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Knowledge of Oral Cancer and Its Effect on Oral Healthcare Practices and Precancerous Habits in a Rural Community in Nigeria

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A B S T R A C T

Objectives: To assess knowledge of oral cancer, identify factors that influence knowledge level and determine if knowledge level influences oral healthcare practices and precancerous habits in a rural community in Nigeria.

Method: This was a descriptive cross-sectional study conducted among adult residents of Ifo Local Government Area, Ogun State, Nigeria. Knowledge of oral cancer, oral healthcare practices, and precancerous habits of participants were assessed using a well structured interviewer-administered questionnaire.

Results: A total of 300 adults with mean age of 44.3 ± 13.17 years participated in the study. 90.7% had low knowledge of general features of oral cancer, 61.7% had low knowledge of risk factors, 71.7% had low knowledge of treatment options and 75.3% had low overall knowledge of oral cancer. Binary logistic regression showed that older adults and males were more likely to have high knowledge of general features of oral cancer (OR=1.036; 95%CI=1.003-1.069 and OR=2.373; 95%CI=1.082-5.200 respectively). Regression analysis also showed that high education was significantly associated with high knowledge of general features (OR=3.547; 95% CI=1.791-7.027), risk factors (OR=2.255; 95% CI=1.557-3.266), treatment options (OR=2.353; 95% CI=1.562-3.545) and overall knowledge of oral cancer (OR=2.085; 95% CI=1.377-3.156). High overall knowledge of oral cancer was significantly associated with twice daily teeth-brushing (OR=1.144; 95% CI=1.078-1.215) and increased oral healthcare utilization (OR=1.186; 95% CI=1.099-1.279). No significant correlation was seen between knowledge of oral cancer and precancerous habits.

Conclusion: Majority of the population had low knowledge of oral cancer which was majorly influenced by low level of education and this resulted in poor oral healthcare practices.

1-sentence abstract summary: The low knowledge of oral cancer resulted in significantly poorer oral healthcare practices of the adult population in a rural community in Nigeria.

Keywords: *Oral cancer, oral hygiene practices, precancerous habits, oral healthcare utilization*

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INTRODUCTION

Oral cancers are a group of malignant neoplasia which develops on the lip or oral cavity. They are a major part of Head and Neck carcinomas (HNC) along with laryngeal and pharyngeal carcinomas. Majority (90%) of oral cavity carcinomas originate histologically from squamous cells, therefore, oral cavity cancers are traditionally defined as oral squamous cell carcinomas (OSCC)[1]. HNCs have different levels of differentiation and a propensity for lymph node metastasis[2]. They remain a health burden as their incidence ranks sixth globally amongst all cancers, accounting for approximately 5% of all malignant tumors[2,3].

OSCCs are among the most common cancers worldwide, with approximately 442,760 incident cases and 241,418 deaths reported in the last worldwide oral cancer census[4,5]. There are geographical variations in the incidence of oral cancers, with increase among men and women in some European and African countries, stabilization in certain Asian countries, and decrease in Canada and USA[6,7]. In Nigeria, OSCCs have shown a broad geographic variation between different geopolitical locations arising from the varying lifestyle and cultural practices of these regions. North-Central Nigeria reported that OSCC constitute 7.6% of all HNCs[8] while North-East Nigeria reported 19.5% of all HNCs[9]. OSCC was reported to account for 2.7% of all cancer cases in South-East Nigeria[10], 18.7% – 25.1% in South-South Nigeria[11,12] and 9.7 – 18% in South-West Nigeria[13,14]. Survival following a diagnosis of OSCC remains poor with overall five- year survival around 68%[15]. Only limited improvements have been recorded since the late 1980s[15].
There is substantial evidence that precancerous habits such as tobacco use, alcohol consumption, betel quid chewing, exposure to carcinogens in the workplace and Human Papilloma Virus (HPV) infection more commonly transmitted through oral sex, are significant risk factors in the aetiology of OSCC with smoking and alcohol having synergistic effects[15-19]. Also, strong evidence exist to show that low socioeconomic status (educational attainment and income) is associated with an increased risk of OSCC not explained by tobacco and alcohol[20]. The incidence of OSCC is higher among men[15,21], with majority of cases occurring in men over 50 years of age[15,22], and among low socioeconomic groups[15,23]. However, the ratio of males to females diagnosed with OSCC has changed from approximately 5:1 in the 1960s to less than 2:1 after year 2000[15,24,25].

