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# Assessing oral cancer awareness, attitude, and practice among Turkish dental students in 2020

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**Original Article**

## Abstract

**BACKGROUND AND AIM:** Dentists are often the first to encounter patients with oral cancer and the detection of lesions plays a major role in early diagnosis of the cancer and improving the prognosis. Undergraduate dentistry students are also future practitioners. The aim of this study was to evaluate the knowledge, awareness, and attitudes of dental students about oral cancer.

**METHODS:** The questionnaire form prepared in digital environment was sent via e-mail to third, fourth, and fifth-year dentistry students registered with the Turkish Dental Association (TDA). The knowledge, awareness, and attitudes of dental students about oral cancer were evaluated with 49 questions in the questionnaire. The data were analyzed with SPSS software.

**RESULTS:** This study included 1041 dentistry students. The actual risk factors for oral cancer were known to most dental students who participated in the study. However, a significant portion of the students marked the situations that are not real risk factors for oral cancer as risk factors. In general, it was determined that the students did not have sufficient knowledge about the diagnostic procedures and symptoms of oral cancer.

**CONCLUSION:** Dental students lacked the adequate level of knowledge and awareness about the prevention and early diagnosis of oral cancer. In undergraduate education, an educational strategy should be developed to provide up-to-date information on risk factors that facilitate early diagnosis, diagnostic procedures, oral examination, and auxiliary diagnostic tools.

**KEYWORDS:** Attitude; Awareness; Dental Student; Knowledge; Mouth Neoplasms

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Oral cancer has been reported as the sixth most common cancer type in the world.[1,2] According to the statistics of the International Agency for Research on Cancer (IARC), 354864 people were diagnosed with oral cancer in 185 countries in 2018, and 177384 people died from oral cancer.[3] According to IARC's data on Turkey, 1948 new cases of oral cancer were reported in 2018 and 452 people died of oral cancer.[4]

About 90% of all oral cancers are squamous cell carcinomas (SCCs) that originate from the oral epithelium.[1] Although they are generally in a superficial location and visible to the eye, in most of the cases, the diagnosis is made in advanced stages.[4,5] Even though it is generally seen in individuals over the age of 40, recent studies have reported an increase in the incidence of oral cancer in young individuals. The most common sites for oral cancer are the lateral of the tongue, buccal mucosa, gingiva, and the floor of the mouth.[6]

After the surgical treatment of oral cancer, the patient's quality of life is significantly compromised by common functional and aesthetic deficiencies. The early detection and diagnosis of such cases is of paramount importance for better prognosis.[7,8] The need to raise awareness of oral cancer and potentially malignant oral diseases has been

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highlighted in several studies.[9-12] The World Health Organization (WHO) clearly states that reducing the incidence of oral cancer requires a comprehensive approach with health education, risk factor reduction, and early detection.[13] Dentists are often the first to encounter patients with oral cancer and the detection of these lesions plays a major role in early diagnosis and improving the prognosis of the case. Although advanced diagnostic techniques aim to improve the accuracy of diagnosis, this is still insufficient.[7] Undergraduate dentistry students are also future practitioners.[13] Therefore, the aim of this study was to evaluate the knowledge, awareness, and attitudes of dental students about oral cancer.

## Methods

The present study was designed as a cross-sectional investigation. This study was approved by the Ethics Committee of Tokat Gaziosmanpasa University, Tokat, Turkey (Date: 01.10.2020, project number: 20-KAEK-247). The third, fourth, and fifth-year dentistry students who were registered to the Turkish Dental Association (TDA) and agreed to participate in the study were included in the study. The purpose of the study was explained to the participants and consent was obtained from all participants. The questionnaire was developed with reference to a study by Keser and Pekiner.[14] The first part of the questionnaire focuses on demographic factors such as participants' age, gender, and year of study. The second part consists of 49 questions with 24 questions about "general awareness of oral cancer and risk factors", 12 questions about "oral cancer signs and symptoms", and 13 questions about "attitude and practice towards oral cancer". The survey questions were imported to Google Forms®. The questionnaire form prepared in digital environment was sent via e-mail to dentistry students registered with the TDA. The students were asked to respond to the questions by selecting from the options "yes", "no", "I don't know". Survey responses given between 02.10.2020-01.12.2020 were accepted. To avoid conflict of interests, the participants were not asked to name their universities. The main goal was to collect as much data as possible to the benefit of dental education on the subject matter.

