



Published in final edited form as:

J Cancer Educ. 2011 September ; 26(3): 505–509. doi:10.1007/s13187-010-0189-4.

Oral Cancer Knowledge: A Survey Administered to Patients in Dental Departments at Large Italian Hospitals

Alessandro Villa,

Dental Clinic, Department of Medicine, Surgery and Dentistry, University of Milano, Via Beldiletto 1/3, 20142 Milan, Italy

Infections and Immunoepidemiology Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute, National Institutes of Health, 6120 Executive Blvd, Rockville, MD 20852, USA

Aimee R. Kreimer,

Infections and Immunoepidemiology Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute, National Institutes of Health, 6120 Executive Blvd, Rockville, MD 20852, USA

Massimo Pasi,

Department of Dentistry, Vita Salute University, San Raffaele Hospital. Via Olgettina, 60, 20132 Milan, Italy

Antonella Polimeni,

Dental Clinic Department of Oral and Maxillo-Facial Science, University of Rome La Sapienza, Viale Regina Elena, 287, 00161 Rome, Italy

Domenico Ciccì,

Department of Dentistry, University of Messina, Messina, Italy

Policlinico Universitario, Torre Biologica, Via C. Valeria, 98125 Messina, Italy

Laura Strohmenger,

Dental Clinic, Department of Medicine, Surgery and Dentistry, University of Milano, Via Beldiletto 1/3, 20142 Milan, Italy

Enrico Gherlone, and

Department of Dentistry, Vita Salute University, San Raffaele Hospital. Via Olgettina, 60, 20132 Milan, Italy

Silvio Abati

Dental Clinic, Department of Medicine, Surgery and Dentistry, University of Milano, Via Beldiletto 1/3, 20142 Milan, Italy

Abstract

We assessed the oral cancer (OC) knowledge, including risk factors and clinical symptoms, among patients attending dental departments within Italian university hospitals. Two thousand and two hundred questionnaires were sent to four hospitals in order to assess patients' knowledge regarding clinical and epidemiological aspects of OC; OC knowledge was evaluated overall and stratified by oral cancer family history. Participants frequently identified cigarette smoking (87.8%) and heavy alcohol consumption (58.6%) as a risk factor for oral cancer, knew the clinical signs of OC (65–79% depending on the specific symptom) and reported that early detection was related to better prognosis of oral cancer (94%). Individuals with a positive family history for oral cancer were significantly more likely to identify risk factors for oral cancer correctly yet family history of OC did not affect smoking status. Less than 15% of patients reported having received OC counseling by a dentist or physician.

Keywords

Oral cancer; Oral cancer knowledge; Risk factors

Background

In 2008, 263,861 new oral cavity cancers were diagnosed globally and about 65% of these cancers occurred in men. This accounts for approximately 2% of all new cancer diagnosed (men, 2.6%; women, 1.5%). Oral cancers cause more than 120,000 deaths each year, with a 5-year survival rate of 60% [1, 2]. Furthermore, incidence rates are currently increasing in many places around the world, especially among younger individuals (aged less than 45 years) [3–5]. Most cases of oral cancer are attributable to modifiable risk factors, specifically tobacco use and alcohol consumption. The combined use of alcohol and tobacco use, multiplies the risk [6]. Also, the risk of oral cancer (OC) increases with the amount of alcohol consumed and is highest among heavy alcohol users [7]. As such, education regarding oral cancer risk factors and behavioral modifications based on this knowledge has the potential to modify these trends.

Previous studies evaluated whether or not dentists and primary physicians are aware of oral cancer risk factors and if they educated patients about cancer prevention [8–10]. In 2008, Colella et al. [10] investigated Italian dentists' ($N=1,000$) knowledge, attitudes, and behaviors regarding oral cancer: the majority of dentists identified tobacco (94%) and alcohol usage (79%) as oral cancer risk factors. Further, more than half of these dentists queried their patients about their tobacco (56%) and alcohol (60%) use. In Spain [11], dentists ($N=440$) reported that they provided systematic counseling on alcohol (55%) and tobacco-smoking (88%) cessation. Education promoting awareness of oral cancer in patients may help in preventing high-risk behaviors such as tobacco and alcohol consumption [12, 13]. While studies have investigated oral cancer knowledge among oral health care providers, little is available about the knowledge of dental patients. As dentists, we wanted a better understanding of the knowledge of our patient population. Therefore, the purpose of the present analysis was to investigate patients' knowledge regarding oral cancer risk factors and to explore communication and health messaging between clinicians and patients attending dental departments within Italian university hospitals.