Majority of OSCCs develop from long standing premalignant lesions such as leukoplakia[26]. The oral environment is easily assessable to both the dental practitioner and the patient and early diagnosis of these lesions significantly improve the prognosis of the disease as treatment can be initiated at an early stage[27]. But most cases of OSCC are diagnosed at an advanced stage suggesting a lack of knowledge on OSCC, its risk factors and treatment options in the general population[28]. Most of the cases of OSCC can be prevented if there was adequate knowledge regarding the risk factors or diagnosed at an early stage if there was proper oral health seeking behavior[28]. Appropriate oral healthcare practices including proper oral hygiene practices, oral healthcare utilization and reduction of precancerous habits may significantly reduce the incidence of OSCC. This study aimed to assess the knowledge of oral cancer, its risk factors and treatment options in a rural community in Nigeria and determine if their level of knowledge influenced their oral healthcare practices and precancerous habits. In this endeavor, the following objectives were addressed:

- To determine the level of knowledge of oral cancer among the adult population in a rural community in Nigeria.
- To determine the factors that influences the knowledge of oral cancer among the adult population in a rural community in Nigeria.
- To determine the relationship between knowledge of oral cancer and oral healthcare practices among the adult population in a rural community in Nigeria.
- To determine the relationship between knowledge of oral cancer and precancerous habits among the adult population in a rural community in Nigeria.

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METHODOLOGY
Background: Ifo Local Government Area (LGA) is a local government area in Ogun state, South-West Nigeria. It consists of several towns and villages with its headquarters in Ifo town. It has an area of about 82,000km^2 with an estimated population of 539,170 according to the 2006 National Population Census figure. Ifo LGA was created in December, 1991 out of the old Ifo/Ota Local Government. The Local Government is divided into eleven Political Wards. On the 31st of May, 2016 three (3) Local Council Development Areas were created out of the Local Government.

Study design: This was a descriptive cross-sectional study to assess the knowledge of oral cancer, its risk factors and treatment options in a rural community in Nigeria and determine if their level of knowledge influences their oral healthcare practices and precancerous habits.

Study population: The study was carried out on the adult population of Ifo Local Government Area. Data collection was from the adults residing in the LGA. Consenting adults 18 years and above who were permanent residents of Ifo LGA were included in the study. Individuals with mental or physical impairments which made it difficult for them to participate in the study were excluded from the study.

Sample size determination: A sample size of 300 adults was used. This sample size was determined using the sample size calculation formula for descriptive studies[29].

$n=z^2PQ/e^2$ (where n=sample size; z=formula constant=1.96; P=prevalence from past studies (The prevalence of OSCC was calculated as 18% of all cancers in South-West Nigeria)[14]; Q=1-P; e=confidence interval=95%). $n=1.96^2x0.18x0.82/0.05^2=227$. 30% (68.1) was included for non-response. So the sample size was 227 + 68.1 = 295.1 approximately 300.

Sampling method: Multistage sampling method was used to select participants from the study population that met the inclusion criteria. Stage 1: A sampling frame of all the wards was obtained from the Local government secretariat and simple random sampling method (balloting) was used to select one ward out of the eleven wards in Ifo LGA. Stage 2: A list of the streets in the selected ward obtained from the Local government secretariat was used as the sampling frame. Simple random sampling method (balloting) was then used to select the streets that were included in the study. Stage 3: A list of all the houses and their numbers in selected streets were used as sampling frame. House numbers were then chosen by simple random sampling method (balloting). Stage 4: All adults in each house selected who met the inclusion criteria were included in the study until pre-determined sample size was achieved.

Method of data collection:

The data was collected using a well structured, close ended, interviewer-administered questionnaire. The questionnaire included a section on socio-demographic characteristics such as age, gender, religion, level of education, marital status and occupation. There were also sections on knowledge of oral cancer, its risk factors and treatment options, and a section on oral hygiene practices, precancerous habits and oral healthcare utilization. A pre-test on the questionnaire was conducted on randomly selected adults in Mushin LGA; a rural community in Lagos state, South-West Nigeria. This was done to assess the validity of the questionnaire and changes were made to the questionnaire where necessary.

The data collection instrument included three sections to test for knowledge of oral cancer: knowledge of general features of oral cancer which included five questions, knowledge of risk factors of oral cancer which also included five questions and knowledge of treatment options of oral cancer which included three questions. The right responses were assigned a score of 1 while wrong or no or "I don't know" responses were given a score of 0.

The respondents were categorized as having either 'low or 'high knowledge on the knowledge of general features of oral cancer, its risk factors and treatment options based on their responses to the knowledge questions. Obtaining a score of $0 - 2$ was classified as low knowledge while obtaining a score of $3 - 5$ was classified as high knowledge for both the knowledge of general features of oral cancer and knowledge of risk factors of oral cancer sections. A score of $0 - 1$ was classified as low knowledge while a score of $2 - 3$ was classified as high knowledge for the knowledge of treatment options of oral cancer section.

Minimum total obtainable score was 0 and maximum total obtainable score was 13. A total score of $0 - 7$ was classified as low knowledge of oral cancer while a total score of $8 - 13$ was classified as high knowledge of oral cancer.

