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A Community Survey on Association of Sociodemographic Characteristics with Risk Perception and Awareness about Oral Cancer in Lagos, Nigeria

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ABSTRACT

Objective: To assess the level of oral cancer awareness and risk factors perception and the relationship between this awareness and the sociodemographic and behavioral characteristics. **Material and Methods:** This descriptive study was conducted among rural and urban residents in Lagos State, Nigeria. A multi-stage random sampling method was utilized. The sociodemographic and behavioral characteristics of respondents, as well as their knowledge about oral cancer risk factors, were assessed with a validated questionnaire. The bivariate association was done using an independent t-test and one-way ANOVA. Multivariate regression was used to determine the association between predictor variables and oral cancer knowledge scores. The statistical significance level is set at p<0.05. **Results:** 590 participants between 18 and 82 years (mean age 34.5 ±13.7) completed the survey. The prevalence of cigarette smoking was 25.7%, of which 16 (1.5%) were heavy smokers (20+ cigarettes per day). The prevalence of alcohol consumption was 66.1%, with 57 (9.7%) being heavy drinkers, consuming drinks for 5-7 days of the week. A high proportion of the respondents (>60%) exhibited gaps in their knowledge of oral cancer. Uneducated participants had lower oral cancer knowledge than those with >12 years of formal education (aOR = 5.347; 95% CI: 4.987-6.240). Participants who were smokers had lower oral cancer knowledge compared with non-smokers (aOR = 3.341; 95% CI: 2.147-4.783); Participants who consumed alcohol had more deficient oral cancer knowledge compared with non-drinkers (aOR = 1.699; 95% CI: 1.087-2.655); While heavy smokers aOR = 4.023; 95% CI: 3.615-4.825) and heavy drinkers aOR = 4.331; 95% CI: 3.158-5.939) had lower oral cancer knowledge compared with those who did not abuse both substances. **Conclusion:** A high proportion of the respondents exhibited gaps in their knowledge of oral cancer in their responses. Delayed diagnosis of oral cancer can be reduced by increasing the awareness and knowledge of the populace about risk factors and also in the recognition of its signs and symptoms.

Keywords: Alcohols; Awareness; Oropharyngeal Neoplasms; Risk Factors; Tobacco.

Introduction

Cancer is the second leading cause of death worldwide and accounted for 9.6 million deaths in 2018 [1]. Oral cancer is defined as cancer that forms in the tissues of the oral cavity or the oropharynx [2]. Based on the World Health Organization (WHO) International Statistical Classification of Disease (ICD-10), Oral and oropharyngeal cancers (OC) are malignancies that occur in the lip, alveolar ridge, and gingiva, buccal mucosa, tongue, floor of mouth and unspecified parts of the mouth, tonsil, hard and soft palate and oropharynx [1]. Most OC/OPC lesions are squamous cell carcinoma (SSC) [3], and they ultimately result in pain, diminished function, reduced quality of life, and mortality [4]. These cancers are highly prevalent globally [5], with an annual estimated incidence of approximately 300,000 cases [6,7]. The incidence rate of oral cancer varies widely in different countries, which is suggested by differences in the distribution of the etiological factors. Globally, oral and pharyngeal cancer accounts for about 5% of all cancers in men and 2.5% of cancers in women [8,9]. The highest rates are generally registered in a few developing countries, particularly Southeast Asia and the Indian subcontinent, with the disease accounting for up to 40% of all malignancies in these areas. In 2018, cancers of the lip and oral cavity accounted for almost 400,000 new cases, with over half of them associated with mortality [5].

There are many factors, with complex mechanisms and interactions, affecting the incidence and mortality of cancer. The risk factors identified in its pathogenesis include tobacco, excessive alcohol use, and human papillomavirus (HPV) infection, with HPV being typically linked with oropharyngeal variants [10]. Thus, hazardous habits like excessive alcohol consumption, tobacco use, and infection with type 16 HPV have been associated with increased odds of OPC and decreased odds of survival [11,12].

