Journal of Current Research in Oral Surgery
2024, Volume 4, Page No: 119-127

Available online at: www.tsdp.net

ISSN: 3062-3480

Original Article

Public Awareness and Misbeliefs about Oral Cancer in Northeast Italy: Influence of Gender, Education, and Sources of Information

Kim Da-Hye[1]*, Oleksandr V. Petrenko[2], Hana T. Desta[1]

[1]Department of Oral and Maxillofacial Surgery, College of Dentistry, Kyung Hee University, Seoul, South Korea.
[2]Department of Oral Surgery, Faculty of Dentistry, Kharkiv National Medical University, Kharkiv, Ukraine.

***E-mail** ✉ dahye.kim@gmail.com

Received: 23 January 2024; **Revised:** 22 April 2024; **Accepted:** 24 April 2024

ABSTRACT

This study sought to evaluate public knowledge regarding oral cancer and to determine whether awareness levels vary according to demographic characteristics and subject-specific factors. An anonymous online questionnaire was administered to 750 randomly selected participants. Statistical analyses were conducted to examine how variables such as gender, age, and educational attainment influence understanding of oral cancer and its associated risk determinants. Approximately 68.4% of respondents were aware that oral cancer exists, with information most often obtained through media or personal networks. Knowledge levels were notably higher among women and individuals with advanced education, whereas age showed no significant impact. While smoking was widely recognized as a major risk factor, fewer respondents identified alcohol misuse or UV exposure as contributors, particularly within groups with lower education. Additionally, the survey revealed widespread misconceptions: over 30% of participants believed that amalgam restorations could initiate oral cancer, regardless of demographic category. These findings highlight the necessity of targeted oral cancer education programs, emphasizing the role of schools and healthcare professionals in delivering, coordinating, and evaluating long-term awareness initiatives with adequate methodological rigor.

Keywords: Oral cancer, Head and neck malignancies, Health surveys, Population surveys, Behavioral risks, Oral disease prevention

How to Cite This Article: Da Hye K, Petrenko OV, Desta HT. Public Awareness and Misbeliefs about Oral Cancer in Northeast Italy: Influence of Gender, Education, and Sources of Information. J Curr Res Oral Surg. 2024;4:119-27. https://doi.org/10.51847/CwDFViXMTu

Introduction

Oral squamous cell carcinoma (OSCC) is a prevalent yet insufficiently recognized malignancy, affecting more than 300,000 people annually and resulting in 177,384 deaths, accounting for roughly 2% of all cancers [1]. In Italy alone, 9,700 new cases were documented in 2018, comprising 7,400 men and 2,300 women [2]. Epidemiological data show that OSCC occurs predominantly in males over the age of 50, though incidence is increasing among individuals under 45 and among women globally [3]. Despite advancements in therapeutic options, OSCC mortality remains close to 50%, mainly due to the stage at initial diagnosis [4, 5]. Limited awareness of the disease and its early manifestations contributes substantially to diagnostic delays, poorer survival [6], diminished quality of life [7], and higher healthcare costs stemming from extended hospital stays and more complex surgical procedures [8]. A recent systematic review identified a lack of public knowledge as the leading contributor to delayed OSCC detection [9]. Like many malignancies, OSCC is strongly linked to specific lifestyle behaviors, including tobacco use, heavy alcohol consumption, ultraviolet exposure, and

HPV infection [10]. HPV plays a more prominent role in oropharyngeal squamous cell carcinoma (OPSCC), which typically affects younger patients than those with OSCC [11]. Beyond understanding risk factors, the general population frequently remains unaware that cancer can arise within the oral cavity, and many report difficulty knowing which specialist to consult when symptoms appear [12].

Although awareness campaigns addressing OSCC and related cancers are conducted worldwide, their real-world effectiveness in reducing diagnostic delays remains challenging to measure [13]. Such initiatives may unintentionally overlook groups that would benefit the most. Therefore, evaluating OSCC awareness within the general population and identifying demographic differences may help determine which communities require focused educational outreach.

The objective of this study was to assess public knowledge of various aspects of OSCC and to examine how levels of awareness differ according to demographic variables such as age, sex, and educational background.

