past few decades.[2] Mortality remains high, where approximately 50% of patients diagnosed with oral cancer eventually die from their own illness,[2] making it one of the highest cancer mortality rates.[2] Unfortunately, public and professional awareness and knowledge of oral cancer are low, especially in developing countries.[19] A study conducted by Okoh *et al.* in 2015[20] on the knowledge of graduating dental students in the south–south region of Nigeria found that only 23% of the students had considerable knowledge of oral cancer.

It has been reported that military personnel worldwide tend to exhibit excessive risky use of tobacco and alcohol, which are key factors in the etiology of oral cancer.[21] Findings from a study on tobacco and alcohol use observed that usage of both products was higher among military personnel than in the civilian population.[21] Alcohol consumption and smoking have been used by soldiers to reduce pain, minimize fatigue, and combat boredom and panic that accompany military operations.[21] Furthermore, these habits have been accepted as a norm in the military with the stereotype characterization of "hard-fighting soldiers as hard-drinking soldiers".[22] An American study found a 46% prevalence of tobacco smoking among military personnel compared to 30% in the general population.[23] Also, a trend analysis conducted between 2007 and 2019 found 443 new cases of oral cancer among serving military personnel in the US armed forces.[24]

Screening, early detection, and appropriate treatment of cancers remain the most effective weapons against oral cancer as these measures dramatically improve cure rates and patients' quality of life by minimizing extensive, debilitating management protocols.[2] Late-stage diagnosis of oral cancer can be attributed to a low socio-economic status, poor knowledge, ignorance, poverty, and a lack of trained personnel.[25] Prevention and early detection efforts, therefore, have the potential not only to decrease the incidence but also to improve the survival of affected patients. A comprehensive oral cancer examination is recommended by the American Cancer Society every 3 years for those between 20 and 39 years of age and annually for individuals 40 years of age and above and possibly high-at-risk populations.[26]

Many studies have looked at cancer knowledge and awareness among various population groups, and many of these studies have served as a precursor to the establishment of educational and preventive programs to enlighten populations on this often poorly understood condition. However, only a few studies have been conducted among the military in Nigeria, a population group that is at a high risk because of their perceived drinking and smoking habits. The need to increase oral cancer awareness cannot be over-emphasized. This population group need to be aware of the importance of regular dental visits/screening, early detection, and the effect of late detection. Thus, our study is aimed at assessing the Nigerian military personnel knowledge and awareness of risk factors related to oral cancer.

METHODOLOGY

This was a cross-sectional descriptive study using a quantitative research method. This study was conducted over a month in 2019 in the 82nd Division Medical services and Hospital Enugu, Enugu State, Nigeria. This state is one of the 36 states of the Federal Republic of Nigeria, geographically located in the southeast region of the country. The Nigerian army consists of eight divisions with headquarters located in different parts of the country. The 82nd armored division of the Nigerian Army was established in 1975. It is charged with the responsibility of securing its Area of Responsibility (AOR), covering the southeast and south–south flanks of Nigeria.[27] It consists of three

brigades (amphibious, artillery, and motorized) and Recce battalions. The division has a range of 6,000 to 22,000 soldiers spread across the different brigades and battalions all over the southeast and south–south regions of the country. From hospital records, it was seen that an average of 420 soldiers access the medical services and dentistry center located in the 82nd division main barracks Enugu monthly. An estimated sample size of 300 using the formula for small population nf = n/1+(n/N).[28] was obtained. In order to reduce bias and give every respondent an equal chance of participating in the study, a simple random sampling technique was used for the selection of study participants. Soldiers attending the medical and dental center were chosen randomly for the survey using the balloting technique until the minimum sample size was attained. Only soldiers attending the hospital were included in the study. Civilians and family members of soldiers attending the hospital were excluded from the study.

