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Original Article

The awareness and knowledge on oral cancer and its relation towards smoking habit among non-medical background students

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Abstract Oral cancer remains as a worldwide health issue. In Malaysia, oral neoplasm contributed about 10.6% death at the government hospitals. The significant consequences of delaying referral and poor prognosis of oral cancer was mainly due to the lack of knowledge among public. This study aims to determine the level of awareness and knowledge on oral cancer among students with non-medical background in Kepala Batas, Pulau Pinang, Malaysia. A cross sectional study using questionnaires were conducted among systematically randomly selected 275 non-medical background students aged 18 years old and above. The association of smoking habit with oral cancer awareness and knowledge was evaluated using chi-square test. Factors associated with the knowledge were determined at both univariable and multivariable levels using simple logistic and multiple logistic regression analyses respectively. Oral cancer awareness level was high among the students (85%) even though knowledge on early signs of oral cancer was low (<37%). Students aged >19 years old has 1.96 time the odds compared to students aged ≤19 to have poor knowledge while Malay has 4.28 time the odds compared to Indian to have poor knowledge. Although smoking was observed as the most recognisable risk factor of oral cancer (82%), the smoking prevalence was relatively high (46.9%). The smokers in this study had low awareness and knowledge on oral cancer compared to the non-smoker. Hence, preventive measures adopting knowledge transfer should be proposed to enhance individual awareness and knowledge on oral cancer with Smoking cessation programme to help the smoker to quit smoking.

Keywords: Awareness; knowledge; oral cancer; smoking; student.

Introduction

Oral cancer is a worldwide health issue with multifactorial origins and fatal consequences. It is ranked as the sixth common type of cancer in the world with annual incidence of approximately 275,000 in the developing countries, by showing high prevalence in challenging areas such as South and Southeast Asia (Warnakulasuriya, 2009). In Malaysia, the highest prevalence was observed among the Indians (Ghani *et al*., 2013) and oral neoplasm contributed about 10.6% death at the government hospitals (National Cancer Registry Malaysia, 2006).

Primary analysis showed that about 67.1 % of oral cancer cases were detected in the advanced stage (Doss *et al*., 2011). Factors that contribute in delaying referral are complex (Rogers *et al*., 2007). Primary delay can be defined as those patients who takes about three weeks to seek professional intervention and these delaying factors are affected by sociodemographic and educational status of the patient (Llewellyn *et al*., 2004). Seventy-eight percent of the patient in UK takes 21 days to be referred from the primary health care to the maxillofacial department. Unfortunately, the patient with asymptomatic lesion consumed longer time to be referred (Rogers *et al*., 2007).

Many researchers in the oral cancer areas believed that early diagnosis of oral cancer is able to reduce the complication and improve the ability to cure and increase the survival rate (Ghani *et al*., 2013). These

could be achieved if awareness programme regarding the accessibility in clinical examination, early sign and symptom of oral cancer and self-examination of the mouth by the individuals through visual inspection are implemented.

Tobacco use is a well-established and primary risk factor for oral cancer besides alcohol abuse, betel nut chewing and poor oral hygiene. However, the smokers were less aware that smoking is one of the inducing factors for oral cancer (West *et al*., 2006). Tobacco use and alcohol intake are most avoidable aetiology of oropharyngeal cancer (Petersen, 2009).

It is a worrying situation to know that oral cancer knowledge is low among the population and not well documented in Malaysia (Ghani *et al*., 2013). Previous oral cancer awareness studies in Malaysia (Ghani *et al*., 2013) were conducted among general population while another study was done amongst the medical and dental students whom already have the basic science and medical knowledge (Al-Dubai *et al*., 2012). As knowledge were significantly associated with the course of study (Al-Dubai *et al*., 2012); hence, our research aim was to determine the level of awareness and knowledge on oral cancer among students with non-medical background. This study also determined the prevalence of smokers among the students and assess the awareness and knowledge on oral cancer among students who are smokers and non-smokers.

Materials and methods

Study design and subject selection

This was a cross sectional study conducted between 17th February until 30th April 2017 using questionnaires distributed among students with non-medical background aged 18 years old and above in an institution in Kepala Batas, Pulau Pinang, Malaysia. Subjects were selected using the systematic sampling by taking the odd numbered students from their registration lists and gathered in lecture hall after permission was obtained from the Director of the institution. The participants were then briefed on the purpose of the study and their rights to withdraw. Those agreed to participate were required to sign the consent forms. Approval of the study was obtained from the Internal Review Board, Universiti Sains Malaysia (USM/JEPeM/1611050).