Materials and Methods

Questionnaire development

The research team from the Oral Medicine and Pathology Unit (School of Dentistry, University of Trieste), together with the University's Scientific Promulgation Office, created a new instrument to measure public understanding of OSCC. Its design was inspired by a questionnaire previously administered to younger populations [14], but it was expanded to include items addressing the perceived need for further educational initiatives. When participants were asked to identify factors that might contribute to OSCC, they could select multiple choices from both established causes (tobacco, alcohol, sunlight) and incorrect attributions (amalgam restorations, fluoride products). This allowed the investigators to determine how widely misinformation circulates. Ethical approval was granted in accordance with the Declaration of Helsinki (protocol 86/2018).

Face and content validity of the questionnaire

To ensure the questionnaire was understandable and logically structured, 10 evaluators (4 dentists, 4 dental hygienists, 2 students) reviewed the draft. Each item received an impact score (IS) using a 1–5 Likert scale, where 1 indicated very poor suitability and 5 indicated high suitability. Items with IS values below 1.5 were removed [15].

Next, content validity was examined through the content validity ratio (CVR) and content validity index (CVI). A separate group of 10 specialists in oral medicine rated each item as unnecessary, useful but not crucial, or essential, and CVR values were calculated using Lawshe's method [16]. Any question with a CVR under 0.62 was discarded. The same panel then judged the relevance of each item using a four-point scale, and CVI scores were computed according to established formulas [17]. Items with CVI below 0.80 were excluded.

Submission of the questionnaire

The finalized survey was administered by students to visitors aged 11 years or older who attended the University of Trieste exhibit during the three-day Trieste NEXT science festival. Individuals entered a public exhibition space freely, and those who agreed to participate provided consent and completed the questionnaire on a tablet. A total of 750 completed surveys were collected. After the event, all responses were anonymized, transferred into Microsoft Excel, and descriptive statistics (frequencies, percentages, mean values) were produced.

Statistical analysis

All statistical procedures were conducted using R version 4.0.2 (R Foundation for Statistical Computing, Vienna, Austria). Fisher's exact test was applied to 2×2 tables to examine relationships between demographic characteristics and awareness of OSCC. Variables showing significant associations were subsequently included in a multivariable logistic regression model. A forward stepwise method was employed, removing predictors that did not improve model fit. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated, with $p < 0.05$ considered statistically significant.

Results and Discussion

Demographic characteristics of the participants

In total, 750 respondents completed the questionnaire. Their demographic data are summarized in **Table 1**. Participants were grouped according to gender (male/female), age (<30 or ≥30), and educational level to identify demographic patterns linked to OSCC knowledge or awareness of risk factors. Educational categories followed the International Standard Classification of Education (ISCED) [18]. Levels 0–2 represent primary and lower-secondary education, whereas levels 3–8 correspond to schooling beyond eight years.

Table 1. Overview of participant demographics and subgroup classifications, presented as frequencies or as mean ± standard deviation for age.

Characteristic	Value
Total participants	750
Gender	
Male	45.32%
Female	54.41%
Age	
Mean ± SD	32 ± 15 years
Range	10–92 years
Age group	
<30 years	64.75%
≥30 years	35.25%
Educational level (ISCED classification)	
ISCED 0–2 (primary to lower secondary)	47.07%
ISCED 3–8 (upper secondary to doctoral)	52.93%
Family or close friends ever diagnosed with any cancer	
Yes	71.54%
No	28.46%

Knowledge about OSCC, risk factors and sources of information

The findings summarized in **Tables 2 and 3** show that 68.4% of respondents were aware that oral cancer exists. The most frequently mentioned sources of information were media (44.3%) and relatives or acquaintances (34.5%), followed by school (21.0%) and dental professionals (13.7%). Nearly all participants recognized smoking as a contributor to oral cancer (94.1%), whereas only about half identified alcohol intake (51.3%). Awareness of sunlight as a potential risk was low (15.4%). Misconceptions were also evident: 12.7% pointed to fluoride and 34.7% to amalgam fillings as possible causes. Most participants knew that OSCC represents a malignant condition (75.2%) and that lifestyle adjustments could help prevent it (83.6%). Although survival statistics were unfamiliar to most, 93.0% agreed that early detection improves outcomes.

Table 2. Knowledge of OSCC, recognized and mistaken risk factors, information channels, and perceived strategies to increase public awareness. Data are expressed as frequencies.