Statistical analysis:

Data entry, analysis and validation were performed using the Statistical Package for Social Sciences for Windows, version 23.0 software package (IBM SPSS Version 23.0. Armonk, NY: IBM Corp.). Descriptive analysis was carried out using frequency and proportion for categorical variables; and mean and standard deviation for numeric variables. Data was analyzed using Pearson's chi-square test and Fisher's exact test where applicable, to test for association; and a preset level of significance of $p<0.05$ will be adopted.

Pearson's correlation coefficient was employed to determine the level of correlation between socio-demographic characteristics, knowledge of oral cancer and oral healthcare practices. Probability values less than 5% inferred the criterion for statistical significance. Correlation coefficient r ≤ 0.2 was considered as weak, >0.2-0.5 as moderate, >0.5-0.7 as strong correlation, >0.7 as very strong correlation. Binary logistic regression was employed to identify factors that predict knowledge of oral cancer.

Ethical considerations: Participants were made to understand the scope of the study including an explanation on the data collection instrument and they were allowed to ask questions. The participants were assured of strict confidentiality of their responses.

Ethical clearance: Ethical approval was obtained from the Health Research and Ethics Committee (HREC) of Lagos University Teaching Hospital, Idi- Araba, Lagos, Nigeria, on 8th of April, 2021 (Protocol Number: ADM/DCST/HREC/APP/4230). Adequate consideration was given to protect the identity of the study participants, and the confidentiality of the information given was guaranteed. Informed consent (verbal and written) was gotten from all participants.

RESULTS

A total of 300 adults participated in the study with a response rate of 100%. Participants included adults residing in residing in Ifo Local Government Area, Ogun State.

Socio-demographic characteristics: The 300 adults that participated in the study were aged between 18 – 79 years with a mean age of 44.3 $\pm$ 13.17. Of the 300 participants; majority were women (65.3%), majority had up to secondary school level education (57.0%) and were semi skilled workers (55.3%). Table 1 shows the distribution of socio-demographic characteristics of respondents.

Table 1: Socio-demographic characteristics

Variables (n= 300)	Frequency	Percentage (%)
Age (as at last birthday)		
$\leq$30	50	16.7
31 – 45	105	35.0
46 – 60	116	38.7
>60	29	9.7
Sex		
Male	104	34.7
Female	196	65.3
Level of Education		
No education	22	7.3
Primary School	83	22.7
Secondary School	171	57.0
Tertiary institution	24	8.0
Occupation		
Skilled	50	16.7
Semi-skilled	166	55.3
Unskilled	9	3.0
Students	22	7.3
Unemployed/Retired	53	17.7

Knowledge of oral cancer

Two-hundred and seventy seven (92.3%) respondents did not know anyone who had oral cancer while only 23 (7.7%) respondents confirmed that they knew people who have had or had oral cancer in the past.

Knowledge of general features of oral cancer was measured with five questions. Each question had only one correct answer. The number of participants with correct responses for each question on general knowledge of oral cancer is detailed in Table 2. Majority (49.0%) of respondents did not answer any of the questions on general features of oral cancer correctly while only one (0.3%) respondent answered all questions correctly. The minimum score of respondents was 0, maximum score was 5 and the mean score was 0.99 $\pm$ 1.124. Two hundred and seventy two (90.7%) respondents attained a score of 0 – 2 representing low knowledge while 28 (9.3%) respondents attained a score of 3 – 5 representing high knowledge. The distribution of knowledge level for knowledge of general features of oral cancer is illustrated in figure 2 below.

Table 2: Knowledge of general features of oral cancer

Variable	Yes (%)	No / I don't know (%)
Oral cancer is seen more in the older age group	31 (10.3)	269 (89.7)
Males are more commonly affected	13 (4.3)	287 (95.7)
Oral cancer can be prevented	114 (38.0)	186 (62.0)
Oral cancer can be treated	134 (44.7)	166 (55.3)
Oral cancer is not contagious	6 (2.0)	294 (98.0)

Knowledge of risk factors of oral cancer was measured with five questions. Each question had only one correct answer. The number of participants with correct responses for each question on knowledge of risk factors is detailed in Table 3. Majority (54.3%) of respondents did not answer any of the questions on knowledge of risk factors correctly however, 60 (20.0%) respondent answered all questions correctly. The minimum score of respondents was 0, maximum score was 5 and the mean score was 1.75 $\pm$ 2.111. One hundred and eighty five (61.7%) respondents attained a score of 0 – 2 representing low knowledge while 115 (38.3%) respondents attained a score of 3 – 5 representing high knowledge. The distribution of knowledge level for risk factors of oral cancer is illustrated in figure 2 below.