More deaths are caused by cancers of the oral cavity and oropharynx than by all other diseases and disorders of the orofacial region combined. Despite this, oral cancer has not received adequate attention from either the medical or the dental profession. Although advances in the treatment of oral cancer have been associated with improved prognosis and survival in high-income countries (or HICs), this observation has not been made in Low- and Middle-income countries (LMIC). Moreover, the five-year survival rate for oral cancer is about 50% poorer in LMICs compared to HIC [13]. Thus, recognition of potentially serious symptoms of oral cancer by patients precedes presentation to primary care and is a crucial aspect of the pathway to cancer diagnosis. Research shows that over 70% of OPC can be prevented by interventions that target modifiable risk factors identified in its development [14]. Thus, a vital objective of the Healthy People 2020 initiative is a behavioral modification and early secondary prevention through screening [15]. Visual screening for OSCC is quick (requiring only five minutes), simple, inexpensive, and non-invasive, and it causes little discomfort to the patients. In contrast, detecting most solid malignancies in their early asymptomatic stages requires special, costly, and often invasive techniques [13]. Through the identification of those groups at higher risk of cancer but who are also more likely to have lower awareness, target campaigns can be very productive.

Recent years have seen a strong emphasis on risk factor awareness and its possible role in cancer prevention [16,17]. Providing evidence-based information with concurrent improvement in self-efficacy may increase awareness about the risk factors associated with the disease and avoidance of these hazards. This is critical because the level of awareness is suboptimal [10,18], and an increase in knowledge level is associated with preventive behavior [19,20]. Extensive research confirms that adopting healthy behaviors is effective and economical in decreasing cancer risk [21]. Thus, assessing the risk factor awareness and beliefs about oral cancer and investigating possible factors, such as socioeconomic status, that impact this perception is pertinent.

To the best of our knowledge, no previous community-based survey has been conducted to explore the level of cancer awareness and beliefs among residents in Lagos State. This study aimed to assess the level of oral cancer awareness and risk factors perception and the relationship between this awareness and the sociodemographic and behavioral characteristics of a sample of Lagos State residents.

Material and Methods

Ethical Consideration

Ethical approval for this research was obtained from the Health Research and Ethics Committee of the Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos, Nigeria. Prior to the commencement of the study, the objectives and protocol of the study were explained to the respondents, underscoring the fact that their involvement was voluntary. They then gave their informed consent by signing or thumb-printing the forms.

Study Population and Sampling

This descriptive study was carried out among rural and urban residents in Lagos State, Nigeria. A multi-stage random sampling method was utilized to enlist the study participants. In the first stage of the sampling, the two Local Government Areas (LGAs) (Ojodu and Agbowa) were selected by simple random sampling (by balloting) from the 16 urban and four rural LGAs in Lagos State. The urban residents were drawn from the Ojodu Local Government area in Lagos State. In contrast, the rural residents were drawn from the Agbowa Ikosi Local Government development area of Lagos State, Nigeria. The LGAs thus formed the Primary Sampling Units (PSUs). Participants were recruited from three of the National Population Enumeration sites in each LGAs. Stage 2 involved the selection of eligible households within the enumeration sites for the survey. At each of the enumeration sites, every third household on each street was considered suitable for recruiting a study participant. Stage 3 involved the selection of actual respondents for interview and examination. Every third house in each street with an eligible respondent was selected until the sample size was reached. Alternative sexes of respondents identified for our study recruitment were selected to participate in each eligible household.

Inclusion and Exclusion Criteria

Participants of all tribes aged 18 years or older who can communicate verbally and have no history of cancer and those who agreed to participate in the study gave informed consent. Individuals with a history of cancer or pre-malignant lesions were exclude

Sample Size Calculation

The minimum calculated sample size was 368, which was determined using a formula for descriptive cross-sectional studies: Sample size = $Z^2 pq/e2$, where Z = 1.96, p = which the prevalence rate was 60% [22] based on poor knowledge about oral cancer from a reference study, q =1-p; and the precision, e, level was 0.05. A total of 590 respondents were surveyed.

Data Collection

The study utilized a validated 52-item, paper-based questionnaire adapted from previous studies [23-25]. The questionnaire comprised three sections: The first assessed sociodemographic characteristics, including gender, age, educational level, religion, ethnicity, and occupation. The second section considered risk factors

such as smoking, use of smokeless tobacco, alcohol use, exposure to secondhand smoke, and efforts at smoking cessation. The third section assessed the respondents' knowledge of the etiology and preventive measures against oral cancer.