Question	Response Options	Percentage (%)
Main source of information about oral cancer	Dentist	13.7
	Family or friends	34.5
	School	21.0
	Media (TV, radio, internet, etc.)	44.3
	Other	11.8
Do you believe that changing lifestyle habits can reduce the risk of oral cancer?	Yes	83.6
	No	13.6
	Do not know	2.7
Do you think oral cancer has high survival rates?	Yes	20.8
	No	22.4
	Do not know	56.8
Do you think oral cancer is a malignant tumor?	Yes	75.2
	No	1.6
	Do not know	23.2
Do you believe that early diagnosis can improve survival rates for oral cancer?	Yes	93.0
	No	2.0
	Do not know	5.0
Which professional would you first consult if you suspected oral cancer? (multiple responses allowed)	Dermatologist	4.6

	General practitioner	36.1
	Dentist	49.1
	Oncologist	33.4
	Otolaryngologist (ENT specialist)	35.4
Do you believe there is a need for more information about oral cancer?	Yes	98.2
	No	1.8
If yes, through which channels would you prefer to receive more information? (multiple responses allowed)	Public meetings	36.0
	Internet and social media	65.7
	Newspapers and magazines	31.6
	School	76.5
	Other	3.9
At what age do you think the topic of cancer prevention should first be addressed?	6–10 years	10.3
	11–14 years	38.8
	15–18 years	56.1
	Older than 18 years	22.9

Table 3. Association of gender, age, and educational background with OSCC knowledge and recognition of risk factors. Frequencies are reported. A p-value < 0.05 indicated statistical significance, and significant results appear in bold.

Question / Statement	Response	Total n (%)	Male n (%)	Female n (%)	p-value (univariate)	Adjusted OR (95% CI)	p-value (multivariate)
Have you ever heard of oral cancer?	**Yes**	513 (68.4%)	215 (29.3%)	291 (39.6%)	0.02	0.68 (0.5–0.9)	0.02
	No	237 (31.6%)	119 (16.2%)	110 (15.0%)			
Do you think smoking is a risk factor for oral cancer?	**Yes**	697 (94.1%)	306 (42.1%)	377 (51.9%)	<0.05	0.53 (0.3–1.0)	<0.05
	No	40 (5.9%)	26 (3.6%)	17 (2.3%)			
Do you think excessive alcohol consumption is a risk factor for oral cancer?	**Yes**	380 (51.4%)	174 (24.0%)	199 (27.4%)	0.65	–	–
	No	357 (48.6%)	158 (21.8%)	195 (26.9%)			
Do you think sunlight/UV exposure (e.g., to the lips) is a risk factor for oral cancer?	**Yes**	114 (15.4%)	44 (6.1%)	70 (9.6%)	0.10	–	–
	No	623 (84.6%)	288 (39.7%)	324 (44.6%)			
Do you think fluoride is a risk factor for oral cancer?	**Yes**	94 (12.7%)	52 (7.2%)	39 (5.4%)	0.02	1.69 (1.1–2.6)	0.02
	No	643 (87.3%)	280 (38.6%)	355 (48.9%)			

Do you think dental amalgam fillings are a risk factor for oral cancer?	**Yes**	257 (34.7%)	123 (16.9%)	128 (17.6%)	0.21	–	–
	No	480 (65.3%)	209 (28.8%)	266 (36.6%)			

Variable	**Awareness of oral cancer (Yes)**	**Education (ISCED 0–2 vs. 3–8)**	**p-value**	**OR (95% CI)**	**p-value**
Lower education (ISCED 0–2)	224 (29.9%)	–	0.01	1.54 (1.1–2.1)	0.01
Higher education (ISCED 3–8)	289 (38.5%)	–			
Variable	Belief alcohol is risk factor (Yes)	Lower vs. higher education	p-value	OR (95% CI)	p-value
Lower education (ISCED 0–2)	157 (21.2%)	–	<0.001	1.65 (1.2–2.2)	<0.001
Higher education (ISCED 3–8)	223 (30.1%)	–			

a Fisher's exact test was used for each variable.
b Variables with significant associations were tested through multiple logistic regression to generate odds ratios (ORs) with 95% confidence intervals (CIs) and corresponding p-values.

When asked which healthcare provider they would consult if they suspected oral cancer, 49.1% chose a dentist, while others indicated a general practitioner, oncologist, or otolaryngologist. Only 4.6% reported that they would consult a dermatologist.

