ORIGINAL ARTICLE

Factors Affecting Awareness of Oral Cancer: A Cross-Sectional Study from a One-Day Free Consultation Camp in Karachi

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Abstract

Background: Oral cancer is currently one of the major public health problems globally. Awareness of the risk factors of oral cancers may result in patients seeking medical advice earlier, which in turn can lead to early detection and a better prognosis of such lesions. Literature also reports lack of awareness to be the most common barrier to care-seeking by oral cancer patients.

Objective: To determine oral cancer awareness and its associated factors among among dental patients attending free consultation camp in a tertiary care hospital in Karachi.

Methods: A cross-sectional study was conducted in a tertiary care dental hospital in district Malir, Karachi, from January 2019 to June 2019. After checking eligibility and taking verbal informed consent, the participants were interviewed using a questionnaire to assess their oral cancer awareness. Data were analyzed on SPSS version 20. Crude and adjusted odds ratio with 95% confidence interval were computed using binary logistic regression to determine the association of demographic characteristics with awareness.

Results: The median age of study participants was 37 (IQR=45-29) years whereas 105 (65.2%) of them were female. The mean awareness score of the participants was 8.94±2.71. Moreover, only 34 (21.1%) participants had adequate awareness whereas 127 (78.9%) had inadequate awareness regarding oral cancer. In a multivariable model, education of the patients was found to be associated with adequate awareness regarding oral cancer.

Conclusion: It was concluded that certain gaps exist in the awareness of dental patients regarding oral cancer, and apart from the education, none of their demographic characteristics significantly influenced it.

Keywords: *Awareness, neoplasms, mouth, free camp, demographic factors.*

INTRODUCTION

Cancer is among the most common causes of mortality in both developed and developing countries [1]. It has been reported in 2022 that the age-standardized incidence rate of oral cancer in Asia increased from 1990 to 2019 with an estimated annual percentage change of 0.32 (95% CI, 0.19-0.46) [2]. Oral cancer is currently one of the major public health problems globally [3]. Amongst all the cancers, 600,000 cases of squamous cell carcinoma of the head and neck occur globally [4]. According to literature, along with some countries in southern Europe, the highest incidence of oral cancers is reported in South and Southeast Asia [5].

Most of the oral microbiome exists in a biofilm state, the oral biofilm; and the dynamic interactions between oral microorganisms and the host are termed oralome; these interactions can range from healthy (eubiotic) to disease (dysbiotic) states [6]. Multiple agents, including genetic, epigenetic, microbial, habitual, and lifestyle factors, are considered to have a close link with the incidence and advancement of oral cancer. Moreover, oral lesions, inherited genetic mutations such as dyskeratosis congenital syndrome and certain viral infections like human papillomavirus are recognized as early signs of oral cancer [7].

Oral cancer is defined as a malignant epithelial neoplasm exhibiting squamous differentiation as characterized by the formation of keratin and/or the presence of intercellular bridges [8]. A majority of oral cavity cancers arise from the epithelial cells of the oral cavity [9]. It includes cancer of the lips, tongue, cheeks, floor of the mouth, hard and soft palate and pharynx. Locally in Pakistan, it has been recently reported that the age-standardized rates of incidence (27.03/100,000) and age-standardized rates of mortality (16.85/100,000) of oral cancers are highest in Pakistan [10]. Data about 5-year survival is not available for the Pakistani population, though in neighboring India it has been reported to be 38% to 42% [11].

Many factors have been implicated in the etiology of oral cancers. Tobacco smoking and alcohol drinking, smokeless tobacco products, and HPV infections are among the major risk factors for oral cancers, with an attributable risk of 80% for tobacco and alcohol [12]. A recent study from Pakistan reported male patients belonging to lower socioeconomic status who had chewing habits for many years to constitute the bulk of oral squamous cell carcinoma patients [13].

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Awareness of the risk factors of oral cancers may result in patients seeking medical advice earlier, which in turn can lead to early detection of such lesions. Early detection and management of small cancers at certain sites may result in a better prognosis and can greatly increase a patient's chances of survival as the mouth is an easily accessible body part for a clinical procedure [12]. Despite this, it has recently been reported that higher-risk lesions are less likely to make patients seek professional advice while high-risk patients are less aware of the appearance of cancerous oral lesions [14]. Literature also reports lack of awareness to be the most common barrier to care-seeking by oral cancer patients [15].

