

# Comparison of views on the need for continuing education on oral cancer between general dentists and oral medicine experts: A Delphi survey

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## Abstract

**Objectives:** The role of dental professionals in screening for oral cancer has been limited. The purpose of this study was to investigate and compare the educational priorities of oral medicine specialists, general dental practitioners, and doctors of dental surgery with regards to the diagnosis and management of oral cancers and potential malignant disorders. **Study Design:** This was a longitudinal survey. **Materials and Methods:** A Delphi survey was directed to a panel of 25 oral medicine specialists asking them to identify the major difficulties in diagnosing and managing patients with oral cancer or suspected malignancy. In a second phase, two groups of generalists were asked to express their ratings on the issues identified by experts. **Results:** The response rate of the experts to the survey was 84%, while only 44% of the generalists participated. Although the three groups agreed on most of the issues, there were significant differences of opinions on 10 of the items proposed by specialists ( $P < 0.05$  from the Kruskal–Wallis test), which were observed mainly between experts and general dental practitioners ( $P < 0.017$  from the Mann–Whitney U test). The opinion of the participants about future investments in the field of education resulted in similar results ( $P > 0.05$  from the Chi-square test), with the specialists ranking highest on mandatory annual thematic courses, while the generalists prioritizing more interactive and extensive pre-graduation courses on oral cancer detection. **Conclusion:** This study confirms a clear need to improve the educational foundation on oral cancer by a didactic process starting with pre-graduation courses that should involve National Health Care Services, National Dental Associations, and academia.

**Key words:** Delphi survey, dental education, oral cancer, potential malignant disorders screening, prevention

## INTRODUCTION

Oral squamous cell carcinoma (OSCC) is a worldwide problem with increasing incidence and mortality rates affecting approximately 700000 people globally, and is within the first 10 most common cancers reported globally. Despite the diagnostic and therapeutic

progresses, survival rates remain low except in few highly resourced cancer centers.<sup>[1,2]</sup> Epidemiological data reported above have considerable impact on the economy of the public healthcare system, particularly due to a large number of cases presenting at late stages (III/IV) for cancer treatment.<sup>[3,4]</sup>

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To date, the best management approach for this disease is early diagnosis, which ensures improved prognosis and has much less burden on the healthcare system. For these reasons, education and training play a pivotal role in enabling physicians in early diagnosis of OSCC; it is essential to examine the process of educational practice, to realize if teachers are providing what the learners really need, and if learners are getting the right messages from the current teaching practices.

The purpose of this study was to survey the views of oral medicine leading experts in Italy using the Delphi methodology, asking them to identify any difficulties that exist in the clinical diagnostic approach to patients presenting with OSCC or suspected of malignancies and any lack of education among general dental practitioners (GDPs) and oral surgery specialists (DDSs) which contributes to the late diagnosis of OSCC.

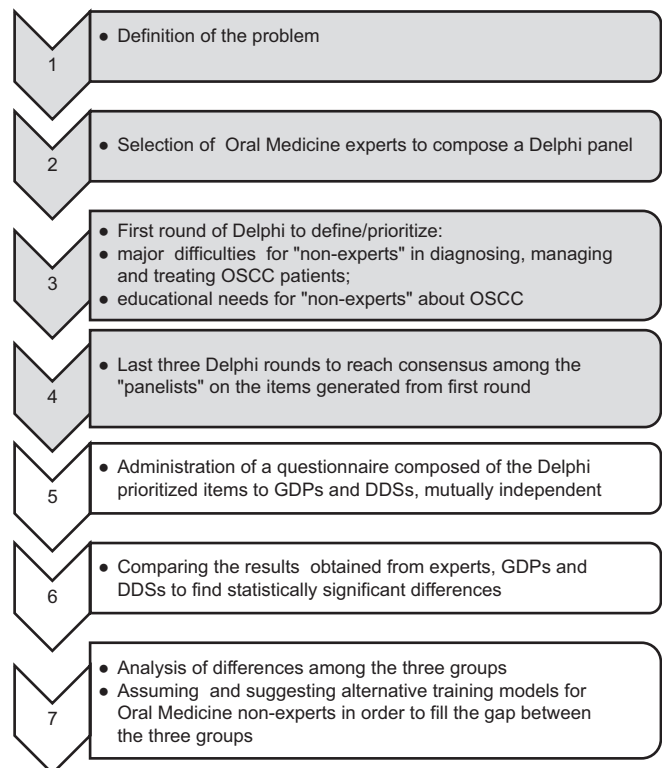
Subsequently, the same questionnaire was submitted to GDPs and DDSs in primary care to identify any significant differences between the three groups. We explored what is perceived by oral medicine experts and the particular items that reflect the real difficulties for GDPs and DDSs (if different from the experts) to determine the real needs throughout their field of training and education.