Nearly all participants believed that more public education on oral cancer is necessary (98.2%). Preferred channels for such information included schools (76.5%), the internet or social media (65.7%), and television (58.2%). Respondents felt that the most suitable age to begin discussing cancer prevention was 15–18 years (56.1%), followed by 11–14 years (38.8%).

Variables affecting knowledge about OSCC and its risk factors

Table 3 presents the statistical outcomes examining the influence of demographic variables. Awareness of OSCC was significantly associated with gender ($p = 0.02$) and educational level ($p = 0.01$), while age showed no significant effect. Specifically, men were less likely to be informed (OR = 0.68; CI: 0.5–0.9; $p = 0.02$), whereas participants with higher education were more knowledgeable (OR = 1.54; CI: 1.1–2.1; $p = 0.01$).

Recognition of smoking as a risk factor differed by gender ($p < 0.05$), with men again being less aware (OR = 0.53; CI: 0.3–1; $p < 0.05$). Alcohol as a risk factor was less frequently acknowledged across all demographic groups except those with greater educational attainment, whose awareness was 1.65 times higher ($p < 0.001$). Knowledge about sunlight exposure remained limited across all demographics, with no statistically meaningful differences.

Some respondents incorrectly cited fluoride or amalgam fillings as risk factors. Male participants were more likely to consider fluoride harmful (OR = 1.69; CI: 1.1–2.6; $p = 0.02$). Older respondents (OR = 0.51; CI: 0.3–0.8; $p = 0.01$) and those with higher educational levels (OR = 0.57; CI: 0.4–0.9; $p = 0.01$) were less likely to endorse this misconception. No significant demographic differences emerged regarding incorrect beliefs about amalgam fillings.

Mass communication strategies are widely employed to enhance public understanding of cancer prevention and to encourage early screening, which has helped reduce mortality in several common cancers [19]. Early identification is especially critical for OSCC, where survival can reach 80%–90% in early-stage diagnoses and where less invasive treatments can preserve quality of life [20]. Despite these advantages, national and global data indicate that both incidence and mortality for OSCC have remained largely unchanged over time [1, 2, 4, 5].

Principal findings and comparison to other studies

A persistent concern in the field is the limited public and professional recognition of oral cancer, which contributes to delays in seeking specialist evaluation [21]. The present survey reflects this pattern: only 68.4% of the 750 respondents were aware that oral cancer exists. This percentage aligns with population surveys reporting awareness levels above 70% [22, 23] or close to 50% [24, 25]. Nevertheless, this figure is notably higher than what we observed in our earlier investigation among 460 youths aged 12–14, where only 26.8% demonstrated awareness [14]. We had previously proposed that the extremely low knowledge rate among younger adolescents might relate to their age; many earlier studies focused on individuals older than 18. The present data support that view, as this sample had a mean age of 32 ± 15.

Despite this, age itself did not emerge as a significant predictor of awareness. Instead, two other demographic factors proved influential: men were less likely to recognize OSCC, and participants with higher educational attainment (ISCED 3–8) showed greater familiarity with the condition. This is a noteworthy contrast to epidemiological patterns, where men exhibit nearly twice the incidence and mortality from OSCC compared with women [1]. Consequently, this demographic discrepancy should be considered when designing outreach strategies aimed at higher-risk populations. Prior studies also document that men tend to be less knowledgeable about cancer determinants [26, 27] and underuse preventive health services [28]. Broader social inequalities in access to information and screening further aggravate these trends. Similar investigations confirm that people with lower education or lower income are less likely to undergo OSCC screening [29] and generally have weaker awareness [30, 31].

A strong understanding of the benefits of early detection was evident, as well as of the importance of lifestyle modification in reducing risk. Recognition of individual risk factors, however, varied widely. Participants overwhelmingly identified smoking as a major contributor (94.1%), similar to the 92.2% measured in our previous youth-focused program and even higher than figures reported in Italy [32] and in several international studies [22-24]. These data suggest that previous education initiatives in the region may have been successful in communicating the role of tobacco in multiple cancers, including OSCC. When demographic variables were examined, male participants again showed reduced awareness of smoking as a risk factor, despite being part of the high-risk group [1, 2, 33] and less likely to undergo oral cancer checks [34]. Since smoking prevalence often correlates negatively with oral cancer awareness [35], it is plausible that a larger proportion of male smokers contributed to this trend.