Table 3: Knowledge of risk factors of oral cancer

Variable	Yes (%)	No / I don't know (%)
Smoking is a risk factor of oral cancer	120 (40.0)	180 (60.0)

Tobacco products are risk factors of oral cancer	117 (39.0)	183 (61.0)
Alcohol consumption is a risk factor of oral cancer	116 (38.7)	184 (61.3)
Herbal concussions are risk factors of oral cancer	76 (25.3)	224 (74.7)
Oral mucosa infections are risk factors of oral cancer	96 (32.0)	204 (68.0)

Knowledge of treatment options for oral cancer was measured with three questions. Each question had only one correct answer. The number of participants with correct responses for each question on knowledge of treatment options of oral cancer is detailed in Table 4. Majority (56.0%) of respondents did not answer any of the questions on knowledge of treatment options of oral cancer correctly however, 49 (16.3%) respondent answered all questions correctly. The minimum score of respondents was 0, maximum score was 3 and the mean score was 0.89 ± 1.151. Two hundred and fifteen (71.7%) respondents attained a score of 0 – 1 representing low knowledge while 85 (28.3%) respondents attained a score of 2 – 3 representing high knowledge. The distribution of knowledge level for treatment option of oral cancer is illustrated in figure 2 below.

Table 4: Knowledge of treatment options for oral cancer

Variable	Yes (%)	No / I don't know (%)
Surgery is a treatment modality for oral cancer	90 (30.0)	210 (70.0)
Chemotherapy is a treatment modality for oral cancer	118 (39.3)	182 (60.7)
Radiotherapy is a treatment modality for oral cancer	58 (19.3)	242 (80.7)

Overall knowledge of oral cancer was measured as the sum of individual scores in each knowledge section. One hundred and fifteen (38.3%) respondents did not answer any question correctly or stated that they did not know the correct answers. None of the participants answered all the questions correctly. The minimum score of respondents was 0, maximum score was 12 and the mean score was 3.63 ± 3.952. Two hundred and twenty six (75.3%) respondents attained a score of 0 – 7 representing overall low knowledge of oral cancer while 74 (24.7%) respondents attained a score of 8 – 12 representing overall high knowledge of oral cancer. The distribution of overall knowledge level of oral cancer is illustrated in figure 1 below.
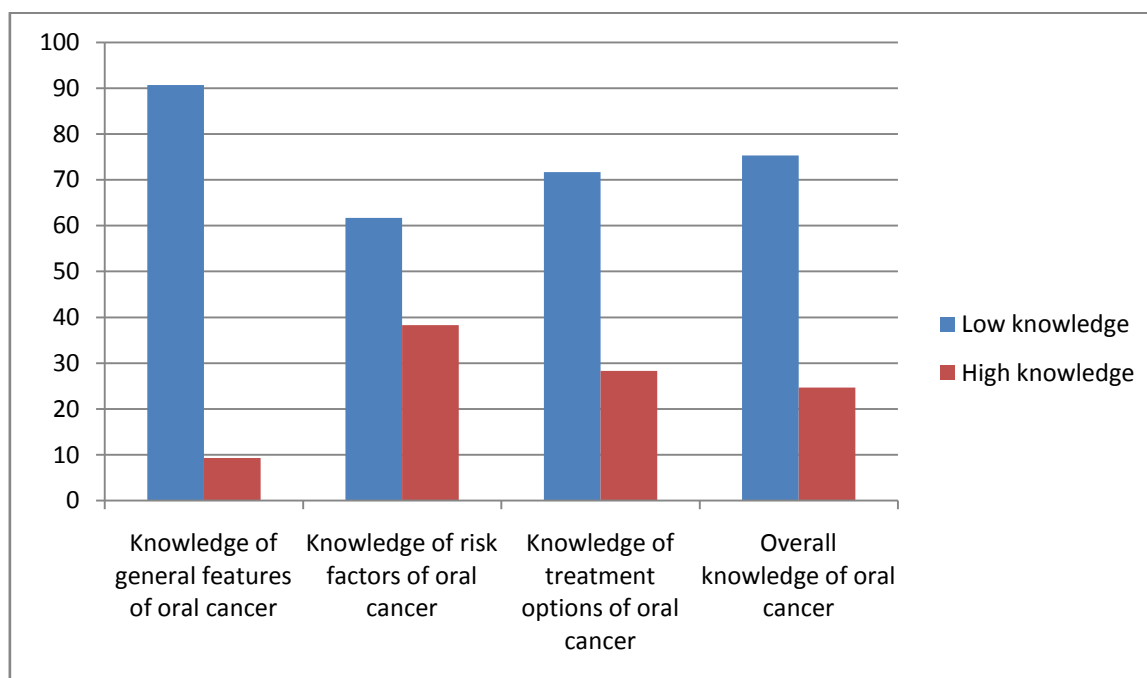

Figure 1: Knowledge of oral cancer showing the distribution of low and high knowledge for general features, risk factors, treatment options and overall knowledge of oral cancer.

Oral healthcare practices: Majority (96.7%) of participants use tooth brush and toothpaste to clean their teeth and more than half (54.7%) of them clean their mouth once daily. Only 54 (18.0%) participants had visited the dentist at least once. Eight (2.7%) of them visited the dentist every six months, 15 (5.0%) of them visited the dentist yearly and 31 (57.4%) of them only visited the dentist because of tooth pain. All but one of them had a dentist conduct oral examination on them while at the dental clinic.