In the given context, a thorough literature review by the investigators revealed very scarce local data on oral cancer awareness among dental patients. A local study from Pakistan showed only 54% of patients have awareness regarding oral cancers [16]. Similarly, another local study revealed a varying degree of knowledge among patients regarding risk factors of oral cancer [17]. In order to expand and update the local knowledge base, this study was conducted to determine oral cancer awareness and its associated factors among dental patients attending free consultation camp in a tertiary care hospital in Karachi.

METHODS

A cross-sectional study was carried out at Baqai Dental College, Karachi, from January 2019 to June 2019. Ethical approval of the study was taken from the Baqai Institute of Health Sciences, Karachi. All patients aged ≥18 years of either gender were included while those refusing to give verbal informed consent were excluded from the study.

Taking the prevalence of the study outcome as 54% [16], with a 95% confidence interval and 8% precision, the minimum required sample size was calculated to be 150 participants by using the following formula: n = z2(p) (1-p) / c2. Patients were included in the study by employing a non-probability consecutive sampling technique. All data were collected during a one-day consultation and awareness camp arranged on Oral Cancer Day, 4th February 2019 at Family Welfare Center, Agra Taj Colony, Liyari, Karachi.

Patients' demographic details and oral cancer awareness were assessed by the study investigators through a questionnaire specifically designed for this study. The questionnaire was piloted on 15% of the sample size to check for face validity and reliability; the face validity was assessed by asking participants if the study questions appeared to have assessed their awareness regarding oral cancers while the reliability was determined by calculating Cronbach's alpha value that came out to be 0.778, indicating an acceptable level of internal consistency.

The study questionnaire comprised of two sections, the first section contained six questions regarding the demographic profile of the study participants whereas the second section consisted of sixteen questions regarding oral cancer awareness. The questionnaire was filled in by the principal investigator after taking patients' verbal informed consent. All questions had dichotomous options. The correct responses of the participants were given a score of 1 while the incorrect responses were given a score of 0. Participants who correctly answered 70% of the awareness questions, *i.e.* 12 out of 16, were considered as having adequate awareness. The study questionnaire is provided in a supplementary file.

The data were entered and analyzed on the statistical package for social sciences version 20. Descriptive analyses such as frequencies and percentages were executed for categorical variables such as age group, gender, marital status, occupation, education and monthly household income while continuous variables like age, median and interquartile range (IQR) were computed after checking the assumption of normality using Shapiro-Wilk test. For inferential analysis, binary logistic regression was applied to compute univariate odds ratios with a 95% confidence interval for determining the association of demographic characteristics with awareness of dental outpatients. Variables with $p<0.25$ and other important variables irrespective of $p<0.25$ in univariate analysis were used to build a multivariable regression model to compute adjusted odds ratios with a 95% confidence interval. A two-tailed p-value of ≤0.05 was considered statistically significant.

Ethics Approval and Participant Consent: To the best of the authors' knowledge, the study procedures were in line with the institutional ethical standards for human experiments and the Helsinki Declaration, including taking verbal informed consent from all the participants. The ethical approval from Baqai Institute of Health Sciences was also duly taken (reference # FHM66-2020/MPH student/Batch 26).

RESULTS

Against the calculated sample size of 151, a total of 161 participants were included in the study. All of the outpatients screened for eligibility agreed to be a part of the study with a 0% refusal rate. The median age of study participants was 37 (IQR=45-29) years, and further detail on their demographic characteristics is provided in Table **1**.

It was further seen that 61.5% (n=99) of the respondents were aware that poor oral hygiene can play an important role in the development of cancerous lesions, and 90.1% (n=145) were aware of the effect of smoking on the development of cancerous lesions, 96.3% (n=155) were aware that chewing tobacco/pan/betel nut can affect the development of cancerous lesions in the oral cavity whereas 52.2% (n=84) were aware that drinking alcohol can affect the development of cancerous lesions.

Table 1: Demographic characteristics of study participants.