Alcohol misuse, another major etiological factor, was acknowledged by only 51.3% of individuals—mirroring low recognition reported elsewhere [13, 17-19, 25, 32]. Higher education was associated with better knowledge regarding alcohol-related risk, consistent with findings by Hassona *et al*. [36]. Only 15.4% identified UV exposure as relevant, with no significant demographic variation. Comparable figures have been observed in both Asian [31] and European [37] cohorts.

Alongside an insufficient understanding of confirmed risks, misinformation remains problematic. Unverified claims about fluoride products and, more prominently, amalgam restorations being linked to systemic diseases or cancer continue to circulate widely. In our study, 12.7% of respondents considered fluoride a risk and 34.7% selected amalgam fillings. These proportions exceeded those found among preadolescents in our earlier work [14]. Notably, belief in a connection with amalgam was not affected by gender, age, or education, indicating a widespread misconception. In contrast, older and more educated women were less likely to classify fluoride as hazardous.

Media were identified as the primary source of information, paralleling reports from other countries [30], followed by input from relatives and schools. Although dentists were the professionals most people would consult for suspected OSCC, they had informed only 13.8% of participants, highlighting an important communication gap. This differs from findings in a related survey conducted with 600 individuals in the Naples area, where among those aware of oral cancer, 54.3% had obtained information from their dentist [38]. In our sample, almost all respondents supported the need for additional educational initiatives, with schools being the preferred venue, followed by online platforms and television.

Respondents generally believed that discussions about cancer prevention should begin after 15 years of age. However, younger adolescents are already heavily exposed to health-related material, often of uncertain reliability, which can foster misunderstanding. Based on our previous experience, well-structured awareness activities are both feasible and effective among youths aged 11–14 [14], supporting the inclusion of younger groups in future campaigns.

Strengths and limitations

A key advantage of this investigation was the creation of a questionnaire aimed at assessing how individuals as young as 11 years old understand the features and risk determinants of oral cancer. The tool underwent

both face and content validity checks, and all respondents were able to complete it independently, without clarification. With appropriate translation, the questionnaire could also be applied in other regions. The responses offer a useful overview, reinforcing the general pattern of limited public knowledge on this subject, in line with previous research.

The study is not without constraints. The sample size was modest, and the population was geographically concentrated, with participants drawn from Trieste, Italy, or nearby towns within a 50-km radius. Although noteworthy findings emerged—such as differences in awareness based on age and education, and the limited role of dentists as information sources—further interpretation of causal relationships was not feasible because the questionnaire did not contain items tailored to explore these aspects in depth.

Implications and future directions

Public health initiatives intended to increase understanding of cancer risk factors remain common tools for improving prevention and encouraging early detection [39]. Yet, evaluating how effectively individuals interpret media messages about cancer or translate such knowledge into healthier behaviors remains challenging [40], particularly given the abundance of unreliable information that can foster misconceptions. For instance, a Cancer Research UK workshop aiming to enhance knowledge about cancer screening and risk factors showed positive outcomes two months later [13], but evidence regarding more sustained effects—especially for oral cancer—is scarce. Additionally, a recent review highlights that although campaigns typically raise awareness and increase short-term engagement with health services, the response often comes predominantly from people at lower risk [41]. Interventions such as direct reminders, small-scale media resources, and provider feedback have been shown to boost screening uptake for breast, cervical, and colorectal cancers [42].

Considering the study's geographic and numerical constraints, the findings underscore the clear need for oral cancer awareness efforts. Schools and healthcare workers—particularly dentists—should be prepared, trained, and actively engaged in designing, implementing, and evaluating strategies that track the medium- and long-term outcomes of prevention initiatives using sound methodology. Potential approaches include personal outreach, broad media messaging, small media tools, or group-based educational programs. Additional research will be required to determine which of these methods offers the greatest effectiveness.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: The study was approved by the University of Trieste ethics committee (86/2018). Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