The sample size was determined by the power analysis test performed in the Minitab 16 program. For all statistical analyses, SPSS software (version 25.0, IBM Corporation, Armonk, NY, USA). Regarding the data, in addition to frequency and percentage distributions, the relationship between categorical variables was analyzed using the chi-square test. P-value less than 0.05 was accepted significant.

## Results

This study included 1041 dentistry students, of whom 705 were women (67.7%) and 336 were men (32.2%). About 28.9% of the participants were third-year students, 32.4% were fourth-year students, and 38.7% were fifth-year students. The mean age of the participants was 22.0 ± 1.6 years (Table 1).

About 97.1% of the students who participated in the survey stated that they had heard of oral cancer, 88.2% of them stated that oral cancer could be prevented, 97.9% of the students said that the disease could be cured, and 91.5% of the students stated that oral cancer might spread to other parts of the body.

**Table 1.** Demographic characteristics of participants

| Variable | Third-year | Fourth-year | Fifth-year | Total number |
|---|---|---|---|---|
| Gender | | | | |
| Men | 106 (31.54) | 99 (29.46) | 131 (38.98) | 336 |
| Women | 195 (27.65) | 238 (33.75) | 272 (38.58) | 705 |
| Total | 301 (28.91) | 337 (32.37) | 403 (38.71) | 1041 |
| Age (year) | 21.40 ± 1.63 | 21.80 ± 1.02 | 23.10 ± 1.50 | 22.20 ± 1.60 |

Data are presented as mean ± standard deviation (SD) or number and percentage

Moreover, 57.3% of students claimed to have knowledge of various ways of detecting oral cancer and 47.1% had knowledge of treating oral cancer (Table 2).

The students who participated in the survey listed risk factors for oral cancer with the following rates: smoking (97.9%), chewing tobacco (85.9%), immune deficiency (83.7%), previous oral cancer (83.5%), malnutrition (81.6%), human papillomavirus (HPV) (79.3%), alcohol consumption (78.4%), old age (75.0%), and exposure to ultraviolet (UV) light (71.9%). All groups determined smoking as a risk factor (third year: 97.3%, fourth year: 96.7%, fifth year: 99.2%) and there was no statistically significant difference between the groups ($P > 0.050$). Although not among genuine risk factors for oral cancer, poor oral hygiene (84.2%), family history of oral cancer (79.4%), prolonged use of poorly fitted dentures (71.8%), consumption of high-temperature food and beverages (58.8%), and consumption of spicy foods (43.0%) were cited by the participants as risk factors. There was a statistically significant difference between the groups in the rates of evaluating chewing tobacco, immune deficiency, previous oral cancer, HPV, alcohol consumption, old age, exposure to UV light, poor oral hygiene, family history of oral cancer, prolonged use of poorly fitted dentures, and consumption of spicy foods as risk factors ($P < 0.050$) (Table 3).

About 72.2% of the participants stated that oral cancer might present as a red lesion and 69.0% of them said that it might present as a white lesion. Swellings, persistent ulcers not healed within 2 weeks, and numbness were cited as symptoms of oral cancer by 55.0%, 62.5%, and 45.9% of the participants, respectively. There was a statistically significant difference between the groups in the responses of the participants regarding the signs and symptoms of oral cancer ($P < 0.050$) (Table 4).

The most common sites of oral cancer were reported by 38.8% of the participants as the floor of the mouth and the sublingual area. 57.92% of the participants reported that the most common type of cancer seen in the oral cavity was SCC. There was a statistically significant difference between the groups in the answers given by the participants regarding the oral cancer diagnostic procedures ($P < 0.050$). When the results were evaluated, it was observed that the level of knowledge increased as the education year increased. The level of knowledge of participants on oral cancer diagnosis procedures is presented in table 5.