## MATERIALS AND METHODS

The study was developed in two phases [Figure 1]. In the first phase, a Delphi survey developed in four rounds was directed to a panel of experts who aimed to identify and prioritize the items related to OSCC diagnosis, management, and education issues. In the second phase, based on the responses of experts, we composed the survey and addressed similar questions to DDSs and GDPs. The results obtained from the three surveys were then statistically compared. The survey was approved by Institutional Review Board, Ethical Committee, Federico II University of Naples (ID: 134/14).

### Phase 1

A sample of 25 Italian specialists in oral medicine was selected.<sup>[5-10]</sup> The experts were full and associate professors and researchers with experience in the field of oral medicine. The level of experience was evaluated considering the number of scientific publications and years of clinical activity (at least 10 years).<sup>[7]</sup> The



**Figure 1:** A schematic description of the project plan

participants were approached by e-mail with a letter of invitation.

### The questionnaire

The survey software was freely downloaded from a website (<http://armstrong.wharton.upenn.edu/delphi2>). The first round, was composed of 5 open-ended questions each of approximately 20–25 words [Table 1].<sup>[9-13]</sup> The experts were asked to respond by giving a maximum of 5 suggestions for each question. From the second round, the experts were asked to grade their agreement about the items derived from the first round on a 6-point Likert scale (0 = strongly disagree, 5 = strongly agree). A “don’t know” option was also available. An even-point Likert scale, without a neutral, was chosen because we wanted to force the experts to side, which is necessary to generate priority criteria in educational planning.

In the second round, we circulated two versions of the survey, one form with the questions arranged in the reverse order to determine if fatigue affected reliability of the survey. Both forms were analyzed using the Pearson’s correlation coefficient. The alternate form reliability was estimated at 0.91, and thus results of only one form of the survey were used for the second

**Table 1: Delphi first round items**

What are the greatest difficulties for GDPs and students in detecting precancerous lesion during a first examination?
Describe synthetically the main difficulties in the management of OSCC patients (clinical, psychological, environmental, treatment)
Which are the main concerns in managing a patient with pre-cancerous/malignant lesions?
Are available reliable instrumental diagnostic procedures to improve and facilitate OSCC diagnosis?
Could Lifelong Learning improve the approach to the OSCC diagnosis among GDPs and students?

round. The reliability of the survey was also evaluated by measuring the internal consistency through the Cronbach's Alpha, which was found to be 0.95.

To obtain a higher response rate, weekly email reminders were sent. To establish if consensus was reached, we set the following criteria:

- median  $\geq 3.5$  or  $\leq 1.5$ ;
- Interquartile range (IQR)  $\leq 1$ ;
- 80% of answer with a median  $\geq 3$  or  $\leq 2$ .

For each item, at least 2 of the 3 criteria were expected to be fulfilled. As the responses to the questionnaire were expressed with ordinal data, descriptive statistics were considered more appropriate than mean and standard deviation.

At the end of the 4 rounds, the items without consensus were considered less influential on diagnostics and management difficulties of an OSCC patient and, consequently, were not circulated to GDPs and DDSs in Phase II.