Sample size were determined using a single proportion formula: $n= (Z/\Delta)^2 *p(1-p)$ (Razak *et al*., 2010). The (n) represents the sample size, while (Z) illustrates the statistical for a level of confidence =1.96 (95% confidence interval). Precision value in proportion of one, if 6%, Δ =0.06. In this study the anticipated awareness on signs and symptoms of oral cancer is p = 0.66 (West *et al*., 2006); so $n = (1.96/0.06)^2 * 0.66(1-0.66) = 239$. With the addition of 10% drop out rate, the sample size was 263. However, the final subject selected based on the enrolment during data collection was 275 subjects.

Research tool

This study utilised validated questionnaires adapted from a previous study (Ghani *et al*., 2013). The original questionnaires consisted of 16 items that were divided into four factors with a fairly good internal consistency reliability (Cronbach alpha 0.60-0.87), and containing five sections, namely: (1) Socio-demographic information (7 questions); (2) Oral cancer awareness (6 questions); (3) Source of information (2 questions); (4) The impact of oral cancer awareness on preventive behaviour (5 questions); and (5) The impact of oral cancer awareness on practice of risk habits (3 questions), making the total of questions into 23 items (Ghani *et al*., 2013) as shown in Table 1. However, in the present study, the questionnaires were simplified into three sections: A, B and C; in order to allow the participants answering the questionnaires with ease. In this study, Section A is about the sociodemographic assessment including information on their smoking habits (A1-A10); section B is about the awareness and knowledge of mouth cancer which consisted of 7 items (B1-B7) while section C assessed the source of information which consisted of 4 items (C1-C4). In Section A, questions were related to participant's age, ethnic group, gender, occupation, marital status, monthly income, level of education, whether they were smoker and type of tobacco used. In section B, to assess awareness (B2), the respondents were considered aware of mouth cancer if they answered "Yes" for question B2 "Have you heard regarding

mouth cancer before" while (B3-B7) assessed the respondent's knowledge on mouth cancer. Mark was given for each question, one mark was given for the right answer for section B3, scoring range from 0 to 7. For (B4 to B6), 2 marks was given for correct answers, scoring ranges from 0-10 and one mark each for correct answer for B7 and score ranges from 0-5. The total score range for knowledge was 0-22. Those respondents with total knowledge score between 0-14 were considered having a poor knowledge and score more than 14 were considered as having a good knowledge. The questionnaires were pretested among 30 subjects (not within the data collection sample frame) with good internal consistency reliability (0.80-0.88) and the questionnaire was modified accordingly (as shown in Table 1).

Data management and statistical analysis

Data was analysed using SPSS version 22 (IBM Inc., USA). Percentage and frequency were used for the categorical data, while mean and standard deviation for the numerical data to illustrate the characteristics of the respondents. The association of smoking habit with oral cancer awareness based on question B2 "Have you heard regarding mouth cancer before" was evaluated using chi-square test. Statistical test was run at 95% confidence interval. Factors associated with the knowledge were determined at both univariable and multivariable level using simple logistic regression analysis and multiple logistic regression analysis respectively. The following independent variables were included for testing: age, gender, income, ethnic education and smoking habit. Any variable with a *p*-value less than 0.25 in the univariate analysis or reported to be influential in previous studies was entered into the multivariate analysis. In multiple logistic regression analysis, variables for inclusion in the model were selected using forward and backward Likelihood Ratio (LR) tests. Following variable selection, the fit of the preliminary model and the importance of each selected variable were verified. All interactions terms were checked. The final model was assessed for fitness using the Hosmer-Lemeshow goodness-of-fit test. The overall correct classification result and the area under the Receiver Operating Characteristic (ROC) curve were also obtained to evaluate the model fitness.