About 86.2% of the participants felt incompetent at detecting oral cancer, 22.5% of the participants reported that they informed their patients about the risk factors of oral cancer, 43.3% of them said that they routinely performed oral examinations, and 59.9% of the participants said that they examined head and neck lymph nodes of suspected patients (Table 6). Moreover, 79.0% of the participants reported textbooks as the source of information about oral cancer.

## Discussion

Oral cancer has become a worldwide health problem with increasing incidence and mortality rate.[15] It is generally diagnosed in advanced stages. Early diagnosis provides a serious decrease in mortality and morbidity rates. Early diagnosis of oral cancer provides a more conservative treatment and a better prognosis.[16,17] In the present study, the knowledge, awareness, and attitudes of dental students about oral cancer were evaluated.

In this study, 67.7% of the participants were women and 32.2% were men. Similarly, the proportion of men participating in a survey by Hashim et al.[18] was 43.0%, and that of women was 57.0%. In a study by Keser and Pekiner,[14] 34.8% of the participants were men and 65.2% were women. In a study by Kebabcioglu and Pekiner,[19] 40.6% of the participants were men and 59.4% were women.

Determining risk factors is crucial to enable dentists to understand which patients are predisposed to oral cancer.[20] Although gender is not a real risk factor, 43.41% of the participants stated gender as a risk factor for oral cancer.

**Table 2.** General awareness of oral cancer

| Questions | Responses | Year of education (%) | | | Total | P1 | P2 | P3 | P |
|---|---|---|---|---|---|---|---|---|---|
| | | Third-year | Fourth-year | Fifth-year | | | | | |
| Have you heard of oral cancer? | Yes | 94.68 | 97.32 | 98.75 | 97.11 | 0.086 | 0.002* | 0.155 | 0.006* |
| | No | 5.31 | 2.67 | 1.24 | 2.88 | | | | |
| Is oral cancer preventable? | Yes | 89.36 | 89.61 | 86.10 | 88.18 | 0.920 | 0.195 | 0.148 | 0.254 |
| | No | 10.63 | 10.38 | 13.89 | 11.81 | | | | |
| Is oral cancer treatable? | Yes | 97.00 | 97.92 | 98.51 | 97.88 | 0.462 | 0.172 | 0.544 | 0.391 |
| | No | 2.99 | 2.07 | 1.48 | 2.11 | | | | |
| Does oral cancer spread to other parts of the body? | Yes | 91.36 | 90.50 | 92.55 | 91.54 | 0.707 | 0.563 | 0.316 | 0.602 |
| | No | 8.63 | 9.49 | 7.44 | 8.45 | | | | |
| Do you know the various ways of detecting oral cancer? | Yes | 33.22 | 48.36 | 82.87 | 57.34 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 66.77 | 51.63 | 17.12 | 42.65 | | | | |
| Do you know the various ways of treating oral cancer? | Yes | 22.59 | 38.57 | 72.45 | 47.07 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 77.40 | 61.42 | 27.54 | 52.92 | | | | |

*Chi-square test, P < 0.05 is statistically significant.

P: Statistical difference between third-year, fourth-year, and fifth-year; P1: Statistical difference between third-year and fourth-year; P2: Statistical difference between third-year and fifth-year; P3: Statistical difference between fourth-year and fifth-year