Data collection

Pre-tested, structured, self-administered questionnaires were used to collect data. The questionnaires were used to elicit awareness and knowledge of the existence of oral cancer. The questionnaire consisted of four main areas: 1) Socio-demographic characteristics, 2) oral cancer awareness, 3) knowledge of risk factors for oral cancer focusing on causes and relationship of oral cancer to certain habits, and 4) knowledge of oral cancer prevention and care-seeking practices focusing on the desirability of screening for oral cancer. To measure knowledge of oral cancer causes and risk factors, participants were given "yes" or "no" response options to these items. A correct response to an item was assigned 1 point, whereas an incorrect response was assigned 0 points. Participants' overall knowledge was categorized, using Bloom's cut-off point, as good if the score was between 80 and 100%, moderate if the score was between 60 and 79%, and poor if the score was less than 60%. Similarly, the questions assessing practice were rated the same using the same Bloom's cut-off point.

The reliability of the knowledge, attitude, and practice questionnaires was checked, and the value of Cronbach's alpha was 0.71, 0.78, and 0.76, respectively, indicating acceptable internal consistency. Data were collected by two trained data collectors, and the filled questionnaires were checked for completeness and consistency of responses by two members of the research team.

The data were analyzed using SPSS version 28. Resultant descriptive statistics were summarized as frequency and percentages. Bivariate and multiple regression analyses were used to test knowledge of oral cancer and its influence on knowledge of oral cancer-associated risks and uptake of prevention strategies. Knowledge of oral cancer was dichotomized as a dependent variable. All tests of significance were carried out at a *P* value of < 0.05. Finally, the analyzed data were organized and presented in tabular and narrative forms accordingly.

Ethical considerations

Ethical clearance for the study was obtained from the ethical review board of the University of Nigeria Teaching Hospital, Enugu.

RESULTS

Table 1 shows that the majority of respondents were Christians between the ages of 25 and 29 with more males than females. The educational level of most of the respondents (n = 157, 52.3%) was primary school, and

Table 1: Socio-demographic Characteristics of the Respondents (*n*=300)	
Variable	***n*=300 (%)**
Age range	
19-24	56 (18.7)
25-29	69 (23.0)
30-34	44 (14.7)
35-39	35 (11.7)
40-44	41 (13.7)
45-49	29 (9.7)
50-54	19 (6.3)
55-59	7 (2.3)
Mean age	37.5
Gender	
Male	239 (79.7)
Female	61 (20.3)
Education Level	
Primary	157 (52.3)
Secondary	18 (6.0)
Tertiary	125 (41.7)
Years of military service	
1-5	95 (31.6)
6-10	48 (16.0)
11-15	42 (14.0)
16-20	34 (11.3)
21-25	43 (14.3)
26-30	24 (8.0)
31-35	14 (4.6)
Religion	
Christian	203 (67.7)
Islam	97 (32.3)

Table 2: Cancer awareness among respondents

Cancer awareness	*n*=300 (%)
Cancer awareness	*n*=300 (%)
Yes	242 (80.7)
No	58 (19.3)
Information source	
Other soldiers	29 (9.7)
Family members	24 (8.0)
Civilian friends	34 11.3)
Unit head	29 (9.7)
Medical doctor	114 (38.0)
Nurse	64 (21.3)
Radio or Television	144 (48.0)
Newspaper	75 (25.0)
*Awareness of types of cancer	
Breast	225 (75.0)
Lung	85 (28.3)
Prostrate	49 (16.3)
Stomach	47 (15.7)
Uterine	23 (7.7)
Ovarian	40 (13.3)
Skin	92 (30.7)
Pancreatic	26 (8.7)
Blood	49 (16.3)
Testicular	20 (6.7)
Oral	46 (15.3)
Cause of oral cancer	
Spiritual attack	54 (18.0)
Enemy	45 (15.0)
Bad Food	24 (8.0)
Sex	42 (14.0)
Kissing	87 (29.0)
Smoking	48 (16.0)
*Risky habits practiced by respondents	
Smoke cigarette	44 (14.7)
Take alcohol	277 (92.4)
Use snuff	7 (2.3)

*Multiple responses

most of them (n = 95, 31.6%) had served in the military between 1 and 5 years.