Table 1 Modifications of questionnaires in the present study as compared to Ghani *et al*. (2013)

No.	Ghani *et al*. (2013)	Present study
1)	Section 1: Socio- demographic (7 questions). No questions regarding a smoker or not	Section A: Socio-demographic (10 questions) Are you a smoker? If Yes: How many times a day Please specify the type of tobacco taken (Shisa, cigarettes, electronic cigarette)
2)	Section 2: Oral cancer awareness (6 questions)	Section B: Awareness of mouth cancer (7 questions)
3)	Section 3: Source of information (2 questions)	Section C: Source of information (4 questions)
4)	Section 4 & 5: The impact of oral cancer awareness on preventive behaviour (5 items) and on practice of risk habits (3 questions)	These sections were not included in our study as our aim was to determine the prevalence of smoker among the students and assess the awareness and knowledge on oral cancer among students who are smokers and non- smokers. No intervention was done.
5)	Total of 23 items	Total of 21 items

Results

Respondent's sociodemographic characteristic and smoking habit

Table 2 showed sociodemographic characteristic and smoking habit of the respondents. Majority of the respondents were Malay (92.4%) followed by Indians (7.6%). Majority of them were male (83.6%) with small percentages of females (16.4%). Most of the respondents were approximately 20 to 24 years old (75.6%) and the rest were below 19 years (24.4%). All the respondents were still single and most of them have tertiary education level. Smoking prevalence was quite high among the students (46.9%). Most of them were exposed to tobacco product 1-5 times daily (52.7%). However, a few of the students (7%) had been exposing themselves to more than 50 times per day. Most of them take solely cigarette (75.9%) but others take combination types of tobacco products.

Table 2 Sociodemographic, prevalence and characteristic of smoking habit among students (n= 275)

Variables		Frequency (N)	Percentages (%)
Gender	Male	230	83.6
	Female	45	16.4
Status	Smoker	129	46.9
	Non-smoker	146	53.1
Marital	Single	275	100.0
Ethnic	Malay	254	92.4
	Indian	21	7.6
Monthly income	≤400	266	96.7
	>400	9	3.3
Age	≤19	67	24.4
	≥20	208	75.6
Occupation	Student	275	100
Education	Tertiary	267	97.1
	Secondary	8	2.9
Smoking habit	Smoking	129	46.9
	Non-smoking	146	53.1
Frequency of tobacco use	1-5 per day	68	52.7
	6-10 per day	28	21.7
	15-20 per day	11	8.5
	30-40 per day	4	3.1
	> 50 per day	9	7.0
	Once in a week -month	3	1.24
	Do not respond	6	4.7
Type of tobacco	All types of tobacco	9	6.9
	Cigarettes	98	75.9
	Cigarettes, electronic cigarettes	5	3.8
	Electronic cigarettes	4	3.1
	Rolled tobacco	3	2.3
	Shisha	3	2.3
	Shisha, electronic cigarettes	1	0.8
	Shisha, cigarettes	4	3.1
	Tobacco	1	0.8

The knowledge of oral cancer among the students

The mean knowledge score of the participants was 11.4 (SD 3.49) with minimum and maximum score of 5 and 21 respectively as shown in Table 3. The students were asked about the habit related to oral cancer, early signs, benefits of early detection and risk factors to determine the level of knowledge among them. However, the students barely knew about the early sign of oral cancer which was reflected in their answers where 36.4% for unhealed ulcer, 31.6% for white, red spot lesion and 29.1% for bleeding gingiva. However, 52% of the respondents had the knowledge about the benefits of early detection. Less than half of the students had the knowledge about the importance of mouth self-examination (47.6%). Regarding the knowledge on risk factor related to oral cancer, majority of them identified smoking as a risk factor (82.2%) as demonstrated in Table 3.

The association between smoking habits with oral cancer awareness

This result was based on question B2 “Have you heard regarding mouth cancer before?” From Table 4, majority of the respondents (85%) were aware of oral cancer, however, the non-smokers were more aware of oral cancer (53.8%) compared to smokers (46.2%) even though it was not significant.

Source of information about oral cancer among the student

Section C determined the source of information about oral cancer as shown in Table 5. The health campaign, mass media and internet played essential roles as the source of information; 67.6%, 67.3% and 61.8% respectively. Most of the respondents did not remember when the last time they heard about oral cancer. Most of the messages on oral cancer were conveyed to them through TV, radio and advertisement (66.9%), and exhibition (56.7%). The form of messages on oral cancer that had given them the biggest impact was the mass media (50.2%) followed by the health campaign (48.0%) as shown in Table 5.

