

Assessing confidence in the understanding and management of oral cancer among medical and dental undergraduates at a UK university

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Key points

Argues dentists are positioned extremely well to diagnose and advise patients on oral cancer.

Suggests the timely referral of any suspicious lesion in the mouth is paramount.

Suggests patients may be unaware of any malignant changes in the oral cavity.

Abstract

Introduction Oral cancer is the eighth most common cancer in the world and associated with a high rate of morbidity and mortality. Appropriate and early diagnosis of the condition is associated with improved patient outcomes, and an improvement in five-year survival rates.

Aims We aim to ascertain if dental and medical students have similar amounts of self-confidence in the understanding and management of oral cancer within a large UK university.

Methods We invited 65 final-year dental students and 101 final-year medical students to undertake our study, with 50 dental students and 59 medical students opting to participate.

Results We found final-year dental students to feel significantly more confident in their understanding and management of oral cancer when compared to their medical counterparts.

Conclusions Medical students may benefit from additional teaching on oral cancer. Additionally, they should be encouraged to briefly screen the oral cavity of individuals who are at high-risk of the disease.

Introduction

Cancer of the oral cavity is the most common subtype of head and neck cancer in the world (excluding non-melanoma skin cancer).¹ One in 75 men and one in 150 women will be diagnosed with oral cancer at some point in their life in the UK; rates which have been steadily rising since 1990.^{2,3} There is typically a

high level of delay in patients presenting with oral cancer, meaning individuals seek advice from a healthcare professional when they have more advanced disease.⁴ The reasons for such delays are not well understood, but may include the painless nature of many oral cancers, alongside poor public understanding of the potential severity of the condition.⁵ The most common intraoral sites affected by cancer are the tongue, gingivae, floor of mouth and lip.⁶

A review of the literature surrounding the condition shows that there are many well-known, avoidable risk factors implicated in the development of 95% of oral cancers.⁷ Tobacco, betel nut, alcohol (particularly when used synergistically with tobacco), diet, and unprotected oral sex have all been extensively linked with the development of oral cancer.^{8,9,10} Smoking is particularly strongly linked, with a meta-analysis of 254 publications demonstrating the relative risk of oral cancer to be 3.43 times greater in smokers than

non-smokers. Moreover, the combination of smoking and alcohol consumption significantly increases the risk of neoplastic change in the oral cavity.¹¹

It appears that survival rates are starting to improve among individuals with oral cancer, with the five-year survival rate now shown to be 70%.¹² Reasons for an 11% increase in five-year survival rates from 1993–2013 are difficult to pinpoint exactly, but it is likely due to combined improvements in imaging, reconstruction, surgical techniques and radiotherapy. Although successful management of more advanced disease seems to be improving, it is still important for healthcare professionals to identify malignant changes in the oral cavity as soon as possible. Such timely diagnoses result in significantly improved patient outcomes.¹²

While this study has been undertaken previously in the United Kingdom, it is always prudent to re-evaluate current knowledge among student healthcare professionals.¹³ Previous studies, undertaken in different

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centres worldwide, consistently demonstrate dental undergraduates to have better understanding and management of oral cancer, a trend which seemingly continues following qualification.^{13,14,15} A lack of education around the condition is consistently identified as a barrier to management of oral cancer across both professions within these papers.

This is of particular importance to UK-based healthcare professionals who, every November, participate in 'Mouth Cancer Action Month'. In this campaign, individuals are told to speak to a 'doctor or dentist immediately' if they notice any changes within their oral cavity. As such advice is being disseminated at a national level within the UK, it is imperative to ascertain if understanding and management of oral cancer across the two professions is similar.

Methods

In our cross-sectional survey, we have utilised the previously validated questionnaire from Carter and Ogden to help determine if there is homogeneity in the management of oral cancer across students of the two professions at a large UK university.¹³ The 12 questions asked within the survey addressed the practitioner's likelihood to examine inside the mouth, knowledge and delivery of oral cancer risk factors and likely choice of referral destination for concerning lesions. Students could also indicate if they were interested in further learning about oral cancer.

We chose to survey final year students only, as both of these cohorts were four months away from starting work as foundation dentists and doctors; positions where they might be needed to advise on oral lesions unassisted. We delivered the questionnaire via REDCap online software, giving students the opportunity to participate at the end of seminars. Sixty-five dental students and 101 medical students were invited to complete the questionnaire. Students could answer via smartphones, tablets or laptop computers. The inclusion criteria included all final-year medical and dental students. Students with a previous degree in the other subject were excluded. The study was undertaken in May 2018, at the end of their undergraduate training. The questionnaire took less than ten minutes for participants to complete and can be seen in Figure 1.