Smoking Status

Smoking status was assessed by two questions: a. "In your entire life, have you smoked at least 100 cigarettes?" and "Do you currently smoke cigarettes every day, some days, or not at all?" The respondents were categorized into three groups: current smokers, former smokers, and those who never smoked. Participants who had smoked at least 100 cigarettes in their lifetime and reported smoking "every day" or "some days" at the time of the survey were categorized as current smokers. Those who reported they had smoked at least 100 cigarettes over the course of their lifetime and identified themselves as not smoking at all currently were categorized as former smokers. Those who never smoked refer to those who had never smoked at least 100 cigarettes in their lifetime and reported they did not smoke at all at the time of the survey. A similar format was utilized in assessing smokeless tobacco use.

Secondhand Smoke (SHS) Exposure Inside the Home was assessed with the question: During the past seven days, how many days has anyone smoked inside your home in your presence? A) 0 days; B) 1 to 2 days; C) 3 to 4 days; D) 5 to 6 days; and E) 7 days; while Secondhand Smoke (SHS) Exposure in Public Places was assessed with the question: During the past seven days, how many days has anyone smoked in your presence, inside any enclosed public place other than your home (such as school, shops, restaurants, shopping malls, movie theaters)? A) 0 days; B) 1 to 2 days; C) 3 to 4 days; D) 5 to 6 days; and E) 7 days.

Attempts to Quit Smoking were assessed with the question: During the past 12 months, did you ever try to stop smoking? A) I have never smoked; B) I did not smoke during the past 12 months; C) Yes; and D) No.

Alcohol Use Status

This was assessed with the questions: How often do you have a drink containing alcohol? 0) Never; 1) Monthly or less; 2) 2-4 times a month; 3) 2-3 times a week; and 4) 4 or more times a week;

And: How many drinks containing alcohol do you have on a typical day when you are drinking? 0) 1 or 2; 1) 3 or 4; 2) 5 or 6; 3) 7 to 9; and 4) 10 or more.
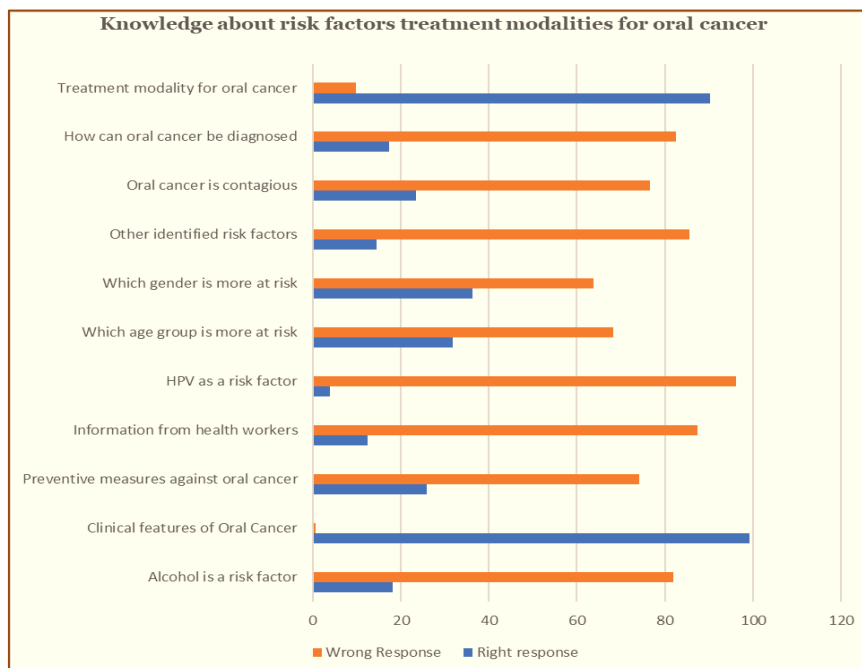
Knowledge of Oral Cancer

Participants were asked 12 questions, with some having multiple responses to assess their knowledge of oral cancer. Possible responses to the questions included 'yes,' 'no,' and 'I don't know.' These included such questions as: a. Can tobacco cause mouth cancer? b. Can alcohol cause mouth cancer? c. Which of the following may be a sign of mouth cancer? d. Which of the following actions may prevent mouth cancer? e. Can Human papillomavirus (HPV) cause mouth cancer? f. According to age, who are more susceptible to oral cancer? g. According to gender, who has the highest occurrence? h. Other Potential risk factors of oral cancer? i. Is oral cancer a contagious disease? j. How can oral cancer be diagnosed? k. How can oral cancer be treated? Participants' answers to the questions were scored 1 for correct and 0 for incorrect responses. The mean score for the responses was computed to dichotomize the final scores as poor and good knowledge based on values above and below the mean value.