References

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394–424. doi:10.3322/caac.21492
2. Associazione Italiana di Oncologia Medica. The numbers of cancer in Italy. Rome: Il Pensiero Scientifico Editore; 2018. Available from: https://www.aiom.it/wp-content/uploads/2018/10/2018_NumeriCancro-operatori.pdf
3. Hussein AA, Helder MN, de Visscher JG, Leemans CR, Braakhuis BJ, de Vet HCW, et al. Global incidence of oral and oropharynx cancer in patients younger than 45 years versus older patients: a systematic review. Eur J Cancer. 2017;82:115–27. doi:10.1016/j.ejca.2017.05.026
4. Rogers SN, Brown JS, Woolgar JA, Lowe D, Magennis P, Shaw RJ, et al. Survival following primary surgery for oral cancer. Oral Oncol. 2009;45(3):201–11. doi:10.1016/j.oraloncology.2008.05.008
5. Le Campion ACOV, Ribeiro CMB, Luiz RR, da Silva Júnior FF, Barros HCS, Dos Santos KCB, et al. Low survival rates of oral and oropharyngeal squamous cell carcinoma. Int J Dent. 2017;2017:5815493. doi:10.1155/2017/5815493
6. Pulte D, Brenner H. Changes in survival in head and neck cancers in the late 20th and early 21st century: a period analysis. Oncologist. 2010;15(9):994–1001. doi:10.1634/theoncologist.2009-0289
7. Aoki T, Ota Y, Suzuki T, Denda Y, Aoyama KI, Akiba T, et al. Longitudinal changes in the quality of life of oral cancer patients during the perioperative period. Int J Clin Oncol. 2018;23(6):1038–45. doi:10.1007/s10147-018-1322-3

8. Kowalski LP, Franco EL, Torloni H, Fava AS, de Andrade Sobrinho J, Ramos G, et al. Lateness of diagnosis of oral and oropharyngeal carcinoma: factors related to the tumour, the patient and health professionals. Eur J Cancer B Oral Oncol. 1994;30:167–73. doi:10.1016/0964-1955(94)90086-8
9. Lima AM, Meira IA, Soares MS, Bonan PR, Mélo CB, Piagge CS. Delay in diagnosis of oral cancer: a systematic review. Med Oral Patol Oral Cir Bucal. 2021;26(6):e815–e24. doi:10.4317/medoral.24808
10. Petti S. Lifestyle risk factors for oral cancer. Oral Oncol. 2009;45(4–5):340–50. doi:10.1016/j.oraloncology.2008.05.018
11. Husain N, Neyaz A. Human papillomavirus associated head and neck squamous cell carcinoma: controversies and new concepts. J Oral Biol Craniofac Res. 2017;7(3):198–205. doi:10.1016/j.jobcr.2017.08.003
12. Gobbo M, Ottaviani G, Rupel K, Zoi V, Di Lenarda R, Biasotto M, et al. Self-perception and physician's awareness on early detection of tongue cancer. Minerva Stomatol. 2020;69(2):95–9. doi:10.23736/S0026-4970.19.04212-2
13. Roberts AL, Crook L, George H, Osborne K. Two-month follow-up evaluation of a cancer awareness training workshop ("talk cancer"). Prev Med Rep. 2018;13:98–104. doi:10.1016/j.pmedr.2018.11.017
14. Rupel K, Ottaviani G, Gobbo M, Poropat A, Zoi V, Zacchigna S, et al. Campaign to increase awareness of oral cancer risk factors among preadolescents. J Cancer Educ. 2020;35(3):616–20. doi:10.1007/s13187-019-01504-7
15. Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, et al. The COSMIN checklist for assessing methodological quality. Qual Life Res. 2010;19(4):539–49. doi:10.1007/s11136-010-9606-8
16. Lawshe CH. A quantitative approach to content validity. Pers Psychol. 1975;28(4):563–75. doi:10.1111/j.1744-6570.1975.tb01393.x
17. Polit DF, Beck CT, Owen SV. Is the CVI an acceptable indicator of content validity? Res Nurs Health. 2007;30:459–67. doi:10.1002/nur
18. UNESCO Institute for Statistics. International Standard Classification of Education ISCED 2011. Montreal; 2012. Available from: http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf
19. Torre LA, Siegel RL, Ward EM, Jemal A. Global cancer incidence and mortality trends: an update. Cancer Epidemiol Biomarkers Prev. 2016;25(1):16–27. doi:10.1158/1055-9965.EPI-15-0578
20. Bagan J, Sarrion G, Jimenez Y. Oral cancer: clinical features. Oral Oncol. 2010;46(6):41417. doi:10.1016/j.oraloncology.2010.03.009
21. Güneri P, Epstein JB. Late stage diagnosis of oral cancer: components and possible solutions. Oral Oncol. 2014;50(12):1131–6. doi:10.1016/j.oraloncology.2014.09.005
22. Varela-Centelles P, Estany-Gestal A, Bugarín-González R, Seoane-Romero JM. Oral cancer awareness in Spain: a pilot study. Oral Dis. 2018;24(1–2):124–7. doi:10.1111/odi.12756
23. Rogers SN, Hunter R, Lowe D. Awareness of oral cancer in the Mersey region. Br J Oral Maxillofac Surg. 2011;49(3):176–81. doi:10.1016/j.bjoms.2010.04.004
24. Ottolenghi L, Romeo U, Carpenteri F, Fiorentini S, Boatta D, Vestri AR, et al. Cognitive experience of oral cancer among university students. Ann Stomatol. 2012;3(3–4):106–12
25. Zhou XH, Huang Y, Yuan C, Zheng SG, Zhang JG, Lv XM, et al. Awareness and knowledge of oral cancer among residents in Beijing. BMC Oral Health. 2022;22(1):367. doi:10.1186/s12903-022-02398-6
26. Sherman SM, Lane EL. Awareness of cancer risk factors in a UK student population. J Cancer Educ. 2015;30(4):660–3. doi:10.1007/s13187-014-0770-3
27. Davis JL, Buchanan KL, Katz RV, Green BL. Gender differences in cancer screening beliefs. Am J Mens Health. 2012;6(3):211–7. doi:10.1177/1557988311425853
28. Bertakis KD, Azari R, Helms LJ, Callahan EJ, Robbins JA. Gender differences in healthcare utilization. J Fam Pract. 2000;49(2):147–52
29. Gupta A, Sonis S, Uppaluri R, Bergmark RW, Villa A. Disparities in oral cancer screening among dental professionals. Am J Prev Med. 2019;57(4):447–57. doi:10.1016/j.amepre.2019.04.026
30. Azimi S, Ghorbani Z, Ghasemi E, Tennant M, Kruger E. Disparities in oral cancer awareness. J Cancer Educ. 2019;34(3):535–41. doi:10.1007/s13187-018-1337-5
31. Al-Maweri SA, Tarakji B, Alsalhani AB, et al. Oral cancer awareness in Saudi Arabia. Asian Pac J Cancer Prev. 2015;16(8):3377–81. doi:10.7314/apjcp.2015.16.8.3377
32. Nocini R, Capocasale G, Marchioni D, Zotti F. Knowledge about oral cancer in Italy. Int J