Precancerous habits: Only 4 (1.3%) participants gave a positive history of cigarette smoking with 3 of them smoking about 10 cigarette sticks daily and one smoking about 4 cigarette sticks daily. Alcohol consumption was reported by 84 (28.0%) participants. Table 6 details precancerous habits of respondents.

Socio-demographics and knowledge of oral cancer

Increase in age was noted to be associated with a significant increase in knowledge of general features of oral cancer among the populace with respondents over 60 years old recording the highest percentage of high level of knowledge in the knowledge of general features of oral cancer section (P = 0.035) (Table 5). This was corroborated by Pearson's correlation coefficient which reported a weak but significant correlation between age and knowledge of general features of oral cancer (r=0.127; p=0.028). Binary logistic regression showed that older adults were 1.036 times more likely to have higher knowledge of general features of oral cancer compared to younger adults (p=0.030; OR=1.036; 95% CI=1.003-1.069). There was no significant relationship between age group and knowledge of risk factors, knowledge of treatment options and overall knowledge of oral cancer with P values greater than 0.05 for all three associations (Tables 6, 7, 8).

Males reported a significant increase in knowledge of general features of oral cancer compared to females (P = 0.025) (Table 5). This was corroborated by Pearson's correlation coefficient which reported a weak but significant correlation between the male gender and high general knowledge of oral cancer (r=0.127; p=0.027). Binary logistic regression showed that males were 2.373 times more likely to have higher knowledge of general features of oral cancer compared to females (p=0.031; OR=2.373; 95% CI=1.082-5.200). There was no significant relationship between gender and knowledge of risk factors, knowledge of treatment options and overall knowledge of oral cancer with P values greater than 0.05 for all three associations (Tables 6, 7, 8).

Higher education was seen to be associated with a statistically significant increase in knowledge of general features, knowledge of risk factors, knowledge of treatment options and overall knowledge of oral cancer (P = 0.000, P = 0.000, P = 0.000, P = 0.004 respectively) (Tables 5, 6, 7, 8). These results were corroborated by Pearson's correlation coefficient which reported a moderate and highly significant correlation between higher education and high knowledge of general features (r=0.214; p=0.00), knowledge of risk factors (r=0.258; p=0.000), knowledge of treatment options (r=0.245; p=0.000) and overall knowledge of oral cancer (r=0.206; p=0.000). Binary logistic regression showed that higher education was significantly associated with high knowledge of general features (p=0.000; OR=3.547; 95% CI=1.791-7.027), knowledge of risk factors (p=0.000; OR=2.255; 95% CI=1.557-3.266), knowledge of treatment options (p=0.000; OR=2.353; 95% CI=1.562-3.545) and overall knowledge of oral cancer (p=0.001; OR=2.085; 95% CI=1.377-3.156).

Table 5: Association between age, gender, education and knowledge of general features of oral cancer

Variables	General knowledge of Oral Cancer			Statistics & P value
	Poor (%)	Good (%)	Total (%)	
Age				
≤30	47 (94.0)	3 (6.0)	50 (100.0)	X^2= 8.58
31 – 45	96 (91.4)	9 (8.6)	105 (100.0)	df= 3
46 – 60	107 (92.2)	9 (7.8)	116 (100.0)	P= 0.035
>60	22 (75.9)	7 (24.1)	29 (100.0)	
Sex				X^2= 4.87
Male	89 (85.6)	15 (14.4)	104 (100.0)	df= 1
Female	183 (93.4)	13 (6.6)	196 (100.0)	P= 0.025
Level of Education				
No education	21 (95.5)	1 (4.5)	22 (100.0)	X^2= 26.37
Primary School	80 (96.4)	3 (3.6)	83 (100.0)	df= 3
Secondary School	156 (91.2)	15 (8.8)	171 (100.0)	P= 0.000
Tertiary institution	15 (62.5)	9 (37.5)	24 (100.0)	

Table 6: Association between age, gender, education and knowledge of risk factors of oral cancer

Variables	Knowledge of risk factor of Oral Cancer			Statistics & P value
	Poor (%)	Good (%)	Total (%)	
Age				
≤30	32 (64.0)	18 (36.0)	50 (100.0)	X^2= 5.82
31 – 45	65 (61.9)	40 (38.1)	105 (100.0)	df= 3
46 – 60	76 (65.5)	40 (34.5)	116 (100.0)	P= 0.117
>60	12 (41.4)	17 (58.6)	29 (100.0)	
Sex				X^2= 1.06