Material and Methods

Study Population and Recruitment

In December 2009, questionnaires were sent to the dental departments of four public Italian university hospitals (550 per hospital): two in the north of Italy (San Paolo Hospital—University of Milano [MilanoSP] and San Raffaele Hospital—University Vita e Salute [Milano SR]), one in the center of Italy (Umberto I Hospital—University La Sapienza [Roma]) and one in the south (University of Messina [Messina]). These hospitals were chosen because they were geographically diverse and because they had a high patient load. Dental patients were targeted in order to improve the level of clinician's knowledge about patients referred to specialized clinics. Patients were selected sequentially based on the following inclusion criteria (1) age 18 or older, and (2) ability to read, understand, and answer the questionnaire. The Italian Ministry of Health approved this study. Each participant gave written consent.

The Questionnaire

All patients received the same questionnaire in the waiting room of the dental clinic; the questionnaires were self-administered, yet a dental student was available if any technical question arose. The questionnaire assessed: socio-demographic information including country of birth, age, gender, and education level; self-reported medical history; family history of oral cancer; tobacco and alcohol habits; diet and physical activities; oral hygiene habits and oral symptoms. For the purpose of this analysis, information regarding tobacco smoking, alcohol consumption, and family history for oral cancer were considered.

Participants were queried as to their knowledge regarding oral cancer and oral cancer risks factors using the following questions: “Is it possible to have a malignant tumor of oral cavity?”, “Is oral cancer treatable?”, and “Is a white or red patch in the mouth a possible initial sign of cancer?”. Smoking status was assessed by the following questions: (1) Do you smoke tobacco now?; (2) If not a current smoker, did you smoke in the past?; (3) Have you ever smoked a total of 100 cigarettes or more over your lifetime?. The responses to these questions were used to build our smoking status variable. Alcohol intake was evaluated as number of glasses per day; heavy alcohol consumption was defined as consuming an average of more than two glasses per day. Finally, participants were asked whether dentists/physicians provided counseling or education on oral cancer and its risk factors. Response categories for all questions were “Yes” and “No”.

After a 12-week period for the data collection, the responsible people at each hospital were contacted and requested to return the questionnaires. Four more weeks were allowed for the return of the questionnaires. Questionnaires were returned by mail to the research team for the analysis. No compensation was offered for participation.

Statistical Analysis

Of the 2,200 mailed questionnaires (four hospitals×550 questionnaires per hospital), 1,201 were returned (54.6%). The response rates were 96.5% from Roma, 63.8% from Milano SP, 42.9% from Milano SR, and 15.1% from Messina. Participants were given the option of

refusing to answer each of the questions on the questionnaire, and these refusals were treated as missing observations.

We described the distribution of participant characteristics, including demographics, smoking status, and heavy alcohol consumption.

Oral cancer knowledge was evaluated overall; we also assessed whether the hospital, education level, oral hygiene (brushing teeth with a fluoride toothpaste daily), smoking status, heavy alcohol consumption, and oral cancer family history modified OC knowledge (Table 1). Similarly, oral cancer education was described overall; then, we assessed whether the hospital, education level, oral hygiene, smoking status, heavy alcohol consumption, and oral cancer family history modified OC education. Associations between exposures of interest such as positive OC family history, hospital, education level, oral hygiene, and our outcomes (OC knowledge and OC education) were evaluated by the use of logistic regression models to estimate odds ratios (ORs) and 95% confidence intervals (CIs).

Finally, we evaluated whether positive OC family history impacted smoking and drinking status.