## Phase 2

We administered an anonymous questionnaire composed of the items prioritized by the Delphi panelists to GDPs and DDSs. The two groups were composed of 50 DDSs and 50 GDPs, randomly chosen among those graduated from 2000 to date. A database of all graduates was available for our use. The items from Phase I were replicated unchanged, excluding items that did not reach consensus. The participants were asked to respond on the same rating scale but were allowed to respond only once. At the end of Phase II, we asked the three groups to rank how they would recommend institutions to invest future funds in the field of education and training.

## Statistical analysis

Statistical analysis encompassed the Kruskal–Wallis test for nonparametric data to globally compare globally the

three groups, the Mann–Whitney U test for the pair-wise comparisons and the Chi-square test to compare rankings. Data being heteroskedastic, we performed a bootstrap by the Monte Carlo method.<sup>[14,15]</sup> A dedicated software was used (Statistical Package for the Social Sciences version 19, IBM inc, USA). The level of significance was set at 0.05 and 0.017 in case of Bonferroni post-hoc correction.

## RESULTS

The study was completed in 7 months. The experts' response rate for the Delphi first round was 84% (21/25 participants), with a dropout of 10% and 5% for the second and the third rounds, respectively. From the first round, 193 comments were received, of which those found to be similar ( $n = 149$ ) in their meaning were excluded. After categorization and selection of common themes, 44 items were generated and proposed to the experts for the following rounds [Table 2]. Six main themes were identified as follows: (1) clinical examination issues, (2) psychological difficulties in approaching the patient, (3) difficulties in communicating with the patient, (4) problems related to the clinical management, (5) adjunctive diagnostic tools, and (6) pre and post-graduation educational issues. At the end of Phase I, consensus was reached on 33/44 (75%) of the proposed items. Most of the 11 items on which experts did not agree were related to the clinical management of cancer or potential malignant disorders (e.g., biopsy issues, post-radiation complications); experts considered that such issues were not directly related to the generalists' clinical problems and educational needs. consequently, these items were not included in the questionnaire.

In Phase II, the response rate to the questionnaire was 44% (22/50 participants) for both of the 50 GDPs and 50 DDSs. At the end of the survey, the data from the three questionnaires were collected and analyzed [Tables 3–5].

The three groups rated similarly ( $P > 0.05$ ) for most of the items of the questionnaire (23/33), thus sharing the same views about clinical and educational needs on oral cancer detection [Table 3]. By the Kruskal–Wallis test, for 10 of the 33 items, statistically significant differences among median scores were detected. Subsequently, such items were further investigated comparing in a pair-wise manner for the three groups, using the Mann–Whitney U test; differences were found mainly comparing experts to GDPs, while views of experts and DDS were not significantly different [Table 4]. Experts' and nonexperts' opinions about how they would invest future funds in the field of education and training were further

**Table 2: Delphi items grouped by theme**

Clinical examination issues  
 The macroscopic similarity between early OSCC and precancerous lesions.  
 To identify early OSCC within potentially malignant disorders.  
 To detect early OSCC in mucosal sites difficult to examine.  
 To make differential diagnosis between OSCC and ulcerative lesions.  
 To make a reliable prognosis on a mild dysplastic lesion during a “wait-and-see” approach.  
 To identify red pre-cancerous lesions within auto-immune lesions.  
 To detect malignant transformation within scarring mucosal tissue previously biopsied.

Psychological difficulties in approaching the patient  
 To face up to the psychological stress in communicating OSCC diagnosis to the patient and his family.  
 A psychologist would be helpful to describe to the patient the post-diagnosis scenarios.

Difficulties in communicating with the patient  
 To be understood enough to obtain collaboration to treatment by patients with low education.  
 There is the risk to understate in communicating OSCC diagnosis to patients afraid to undergo examinations or to see their lives devastated.  
 To persuade patients, who initially underestimate the risk of developing OSCC, to eliminate risk factors and to improve their lifestyle.