Data Analysis

The Statistical Package for Social Sciences IBM SPSS version 23.0 (IBM, Armonk, New York, USA) was utilized for data analysis. Continuous variables were displayed as means with standard deviation, while categorical variables were displayed as frequencies with accompanying percentages. Bivariate associations between participant characteristics and oral cancer knowledge were assessed using an independent samples t-test, one-way ANOVA, and simple linear regression where appropriate. A multivariate regression model estimated the association between predictor variables and oral cancer knowledge score. All variables were included in the multivariable model regardless of their association with the outcome variable. Statistical significance level set at $p < 0.05$.

Results

Figure 1 shows the distribution of the oral cancer knowledge questions used in the study and the participants' correct and wrong responses. A high proportion of the respondents (>60%) exhibited gaps in their knowledge of oral cancer from their responses. More than 80% did not know that alcohol is a risk factor for oral cancer, that HPV is a risk factor for oral cancer, nor the other identified risk factors for oral cancer; similarly, more than 80% had never received oral cancer-related information from health workers while more than 60% of respondent did not know if oral cancer was contagious, the preventive measures against oral cancer nor which gender or age groups were most at risk. The majority of participants (>90%), however, knew the clinical features of oral cancer and how oral cancer could be diagnosed.

Other Identified Risk factors include smoking, sunlight exposure, and viral and fungal infections.

Figure 1. Knowledge about risk factors and treatment modalities for oral cancer.

Five hundred ninety participants between 18 and 82 years (mean age 34.5±13.7) completed the survey. The majority of the participants [352; 59.7%] were aged between 18-35 years; 299 (50.7%) respondents were males, while 440 (74.6%) had ≤12 years of formal education. The prevalence of cigarette smoking among the study population was 25.7%, of which 16(1.5%) were heavy smokers (20+ cigarettes per day); of these, 53 (89%) had made efforts towards tobacco cessation while 130 (22%) of the participants were past smokers. The

prevalence of alcohol consumption was 66.1%, with 57 (9.7%) being heavy drinkers, consuming drinks for 5-7 days of the week. Two hundred and twenty (37.3%) of them were exposed to SHS, and eighteen (3.0%) of the participants used smokeless tobacco.

The mean oral cancer knowledge score was 4.00±1.69. Bivariate analyses using independent samples t-test, one-way ANOVA, or simple revealed a significant association between education, cigarette use, alcohol use, and oral cancer knowledge score (Table 1). Those with no formal education (2.78±0.94), current smokers (3.80±1.60), those who smoked 20 or more cigarettes per day (3.38±0.51), those who consumed alcoholic drinks (3.88±1.71) and those that consumed alcoholic beverages for 5-7 days of the week (3.80±1.67) had a higher proportion of those with poor knowledge of oral cancer and significantly lower mean knowledge scores (Table 1).

Table 1. Bivariate association between sociodemographic characteristics and knowledge about oral cancer.