Results

A total of 1,201 questionnaires were collected from 459 males and 735 females. Overall, subjects ranged in age from 18 to 98 years; the median age was 46 years (interquartile range 37–54 years). The majority of the study participants were Italian (89.7%). Around 25% of patients completed university, 52.0% completed high school, and 22.7% reported less than 9 years of education. Positive family history of oral cancer was present in 17.1% of participants. Approximately 36% of the population reported current smoking, although the proportion of smokers was higher in subjects from Messina (48.8%) compared to Milano SP and Milano SR (26.6% and 31.6%, respectively). Heavy alcohol consumption was reported by 58.6% of subjects and the highest rate was found in the North of Italy (76.7% in Milano SR, 72.0% in Milano SP, 57.7% in Roma, and 54.2% in Messina; data not shown).

Oral Cancer Knowledge

Overall, 93.6% of the sample reported that early detection was related to better prognosis of oral cancer (Table 1). Sixty-five percent and 79.5% of individuals reported that a white/red patch and mass/ulcer in the mouth, respectively, were possible signs of oral cancer. The majority of participants correctly identified cigarette smoking as a risk factor for oral cancer (87.8%) and vegetable consumption (73.7%) and good oral hygiene (79.4%) as possible protective factors. However heavy alcohol consumption (59.2%) and pipe smoking (20.7%) were less frequently reported as oral cancer risk factors. Also, 69.1% of current smokers did not receive counseling to quit smoking from dentists.

In stratified analysis, individuals with a positive family history for oral cancer were three times more likely to identify risk factors for oral cancer correctly such as cigarette smoking (OR, 2.9; 95% CI 1.5–6.3) and twice more likely to identify possible signs of oral cancer such as a mass/ulcer (OR, 1.9; 95% CI 1.2–3.2; Table 1). Family history of oral cancer did

not affect current smoking status (OR, 1.1; 95% CI 0.9–1.3) or heavy alcohol consumption (OR, 1.1; 95% CI 0.8–1.5).

Current (34%), former (11%), and never smokers (50%) reported similar OC knowledge ($p>0.05$). The only exception was that current smokers were significantly more knowledgeable about the initial signs of oral malignancy compared to former and never smokers ($p<0.05$; data not shown). Knowledge that heavy alcohol consumption is a risk factor for oral cancer was similar among individuals who did and did not consume heavy alcohol (38.8% vs. 27.5%, $p=0.47$; data not shown). No associations were observed between level of education, gender, or age and oral cancer knowledge.

Oral Cancer Education

The majority of the individuals did not receive counseling on oral cancer by dentists, physicians, or other health care providers (86.1%, 92.3%, and 88.9%, respectively).

Individuals with a positive family history for oral cancer had a significant increase in the odds of receiving oral cancer counseling by physicians (OR, 2.1; 95% CI 1.4–3.9), dentists (OR, 2.5; 95% CI 1.6–3.6) or other health care personnel (OR, 4.3; 95% CI 2.8–6.4) compared to those with negative family history for oral cancer (Table 2). Counseling and education on oral cancer provided by physicians ($p=0.14$), dentists ($p=0.39$), or other health care personnel ($p=0.80$) was similar among never, former, and current smokers (data not shown).

We additionally evaluated OC knowledge and education by hospital, education level, and oral hygiene status. No differences were observed (data not shown).

Discussion

We conducted a large multicentric study to examine patients' knowledge regarding oral cancer risk factors and to explore communication and health messaging between clinicians and dental patients in Italy; few studies have addressed questions on patients' oral cancer knowledge. Our findings show that the majority (94%) of individuals are knowledgeable regarding what clinical signs are associated with oral cancer (such as red/white patch and/or mass/ulcer in the mouth). Furthermore, this knowledge was modified by the personal experience of having a positive family history for oral cancer: these individuals identified the risk factors and possible signs of oral cancer significantly more frequently compared to individuals with no family history. While knowledge of oral cancer was high overall, it did not appear that this information was being provided by clinicians: less than 15% of participants reported receiving counseling about oral cancer from their physicians or dentists. From this incongruity, it appears as if individuals are seeking information from alternative sources, perhaps Web-based resources, magazines, or books [14, 15].