	60 (57.7)	44 (42.3)	104 (100.0)	df= 1
Male				
Female	125 (63.8)	71 (36.2)	196 (100.0)	P= 0.182
Level of Education				
No education	21 (95.5)	1 (4.5)	22 (100.0)	X^2= 20.69
Primary School	58 (69.9)	25 (30.1)	83 (100.0)	df= 3
Secondary School	97 (56.7)	74 (43.3)	171 (100.0)	P= 0.000
Tertiary institution	9 (37.5)	15 (62.5)	24 (100.0)	

Table 7: Association between age, gender, education and knowledge of treatment options oral cancer

Variables	Knowledge of treatment option			Statistics & P value
	Poor (%)	Good (%)	Total (%)	
Age				
≤30	34 (68.0)	16 (32.0)	50 (100.0)	X^2= 5.61
31 – 45	69 (65.7)	36 (34.3)	105 (100.0)	df= 3
46 – 60	92 (79.3)	24 (20.7)	116 (100.0)	P= 0.132
>60	20 (69.0)	9 (31.0)	29 (100.0)	
Sex				X^2= 0.17
Male	73 (70.2)	31 (29.8)	104 (100.0)	df= 1
Female	142 (72.4)	54 (27.6)	196 (100.0)	P= 0.388
Level of Education				
No education	21 (95.5)	1 (4.5)	22 (100.0)	X^2= 18.09
Primary School	68 (81.9)	15 (18.1)	83 (100.0)	df= 3
Secondary School	114 (66.7)	57 (33.3)	171 (100.0)	P= 0.000
Tertiary institution	12 (50.0)	12 (50.0)	24 (100.0)	

Table 8: Association between age, gender, education and overall knowledge of oral cancer

Variables	Overall knowledge of Oral Cancer			Statistics & P value
	Poor (%)	Good (%)	Total (%)	
Age				
≤30	39 (78.0)	11 (22.0)	50 (100.0)	X^2= 6.29
31 – 45	73 (69.5)	32 (30.5)	105 (100.0)	df= 3
46 – 60	95 (81.9)	21 (18.1)	116 (100.0)	P= 0.098
>60	19 (65.5)	10 (34.5)	29 (100.0)	
Sex				X^2= 0.89
Male	75 (72.1)	29 (27.9)	104 (100.0)	df= 1
Female	151 (77.0)	45 (23.0)	196 (100.0)	P= 0.211
Level of Education				
No education	22 (100.0)	0 (0.0)	22 (100.0)	X^2= 13.30
Primary School	67 (80.7)	16 (19.3)	83 (100.0)	df= 3
Secondary School	123 (71.9)	48 (28.1)	171 (100.0)	P= 0.004
Tertiary institution	14 (58.3)	10 (41.7)	24 (100.0)	

Personal experience of an oral cancer patient and knowledge of oral cancer

A statistically significant difference was noted between having a personal experience with an oral cancer patient and knowledge of oral cancer. Participants who knew patients who had or have had oral cancer had a statistically significant increase in general knowledge of oral cancer (P = 0.000; r=0.295; p=0.000), knowledge of risk factors of oral cancer (P = 0.000; r=0.288; p=0.000), knowledge of treatment options of oral cancer (P = 0.000; r=0.347; p=0.000) and overall knowledge of oral cancer (P = 0.000; r=0.358; p=0.000) compared to those who did not know anyone with oral cancer. Binary logistic regression showed that knowing an oral cancer patient was significantly associated with high knowledge of general features (p=0.000; OR=8.729; 95% CI=3.348-22.759), knowledge of risk factors (p=0.000; OR=12.772; 95% CI=3.701-44.073), knowledge of treatment options (p=0.000; OR=15.186; 95% CI=4.989-46.221) and overall knowledge of oral cancer (p=0.000; OR=14.207; 95% CI=5.055-39.926).

Knowledge of oral cancer and oral healthcare practices, precancerous habits

No statistically significant difference was noted between overall knowledge of oral cancer and use of tooth brush, use of toothpaste and use of chewing sticks to clean the teeth (P > 0.05 for the three associations). However, a statistically significant difference was noted between overall knowledge of oral cancer and frequency of cleaning the

teeth daily (P = 0.001). This was corroborated by Pearson's correlation coefficient which reported a moderate and highly significant correlation between high overall knowledge of oral cancer and cleaning the teeth twice daily (r=0.202; p=0.000). Binary logistic regression showed that participants with high overall knowledge of oral cancer were 1.144 times more likely to brush twice daily (p=0.000; OR=1.144; 95% CI=1.078-1.215).

A statistically significant difference was noted between overall knowledge of oral cancer and oral healthcare utilization (P = 0.001). This was corroborated by Pearson's correlation coefficient which reported a moderate and highly significant correlation between high overall knowledge of oral cancer and increase in oral healthcare utilization (r=0.215; p=0.000). Binary logistic regression showed that participants with high overall knowledge of oral cancer were 1.186 times more likely to visit the dental clinic (p=0.000; OR=1.186; 95% CI=1.099-1.279). Table 9 details the association between overall knowledge of oral cancer and oral hygiene practices and oral healthcare utilization.