Problems related to the OSCC management  
 To make a diagnostic biopsy in patients with widespread and multifocal lesions (e.g. proliferative verrucous leukoplakia, OLL).  
 To perform a biopsy on posterior third of the tongue, mouth floor or soft palate.  
 To guarantee oral health and give a prosthetic rehabilitation in patients underwent OSCC surgery.  
 To choose the proper site to biopsise in case of widespread lesions.  
 To decide how much deeply remove the affected tissue.  
 Management of the field cancerization as concerns therapy and follow-up.  
 Grading and TNM staging have to be done very quickly.  
 To be skilled enough to perform diagnostic surgical procedures, instead of referring patients.  
 Instrumental diagnosis is required (e.g. ecography, TC-PET) to intercept metastasis in followed-up patients.  
 Instrumental tests have to be done as soon as possible (even before biopsy) when invasive OSCC is suspected on the basis of clinical examination.  
 It is needed to wait histological findings before to refer patients to imaging tests.  
 Concernment about the time between diagnosis and therapy: it is not always appropriate as required for the patient.  
 Managing and treating complications of oral cancer radiation therapy (e.g. mucositis, xerostomia, osteonecrosis).  
 Concernment as clinicians can't verify patients' elimination of risk factors during the follow-up.

*Contd...*

**Table 2: Contd...**

Issues related to the adjunctive diagnostic tools  
 There are not reliable tools that could facilitate early diagnosis of OSCC.  
 Light sources used to evaluate tissue chemiluminescence and fluorescence are not reliable yet.  
 Micro-biopsy can be a reliable first-level test.  
 Cytology is less reliable than micro-biopsy.  
 Vital dyes (toluidine blue and Lugol's iodine) are useful only if used in combination (one after the other).  
 Vital dyes (toluidine blue and Lugol's iodine) are useful only to orientate the surgical incision of biopsy.  
 It is necessary to perform multiple biopsies in widespread lesions.  
 Magnification can improve early detection of precancerous lesions.

Pre and post-graduation education issues  
 The current system of continuing education, based on Masters and Postgraduate Courses in Oral Medicine, is sufficient to ensure education and awareness among dentists.  
 Master and Postgraduate Courses in Oral Medicine should be flexible and low cost, to ensure a greater access by general dentists.  
 Dentists and primary care physicians should attend national mandatory courses dedicated to the diagnosis of OSCC, every 2 years.  
 Thematic courses about OSCC should be managed by scientific committees and advertised by national dental and medical associations.  
 A regular attendance at Oral Medicine units is needed for attendees of Postgraduate Courses, as it is essential to deal with the patients.  
 E-Learning courses are inappropriate to educate dentists to early detection and to increase their awareness about OSCC.  
 A proper undergraduate training is sufficient to increase dentists' skills at detecting pre-cancerous lesions.  
 Oral Medicine Schools are needed to improve OSCC awareness among dental professionals.  
 Oral Medicine School should be a Medicine postgraduate specialty rather than a Dentistry one.  
 Engaging dentists and primary care physicians in national projects, as part of their practice, could increase their awareness and attention to oral diseases.

confirmed in the last question of the survey. Using the Chi-square test, the three groups gave similar priority to the available options ( $P > 0.05$ ), with the specialists ranking highest on mandatory annual thematic courses, and the generalists prioritizing more interactive and extensive pre-graduation courses [Table 5].