Table 3 Knowledge of early signs and risk factors of oral cancer

Knowledge	Yes N (%)	No N (%)
Early signs of oral cancer (B4)		
Unhealed mouth ulcer	100 (36.4)	175(63.4)
White, red spot inside the oral cavity	87 (31.6)	188(68.4)
Bleeding gum	80(29.1)	195(70.9)
Benefits Early detection (B5)	143(52.0)	132(48)
Mouth self-examination as prevention (B6)	131(47.6)	144(52.4)
Risk factors of oral cancer B7		
Smoking	226 (82.2)	49 (17.8)
Alcohol	100 (36.4)	175(63.6)
Spicy food	9 (3.3)	266(96.7)
Betel quid chewing	31(11.3)	244(88.7)
Excessive UV exposure	27(9.8)	248(90.2)

Table 4 The association of smoking habit with oral cancer awareness and knowledge on oral cancer

Variables	n	Aware of oral cancer n(%)	Not aware of oral cancer n(%)	χ^2 statistic (df)	*p*-value*
Non-smoker	146	126(53.8)	20(48.8)	0.359 (1)	0.549
Smoker	129	108(46.2)	21(51.2)		

* Chi-square test.

Table 5 Source of information about oral cancer among the students

Source of information	N	%
From where did you hear about mouth cancer C1		
Internet	170	61.8
Medical doctor/dentist	145	52.7
Media	185	67.3
Health campaign	186	67.6
Family	97	35.3
Last time you heard about cancer C2		
1-3 Weeks	16	5.8
A Year Ago	22	8.0
More Than a Month Ago	5	1.8
Cannot Remember	180	65.5
More Than 3 Months Ago	10	3.6
Form of message given on mouth cancer C3		
Documentary	66	24.0
Magazine, Book, Article	137	49.8
TV, Radio, Advertisement	184	66.9
Exhibition	156	56.7
Talk show	93	33.8
Information from medical doctor or dentist	43	15.6
Biggest impact on you C4		
Internet	117	42.5
Medical	121	44.0
Mass Media	138	50.2
Health Campaign	132	48.0
Family Member	57	20.7

Table 6 Factors associated with knowledge by simple logistic regression (SLR)

Variables	Good knowledge n(%)	Poor knowledge n(%)	*b*[a]	Crude OR[b] (95% CI)	*p*-value*
1)Age					
≤19 years old	25(32.5)	42(21.2)		1	0.053*
>19 years old	52(67.5)	151(78.8)	0.580	1.786 (0.994, 3.209)	
2) Gender					
Female	15(19.5)	30(15.2)		1	0.385
Male	62(80.5)	168(84.8)	0.304	1.355 (0.683, 2.687)	
3) Ethnic					
Indian	12(15.6)	9(4.5)		1	0.003*
Malay	65(84.4)	189(95.5)	-1.355	0.258 (0.104, 0.640)	
4) Education					
Tertiary	73(94.8)	194(98.0)		1	0.175*
Secondary	4(5.2)	4(2)	-0.977	0.376 (0.092, 1.544)	
5) Income					
≥RM 400	2(2.6)	13(6.6)		1	0.209*
< RM 400	75(97.4)	185(93.4)	-0.969	0.379 (0.084, 1.722)	
6)Smoking habit					
Non-smoker	45(58.4)	101(51)		1	0.268
Smoker	41.6(77)	97(49)	0.301	1.351(0.793, 2.299)	

* SLR – $p<0.25$ significant; [a] regression coefficient; [b] crude odds ratio.

Table 7 Factors associated with knowledge test by multiple logistic regression

Variables	*(b)*[a]	Adjusted OR[b] (95% CI)[c]	Wald statistic	*p*-value[d]
Age				
<19 years old		1		
>20 years old	0.670	1.955(1.074,3.559)	4.807	0.028
Ethnicity				
Indian		1		
Malay	1.454	4.279(1.703,10.756)	9.558	0.002

Constant=0.586; [a] *b* regression coefficient; [b] adjusted odds ratio; [c] 95% confident interval; [d] *p*-value MLR <0.05 significant; Interaction checked and not found; Hosmer-Lemeshow test (*p*=0.972); Classification table (73.1%); Area under ROC curve =61.1%.