Approval for this project was sought, and granted, by medical and dental undergraduate deans and the University of Birmingham

A few questions about a typical patient encounter

Do you routinely examine your patient's oral mucosa?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If your answer to question 1 is no, do you screen the oral mucosa if the patients are in a high risk category?	<input type="checkbox"/> Yes <input type="checkbox"/> No
When you have graduated, will you advise patients about the risk factors for oral cancer?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Have you had the opportunity to examine patients with oral lesions?	<input type="checkbox"/> Yes <input type="checkbox"/> No
As regards to the clinical appearance of oral cancer, how knowledgeable do you feel?	<input type="checkbox"/> very well informed <input type="checkbox"/> well informed <input type="checkbox"/> adequately informed <input type="checkbox"/> poorly informed
Do you feel you have sufficient knowledge concerning prevention and detection of oral cancer?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Would you like more information or teaching on oral cancer?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Do you think a patient should go to a doctor or dentist if he/she has an oral lesion?	<input type="checkbox"/> Doctor <input type="checkbox"/> Dentist <input type="checkbox"/> Both
When you have graduated, where would you send a patient if you suspected an oral malignancy?	<input type="checkbox"/> Plastic surgery <input type="checkbox"/> ENT <input type="checkbox"/> Oral and maxillofacial surgery <input type="checkbox"/> Oral medicine <input type="checkbox"/> Dentist <input type="checkbox"/> GP <input type="checkbox"/> Other
If you would like more information on oral cancer, which format would you prefer?	<input type="checkbox"/> Information pack <input type="checkbox"/> lectures <input type="checkbox"/> seminars

Fig. 1 The questionnaire given to both medical and dental undergraduate students

science, technology, engineering and mathematics ethical review committee. Potential study participants were informed in writing that participation was voluntary and anonymous, and that responses between dental and medical students were being compared and analysed to ascertain themes. They were also advised the study may be used in published work in the future and withdrawal following submission of responses was not possible. No personally identifiable information was gathered.

Fisher exact testing has been utilised for statistical analysis of our data set. This is because our data set is nominal, with a relatively small number of responses. Additionally, some cells have an observed count of less than five. This makes Fisher's exact test a more appropriate choice for our responses than chi-squared testing.

Results

Fifty dental students (77% response rate, 57% female) and 59 medical students (58% response rate, 61% female) answered the questionnaire. We believe that the response

rate among medics was low because the data set was collected during the final seminars of the year, but still demonstrated an appropriate cross-section of the year group as a whole.

When asked if they 'routinely examine patients' oral mucosa', 49 dentists (98%) answered 'yes'. The one respondent who answered 'no', also did not screen high-risk patients. Conversely, only ten (17%) of the medical students stated they regularly examined their patients' oral cavity. Seventeen of the 49 (35%) who do not routinely examine the oral cavity of their patients would do so if high risk factors were identified. The Fisher exact test demonstrates $p < 0.00001$, meaning dentists are significantly more likely to examine their patients' oral mucosa than their medical counterparts.

When participants were asked if they would 'advise patients on the risk factors of oral cancer after graduation', 50 dentists (100%) answered yes. Thirty-eight medics (64%) stated they would give this advice to patients. The Fisher exact test demonstrates $p < 0.00001$, meaning dentists in our cohort are significantly more likely to offer advice on the risk factors of oral cancer to their patients.

When questioned on whether they had examined patients with oral lesions, 49 dentists (98%) stated they had, whereas only 16 doctors (27%) had similar first-hand experience of oral lesions. Fisher exact testing showed $p < 0.00001$, meaning that dentists were significantly more likely to have experience in viewing oral lesions.

Twenty-five dentists (50%) believed their knowledge of oral cancer's clinical appearance to be 'adequate,' with two (4%) stating they were poorly informed on the condition, 14 (28%) believed they are 'well informed,' and nine (18%) believed themselves to be 'very well informed' on the condition. Three doctors (5%) believed their knowledge of oral cancer's clinical appearance to be 'adequate,' with the remaining 56 (95%) stating that they believed they were poorly informed on the condition. Dentists have significantly more belief in their knowledge of oral cancer's clinical appearance than doctors, with $p < 0.00001$ for adequate knowledge or greater between the two cohorts.