## DISCUSSION

Much of today's dental education is based upon traditional didactic approaches, which are ineffective for the learning needs of GDPs or DDSs. This project

was initiated considering the need for change, and hence improve dentists' knowledge about disorders managed by oral medicine experts and approaches to it, investigating the reasons that lie beyond the difficulties of early diagnosis of OSCC both in primary and secondary care. Numerous efforts in this direction have been made in recent years, however, the methodologies

adopted have not been driven by recognized technology.<sup>[16-19]</sup> Using the Delphi method, it is possible to achieve this goal, encouraging opinion exchanges and sharing the responsibility of resolving certain issues.<sup>[20,21]</sup>

The major issue to be discussed is the early diagnosis, based on a widespread awareness of the signs and

**Table 3: Kruska-Wallis analysis results**

	Experts		DDSs		GDPs		P
	Median	IQR	Median	IQR	Median	IQR	
<b>A. Diagnostic difficulties</b>							
Item 2	4	1	3	3.25	3	2	0.049 <sup>a</sup>
Item 3	4	2	4	2	4	2	0.653
Item 4	3	1	3	2.75	3	2	0.437
Item 5	5	1	4	2.25	4	2.75	0.04 <sup>a</sup>
Item 6	3	1	3	3	3.5	2	0.63
Item 7	4	1	4	2	4	1	0.558
<b>B. Psychological difficulties in approaching the patient</b>							
Item 8	4	1	4	2	5	1	0.028 <sup>a</sup>
Item 9	4	1	4	1	5	2	0.044 <sup>a</sup>
<b>C. Difficulties in communicating with the patient</b>							
Item 11	0	1	1	3.75	1	2.75	0.115
<b>D. Problems related to the therapeutic management</b>							
Item 13	5	1	4	2	3	3	0.001 <sup>a</sup>
Item 15	4	2	3	3	3	3	0.016 <sup>a</sup>
Item 18	4	1.5	3	2.25	4	1	0.424
Item 19	5	0.25	5	0	5	0	0.890
Item 21	5	0	5	1	5	2	0.136
Item 22	0	1	1	4	1.5	2.25	0.298
Item 23	5	2	5	1	4	2	0.6
Item 24	4	2	5	2	4	2	0.846
Item 26	3	0.75	4	2	3	1	0.238
<b>E. Technical-instrumental aspects of diagnosis</b>							
Item 28	5	1.75	3	1	3	2	0.008 <sup>a</sup>
Item 30	5	1	3	1.5	4	2	0.032 <sup>a</sup>
Item 31	1.5	2	1	3.5	2	3.5	0.447
Item 32	4	1.75	4	2	4	1	0.960
Item 33	5	0	5	1	5	1	0.642
Item 34	3.5	1.25	5	1.75	4	1	0.127
<b>F. Pre and post-graduation training issues</b>							
Item 35	1	2	3	3	3	3	0.001 <sup>a</sup>
Item 36	4	2	5	1	5	1	0.067
Item 37	5	0	5	2	5	1.75	0.314
Item 38	5	2	5	1	4	2	0.468
Item 39	4	1	5	0	5	0	0.028 <sup>a</sup>
Item 41	3	1	3	1.5	3	2	0.955
Item 42	5	1.75	4.5	3	4	2	0.426
Item 43	0	1.25	0	1	0	1	0.911
Item 44	4	2	5	1	5	1	0.063

<sup>a</sup>for P<0,05; P value calculated through Monte Carlo bootstrap for 10000 repetitions

symptoms of the disease among the medical and dental professionals, on the acquisition of a clinical attitude that brings all the professionals to inspect oral mucosa systematically. The dentists' role is crucial for opportunistic screening because people undergo a dental examination at least once in their life and regular attendees do so at least twice a year.

As it concerns the present study, the high response rate to the Delphi survey (84%) in Phase I has been possible thanks to the "face-to-face" motivation to participate to the study, as well as the weekly reminders.<sup>[11,22]</sup> Among experts' opinions, education and training on OSCC are very salient and debated issues, and one of the first targets to be achieved in the medical and dental undergraduate classes.