**Table 3.** Knowledge about oral cancer risk factor

| Questions | Responses | Year of education (%) | | | Total | P1 | P2 | P3 | P |
|---|---|---|---|---|---|---|---|---|---|
| | | Third-year | Fourth-year | Fifth-year | | | | | |
| Do you consider gender as a risk factor? | Yes | 26.24 | 39.76 | 59.30 | 43.41 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 3.65 | 9.19 | 12.15 | 8.74 | | | | |
| | I don't know | 70.09 | 51.03 | 28.53 | 47.83 | | | | |
| Do you consider smoking as a risk factor? | Yes | 97.34 | 96.73 | 99.25 | 97.88 | 0.408 | 0.039* | 0.039* | 0.076 |
| | No | 0 | 0.59 | 0.24 | 0.28 | | | | |
| | I don't know | 2.65 | 2.67 | 0.49 | 1.82 | | | | |
| Do you consider low consumption of fruits and vegetables as a risk factor? | Yes | 45.51 | 47.47 | 49.13 | 47.55 | 0.289 | 0.157 | 0.897 | 0.387 |
| | No | 9.63 | 12.75 | 12.65 | 11.81 | | | | |
| | I don't know | 44.85 | 39.76 | 38.21 | 40.63 | | | | |
| Do you consider betel quid chewing as a risk factor? | Yes | 14.61 | 25.81 | 55.08 | 33.90 | 0.002* | < 0.001* | < 0.001* | < 0.001* |
| | No | 1.32 | 0.89 | 1.48 | 1.24 | | | | |
| | I don't know | 84.05 | 73.29 | 43.42 | 64.84 | | | | |
| Do you consider tobacco chewing as a risk factor? | Yes | 76.74 | 80.41 | 97.27 | 85.87 | 0.460 | < 0.001* | < 0.001* | < 0.001* |
| | No | 0.66 | 0.89 | 0.49 | 0.67 | | | | |
| | I don't know | 22.59 | 18.69 | 2.23 | 13.44 | | | | |
| Do you consider ultraviolet exposure as a risk factor? | Yes | 61.79 | 70.32 | 80.64 | 71.85 | 0.053 | < 0.001* | < 0.001* | < 0.001* |
| | No | 5.64 | 5.63 | 7.44 | 6.34 | | | | |
| | I don't know | 32.55 | 24.03 | 11.91 | 21.80 | | | | |
| Do you consider viral infection (e.g., HPV) as a risk factor? | Yes | 69.10 | 77.15 | 88.83 | 79.34 | 0.047* | < 0.001* | < 0.001* | < 0.001* |
| | No | 2.65 | 2.96 | 2.97 | 2.88 | | | | |
| | I don't know | 28.25 | 19.88 | 8.18 | 17.77 | | | | |
| Do you consider alcohol use as a risk factor? | Yes | 70.76 | 77.74 | 84.61 | 78.38 | 0.130 | < 0.001* | 0.018* | < 0.001* |
| | No | 1.99 | 1.48 | 2.23 | 1.92 | | | | |
| | I don't know | 27.24 | 20.77 | 13.15 | 19.69 | | | | |
| Do you consider prior oral cancer lesion as a risk factor? | Yes | 73.08 | 81.89 | 92.55 | 83.47 | 0.015* | < 0.001* | < 0.001* | < 0.001* |
| | No | 1.66 | 2.07 | 1.48 | 1.72 | | | | |
| | I don't know | 25.24 | 16.02 | 5.95 | 14.79 | | | | |
| Do you consider older age as a risk factor? | Yes | 66.44 | 72.99 | 83.12 | 75.02 | 0.002* | < 0.001* | < 0.001* | < 0.001* |
| | No | 2.99 | 6.82 | 8.18 | 6.24 | | | | |
| | I don't know | 30.56 | 20.17 | 8.68 | 18.73 | | | | |
| Do you consider malnutrition as a risk factor? | Yes | 78.73 | 81.89 | 83.37 | 81.55 | 0.416 | 0.291 | 0.672 | 0.494 |
| | No | 2.65 | 3.26 | 2.23 | 2.68 | | | | |
| | I don't know | 18.60 | 14.83 | 14.39 | 15.75 | | | | |