Table 2 shows that 80.7% (n = 242) of the respondents were aware of cancer with a majority having more knowledge of breast cancer (75%, n = 225) than other types of cancer. Only 15% of respondents knew about oral cancer. Most respondents heard about cancer from the media (48%, n = 144), followed by their medical doctor (38%, n = 114). Respondents stated that kissing (29%, n = 87) followed by a spiritual attack (18%, n = 54) could be the cause of oral cancer.

The majority indulged in drinking alcohol (92.4%, n = 277) compared to other risky habits.

Table 3 is based on the correct responses evidenced by the score point of 1. The majority of the respondents stated that swelling within the mouth and non-healing mouth ulcer were indicative of oral cancer. However, their total knowledge score based on bloom's criteria is poor. In addition, the total knowledge of respondents about risk factors for oral cancer based on Bloom's criteria was also poor, with a majority of respondents indicating that smoking, followed by not brushing teeth, was a risk factor of oral cancer.

Table 4 shows that that holding all other variables constant, the odds that knowledge of smoking cigarette as a risk factor for oral cancer increased by 18% with increased knowledge of oral cancer. In addition, the odds that knowledge of oral cancer will increase routine dental check-up is by 20% ($P < 0.05$)

Table 5 shows that most respondents (72.7%, n = 218) felt that cancer was curable and sought care in a hospital and dental clinic. They believed that educating military personnel, (51%, n = 153) providing free cancer treatment (46%, n = 138), and provision of more cancer treatment centers on military bases (44%, n = 132) would improve cancer cures among this population group. However, only 40% (n = 126) of respondents had ever performed cancer screening, the reason being that they had no risk factors (31%, n = 54), were not just interested (28.7%, n = 50), or were not aware of cancer screening (10.3%, n = 18).

DISCUSSION

Awareness of oral cancer

Our study showed that respondents (80.7%) were aware of cancer. However, oral cancer awareness was low compared to other types of cancer. A similar finding was observed in a study concerning a non-military population.[29] This is surprising as oral cancer is the sixth most common cancer and the most common head and neck malignancy globally.[1,2] In Nigeria, it also accounted for about 1146 new cases and an estimated mortality of 764 cases annually in 2012.[3] However, another study conducted in Lagos, Nigeria, observed results that differed from our study. This study showed that oral cancer awareness was average: about 66% of study participants knew about oral cancer. This increased awareness could be linked to the high educational level of the study participants, who had tertiary level education. Studies conducted in the UK, Western Europe, the USA, and Australia all showed similar results to our study, emphasizing a relatively low level of public awareness of oral cancer, its signs and symptoms, and risk factors.[30]

Table 3: Knowledge of oral cancer and causes and risk factors		
Variables	**n=300 (%)**	**Response score point**
Knowledge of oral cancer	46 (15.3)	
*Knowledge of features of oral cancer		
Mouth odor	119 (39.7)	0
Sudden inability to open the mouth	55 (18.3)	1
Tongue-tie	39 (13.0)	0
White patch on the tongue or inside the mouth	51 (17.0)	1
Red patch on the tongue or inside the mouth	47 (15.7)	1
Toothache	48 (16.0)	0
Loss of taste	45 (15.0)	0
Dry mouth	40 (13.3)	0
Sudden loosening of teeth	50 (16.7)	1
Non-healing wound or ulcer in the mouth	75 (25.0)	1
A sudden change of voice	44 (14.7)	1
Swelling within the mouth, jaws, or the tongue	77 (25.7)	1
Non-healing sore on the lips	66 (22.0)	1
Non-healing extraction socket	58 (19.3)	1
Total Knowledge score (Bloom's cut-off point)	19.7% poor	
*Knowledge of risk factors for oral cancer		
Excessive chewing of gum	36 (12.0)	0
Not brushing of teeth	86 (28.7)	1
Excessive tooth picking	44 (14.7)	0
Oral sex with HPV transmission	73 (24.3)	1
Spicy food (0)	35 (11.7)	0
Cigarette smoking	124 (41.3)	1
Cleaning mouth with only chewing stick	30 (10.0)	0
Chewing kola nuts	63 (21.00	0
Oral use of snuff	68 (22.7)	1
Excessive alcohol consumption	78 (26.0)	1
Excessive consumption of smoked fish and meat	31 (10.3)	1
Poor diet and lack of vitamins	65 (21.7)	1
Excessive use of mouthwash	29 (9.7)	0
Total Knowledge score (Bloom's cut-off point)	25.0% poor	