Participants were also questioned on whether they felt they had sufficient knowledge to detect and offer preventative advice for oral cancer. Forty-three dental students (86%) believed they had sufficient knowledge, compared to four medical students (7%). Therefore, significance can be demonstrated at $p < 0.00001$ for the perceived knowledge between these cohorts.

Forty of the dental cohort (80%) and 56 of the medical cohort (95%) indicated that they would benefit from further training regarding oral cancer. Of these, 17 dentists (43%) and 20 medics (36%) would opt for further education via information packs, making this the most popular learning resource of the cohort who would like further information (39%). Ten dentists (25%) and 25 medics (47%) who would like further information opted for lectures on the subject, making this the second most popular choice of the cohort (36%). Thirteen dentists (33%) and 11 medics (20%) opted for seminars on the subject, making this the least popular choice among students who wanted further information (25%).

Twenty-seven dentists (54%) thought patients should see either a doctor or a dentist with a suspected oral lesion, with 22 (44%) believing it was better to see a dentist and one (2%) stating oral lesions should ideally be seen by a doctor. Twenty-one medics (36%) believed oral lesions should be assessed by either a doctor or a dentist, with 37 (63%) of this cohort believing a dentist was better

suited to addressing these lesions. One (2%) felt a doctor would be the best professional to diagnose oral lesions.

Finally, six dentists (12%) would refer potentially malignant oral lesions to oral and maxillofacial surgery departments. The remaining 44 (88%) would refer to an oral medicine department. Of the medics, five (8%) would refer to a dentist if they suspected oral malignancy, with eight (14%) opting for a referral to otolaryngology. Thirty-five (59%) would refer to oral and maxillofacial surgery, while the remaining 11 (19%) would opt for a referral to oral medicine. Responses for dental and medical students can be seen in Supplementary Table 1 and Table 2, respectively.

Discussion

Oral cancer is lethal if left untreated, making it one of the most important intraoral pathologies to diagnose and manage appropriately by primary care practitioners. Indeed, the survival rate of oral cancer has been shown to be four times higher if treated while disease is localised compared to treatment following metastasis.¹⁶ This highlights the paramount nature of early detection and the referral of patients suffering from the condition, which may include incidental findings during a routine appointment. It has been shown that detection during a non-symptom-driven examination is associated with a lower cancer staging at diagnosis, resulting in improved patient outcomes.¹⁷ Our data clearly shows that dental students are more self-confident in their understanding and management of oral cancer, and that medical students are interested in further learning around the topic. In the first instance, educating medics how to undertake a brief intraoral examination (and identify anomalies) in at-risk individuals could be extremely useful in promoting early oral cancer diagnoses. As tobacco and alcohol usage is discussed as part of a patient's social history, it is easy to identify this cohort of patients.

It is promising to note that a majority of both dental and medical students would offer a patient advice on the risk factors for oral cancer, however dental students were significantly more likely to do this than medical students. There is evidence that knowledge of up to date care decreases following graduation from medical school, meaning that delivering appropriate teaching

to an undergraduate audience is particularly important.¹⁸ There is additionally a strong body of evidence to suggest that patients respond well to smoking and alcohol cessation from doctors and dentists, and that doing so can actually improve the clinician-patient relationship.^{19,20,21,22} Brief intervention on these easily modifiable risk factors can be implemented in less than one minute and engage patients who are considering changing their at-risk behaviours.²³

Our dental respondents were significantly more likely to have seen oral lesions than the medical group, with our medics having had less exposure than medical students in similar studies.^{13,14} While it is understandable that dentists have more contact with such lesions, many systemic diseases can result in oral sequelae, meaning an appreciation of oral health may be useful to medics in the future. Good oral health is an important aspect of good general health, which is why taking opportunities to increase medical undergraduates' exposure to oral health conditions may be beneficial.²⁴ While the UK medical undergraduate curriculum is extremely busy, exposure to general hospital specialties such as oral and maxillofacial surgery (or otolaryngology/dermatology where there is no oral and maxillofacial surgery department) ensures medical undergraduates continue to experience medically-centred surgical specialties, alongside appreciating simple management of conditions which may present within the oral cavity.²⁵ Oral and maxillofacial surgery is one of the ten surgical specialties recognised by the General Medical Council (GMC); exposure to a wide range of surgical specialties can help medical students identify role models in surgical specialties, which may result in more individuals pursuing this career.²⁶