Factors associated with knowledge by simple logistic regression and multiple regression

Results of simple logistic regression analysis of the relationship between the tested variables and knowledge on oral cancer among the participants are shown in Table 6. After reviewing the *p*-value from univariable analysis. The variable with *p*-value less than 0.25 were selected (age, ethnic, education and income). Variable selection after using enter method, forward LR and backward LR showed age and ethnicity are significant. Interaction was checked, and no significant interaction found. The model goodness of fit was checked. The model can accurately discriminate 61.1% of the cases. Table 7 shows result of multiple logistic regression analysis of factors associated with knowledge. Student aged >19 years old has 1.96 time the odds compared to student aged ≤19 to have poor knowledge (95% CI: 1.07 to 3.56, *p*-value<0.028) when adjusted for age. Malay has 4.28 time the odds compared to Indian to have poor knowledge (95% CI: 1.70 to10.75, *p*-value<0.002) when adjusted for ethnicity.

Discussion

The participants in this study were homogenous in character as all of them were students and single (not married); and majority of them were Malay male and had income less than RM400 from their monthly allowance. These features made it difficult to determine the associate factors that influence the outcome of the study and to generalise the result to the population. However, due to the logistic reasons and the institution offering technical courses, they were ideal candidates for this study with non-medical background.

Oral cancer is one of the most destructive diseases where awareness regarding its occurrence, status and prognosis play a very crucial role in early detection and diagnosis. Today, smoking prevalence among young adults is a challenging issue economically and clinically. Our results indicated that the prevalence of smoking is high among the students (46.9%) if compared to the smoking prevalence among Malaysian population aged 15 years and above in 2015, which was approximately 22.8% (Institute for Public Health, 2015). Our finding could be attributed to the very high proportion of male respondents (83.6 %) compared to female. Many studies had found that male smokers are more than female smokers (Haddad and Malak, 2002; Toriola *et al*., 2008; Al-Naggar *et al*., 2011) and these findings could be due to cultural and social factors or under report due to shame (Al-Naggar *et al*., 2011).

Subsequently, the cigarettes consumption per day was 12.3 pieces which is relatively high. However, the students were being asked only about the frequency of daily tobacco used and they reported that most of them took about one to five times a day (52.7%) and the commonly used types of tobacco was cigarettes (75%) even though few of them took other type of tobacco at the same time. The prominent ethnic group with high prevalence of smoking was Malay male similar as reported by a previous study (Lim *et al*., 2013); however, this result could be biased as the majority of our participants were Malay (92.4%).

Our result reflects fairly good awareness (85%) regarding oral cancer among the non-medical background students. This result is comparable with study done by Ghani *et al*. (2013) whereby their participants were selected in various shopping mall. However, it was observed that better awareness (92%) was reported by other study among medical background students (Al-Dubai *et al*., 2012). In Pakistan, similar study on non-medical university students revealed very low awareness (3%) among their participants (Mehboob *et al*., 2011).

Even though, majority of the participants were aware of oral cancer but their knowledge (mean score 11.3) of oral cancer were generally poor. Being non-medical background students, not much detailed information regarding oral cancer were received from their academic course. This fact was supported by previous studies (Kazmi *et al*. 2011; Al-Dubai *et al*., 2012) of which, the participants were undergraduate medical students and the oral cancer knowledge were higher among the older student group which correspond to year of study. In the present study, despite being older (subjects aged >19 years old), their knowledge of oral cancer is not significantly different than samples aged 19 years and below. This may be due to the similar types of exposure towards information they gained from the internet and mass media. Our study did not show any significant difference in knowledge among gender which was not a typical finding as the females are more concerned of any changes to their appearances for example stained teeth or smelly mouth, and health (Ghani *et al*., 2013) and this result could be attributed by the small number of female participants.

The participants in our study were all single, thus no deduction could be made on marital status, however previous study had reported that the education level and marital status was not significant in relation to knowledge (Al-Shammari *et al*., 2006). In the present study, the majority of the students were Malay with very few Indians; the Malay were 4 times more likely to have poorer knowledge than the Indian. This result was contradictory with findings by Ghani *et al*. (2013) whereby the Malay had better knowledge than the Indians. These differences in findings could be due to the differences in the number of subjects enrolled in their study with 364 Malay subjects and 25 Indian subjects. On the other hand, the Indians in our study may have heard and knew about the sign and symptoms of oral cancer from friends and relative compared to the Malays as the prevalence were higher among the Indians. These facts are supported by Ghani *et al.* (2013) whereby the Indians were 4 times more likely to identify unhealed ulcer as an early sign of oral cancer.