In our work, only one third of dentists in Italy regularly promoted tobacco-smoking cessation to current smokers despite the fact that patients are both comfortable receiving tobacco cessation advice and expect their dentists to provide such counseling [16]. Furthermore, most smokers in our study knew that smoking was a risk factor for oral cancer

(87%) and yet continued to smoke. Similarly, two thirds of smoking adults from a US study ($N=803$) [17] and more than half of smoking adults from Kuwait ($N=1,012$) [18] were aware of the correlation between heavy smoking and oral cancer but, nevertheless, continued to smoke. Data from large-scale randomized clinical trials provide evidence that counseling by health professionals modestly improves smoking cessation rates [19, 20] and therefore highlights the importance of continued efforts on the part of clinicians. A dedicated curriculum content might improve upon deficiencies in counseling skills and conveying tobacco-use cessation information [21]. Patients knew that smoking and heavy alcohol consumption were risk factors for oral cancer, but did not change behavior. These findings suggest that health professionals may need to focus on changing their patients' behavior, in addition to educating patients about oral cancer risk factors.

As in all work, our results must be interpreted in the context of the limitations of the study. First, the response rate for the questionnaire was slightly greater than 50%. As such, a systematic bias may have been introduced if the non-responders were different and not representative of those who answered our questionnaire. Because demographic information was not available for non-responders, the magnitude of this bias could not be assessed. Second, our results may not be generalizable to the population at large, as the proportion of oral cancer family history was high (17%). It may be that participants with positive oral cancer family history were more likely to participate in this study. Also, response rates differed by hospital (96.5% from Roma, 63.8% from Milano SP, 42.9% from Milano SR, and 15.1% from Messina). Thus, data from centers with lower response rates may be less generalizable for the general population. In addition, our study population was recruited from dental clinics nested within tertiary referral centers. As such, the results of this study likely represent an overestimate of knowledge about oral cancer risk factors, signs, and symptoms. Finally, in attempting to assess the participants' knowledge by use of the questionnaire, many of the questions could have been considered "leading questions" in that the questions were typically asked so that "yes" was the correct answer. For example, we asked "Does cigarette smoking increase risk of oral cancer?" and then "Does good oral hygiene decrease risk of oral cancer?" Since the appropriate answer was embedded in the question, some respondents probably tended to agree with statements rather than disagree [22], which would artificially inflate the apparent knowledge of our study population.

Health promotion messaging to patients is an essential component of preventive medicine; prevention/cessation of tobacco and alcohol use contributes to good general and oral health [23]. While dentists and physicians have the great opportunity to counsel their patients about risk factors for oral cancer, according to this survey, health professionals infrequently provided this information. Yet, our population was reasonably informed about oral cancer, and its risk factors, signs, and symptoms. Additional communication between patients and health care personnel could increase oral cancer knowledge and potentially motivate individuals towards improved well-being.

Acknowledgments

The authors thank Dr. Allan Hildesheim from the National Cancer Institute for comments on the manuscript.