Sociodemographic Characteristics	Knowledge about Oral Cancer		Mean	F	p-value
	Good N (%)	Poor N (%)			
Age (Years)					
18-35	108 (18.3)	244 (41.4)	4.03±1.74	1.893	0.152
36-65	84 (14.2)	142 (24.1)	3.90±1.60		
66-80	4 (0.7)	8 (1.4)	4.83±1.75		
Total	196 (33.2)	394 (66.8)			
Gender					
Female	98 (16.6)	193 (32.7)	4.05±1.62	0.610	0.435
Male	98 (16.6)	201 (34.1)	3.94±1.74		
Educational Level					
None	0 (0.0)	18 (3.1)	2.78±0.94	9.521	0.000*
≤12 years of formal education	139 (23.6)	301 (51.0)	3.88±1.54		
>12 years of formal education	57 (9.6)	75 (12.8)	4.62±2.19		
Current Smoker					
No	161 (27.3)	277 (46.9)	4.06±1.71	9.575	0.000*
Yes	35 (5.9)	117 (19.8)	3.80±1.60		
Past Smoker					
No	151 (25.6)	309 (52.4)	3.93±1.70	2.810	0.094
Yes	45 (7.6)	85 (14.4)	4.22±1.64		
Smokeless Tobacco User					
No	190 (32.2)	382 (64.7)	3.99±1.68	0.331	0.565
Yes	6 (1.0)	12 (2.0)	4.22±1.83		
Tobacco Cessation effort					
Yes	15 (2.5)	38 (6.4)	3.99±1.70	0.010	0.920
No			4.02±1.53		
Exposure to SHS in the home					
No	134 (22.7)	236 (40.0)	3.91±1.61	5.376	0.069
Yes	62 (10.5)	158 (26.8)	4.10±1.52		
Cigarettes/day					
0	439 (26.8)	281 (47.6)	4.05±1.69	9.065	0.025*
1-9	119 (5.1)	89 (15.1)	3.87±1.73		
10-19	24 (1.4)	16 (2.7)	3.75±1.54		
20+	8 (0.1)	8 (1.4)	3.38±0.51		
Alcohol drinker					
Yes	120 (20.3)	270 (45.8)	3.88±1.71	5.583	0.018*
No	76 (12.9)	124 (21.0)	4.23±1.63		
Days of alcohol consumed per week					
0	104 (17.6)	261 (44.2)	4.36±1.72	4.367	0.005*
1-4	72 (12.2)	96 (16.3)	4.24±1.51		
5-7	20 (3.4)	37 (6.3)	3.80±1.67		

*Statistically Significant.

In the linear regression model and in the adjusted model, education, current smoking, Exposure to SHS in the home, number of cigarettes smoked per day, alcohol consumption, and number of days per week that alcoholic drinks were consumed remained significant predictors of oral cancer knowledge (Table 2). Uneducated participants had lower oral cancer knowledge than those with >12 years of formal education (aOR = 5.347; 95% CI: 4.987-6.240). Participants who were smokers had lower oral cancer knowledge compared with non-smokers (aOR = 3.341; 95% CI: 2.147-4.783); Participants who consumed alcohol had more deficient oral cancer knowledge compared with non-drinkers (aOR = 1.699; 95% CI: 1.087-2.655); While heavy smokers aOR = 4.023; 95% CI: 3.615-4.825) and heavy drinkers aOR = 4.331; 95% CI: 3.158-5.939) had lower oral cancer knowledge compared with those who did not abuse both substances (Table 2).

Table 2. Predictors of poor knowledge about oral cancer.

Variables	OR	95% CI	p-value	aOR	95% CI	p-value
Age						
18-35	1 (ref)			1 (ref)		
36-65	1.019	0.960-1.117	0.621	1.227	0.858-1.756	0.263
66-80	1.002	0.974-1.270	0.958	1.426	1.315-1.438	0.000*
Gender						
Female	1 (ref)			1 (ref)		
Male	1.024	0.981-1.224	0.541	1.3432	0.893-1.996	0.159
Educational Level						
>12 years of formal education	1 (ref)			1 (ref)		
≤12 years of formal education	1.311	1.162-1.618	0.001*	1.332	1.295-2.863	0.014*
None	3.656	2.674-3.981	0.000*	5.347	4.987-6.240	0.000*
Current Smoker						
No	1 (ref)			1 (ref)		
Yes	1.658	1.464-2.2331	0.043*	3.341	2.147-4.783	0.012*
Past Smoker						
No	1 (ref)			1 (ref)		
Yes	1.115	1.058-1.879	0.025*	1.822	0.956-3.475	0.068
Smokeless Tobacco User						
No	1 (ref)			1 (ref)		
Yes	1.497	0.467-1.783	0.619	1.439	0.352-5.886	0.013*
Tobacco Cessation effort						
Yes	1 (ref)			1 (ref)		
No	0.382	0.241-0.423	0.040*	0.540	0.257-1.132	0.103
Exposure to SHS in the home						
No	1 (ref)			1 (ref)		
Yes	0.970	0.780-1.214	0.060	1.670	1.491-1.915	0.012*
Cigarettes/day						
0	1 (ref)			1 (ref)		
1-19	1.160	1.015-1.535	0.008*	1.572	1.408-1.802	0.001*
20+	3.989	3.726-4.071	0.001*	4.023	3.615-4.825	0.000*
Alcohol drinker						
No	1 (ref)			1 (ref)		
Yes	1.063	0.970-1.520	0.135	1.699	1.087-2.655	0.020*
Days of alcohol consumed per week						
0	1 (ref)			1 (ref)		
1-4	1.243	1.118-1.368	0.011*	1.373	1.172-1.608	0.000*
5-7	3.448	2.993-4.098	0.000*	4.331	3.158-5.939	0.000*

*Statistically Significant.