The low response rate of the nonexperts' questionnaires (44%) in Phase II is hard to understand, considering the participants were personally motivated to attend the survey, and one of the aims of the study was also to improve the training models of

the pre- and postgraduate courses in which they are directly involved. It is likely that professionals took into account that replying to the questionnaire was too "time-consuming." Dental school educational programs in Italy provide specific training modules on the primary and secondary prevention of OSCC, including anamnesis and examination of the oral mucosa, however, very often we are faced with dental graduates unprepared to make a proper "first examination," in approaching the patient and intercepting early oral precancerous lesions. This leads, on one hand, to question the traditional teaching methods in oral medicine and, on the other hand, reflects the "negligence" usually shown by professionals during patient examination. National annual mandatory free-cost courses in postgraduate training of oral medicine and pathology are strongly recommended and the Ministry of Education, Universities and Research should encourage this essential issue in the "lifelong learning programs," improving practice through recommendations on scientific review.

**Table 4: Pairwise comparisons between Experts, DDSs, GDPs by Mann-Whitney U test**

	Experts vs. DDSs	Experts vs. GDPs	DDSs vs. GDPs
Item 2	0,103	0,013*	0,510
Item 5	0,027	0,033	0,928
Item 8	0,657	0,005*	0,090
Item 9	0,024	0,032	0,731
Item 13	0,218	0,001*	0,025
Item 15	0,035	0,006*	0,508
Item 29	0,014*	0,005*	0,613
Item 31	0,012*	0,062	0,411
Item 36	0,419	0,014*	0,013*
Item 37	0,057	0,001*	0,071
Item 41	0,028	0,047	0,911

\*for  $P \leq 0,017$ , after Bonferroni correction;  $P$  value calculated through Monte Carlo bootstrap for 10000 repetitions

From the Kruskal–Wallis test results [Table 3] it is evident that, for 10 out of 33 (30%) items, there is a statistically significant difference ( $P < 0.05$ ) among the three groups. On the basis of the Mann–Whitney U test [Table 4], the differences ( $P < 0.017$  after Bonferroni correction) are observed mainly comparing experts to GDPs.<sup>[23]</sup> At the same time, it is comforting to note that, for 70% of the items, the three groups appear to share the same views on the majority of the issues related to the management, approach, diagnosis, and education on OSCC. This is encouraging when planning future education strategies.

Experts and nonexperts give different priority to certain aspects of the diagnostic, therapeutic, and psychological approach to the patient with OSCC.

**Table 5: How would you invest future funds to improve early diagnosis of OSCC?**

	Experts		DDSs		GDPs	
	Average rank	Times ranked #1	Average rank	Times ranked #1	Average rank	Times ranked #1
Masters and postgraduate courses	3.7	2	3.4	2	3.1	4
Mandatory annual thematic courses	2.8	7	3.4	3	4.1	1
More interactive and extensive pre-graduate courses	3.3	3	2.4	9	2.9	9
Ensure attendance to the Oral Medicine units, both to students and to attendees of postgraduate courses	4.1	1	2.9	3	3	2
E-Learning courses	5.3	1	5.6	1	6.3	0
Establishing more Oral Medicine schools	3.4	4	5.1	3	4.2	4
Engaging dentists and physicians in national projects, as part of their practice	5.4	0	5.1	0	4.3	1

Among the diagnostic difficulties, GDPs, while differing with the other two groups, believe to a lesser extent that recognizing a frank carcinoma from a potentially malignant lesion is a relevant issue (item 2). Similarly, both groups of nonexperts are less concerned than experts about a wait-and-see approach of mild dysplastic lesions (item 5); this is likely linked to the fact that nonexperts usually refer patients with potentially malignant disorders to specialists rather than follow-up them directly. The same could be said about biopsy management in case of widespread/multifocal lesions; GDPs, compared to DDSs and experts, who usually perform biopsies in their clinical practice and are well-versed with biopsy techniques, do not give considerable relevance to this issue (item 13).

Another interesting observation is that both the groups of nonexperts reveal having emotional difficulties in the verbal communication with patients diagnosed with OSCC. The three groups agree on the need for support from a behavioral psychologist when they communicate with patients, and this is particularly true for nonexperts, who are less prepared to manage the fragility, anxiety, and fear of patients with OSCC (item 8–9).