*Significant, Multiple responses

The major source of information about oral cancer in this study was the media (television and radio), followed by a medical practitioner. However, a large number of respondents still believed that oral cancer was caused more by kissing and spiritual issues than by smoking. Nigeria is a country where a lot of unexplained or poorly understood issues are tagged as spiritual attacks and witchcraft.[5] The myth surrounding the cause of oral cancer and the superstitious nature of some people further complicate early prevention and treatment of the disease.

Knowledge of causes and risk factors

Our study showed that the overall knowledge of the causes of oral cancer and risk factors associated with oral cancer was poor. Most of the respondents know that smoking is a risk factor for oral cancer. However, only 26% of the respondents cited alcohol as a major risk factor for oral cancer, although it has been documented in several studies as one of the leading causes of oral cancer in Africa. This is a disturbing finding as Nigeria is known to have the highest alcohol consumption rate in Africa.[15] The high (92.4%) percentage of alcohol consumption by respondents also points to the fact that most are not aware that alcohol is a risk factor, are just not concerned, or need alcohol as an image or confidence booster, especially as soldiers. Similar findings were observed in a Nigerian study among prison officials.[31] The fact that these risk factors are more prevalent in the military and paramilitary sectors

Table 4: Multiple logistic regression analysis between Knowledge of oral cancer versus knowledge of risk factors and other determinants of oral cancer

Independent Variables	B	Std. Error	t	P	Confidence Interval	OR
(Constant)	0.201	0.055	3.638	<.001	0.092-0.310	
Excessive chewing of gum	-0.145	0.113	-1.280	0.202	-0.368-.078	
Not brushing of teeth	0.028	0.078	0.355	0.723	-0.126-.181	
Excessive tooth picking	0.060	0.103	0.580	0.562	-0.143-.262	
Oral sex	0.136	0.087	1.567	0.118	-0.035-.308	
Spicy food	0.039	0.123	0.316	0.752	-0.204-.281	
Cigarette smoking	0.164	0.078	2.095	0.037	0.010-.319	1.18
Cleaning mouth with only chewing stick	0.051	0.157	0.328	0.743	-0.257-.360	
Chewing kola nuts	0.030	0.102	0.294	0.769	-0.172-.232	
Oral use of snuff	0.037	0.117	0.315	0.753	-0.194-.268	
Excessive alcohol consumption	0.154	0.087	1.766	0.079	-0.018-.326	
Excessive consumption of smoked fish and meat	-0.085	0.127	-0.669	0.504	-0.334-.165	
Poor diet and lack of vitamins	0.022	0.096	0.228	0.820	-0.168-.212	
Excessive use of mouthwash	-0.167	0.138	-1.213	0.227	-0.439-.105	
Oral cancer screening	0.103	0.067	1.529	0.128	-0.030-.235	
Routine dental check-up	0.180	0.065	2.782	0.006	0.052-.307	1.20

Dependent variable: Knowledge of oral cancer

compared to the general population should raise an alarm about the consequent burden of oral cancer in the future. The greater level of knowledge of smoking as a risk factor for oral cancer compared to other risk factors, especially alcohol, could be related to general health campaigns that primarily promote tobacco cessation. Thus, strengthening knowledge on increased cancer risks by alcohol use and other risk factors should be included in future health promotion strategies.