Participants' Features	n (%)
Age Group	
Less than 40 years	89 (55.3)
40 years or Above	72 (44.7)
Gender	
Male	56 (34.8)
Female	105 (65.2)
Marital Status	
Unmarried	23 (14.3)
Married	133 (82.6)
Divorced/Widowed/Separated	5 (3.1)
Occupation	
Employed	48 (29.8)
Self-Employed	25 (15.5)
Housewife	88 (54.7)
Education	
Illiterate	24 (14.9)
Able to Read and Write	10 (6.2)
Primary	24 (14.9)
Secondary	36 (22.4)
Intermediate	34 (21.1)
Graduation or Above	33 (20.5)
Monthly Household Income	
Up to 15,000 Rs.	97 (60.2)
16,000 Rs or More	64 (39.8)

Moreover, 50.3% (n=81) were aware of the effect of any chronic irritation/traumatic lesion on the development of cancerous lesions in the oral cavity, and 68.3% (n=110) were aware that a non-healing oral ulcer can be a cancerous lesion, only 16.1% (n=26) were aware that any red/white patch or spot in the oral cavity can be a pre-cancerous lesion whereas only 32.9% (n=53) were aware that any overgrowth/lump can be a pre-cancerous lesion. Furthermore, 76.4% (n=123) were aware that the frequency of dental visits may have an impact on the development of a cancerous lesion in terms of its early detection, while only 41.6% (n=67) were aware that having a balanced lifestyle, in terms of avoiding high fat and/or sugar intake and increasing fruit and/or vegetable intake, may have an impact on preventing the development of oral cancer, 93.8% (n=151) were aware that early detection of some cancers can improve the chances of successfully treating them, 65.8% (n=106) were aware that a dentist should be visited in case of a painless, non-burning wound in oral cavity whereas only 23.6% (n=38) were aware that a dentist should be visited in case of a red or white color change within the oral cavity. Also, 78.3% (n=126) were aware that oral cancer can be fatal if left untreated, only 11.2% (n=18) were aware that oral cancer may manifest without any initial complaint or symptom whereas only 36.0% (n=58) were aware that any painless projected growth in the neck can be a sign of oral cancer.

The mean awareness score of the participants was 8.94±2.71. Moreover, it was found that only 34 (21.1%) participants had adequate awareness whereas 127 (78.9%) had inadequate awareness regarding oral cancer.

Table 2: Univariate analysis of the association between demographic characteristics and awareness.

Participants' Features	Crude OR	(95% CI)		p-value
		Lower Bound	Upper Bound	
Age (Years)				
Less than 40	2.407	1.106	5.237	*0.027
40 or Above	Ref			
Gender				
Male	0.972	0.440	2.147	0.944
Female	Ref			
Marital Status				
Married	0.313	0.070	1.412	0.131
Divorced/Widowed/ Separated	0.381	0.028	5.274	0.472
Unmarried	Ref			
Occupation				
Employed	0.771	0.335	1.776	0.542
Self-Employed	1.350	0.411	4.429	0.621
Housewife	Ref			
Education				
Able to read and write/Primary	2.286	0.352	14.859	0.387
Secondary/ Intermediate	0.690	0.177	2.690	0.594
Graduate or Above	0.134	0.034	0.539	*0.005
Illiterate	Ref			
Monthly Household Income (Rs.)				
Up to 15,000	5.220	2.282	11.939	**<0.001
16,000 or More	Ref			

Ref: Reference Category, OR: Odds Ratio, CI: Confidence Interval, *Significant at <0.05, **Significant at <0.005

Table **2** represents a univariate analysis of the association between participants' characteristics and their awareness. It shows that age, education and monthly household income were significantly associated with the awareness of the participants (p<0.05 for all) where participants aged less than 40 years had significantly higher odds of having adequate awareness than those who were aged 40 years or above (OR=2.407, 95% CI: 1.106-5.237), participants who had graduation or above education had significantly lower odds of having adequate awareness than those who were illiterate (OR=0.134, 95% CI: 0.034-0.539) whereas participants who had a monthly household income of up to 15,000 rupees had significantly higher odds of having adequate awareness than those who had a monthly household income of 16,000 rupees or more (OR=5.220, 95% CI: 2.282-11.939).

Fig. (1) shows details of the multivariable model of factors affecting awareness. The odds of adequate awareness were higher in patients aged <40 years as compared to those aged >40 years but statistically it was not significant (aOR=2.532, 95% CI: 0.930-6.891). The odds of adequate awareness were higher in male

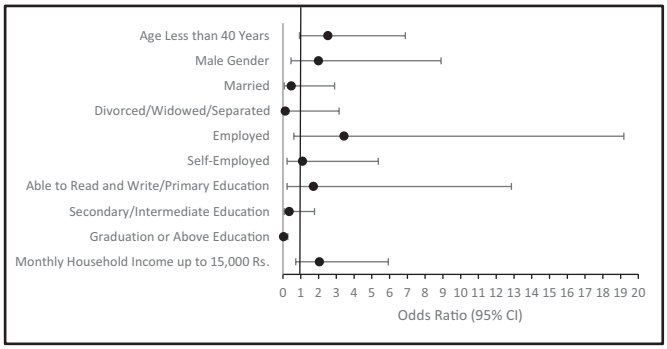

Fig. (1): Multivariable association of demographic characteristics with awareness in dental patients.