**Table 3.** Knowledge about oral cancer risk factor (continue)

| Questions | Responses | Year of education (%) | | | Total | P1 | P2 | P3 | P |
|---|---|---|---|---|---|---|---|---|---|
| | | Third-year | Fourth-year | Fifth-year | | | | | |
| Do you consider consumption of high-temperature food and beverages as a risk factor? | Yes | 55.81 | 55.19 | 58.80 | 56.77 | 0.988 | 0.050 | 0.036* | 0.068 |
| | No | 11.96 | 12.16 | 16.37 | 13.73 | | | | |
| | I don't know | 32.22 | 32.64 | 24.81 | 29.49 | | | | |
| Do you consider consumption of spicy food as a risk factor? | Yes | 32.55 | 42.13 | 51.61 | 43.03 | 0.023* | < 0.001* | 0.013* | < 0.001* |
| | No | 15.94 | 16.61 | 17.12 | 16.61 | | | | |
| | I don't know | 51.49 | 41.24 | 31.26 | 40.34 | | | | |
| Do you consider poor oral hygiene as a risk factor? | Yes | 87.04 | 84.27 | 82.13 | 84.24 | 0.234 | < 0.001* | 0.027* | 0.001* |
| | No | 1.66 | 3.85 | 8.43 | 4.99 | | | | |
| | I don't know | 11.29 | 11.86 | 9.42 | 10.75 | | | | |
| Do you consider incompatible prostheses as a risk factor? | Yes | 60.46 | 67.95 | 83.37 | 71.75 | 0.009* | < 0.001* | < 0.001* | < 0.001* |
| | No | 3.98 | 6.82 | 7.69 | 6.34 | | | | |
| | I don't know | 35.54 | 25.22 | 8.93 | 21.90 | | | | |
| Do you consider family history of oral cancer as a risk factor? | Yes | 70.76 | 80.41 | 85.11 | 79.44 | 0.013* | < 0.001* | 0.238 | < 0.001* |
| | No | 4.31 | 3.85 | 2.97 | 3.65 | | | | |
| | I don't know | 24.91 | 15.72 | 11.91 | 12.10 | | | | |
| Do you consider chronic candidiasis as a risk factor? | Yes | 37.87 | 58.16 | 74.44 | 58.59 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 0.33 | 4.15 | 6.45 | 3.93 | | | | |
| | I don't know | 61.79 | 37.68 | 19.10 | 37.46 | | | | |
| Do you consider immune deficiency as a risk factor? | Yes | 76.41 | 84.27 | 88.58 | 83.66 | 0.018* | < 0.001* | 0.004* | < 0.001* |
| | No | 0.33 | 0.89 | 2.97 | 1.53 | | | | |
| | I don't know | 23.25 | 14.83 | 8.43 | 14.79 | | | | |

*Chi-square test, P < 0.05 is statistically significant.

P: Statistical difference between third-year, fourth-year, and fifth-year; P1: Statistical difference between third-year and fourth-year; P2: Statistical difference between third-year and fifth-year; P3: Statistical difference between fourth-year and fifth-year; HPV: Human papillomavirus

**Table 4.** Knowledge of signs and symptoms of oral cancer

| Questions | Responses | Year of education (%) | | | Total | P1 | P2 | P3 | P |
|---|---|---|---|---|---|---|---|---|---|
| | | Third-year | Fourth-year | Fifth-year | | | | | |
| Can oral cancer manifest without initial complaint or symptoms? | Yes | 54.81 | 67.35 | 86.10 | 70.98 | 0.002* | < 0.001* | < 0.001* | < 0.001* |
| | No | 3.32 | 4.15 | 5.70 | 4.70 | | | | |
| | I don't know | 41.80 | 28.48 | 8.18 | 24.49 | | | | |
| Can oral cancer appear as a red lesion? | Yes | 52.15 | 68.84 | 90.07 | 72.23 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 0.66 | 1.78 | 0.49 | 0.96 | | | | |
| | I don't know | 47.17 | 29.37 | 9.42 | 26.80 | | | | |
| Can oral cancer appear as a white lesion? | Yes | 48.83 | 69.43 | 83.62 | 68.97 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 2.99 | 2.07 | 4.71 | 3.36 | | | | |
| | I don't know | 48.17 | 28.48 | 11.66 | 27.66 | | | | |
| Can oral cancer appear as a mixture of red and white lesions? | Yes | 43.52 | 62.51 | 84.11 | 65.41 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 2.32 | 0.29 | 2.97 | 1.92 | | | | |
| | I don't know | 54.15 | 37.09 | 12.90 | 32.66 | | | | |
| Is swelling a sign/symptom of oral cancer? | Yes | 44.85 | 54.00 | 63.52 | 55.04 | 0.003* | < 0.001* | < 0.001* | < 0.001* |
| | No | 2.99 | 6.23 | 13.39 | 8.06 | | | | |
| | I don't know | 52.15 | 39.76 | 23.07 | 36.88 | | | | |
| Is an ulcer not healed for more than 2 weeks a sign/symptom of oral cancer? | Yes | 35.21 | 60.83 | 84.36 | 62.53 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 0.99 | 5.93 | 5.45 | 4.32 | | | | |
| | I don't know | 63.78 | 33.23 | 10.17 | 33.14 | | | | |
| Is numbness of the tongue or other areas of the mouth a sign of oral cancer? | Yes | 29.90 | 37.09 | 65.26 | 45.91 | 0.008* | < 0.001* | < 0.001* | < 0.001* |
| | No | 1.66 | 4.74 | 9.42 | 5.66 | | | | |
| | I don't know | 68.43 | 58.16 | 25.31 | 48.41 | | | | |