Findings from respondents' knowledge of features of oral cancer showed that although the presence of a non-healing wound and oral lumps was widely identified as one of the first signs of oral cancer, the presence of white or red persistent plaques was not associated with oral cancer by almost half of the individuals. This is similar to findings in other studies.[18,19] However, these red and white patches, in addition to being an early sign of cancer, can correspond to potentially malignant disorders whose prompt assessment and treatment could contribute to reducing the risk of developing oral cancer.

Oral cancer prevention and care-seeking strategies

Early identification and screening for oral cancer improve treatment effectiveness and decrease mortality. However, our study showed that the majority of the respondents did not go for oral cancer screening and highlighted barriers to oral cancer screening as a lack of interest, fear, healthy lifestyle, young age, low awareness, and poverty. Of all these, the belief of apparent good health and healthy lifestyle practices, captioned as, "No need,

I have no risk factor," seemed to have the highest response rate. This perception could be linked to fear of the procedure or result, stigmatizations, or ignorance of screening. These respondents may also refuse to adhere to screening recommendations because they do not view themselves as susceptible or because of a fatalistic attitude toward cancer detection and treatment. If that is the case, physicians and health-care institutions must attempt to change perceptions, educate, and personalise the message so that patients accept their disease susceptibility and also acknowledge the importance of early detection.

Most times, these dental check-ups are necessitated by pain or to get health insurance benefits. This is a drawback in our health-care system that needs to be strengthened. Population-level awareness campaigns need to be established to provide accurate information and motivations for oral cancer prevention. Designing a well-tuned oral cancer screening campaign is becoming urgent, especially in populations at high risk for oral cancer.

Opportunistic oral cancer screening is performed when the patient sees a doctor. Dentists in particular can be important in this regard. However, they need to be complemented by other primary care activities. A network of private and public dentists and other health-care professionals at military hospitals and primary health centers including GP and nurses would form an ideal oral cancer screening team providing access for all military personnel complemented with

Table 5: Knowledge of oral cancer prevention and care-seeking strategies

Oral cancer prevention and care-seeking strategies	n=300 (%)
*Care seeking for oral cancer	
Church	37 (12.3)
Native doctor	7 (2.3)
Herbal healer	10 (3.3)
Patent medicine vendor	7 (2.3)
Hospital (medical practitioner)	227 (75.7)
Dental clinic	125 (41.7)
The curability of oral cancer	
Oral cancer is curable	218 (72.7)
Oral cancer is not curable	82 (27.3)
*Strategies respondents believe will improve cure	
Increase oral cancer awareness and education	153 (51.0)
Free cancer treatment	138 (46.0)
More cancer centers on military bases	132 (44.0)
Increase health-care staffing	87 (29.0)
Hold regular prayer against cancer	94 (31.3)
Routine compulsory cancer screening for military personnel and dependents	86 (28.7)
Uptake of prevention strategies	n=300 (%)
Received oral cancer screening by a dentist	126 (40.0)
Only routine dental check-up	160 (53.3)
None	14 (4.7)
Reason screening was not performed	n=174 (%)
Not interested	50 (28.7)
Too afraid to have one	29 (16.8)
No need I have no risk factor	54 (31.0)
Too young	23 (13.2)
Not aware	18 (10.3)

*Significant, Multiple responses

active campaigns of awareness and knowledge on oral cancer by health institutes or the government.

CONCLUSION

This survey highlights the general lack of awareness and knowledge of oral cancer among the military population in southeast Nigeria. Almost all study participants had never undertaken oral cancer screening. Programs such as awareness campaigns and population screenings remain important public health measures to reduce delays in diagnosis. Thus, an oral health promotion strategy for this population group should involve elements of basic education on oral cancer and oral cancer screening, which should be implemented for this population. There is also a need for urgent oral health promotion campaigns against stated risk factors among this population group.