than female patients but statistically, significance was not observed (aOR=2.001, 95% CI: 0.450-8.893). The odds of adequate awareness among patients who were married or divorced/widowed/separated were 0.464 and 0.125 times lower respectively in contrast to patients who were unmarried without statistical significance (aOR=0.464, 95% CI: 0.074-2.904 and aOR=0.125, 95% CI: 0.005-3.159 respectively). No statistically significantly higher odds of awareness were seen among patients who were employed or self-employed as compared to those who were housewives (aOR=3.434, 95% CI: 0.615-19.179 and aOR=1.107, 95% CI: 0.228-5.369 respectively). No statistically significantly higher or lower odds of awareness were seen among patients who were able to read and write/had primary education or had secondary/intermediate education as compared to those who were illiterate (aOR=1.718, 95% CI: 0.230-12.857 and aOR=0.350, 95% CI: 0.069-1.776 respectively) but strangely odds of awareness were statistically significantly lower among patients who had graduation or higher education as compared to those who were illiterate (aOR=0.037, 95% CI: 0.005-0.273). The odds of adequate awareness were higher in patients who had a monthly household income of up to 15,000 rupees as compared to those who had a monthly household income of 16,000 rupees or more but statistically, it was not significant (aOR=2.052, 95% CI: 0.711-5.926).

DISCUSSION

The study results showed that only 21.1% of participants had adequate awareness regarding oral cancer. An earlier study by Shakoor A *et al.* reported 54.0% of the patients to have awareness regarding oral cancer [16]. In both these instances, a vast proportion of patients was found to have inadequate awareness regarding oral cancer, pointing toward a need for enhancing awareness of dental patients on this topic. This can be achieved by appropriate counselling by dentists during their contact with patients, particularly those with poor oral hygiene.

As previously reported [8], a majority of the patients were found to be aware of the relationship between poor oral hygiene and oral cancer. These findings indicate that the need of maintaining good oral hygiene for the prevention of oral cancers is well known among dental patients.

Moreover, a vast majority of the study participants were aware of the effect of smoking on the development of cancerous lesions, a finding well in line with the published literature [8, 18, 19]. But as some contrary results have also been reported [20, 21], further exploration of this finding is called for.

As previously reported [20], the study results showed that a vast majority of the patients were aware of the effect of chewing tobacco/pan/betel nut on the development of cancerous lesions. Being a common addiction in our local setting, it is important that patients have awareness regarding the harmful effects of chewing tobacco/pan/betel nut on oral health.

It was found in our study that more than half of the patients were aware about the effect of alcohol on the development of cancerous lesions in the oral cavity, a finding supported by published literature [18, 19]. But as dissimilar results have also been reported [20, 21], further confirmation of our findings, particularly in the local context, is suggested.

Moreover, two-thirds of the patients were aware that a non-healing oral ulcer can be a cancerous lesion. Though literature reports wide-ranging estimates on this finding [8, 21], a scoping review published in 2021 also reported that a non-healing ulcer was most commonly identified as a symptom of concern by dental patients [22]. If patients do not have the awareness that a non-healing oral ulcer can be a cancerous lesion, they may take longer to consult a dentist which may result in loss of precious time for early diagnosis and better prognosis of their illness.

Furthermore, only a third of the patients were aware that any overgrowth/lump can be a pre-cancerous lesion. Literature again reports wide-ranging estimates on this finding [8, 21]. Such variable estimates are not unexpected because of the different methods and settings of these studies. In any case, however, the need to improve the awareness of dental patients about this condition cannot be overlooked. It is suggested that during a dental exam if any overgrowth/lump is found, the dentist should discuss in detail the significance and implication of this finding for the health of the patient and provide the necessary guidance to the patient as to how this condition should be investigated and treated.

As previously reported [8], a vast majority of the patients were aware that early detection of some cancers can improve the chances of successfully treating them. Moreover, around two-thirds of the patients were aware that a dentist should be visited in case of a painless, non-burning wound in the oral cavity while almost a quarter of the patients were aware that a dentist should be visited in case of a red or white color change within the oral cavity. Similar results were reported by an earlier

study [21], lending a degree of credibility to the study findings.