*Chi-square test, P < 0.05 is statistically significant.

P: Statistical difference between third-year, fourth-year, and fifth-year; P1: Statistical difference between third-year and fourth-year; P2: Statistical difference between third-year and fifth-year; P3: Statistical difference between fourth-year and fifth-year

**Table 5.** Knowledge about oral cancer diagnostic procedures

| Questions | Responses | Year of education (%) | | | Total | P1 | P2 | P3 | P |
|---|---|---|---|---|---|---|---|---|---|
| | | Third-year | Fourth-year | Fifth-year | | | | | |
| The most common sites for oral cancer | Floor of the mouth and under the tongue | 17.60 | 34.12 | 58.56 | 38.80 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | Mucous membrane cheek/lip/gums and back of the tongue | 25.91 | 26.40 | 19.60 | 23.63 | | | | |
| | Hard and soft palate and floor of mouth | 2.99 | 7.71 | 5.45 | 5.47 | | | | |
| | Under the tongue and hard and soft palate | 3.98 | 6.23 | 3.97 | 4.70 | | | | |
| | All sites equally | 2.65 | 0.59 | 0.99 | 1.34 | | | | |
| | I don't know | 46.84 | 24.92 | 11.41 | 26.03 | | | | |
| Two lesions most likely to be precancerous | Erythroplakia and morbus Bowen | 6.64 | 12.16 | 23.82 | 15.08 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | Leukoplakia and erythroplakia | 13.62 | 28.18 | 54.34 | 34.10 | | | | |
| | Blue nevus and leukoplakia morbus | 0.99 | 2.37 | 4.46 | 2.78 | | | | |
| | Bowen and blue nevus | 3.32 | 4.15 | 4.96 | 4.22 | | | | |
| | I don't know | 75.41 | 53.11 | 12.40 | 43.80 | | | | |
| The most common form of oral cancer | Squamous cell carcinoma | 26.91 | 50.14 | 87.59 | 57.92 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | Large cell carcinoma | 0.99 | 1.78 | 0.74 | 1.15 | | | | |
| | Small cell carcinoma | 1.32 | 0.59 | 0.74 | 0.89 | | | | |
| | Adenosquamous cell carcinoma | 2.65 | 4.45 | 3.22 | 3.45 | | | | |
| | I don't know | 68.10 | 43.02 | 7.69 | 36.59 | | | | |
| Age group more likely to be diagnosed with oral cancer | 20-40 | 4.31 | 8.01 | 7.19 | 6.62 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | 40-60 | 31.89 | 44.51 | 58.56 | 46.30 | | | | |
| | 60-80 | 12.62 | 13.64 | 15.63 | 14.12 | | | | |
| | I don't know | 51.16 | 33.82 | 18.61 | 18.61 | | | | |
| Clinical properties of a prior oral cancer lesion | Small, painful, white area | 5.31 | 11.27 | 10.91 | 10.91 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | Small, painless, white area | 7.97 | 13.35 | 17.86 | 17.86 | | | | |
| | Small, painful, red area | 11.29 | 20.77 | 27.79 | 27.79 | | | | |
| | Small, painless, red area | 5.64 | 12.75 | 23.57 | 23.57 | | | | |
| | I don't know | 76.41 | 41.83 | 19.85 | 19.85 | | | | |

*Chi-square test, P < 0.05 is statistically significant.