References

1. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *Int J Cancer*. 2010; 127(12):2893–2917. [PubMed: 21351269]
2. Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics, 2002. *CA Cancer J Clin*. 2005; 55(2):74–108. [PubMed: 15761078]
3. Llewellyn CD, Johnson NW, Warnakulasuriya KA. Risk factors for squamous cell carcinoma of the oral cavity in young people—a comprehensive literature review. *Oral Oncol*. 2001; 37(5):401–418. [PubMed: 11377229]
4. Warnakulasuriya S, Mak V, Moller H. Oral cancer survival in young people in South East England. *Oral Oncol*. 2007; 43(10):982–986. [PubMed: 17350878]
5. Llewellyn CD, Linklater K, Bell J, Johnson NW, Warnakulasuriya S. An analysis of risk factors for oral cancer in young people: a case-control study. *Oral Oncol*. 2004; 40(3):304–313. [PubMed: 14747062]
6. Pelucchi C, Gallus S, Garavello W, Bosetti C, La Vecchia C. Cancer risk associated with alcohol and tobacco use: focus on upper aero-digestive tract and liver. *Alcohol Res Health*. 2006; 29(3):193–198. [PubMed: 17373408]
7. Blot WJ, McLaughlin JK, Winn DM, et al. Smoking and drinking in relation to oral and pharyngeal cancer. *Cancer Res*. 1998; 48:3282–3287. [PubMed: 3365707]
8. Lopez-Jornet P, Camacho-Alonso F, Molina-Minano F. Knowledge and attitudes about oral cancer among dentists in Spain. *J Eval Clin Pract*. 2010; 16(1):129–133. [PubMed: 20367825]
9. Greenwood M, Lowry RJ. Primary care clinicians’ knowledge of oral cancer: a study of dentists and doctors in the North East of England. *Br Dent J*. 2001; 191(9):510–512. [PubMed: 11726063]
10. Colella G, Gaeta GM, Moscariello A, Angelillo IF. Oral cancer and dentists: knowledge, attitudes, and practices in Italy. *Oral Oncol*. 2008; 44(4):393–399. [PubMed: 17804279]
11. Seoane J, Velo-Noya J, Warnakulasuriya S, Varela-Centelles P, Gonzalez-Mosquera A, Villa-Vigil MA, Rodriguez-Lozano F, Diz-Dios P. Knowledge of oral cancer and preventive attitudes of Spanish dentists. Primary effects of a pilot educational intervention. *Med Oral Patol Oral Cir Bucal*. 2010; 15(3):e422–e426. [PubMed: 20038900]
12. Warnakulasuriya KA, Harris CK, Scarrott DM, Watt R, Gelbier S, Peters TJ, Johnson NW. An alarming lack of public awareness towards oral cancer. *Br Dent J*. 1999; 187(6):319–322. [PubMed: 10589135]
13. Tromp D, Brouha XD, Hordijk GJ, Winnubst JA, de Leeuw JR. Patient factors associated with delay in primary care among patients with head and neck carcinoma: a case-series analysis. *Fam Pract*. 2005; 22(5):554–559. [PubMed: 16006495]
14. Chen X, Siu LL. Impact of the media and the internet on oncology: survey of cancer patients and oncologists in Canada. *J Clin Oncol*. 2001; 19(23):4291–4297. [PubMed: 11731511]
15. James C, James N, Davies D, Harvey P, Tweddle S. Preferences for different sources of information about cancer. *Patient Educ Couns*. 1999; 37(3):273–282. [PubMed: 14528553]
16. Campbell HS, Sletten M, Petty T. Patient perceptions of tobacco cessation services in dental offices. *J Am Dent Assoc*. 1999; 130(2):219–226. [PubMed: 10036845]
17. Hay JL, Ostroff JS, Cruz GD, LeGeros RZ, Kenigsberg H, Franklin DM. Oral cancer risk perception among participants in an oral cancer screening program. *Cancer Epidemiol Biomark Prev*. 2002; 11(2):155–158.
18. Al-Shammari KF, Moussa MA, Al-Ansari JM, Al-Duwairy YS, Honkala EJ. Dental patient awareness of smoking effects on oral health: comparison of smokers and non-smokers. *J Dent*. 2006; 34(3):173–178. [PubMed: 16087286]
19. Lancaster T, Stead L. Physician advice for smoking cessation. *Cochrane Database Syst Rev*. 2004; (4):CD000165. [PubMed: 15494989]
20. Lemmens V, Oenema A, Knut IK, Brug J. Effectiveness of smoking cessation interventions among adults: a systematic review of reviews. *Eur J Cancer Prev*. 2008; 17(6):535–544. [PubMed: 18941375]