Study limitation

A limitation of our study that we would like to acknowledge is that we surveyed a military population attending military out-patient clinics because of paucity of funds. It would have been ideal to survey a random sample of the whole military population. However, this study will form a baseline for a much larger study.

Financial support and sponsorship

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Asthana S, Labani S, Kailash U, Sinha DN, Mehrotra R. Association of smokeless tobacco use and oral cancer: A systematic global review and meta-analysis. academic.oup.com. 2019;21:1162-71.
2. Gbotolorun O, Eweka O, Lawal A, Fadeyibi O. Knowledge, opinions, and practices about oral cancer among general medical practitioners in Lagos, Nigeria. 2015. Available from: http://196.45.48.59:8080/handle/123456789/5661. [Last accessed on 2022 Jan 01].
3. Gbenga Omitola O, Soyele OO, Sigbeku O, Okoh D, Akinshipo AO, Butali A, *et al.* A multi-centre evaluation of oral cancer in Southern and Western Nigeria: An African oral pathology research consortium initiative. ajol.info. 2017. Available from: https://www.ajol.info/index.php/pamj/article/view/167223. [Last accessed 2022 Jan 01].
4. Oji C, Chukwuneke FN. Oral cancer in Enugu, Nigeria, 1998-2003. Br J Oral Maxillofac Surg 2007;45:298–301.
5. Okoh M, Diagn DO-JMB, 2017 undefined. Oral Cancer-The Nigerian Perspective. researchgate.net. 2017;8:369. Available from: https://www.researchgate.net/profile/Mercy-Okoh/publication/322639947_Oral_Cancer-_The_Nigerian_Perspective/links/5a85c98f0f7e9b1a954860b2/Oral-Cancer-The-Nigerian-Perspective.pdf. [Last assessed on 2022 Jan 01].
6. Lawal AO, Kolude B, Adeyemi BF. Oral cancer: The Nigerian experience. Int J Med Med Sci 2013;5:178–83.
7. Ferlay J, Soerjomataram I, Dikshit R, Mathers C, Rebelo M, Parkin DM, *et al.* Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. Wiley Online Libr [Internet]. 2015;136(5):E359-86. Available from: https://onlinelibrary.wiley.com/doi/pdf/10.1002/ijc.29210%4010.1002/%28ISSN%291097-0215.world_cancer_congress2018. [Last assessed on 2022 Jan 01].
8. Johnson NW, Warnakulasuriya S, Gupta PC, Dimba E, Chindia M, Otoh EC, *et al.* Global oral health inequalities in incidence and outcomes for oral cancer: Causes and solutions. Adv Dent Res 2011;23:237–46.
9. Porter S, Gueiros LA, Leão JC, Fedele S. Risk factors and etiopathogenesis of potentially premalignant oral epithelial lesions. Oral Surg Oral Med Oral Pathol Oral Radiol 2018;125:603–11.
10. Choi SY, Kahyo H. Effect of cigarette smoking and alcohol consumption in the aetiology of cancer of the oral cavity, pharynx and larynx. Int J Epidemiol 1991;20:878–85.
11. Di Credico G, Polesel J, Dal Maso L, Pauli F, Torelli N, Luce D,

et al. Alcohol drinking and head and neck cancer risk: The joint effect of intensity and duration. Br J Cancer 2020;123:1456–63.

12. Hille J, Johnson NW. The burden of oral cancer in sub-Saharan Africa: An estimate as presented to the Global Oral Cancer Forum, March 2016. Transl Res Oral Oncol 2017;2:2057178X17721094.

13. Mayne ST, Morse DE, Winn DM. Cancers of the oral cavity and pharynx. nyuscholars.nyu.edu. 2006. Available from: https://nyuscholars.nyu.edu/en/publications/cancers-of-the-oral-cavity-and-pharynx. [Last accesed on 2022 Jan 01].

14. Kruse AL, Bredell M, Grätz KW. Oral squamous cell carcinoma in non-smoking and non-drinking patients. Head Neck Oncol 2010;2:1–3.