Discussion

Oral cancer refers to cancerous tissues inside the mouth involving the anterior two-thirds of the tongue, the floor of the mouth, buccal mucosa, gingiva, lips, retromolar trigone, and hard palate, while Oropharyngeal

Cancers involve the base of the tongue, soft palate, tonsils, and posterior pharyngeal wall. Oral cancer is a significant global health problem where statistical data have changed little over time, with 177,757 deaths out of 377,713 new cases recorded in 2020 and with a low 5-year survival rate of 50% [26,27]. Despite the advancements in surgical techniques and adjuvant therapy, the prognosis for patients with oral and pharyngeal cancer remains poor, with global 5-year survival rates of 40-50%, which have not changed significantly in the last three decades [28].

This study shows poor oral cancer risk-related knowledge among the sampled population. A high proportion of the respondents (over 60%) exhibited gaps in their knowledge of oral cancer from their responses. Of the other risk factors listed, the majority of participants identified smoking as a cause of oral cancer but did not know the other risk factors, such as sunlight exposure and viral and fungal infections. This finding was similarly made by some other researchers [29-31] and is likely a result of anti-tobacco messaging in the media as well as the visual warnings on cigarette packs regarding the harmful effects of smoking. It is instructive to note that more than 80% of respondents claimed they did not receive this information from health workers.

In addition, more than 80% of respondents did not know that alcohol is a risk factor for oral cancer. Although knowledge about tobacco exposure being the leading risk factor for oral cancer is more prevalent, the association between alcohol use and Oral Cancer remains poor [32]. Alcoholic beverages lead to an increased risk of head and neck cancer, regardless of the type of alcoholic beverage consumed. Tobacco and alcohol have a synergistic role in about 80% of all oral cancer cases [33], and those who use both tobacco and alcohol are at greater risk of developing these cancers than are people who use either tobacco or alcohol alone [34]. Moreover, more than 80% of respondents did not know that HPV is a risk factor for oral cancer. There is a need to increase this awareness because there is also solid molecular evidence supporting the role of HPV (principally HPV-16) in the pathogenesis of oral cancer.) In a systematic review and pooled analyses of over 5,000 head and neck cancer specimens from 60 studies, Kreimer et al. [35] observed an overall HPV prevalence of 36% in oropharyngeal cancers, 36% and 24% in oral cancers. Of this proportion, HPV-16 accounted for 87% of oropharyngeal cases and 68% of oral cancer cases (68%).

Furthermore, more than 60% of respondents did not know if oral cancer was contagious, which preventive measures to take against oral cancer, nor which gender or age groups were most at risk. Various studies confirm significant deficits in awareness and knowledge about oral cancer and the available treatment options. In one comparable study where respondents had poor knowledge about the epidemiological characteristics of oral cancer, only 23.9% of the participants knew that men had a higher prevalence of oral cancer, and only 36.3% knew that a higher incidence is seen in people who are over 40 years old [36]. Similar findings were also made by other researchers who observed that 21.8% and 43.2% of respondents correctly identified the correct epidemiological pattern [37]. In most countries, oral cancer prevalence is higher in men than in women, possibly due to a greater indulgence in the associated risk habits by men. Globally, the ratio of males to females diagnosed with oral cancer has declined over the decades and is now about 1.5:1 for the mouth and 2.8:1 for oropharyngeal cancer. Furthermore, the age-specific rates for oral cancer demonstrate marked increased incidence with increasing age, with a peak of incidence in the sixth and seventh decades. This pattern is consistent across all countries globally despite marked variation in absolute incidence rates at every age [8,9].