21. Gordon JS, Albert DA, Crews KM, Fried J. Tobacco education in dentistry and dental hygiene. *Drug Alcohol Rev.* 2009; 28(5):517–532. [PubMed: 19737210]
22. Edwards P. Questionnaires in clinical trials: guidelines for optimal design and administration. *Trials.* 2010; 11:11–13. [PubMed: 20137079]
23. Dyer TA, Robinson PG. General health promotion in general dental practice—the involvement of the dental team. Part 1: a review of the evidence of effectiveness of brief public health interventions. *Br Dent J.* 2006; 200(12):679–685. [PubMed: 16799445]

Table 1

Oral cancer education overall and by family history

	Total	Family history of oral cancer	
	<i>n</i> (%) ^a	Yes (<i>N</i> =202)	Odds ratio (95% CI)
Does early detection of oral cancer means better prognosis?			
No	60 (5.1)	5 (8.3)	1.0
Yes	1,124 (94.9)	197 (17.5)	2.4 (0.9-7.7)
Is a white/red patch in the mouth a possible initial sign of cancer?			
No	364 (34.8) ^b	44 (12.1)	1.0
Yes	682 (65.2) ^b	157 (23.0)	0.9 (0.6-1.4)
Is a mass/ulcer in the mouth a possible sign of cancer?			
No	225 (20.5)	23 (10.2)	1.0
Yes	873 (79.5)	167 (19.1)	1.9 (1.2-3.2)
Is oral cancer more frequent in people 40+?			
No	390 (35.9)	64 (16.4)	1.0
Yes	697 (64.1)	131 (18.8)	1.1 (0.7-1.6)
Does cigarette smoking increase risk of oral cancer?			
No	144 (12.2)	10 (6.9)	1.0
Yes	1,033 (87.8)	190 (18.4)	2.9 (1.5-6.3)
Does eating vegetables decrease risk of oral cancer?			
No	255 (22.4)	21 (8.2)	1.0
Yes	885 (77.6)	174 (19.7)	2.7 (1.6-4.5)
Does pipe smoking increase risk of oral cancer?			
No	876 (79.3)	37 (4.2)	1.0
Yes	228 (20.7)	156 (68.4)	1.1 (0.7-1.7)
Does heavy beer/wine drinking increase risk of oral cancer?			
No	457 (40.8)	89 (19.5)	1.0
Yes	662 (59.2)	111 (16.8)	0.9 (0.6-1.2)
Does good oral hygiene decrease risk of oral cancer?			
No	239 (20.6)	44 (18.4)	1.0
Yes	919 (79.4)	157 (17.1)	0.9 (0.6-1.4)
Heavy alcohol consumption			
No	457 (41.4)	62 (16.2)	1.0
Yes	648 (58.6)	125 (17.1)	1.1 (0.8-1.5)
Smoking status			
Never	594 (52.6)	96 (16.2)	1.0
Former	127 (11.2)	23 (18.1)	1.1 (0.8-1.3)
Current	408 (36.1)	67 (16.4)	1.1 (0.9-1.3)

^aIndicate the total percentage of responders^bIndicate that more than 10% data were missing

Table 2

Oral cancer education overall and by family history

	Total	Family history of oral cancer	
	<i>n</i> (%) ^a	Yes (<i>N</i> =202)	Odds ratio (95% CI)
Have you been counseled on oral tumor by your physician?			
No	1,086 (92.3)	162 (14.9)	1.0
Yes	91 (7.7)	27 (29.7)	2.1 (1.4-3.9)
Have you been counseled on oral tumor by your dentist?			
No	1,020 (86.1)	145 (14.2)	1.0
Yes	164 (13.9)	48 (29.3)	2.5 (1.6-3.6)
Have you been counseled on oral tumor by any other health care provider?			
No	1,049 (88.9)	146 (13.9)	1.0
Yes	131 (11.1)	54 (41.2)	4.3 (2.8-6.4)
Has the dentist counseled to quit smoking?			
No	307 (68.2) ^b	45 (14.7)	1.0
Yes	143 (31.8) ^b	29 (20.3)	1.5 (0.9-2.6)

^a Indicate the total percentage of responders^b Indicate that more than 10% data were missing