Furthermore, only a tenth of the patients were aware that oral cancer may manifest without any initial complaint/ symptom while an earlier study reported almost a third of the patients to have this awareness [21]. This finding, combined with a reported lack of knowledge about early signs of oral cancer among most dental patients [23], is very worrisome because a low awareness may translate into neglect on the part of patients for their regular oral checkups due to the absence of any active complaint. This may ultimately prove costly for their well-being because of missed opportunities for early diagnosis of any cancerous lesion in the oral cavity. In order to deal with this alarming trend, the importance and significance of periodic oral examinations and screening should be conveyed to the patients and the general public at every opportunity available. This may include advising patients during treatment, arranging screening and awareness camps, conducting seminars and using media platforms to enhance awareness about the importance of oral screening among the masses.

Moreover, only a third of the patients were aware that any painless projected growth in the neck can be a sign of oral cancer. Similar results have been reported previously [21]. Because of the apparent difference in the location of any growth in the neck, a patient may get misguided and not consult the concerned specialist. Adequate patient counselling about the importance of periodic oral examinations and screening should therefore be done to avoid future complications that may result due to lack of awareness in such cases.

As reported previously [24, 25], the study results did not show any significant difference in the awareness of the patients based on their age or gender. Unlike these findings though, higher knowledge of female patients than their male counterparts regarding oral cancers has also been reported [26, 27]. As suggested by local data from Pakistan, females suffer more from oral cancer than males [28], it is therefore even more important for female patients to have adequate awareness regarding oral cancer. Moreover, in today's world, where access to various media sources is increasingly becoming easier, it can be reasonably argued that the age and gender of the patients are no longer a limiting factor in determining their awareness levels.

Moreover, the occupation of the patients was not found to be significantly associated with their awareness of oral cancers. Though the presence of such an association has not been previously studied, this potential association was explored in this study to present a venue for future investigation.

Strangely though, the study results showed that respondents who were graduates or had higher education had significantly lower awareness about oral cancers. As Literature generally reports contrary findings in this regard [19-21, 25, 29], our findings may not be a true representation of the actual association, though the absence of any relationship between education and oral cancer awareness has also been reported previously [24].

The study results further showed that the monthly household income of the respondents was not significantly associated with their awareness of oral cancers. Literature shows equivocal findings in this regard [24, 30]. Further exploration of this finding is therefore warranted to make a meaningful conclusion.

This study has certain limitations. Being a single-center study with moderate sample size, the generalizability of the study findings is limited. Furthermore, it is also acknowledged that certain variables related to oral cancer awareness, such as the use of spices and other forms of tobacco, presence of sharp tooth, ethnicity, sexual orientation and history of viral infections, could not be included in the study questionnaire. A piloted questionnaire with an acceptable level of internal consistency can though be considered the strength of the study. Structured, well-organized and low-cost public health awareness programs should be arranged for the masses that focus on the etiological factors of oral cancer and the importance of regular oral examination.

CONCLUSION

It was concluded that certain gaps exist in the awareness of dental patients regarding oral cancer, and apart from the education, none of their demographic characteristics significantly influenced it.

ETHICS APPROVAL

To the best of the authors' knowledge, the study procedures were in line with the institutional ethical standards for human experiments and the Helsinki Declaration. The ethical approval from the Baqai Institute of Health Sciences was also duly taken (reference # FHM66-2020/MPH student/Batch 26).

CONSENT FOR PUBLICATION

Prior to data collection, verbal informed consent was taken from each participant of the study.

AVAILABILITY OF DATA

Data cannot be shared publicly because it is the intellectual property of the Baqai Institute of Health Sciences. Data are available from the Baqai Institute of Health Sciences (contact *via* manager.mph@baqai.edu.pk).

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CONFLICT OF INTEREST

All authors do not have any conflict of interest.

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AUTHOR'S CONTRIBUTION

Syed Mohsin Abbas Abidi: Substantial contribution to the design of the work; and acquisition of data for the work; and Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Syed Imtiaz Ahmed Jafry: Substantial contribution to the conception of the work; and Final approval of the version to be published.

Syeda Zeenat Raza Rizvi: Substantial contribution to the acquisition of data for the work; and drafting of the work.

Syed Muhammad Zulfiqar Hyder Naqvi: Substantial contribution to analysis and interpretation of data for the work; and Revising the work critically for important intellectual content.

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