In the bivariate analyses, current smokers, those who smoked 20 or more cigarettes per day, those who consumed alcoholic drinks, and those who consumed alcoholic beverages for 5-7 days of the week had a higher proportion of those with poor knowledge of oral cancer and significantly lower mean knowledge scores. This was further confirmed in the linear regression model and in the adjusted model. This was similarly reported by

West et al. [31], who observed that smokers had significantly poorer knowledge about risk factors such as smoking when compared with smokers and highly educated respondents. The finding mentioned above calls for a greater need for additional information targeted at high-risk groups, such as smokers. This is concerning because those with higher exposure to risk factors appeared to be more deficient in knowledge. The adverse effects of tobacco smoking on oral health are well documented. Studies have reported an associative relationship between the use of all forms of tobacco products, including direct and indirect use, and oral cancer [38-42]. Tobacco smoking exposes the oral cavity to over 60 carcinogens such as polycyclic aromatic hydrocarbons, aldehydes, and current smokers have a 3- to 12-fold increased risk over never smokers while ex-smokers have a 1- to 5-fold increased risk [43]. Smokers are also at a higher risk of death through oral and pharyngeal cancers than non-smokers, regardless of gender [44]. In addition, alcohol consumption increases the relative risk of oral cancer by 5.13 in comparison to non-drinkers or occasional drinkers, even though this association might be confounded by tobacco smoking [45].

Moreover, compared with those with >12 years of formal education, uneducated participants had lower oral cancer knowledge with an adjusted odds ratio of 5.35. Studies in other countries have also shown that risk factor awareness and beliefs about cancer vary with sociodemographic variables [46,47]. Previous research by Niksic et al. [48] similarly showed that participants with no school education were less likely to identify the signs and symptoms of cancer. Likewise, Park et al. [49] reported that university-educated participants were more likely to identify a correct sign or symptom than those with less than ten years of formal education. Grossman [50] also observed that more educated respondents were more knowledgeable about the relationship between oral cancer and smoking, while West et al. [31], in a population study of 4198 participants, observed that those with high levels of education had higher rates of knowledge about oral cancer than those with lower levels of education. These findings also agree with population-based studies in Denmark and the UK that observed an association between income and education with negatively framed beliefs about oral cancer [46,47].

The main reason for delayed diagnosis of oral cancer is a lack of awareness and knowledge of potential risk factors, as well as the recognition of its signs and symptoms [51]. WHO Global Oral Health programs' approach to controlling oral cancer includes two approaches. The first approach is prevention through reduction of the exposure to risk factors. The second approach is detecting patients with suspicious oral lesions early through screening programs [52]. The early detection of patients with oral cancer depends on the patient's awareness and perception of their health and on the ability of healthcare providers to examine and screen their patients. Public health practitioners have recently focused on increasing public awareness of cancer symptoms and risk factors and evaluating intentions for lifestyle changes. Cancer patients would benefit from early diagnosis and detection of lesions, with immediate referral to specialist care centers. Early diagnosis and referral will improve survival rates, reduce morbidity, and improve treatment outcomes [53,54]. However, early detection is not often realistic for most individuals; only one-third of patients present with early-stage oral cancer disease. Compared to the cost of managing oral cancer, community oral cancer screenings and educational measures are far more cost-effective. Patients with high awareness and knowledge of the risk factors, signs, and symptoms of oral cancer were more likely to present for opportunistic screenings, thereby promoting early detection [55]. Thus, cancer awareness is critical for behavior change and motivation opportunistic screening for oral cancer.

There are some limitations associated with this study. Firstly, all estimates in our study were based on self-report, which might be affected by reporting bias. However, this study provides essential baseline data for further analytical studies.

Conclusion

A high proportion of the respondents exhibited gaps in their knowledge of oral cancer from their responses. Compared with those with >12 years of formal education, uneducated participants had lower oral cancer knowledge. Participants who were smokers had more inadequate oral cancer knowledge compared with non-smokers, while those who consumed alcohol had more deficient oral cancer knowledge compared with non-drinkers. Heavy smokers and heavy drinkers also had lower oral cancer knowledge compared with those who did not abuse both substances. Delayed diagnosis of oral cancer can be reduced by increasing the awareness and knowledge of the populace about risk factors and also in the recognition of its signs and symptoms.

Authors' Contributions

AO	[iD]	https://orcid.org/0000-0003-4433-8276	Conceptualization, Methodology, Validation, Formal Analysis, Investigation, Data Curation, Writing - Original Draft, Writing - Review and Editing and Project Administration.
OE	[iD]	https://orcid.org/0000-0003-0733-3847	Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft, Writing - Review and Editing and Project Administration.
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All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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