No statistically significant difference was noted between overall knowledge of oral cancer and smoking history (P > 0.05). Increase in overall knowledge of oral cancer was noted to be associated with a significant increase in alcohol consumption among the populace (P = 0.044) (Table 9). This however, was not corroborated by Pearson's correlation coefficient which reported a weak and insignificant correlation between overall knowledge of oral cancer and alcohol consumption (r=0.112; p=0.053) suggesting that the noted statistical significant increase in alcohol consumption in the Pearson's chi square test may be due to other confounding factors and not necessarily the effect of knowledge of oral cancer.

Table 9: Association between overall knowledge of oral cancer, oral healthcare practices, and precancerous habits

Variables	Overall knowledge of Oral Cancer			Statistics & P value
	Poor (%)	Good (%)	Total (%)	
Toothbrush and tooth paste				X^2= 0.12
Yes	218 (75.2)	72(24.8)	290 (100.0)	df= 1
No	8 (80.0)	2 (20.0)	10 (100.0)	P= 0.535
Chewing stick				X^2= 1.23
Yes	13 (65.0)	7 (35.0)	20 (100.0)	df= 1
No	213 (76.1)	67 (23.9)	280 (100.0)	P= 0.197
Frequency of cleaning the teeth daily:				X^2= 13.748
Once	137 (83.5)	27 (16.5)	164 (100.0)	df= 2
More than once	89 (65.4)	47 (34.6)	136 (100.0)	P= 0.001
Oral healthcare utilization				X^2= 13.862
Yes	30 (55.6)	24 (44.4)	54 (100.0)	df= 1
No	196 (79.7)	50 (20.3)	246 (100.0)	P= 0.000
Smoking history				X^2= 1.81
Yes	3 (75.0)	1 (25.0)	4 (100.0)	df= 1
No	226 (76.4)	70 (23.6)	296 (100.0)	P= 0.340
Alcohol consumption				X^2= 3.509
Yes	57 (67.9)	27 (32.1)	84 (100.0)	df= 1
No	169 (78.2)	47 (21.8)	216 (100.0)	P= 0.044

DISCUSSION

The prevalence of oral cancer in Nigeria varies based on location with different geopolitical zones recording different prevalence and mortality rate of oral cancer[30]. These variations can be attributed to differences in socio-cultural beliefs and practices, educational level, healthcare accessibility and other environmental factors[31]. In Nigeria, oral cancer has been reported to constitute up to 25%[15] of all head and neck cancers with a mortality rate of up to 32%.[15] Also, majority of oral cancers are diagnosed at an advanced clinical stage in Nigeria[30,32]. This delay has been attributed to patient related factors and professional related factors with patient related factors being the most significant[33,34]. Oral cancer knowledge was found to be a major patient related factor in the early diagnosis of oral cancer[26] but despite the high prevalence and mortality rate of oral cancer in Nigeria, data on the level of knowledge of Nigerians on oral cancer are limited. Hence, the findings from this study may be useful in designing effective education strategies for the general populace.

This study grouped knowledge of oral cancer into three categories; knowledge of general features, knowledge of risk factors and knowledge of treatment options for oral cancer. Findings from this study showed low level of knowledge of oral cancer for all three categories assessed. Majority of respondents had low knowledge of general features of oral cancer with about 50% not answering any of the questions correctly. An alarming number of respondents had negative beliefs about oral cancer with majority of them claiming that oral cancer is not preventable (62.0%), treatable (55.3%) and is contagious (98.0%). This was higher than results reported from similar studies[35-37] and may be due to misinformation and publicly accepted misconceptions.

In this study, over 50% of respondents could not identify any of the risk factors of oral cancer. Similar studies have reported varying results ranging from 28.1%,[36] 37%[38] to 83.1%.[39] Considering all other risk factors mentioned in this study, cigarette smoking was the most commonly identified (40%) as a risk factor of oral cancer. This is similar to results gotten from past studies[36,39,40] and may be attributed to increased anti-smoking campaigns initiated to curb the prevalence of cigarette smoking related cancers[37]. The knowledge of respondents on other risk factors was poor compared to knowledge of cigarette smoking. This was contrary to results seen in previous studies[41,42] where tobacco and alcohol were identified as significant risk factors of oral cancer. Notably poor was knowledge of herbal concussions (referred to as "agbo" in South-Western Nigeria) as a risk factor for oral cancer. Many of these herbal concussions are made from local herbs mixed with alcohol, sugar and other chemicals which can serve as etiologic factors of oral cancer as well as provide a synergistic effect with tobacco and alcohol consumption. This study was conducted in South-Western Nigeria where "agbo" consumption is predominant, which makes this result even more alarming. The lack of knowledge of herbal concussions as risk factors of oral cancers may be due to the popular misconception that it is a healthy beverage as it contains some natural herbs.