Environ Res Public Health. 2020;17(13):4889. doi:10.3390/ijerph17134889

33. Ernani V, Saba NF. Oral cavity cancer: risk factors and management. Oncology. 2015;89(4):187–95. doi:10.1159/000398801
34. Akinkugbe AA, Garcia DT, Brickhouse TH, Mosavel M. Lifestyle disparities in oral cancer examination. BMC Public Health. 2020;20(1):153. doi:10.1186/s12889-020-8247-2
35. Elango JK, Sundaram KR, Gangadharan P, et al. Factors affecting oral cancer awareness in India. Asian Pac J Cancer Prev. 2009;10(4):627–30
36. Hassona Y, Scully C, Abu Ghosh M, et al. Mouth cancer awareness among dental patients. Int Dent J. 2015;65(1):15–21. doi:10.1111/idj.12140
37. Hertrampf K, Wenz HJ, Koller M, Wiltfang J. Public awareness about oral cancer. J Craniomaxillofac Surg. 2012;40(3):e82–e6. doi:10.1016/j.jcms.2011.04.007
38. Leuci S, Amato M, Calabria E, et al. Screening projects for oral carcinoma. J Int Soc Prev Community Dent. 2017;7(Suppl 3):S163–S9. doi:10.4103/jispcd.JISPCD_370_17
39. Scully C, Boyle P, Day T, et al. International consortium on head and neck cancer awareness. Oral Oncol. 2007;43(9):841–2. doi:10.1016/j.oraloncology.2007.06.009
40. Schliemann D, Su TT, Paramasivam D, et al. Effectiveness of media campaigns for cancer awareness. J Glob Oncol. 2019;5:1–20. doi:10.1200/JGO.19.00011
41. Macpherson LMD. Raising awareness of oral cancer. Br Dent J. 2018;225(9):809–14. doi:10.1038/sj.bdj.2018.919
42. Brouwers MC, De Vito C, Bahirathan L, et al. Implementation interventions to increase screening rates. Implement Sci. 2011;6:111. doi:10.1186/1748-5908-6-111