15. Conway. Alcohol consumption per capita, by country Africa 2019 | Statista. 2021. Available from: https://www.statista.com/statistics/1038427/alcohol-per-capita-consumption-african-countries/. [Last accessed on 2022 Jan 02].

16. Adebola RA, Bamgbose BO, Adeoye JB, Amole TG. Awareness of oral cancer in a Northwestern Nigerian state: Assessing the knowledge, opinion, and practice of traditional healers and herbalists. J Oral Oncol 2013;2013:1–7.

17. Fitzpatrick TB. The validity and practicality of sun-reactive skin types I through VI. Arch Dermatol 1988;124:869–71.

18. Lawal A, Kolude B, Adeyemi B. Serum antioxidant vitamins and the risk of oral cancer in patients seen at a tertiary institution in Nigeria. ajol.info. 2012;15. Available from: https://www.ajol.info/index.php/njcp/article/view/75781. [Last accessed on 2022 Jan 01].

19. Al-Maweri SA, Addas A, Tarakji B, Abbas A, Al-Shamiri HM, Alaizari NA, *et al*. Public awareness and knowledge of oral cancer in Yemen. koreascience.or.kr. 2015;15:10861-5. Available from: https://www.koreascience.or.kr/article/JAKO201506234294217.page.

20. Okoh M, Enabulele J. Knowledge and practices regarding oral cancer among graduating dental students. indjos.com. 2015; Available from: https://go.gale.com/ps/i.do?id=GALE%7CA409373083&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=09766944&p=AONE&sw=w&userGroupName=anon%7E2ebb4431. [Last accessed on 2022 Jan 02].

21. Severson H, Peterson A. Smokeless tobacco cessation in military personnel: A randomized controlled trial. academic.oup.com. 2009; Available from: https://doi.org/10.1093/ntr/ntp057. [Last accessed on 2022 Jan 01].

22. Karmarkar A. Determination of relationship and frequency of sensorineural hearing loss in previously diagnosed diabetes mellitus and/or hypertensive adults using. texilajournal.com. 2016; Available from: https://www.texilajournal.com/clinical-research/edition/28-specialedition. [Last accessed on 2022 Jan 01].

23. Burns JC, Williams LN. A survey to determine the knowledge of military members about the hazards of tobacco use, and a resulting tobacco-hazard education project. J Cancer Educ 1995;10:37–40.

24. Goodwin C. Oral Cavity and Pharynx Cancers, Active Component, US Armed Forces, 2007-2019. europepmc.org. 2021. Available from: https://europepmc.org/article/med/34542258. [Last accessed on 2022 Jan 01].

25. Rodriguez-Archilla A. Diagnostic delay in oral cancer. Ann Clin Res Trials 2017;2:2.

26. Alfano M, Horowitz A. Professional and community efforts to prevent morbidity and mortality from oral cancer. J Am Dent 2001. Available from: https://www.sciencedirect.com/science/article/pii/S0002817714652879. [Last accessed on2022 Jan 01].

27. Pike J. Nigeria-82 Composite Division. 2021. Available from: https://www.globalsecurity.org/military/world/nigeria/82div.htm. [Last accessed on 2022 Jan 01].

28. Araoye MO. Research Methodology with Statistics for Health and Social Sciences. 1ˢᵗ ed. Ilorin: Nathadex; 2003. p. 117–21.

29. Wu D-M, Chu N-F, Lin Y-S, Lai H-R. Aggregation of adverse behaviors and its affecting factors among young military conscripts in Taiwan. Addict Behav 2007;32:1302–8.

30. Monteiro LS, Warnakulasuriya S, Cadilhe S, Sousa D, Trancoso PF, Antunes L, *et al*. Oral cancer awareness and knowledge among residents in the Oporto city, Portugal. J Investig Clin Dent 2016;7:294–303.

31. Azodo CC, Omili M. Tobacco use, alcohol consumption and self-rated Oral health among Nigerian prison officials. Int J Prev Med 2014;5:1364.