In this study, smokers generally had less awareness and knowledge on oral cancer than non-smokers which was concordance with previous studies (Al-Shammari *et al*., 2006; Foong and Tan 2008; Pakfetrat *et al*., 2010; Al-Naggar *et al*., 2011). Besides, being less knowledgeable of the harmful effect of tobacco towards health, smokers could be led to the wrong beliefs such as smoking could increase concentration, reduce weight and give confidence (Al-Naggar *et al*., 2011). Smoking (82.2%) was the most recognised risk factors of oral cancer among the respondents which agreed with previous studies (Carter and Ogden, 2007; Kazmi *et al*., 2011; Al-Dubai *et al*., 2012). Despite the fact that they knew smoking was a risk factor for oral cancer, they still smoke. This could be due to peer influence, wrong beliefs on smoking and unwilling to give up their habits due to addiction and could not accept that it can cause harm to their health. Moreover, since the prevalence of students smoking were high, it has become a norm to them.

Generally, there was lack of knowledge about early signs of oral cancer for unhealed ulcer (36.4%), colour changed in oral cavity (31.6%) and mouth self-examination and these findings were in contrast from previous studies (Ghani *et al*., 2013; West *et al*., 2006). Nevertheless, most of the students agreed and acknowledged the importance and benefits of early oral cancer detection. Definitely early detection could not be achieved if their knowledge on early sign of oral cancer are poor, therefore, these problems should be addressed.

Only 11.3 % of the respondents in this study recognise betel quid chewing as a risk factor of oral cancer. This concurred with that reported by Ghani *et al.* (2013). This finding

was expected as betel quid chewing was popular among the elderly adults above the age 50 and in the rural area (Ghani *et al*., 2011). Very few participants (9.8%) knew excessive UV exposure could cause oral cancer, this may be due to uncommon lip cancer among Malaysian and any other non-white population country (Warnakulasuriya, 2009). Moreover, possibly it is not the Malaysian culture to get exposed to excessive UV light as in white population countries where outdoor activities are popular.

Most of the messages on oral cancer received by the respondents in this study were from mass media and exhibition, 66.9 % and 56.7% respectively, which is similar with previous studies (Al-Maweri *et al*., 2015). The result of this study showed internet (61.8%) could be a useful and convenient tool for gaining knowledge on oral cancer Surprisingly, only 15% of the information come from the medical doctors/ dentist. Similar findings were reported by a study done in Arab Saudi (Al-Maweri *et al*., 2015). On the other hand, high percentage (80%) of the Malaysian dentists admitted they provided oral cancer risk habits cessation advice to their patients (Saleh, 2014). Perhaps chair side advice to patient may not be sufficient to disseminate information on risk factor, sign and symptoms and mouth self-examination. The poor in-depth knowledge on oral cancer in this study group indicate their main source of information from mass media and health campaign was still not very effective. Dentist is the most appropriate person to disseminate information on oral cancer as their profession are directly related to oral cavity. Research had shown that dentist would participate in oral cancer prevention and detection if they are comfortable with their level of knowledge regarding oral cancer. Therefore, continuous education on oral cancer would be able to motivate the dentist to conduct oral cancer screening and discuss mouth self-examination with their patients, targeted group in particular the school children and public via intensive health education programme (Saleh, 2014).

Conclusion and recommendation

The present study found that there was satisfactory level of awareness on oral cancer among the non-medical background students even though their in-depth knowledge on oral cancer was low. Prevalence of smoking was high (46.9%) and level of awareness and knowledge on oral cancer among the smoker were lower than non-smokers. The most popular type of tobacco used was cigarette. Mass media and health exhibition were the main source of information regarding oral cancer. There is a need to educate the non-medical background students with preventive and risk factors of oral cancer and introduce smoking cessation programme. The use of television, advertisement and internet should be stressed to widely impart information on the risk factors of oral cancer. Dentist should carry out routine opportunistic oral cancer screening and educate their patients.

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Declaration

Authors declared no conflict of interest.

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