On the contrary, GDPs and DDSs are not so concerned about the prosthetic rehabilitation of their patients who have undergone OSCC surgery (item 15).

In regards to the item 28, experts believe that adjunctive diagnostic tools such as optical instruments, which evaluate tissue fluorescence and chemiluminescence, are useful only to confirm the presence of an oral mucosal disorder, but are completely unable to discriminate high/low risk lesions.<sup>[24–26]</sup> In contrast nonexperts consider the same tools to be a valid help. This opens ample food for thought because often such devices, marketed by commercial companies as infallible methods, up to date do not have enough scientific support, validating their sensitivity and specificity on a large case-series in primary care. Furthermore, experts appear significantly distant from oral surgeons in regards to the reliability of cytology compared to microbiopsy (item 30), considering it unreliable. More efforts should be made to educate nonexperts to the rational use of adjunctive diagnostic tools because histopathology is the only means to diagnosis. There is a difference between experts' and nonexperts' sense of possessing the necessary skills and employing them in daily practice. Nonexperts recognized this lack of knowledge and expressed their willingness to improve these skills by further training.

It is imperative that nonexperts be able to apply simple algorithms in the management of patients to practice a biopsy, if deemed appropriate, and to refer to more complex cases to the special centers. Biopsy is technically easy to perform as a surgical technique, however, it requires much experience to know when, how, and where do it correctly; therefore, it is challenging to a practitioner with limited skills or working single-handed in their practices.

For what concerns the education, the experts believe that the current system of postgraduate training is insufficient to ensure adequate preparation; highlighting the need for suggesting mandatory annual courses (item 35). GDPs, instead, clearly express their will to attend more actively oral medicine units (item 39). As confirmed by Broomfield *et al.*, nonexperts ascribe their difficulty to manage patients affected by potential malignant disorders and/or OSCC to the need of clinical training and of a more interactive way of learning rather than to own cultural problems.<sup>[27,28]</sup>

More practical sessions are needed giving the learners the possibility to develop skills in clinical reasoning, either talking directly with patients or through problem-based learning (PBL) in working groups. For this purpose, we ended the study by asking the three groups to rank how they would recommend to invest future funds in the field of education and training [Table 5]. The Chi-square test results clearly shows ( $P > 0.05$ ) that participants would invest funds in undergraduate courses involving more activity by the trainees (e.g., PBL) in a higher attendance at oral medicine units, as well as for attending national/regional mandatory annual thematic meetings. Postgraduation courses and masters were chosen with a lower frequency maybe because, being optional, they have no wide spread acceptance among dental professionals. In addition, only experts have given priority to the development of a residency in oral medicine, which would create a larger number of reference centers on the territory but would not directly improve screening skills programs for GDPs on a large scale.

Targeted policies and strategies should be promoted by competent organizations, such as the NHS and the national dental associations, in order to make people aware of the possibility that no one is immune to mouth cancer.

This survey has some limitations. The first is related to the small number of respondents among the groups of nonexperts, and hence, the results may

not reflect the average population but only that of the individuals most interested in the project. The second is tied to the fact that the experts, unlike nonexperts, have had the opportunity to evaluate the items of the questionnaire in subsequent rounds, which may have generated distortions at the time of the comparison between the groups. It is worth noting that, if the Delphi method is applied to nonexperts, agreement is the result of conformity to the general average, more than a constructive exchange of views on the basis of feedback received from other participants.<sup>[29]</sup> Finally, it would have been interesting to explore the opinions of patients diagnosed with OSCC, which are pivotal to understand the phenomenon of “diagnostic delays” and to understand healthcare priorities of who is going to receive the care, but this was not the purpose of the present study.<sup>[30,31]</sup>

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### Conflicts of interest

There are no conflicts of interest.

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