We questioned participants on their perceived knowledge of oral cancer, which has typically been shown to be poorly correlated to actual knowledge.²⁷ However, we must assume that all healthcare professionals would be equally candid in their perceptions. We can see from our results that dentists are significantly more confident in their knowledge of the condition. This lack of confidence in medical undergraduates may be a deterrent to these individuals examining the oral cavity. Additionally, 'Oral Cancer: Early detection' is an important topic of the General Dental Council (GDC) guidance for continuing professional development (CPD)

for dental professionals, meaning dentists are more likely to continue educating themselves on the condition following graduation.²⁸ This view on perceived knowledge continues into confidence of detecting oral cancer; dentists feel significantly more empowered to do so when compared to their medical counterparts. This echoes previous studies which call for the continued need to address the education of medical practitioners on oral cancer.²⁹

The preferred choice of referral location for suspected malignancy also differed greatly between doctors and dentists. Dentists predominantly chose to refer to oral medicine, a dental speciality with the remaining individuals opting to refer to oral and maxillofacial surgery. Both of these locations are thoroughly appropriate, with excellent links between the two specialties meaning diagnosis and treatment planning can occur very quickly. In contrast, medical students had a larger number of specialties they would potentially refer to. Five respondents opted to refer to a dentist, which would add a further stage to the referral process, reducing the speed of referral and ultimately definitive treatment. Eight respondents opted for a referral to otolaryngology. Again, this may slow treatment as this speciality seeks advice from an oral and maxillofacial surgery specialist, but may be more appropriate if the cancer is visible extremely posteriorly in the oral cavity. The remaining respondents predominantly opted for oral and maxillofacial surgery, and the rest oral medicine. Oral and maxillofacial surgery is a medical speciality, and studies have shown that choice of referral may be based on understanding of the condition being referred, making the decisions of our two cohorts more understandable.³⁰ It should also be noted that oral medicine departments are dental hospital-specific. Medics training in an institution which doesn't have an attached dental hospital may therefore not be aware of the option of such a referral.

Ultimately, patients value appropriate referrals which result in the least amount of time wasted; oral and maxillofacial, oral medicine or otolaryngology may all be appropriate referral destinations depending on the availability of services in different areas across the UK. Educating practitioners on the correct referral location for suspected oral malignancy at a local level may therefore help improve patient satisfaction and outcomes.³¹

When considering the responses received regarding understanding of oral cancer,

it is positive that medical students were significantly more likely to request further information on oral cancer. The choice of an information pack as the most popular learning choice for dental students echoes that they do not feel the need for formal teaching, due to their pre-existing confidence. Medics, who feel less confident in their oral cancer knowledge, opted for taught learning. A compromise of both of these approaches may be the use of an online e-learning resource, which can implement taught learning elements and the delivery of contemporaneous information similar to an 'information pack', allowing the individual to choose their pace of learning.³² Moreover, information presented within an e-learning resource can easily be updated. Current web-based learning relating to oral cancer prevention (for example, smoking cessation) has a high level of heterogeneity in its content and often does not utilise interactive material (such as videos and interactive quizzes) appropriately. This greatly reduces their utility to health care learners.³³ The development of a gold-standard, targeted, e-learning resource for undergraduate healthcare professionals could therefore prove extremely beneficial and fit readily into a medical school curriculum, without affecting the landscape of undergraduate training.³⁴ An excellent example of a learning resource aimed at qualified practitioners is the 'BDA-CRUK Oral Cancer Recognition Toolkit', which could be used to appropriately educate healthcare practitioners or possibly adapted slightly to be suitable within an undergraduate curriculum.³⁵ The desire to have information delivered as an information pack is concurrent with previous, similar studies of UK dentists and doctors.^{13,29}

We do appreciate there are some limitations to our study, such as the comparatively low percentage of medical respondents and the questionnaire focusing on perceptions instead of facts. We also asked no open-ended questions about knowledge. To further understanding within these two populations, the authors have also designed a survey assessing knowledge of oral lesions based on photos. This will help ascertain if there is a link between perceived knowledge and actual knowledge among respondents. It may also be useful to identify improvement in knowledge following a teaching episode in both dentists and medics. The choice to keep this particular survey short was to not dissuade potential participants.³⁶

Conclusions

We can conclude that, in our sample, dentists feel more confident with their understanding and management of oral cancer. Education of oral malignancy in our medical respondents could readily be provided via e-learning, increasing confidence in these young practitioners. Based on our data of self-perceived understanding, it may be better for an individual worried about oral malignancy to see a dentist in the first instance, but if this is not possible or the patient has to wait a longer time for an appointment, visiting their medical practitioner will elicit a similar outcome. Additionally, medical students should be encouraged to briefly examine the oral cavity of patients with high risk factors for oral cancer.

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