This study also reported low knowledge of treatment options for oral cancer with over 50% not knowing any of the available treatment options. This is particularly important because if patients do not believe the condition is treatable and are not aware of the available treatment options, they may end up employing other non-conventional means of treatment and eventually present to a hospital when the lesion is at a more advanced stage. Over 75% of respondents showed low overall knowledge of oral cancer which was similar to results seen in other Nigerian studies[30,32,43] as well as studies[44-46] in other developing countries.

This study did not report significant correlation between age, gender and overall knowledge of oral cancer. However, male respondents and respondents over 60 years of age reported a significantly higher general knowledge of oral cancer compared to other groups of respondents. A similar study by Al-Maweri et al.[37] reported similar results that knowledge of oral cancer was significantly associated with increase in age (p<0.01) and the male gender (p<0.05). The results of this study showed that higher education was significantly associated with overall knowledge of oral cancer as well as all the three categories. This is similar to results reported by previous Nigerian studies[30,32] as well as other international studies[37,38,45,46].

Only 7.7% of respondents knew people who had oral cancer or had been treated for oral cancer. Similar studies reported respondents who had heard about people with oral cancer and this percentage varied from 45%[36] to 72%[38] to 81%.[45] This study reported a significant increase in knowledge of oral cancer in respondents who knew oral cancer patients which was similar to results reported by previous studies[36,38,45].

This study reported a statistically significant association between high knowledge of oral cancer and increased tooth brushing frequency similar to results of past studies[45]. This may be explained by the fact that majority of community-based oral health education inculcate teachings on both good oral hygiene practices and common oral diseases. Hence, respondents who are able to learn about oral cancer are more likely to learn good oral hygiene practices[37].

Reported social habits which are known environmental risk factors for oral cancer such as smoking[47], and alcohol consumption[48] was low in this study. This low response could be due to cultural factors associated with admission of engagement in such social habits especially among women, as majority of respondents in this study were women. In addition, a generally higher response to such questions will be expected from anonymous self-administered surveys compared to interviewer administered surveys. No significant association was noted between knowledge of oral cancer and smoking history. And although this study reported significant association between higher knowledge of oral cancer and reduced alcohol consumption, this association was not corroborated by the Pearson's correlation coefficient test, similar to results gotten by Lawoyin et al[32]. This lack of statistical significance may be due to the low number of respondents in the smoking and alcohol consumption groups or other confounding factors.

Results of this study showed a statistically significant association between knowledge of oral cancer and oral healthcare utilization. This is similar to results of past studies[45] and may be explained by the fact that respondents who visit the dental clinic routinely are more likely to be educated on the characteristics, risk factors and treatment options of

oral cancer. Previous studies[49] have also shown a direct association between oral healthcare utilization and early diagnosis of head and neck cancers further emphasizing the importance of oral healthcare utilization.

This study is not without its limitations, as the findings are based on interviewer-administered questionnaires which may have been subject to information bias due to social desirability as some participants may not be truthful in an attempt to not appear socially irresponsible. This may have been notable in the oral hygiene practices and precancerous habits sections of the questionnaire.

CONCLUSION

Oral cancers have a relatively high prevalence in Nigeria[13,14] and are associated with a poor prognosis and a five-year survival rate of just 68% making them a public health burden[15]. Early detection and presentation to the dental clinic have been noted as major determinant factors for improved prognosis and improved treatment outcome for oral cancer[27]. Unfortunately, Nigeria and other developing countries are plagued with late patient presentation making management more challenging and resulting in less favorable prognosis[30,32]. Studies have shown that knowledge of various oral health conditions may significantly influence presentation at the dental clinic and diagnosis of oral cancer[26,33,34] hence this study determined the knowledge of oral cancer and its effect on oral hygiene practices, precancerous habits and oral healthcare utilization. Results of this study showed that majority of the population had low knowledge of oral cancer and this affected their oral hygiene practices and frequency of oral healthcare utilization. Hence, an increase in knowledge of oral cancer will inadvertently lead to an improvement in early diagnosis of the condition. No correlation was seen between knowledge of oral cancer and precancerous habits. However, this may be due to information bias. The results of this study may explain the late presentation of oral cancer seen particularly in rural areas in Nigeria. The following are recommendations made in view of the findings from this study:

- Adequate and consistent oral health education should be given to members of the community (particularly the rural communities) on oral cancer including its clinical features, risk factor, and treatment options.
- They should also be educated on the importance of early detection and presentation of any oral condition to the dental clinic and routine dental visits should be encouraged.
- Members of the community, particularly community leaders and other influential members should be educated on the negative effects associated with consumption of certain herbal concussions to help debunk popular misconceptions associated with its consumption.
- Dental health facilities should be made more affordable and accessible to the rural population so as to encourage and increase its utilization.
- Government policies that make education more accessible to the rural community should be proposed and encouraged as higher education was seen to be associated with high knowledge of oral cancer.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

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