P: Statistical difference between third-year, fourth-year, and fifth-year; P1: Statistical difference between third-year and fourth-year; P2: Statistical difference between third-year and fifth-year; P3: Statistical difference between fourth-year and fifth-year

**Table 6.** Practice and attitude of oral cancer

| Questions | Responses | Year of education (%) | | | Total | P1 | P2 | P3 | P |
|---|---|---|---|---|---|---|---|---|---|
| | | Third-year | Fourth-year | Fifth-year | | | | | |
| Do you know anyone who has oral cancer? | Yes | 3.32 | 2.67 | 9.18 | 5.37 | 0.629 | 0.002* | < 0.001* | < 0.001* |
| | No | 96.67 | 97.32 | 90.81 | 94.62 | | | | |
| Do you think you are competent to detect oral cancer? | Yes | 3.98 | 8.60 | 25.55 | 13.83 | 0.018* | < 0.001* | < 0.001* | < 0.001* |
| | No | 96.01 | 91.39 | 74.44 | 86.16 | | | | |
| Will you deny treatment to patients with oral cancer? | Yes | 12.29 | 17.80 | 23.82 | 18.53 | 0.053 | < 0.001* | 0.046* | < 0.001* |
| | No | 87.70 | 82.19 | 76.17 | 81.46 | | | | |
| Do you go for screening for oral cancer by yourself? | Yes | 76.07 | 78.04 | 77.66 | 77.32 | 0.556 | 0.620 | 0.903 | < 0.001* |
| | No | 23.92 | 21.95 | 22.33 | 22.67 | | | | |
| Would you advise your friends and family to go for oral cancer screening routinely? | Yes | 80.39 | 75.37 | 82.38 | 79.53 | 0.127 | 0.502 | 0.019* | < 0.001* |
| | No | 19.60 | 24.62 | 17.61 | 20.46 | | | | |
| Do you feel that oral cancer awareness-raising campaigns are effective? | Yes | 58.47 | 54.59 | 53.10 | 55.13 | 0.325 | 0.156 | 0.684 | < 0.001* |
| | No | 41.52 | 45.40 | 46.89 | 44.86 | | | | |
| Do you think more oral cancer awareness-raising campaigns should be carried out? | Yes | 97.67 | 98.81 | 97.27 | 97.88 | 0.270 | 0.737 | 0.138 | < 0.001* |
| | No | 2.32 | 1.18 | 2.72 | 2.11 | | | | |
| Have you ever informed your patients about the risk factors of oral cancer? | Yes | 6.97 | 20.17 | 35.98 | 22.47 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 93.02 | 79.82 | 64.01 | 77.52 | | | | |
| Have you ever advised patients to avoid the risk factors of oral cancer? | Yes | 23.25 | 41.54 | 59.80 | 43.32 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 76.74 | 58.45 | 40.19 | 56.67 | | | | |
| Do you routinely examine the patients' oral cavity for signs of oral cancer? | Yes | 18.27 | 40.05 | 64.76 | 43.32 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 81.72 | 59.94 | 35.23 | 56.67 | | | | |
| Do you record tobacco and alcohol use in personal history? | Yes | 44.85 | 70.02 | 80.89 | 66.95 | < 0.001* | < 0.001* | < 0.001* | < 0.001* |
| | No | 55.14 | 29.97 | 19.10 | 33.04 | | | | |
| Do you examine head and neck lymph nodes of suspicious patients? | Yes | 31.56 | 66.46 | 75.68 | 59.94 | < 0.001* | < 0.001* | 0.006* | < 0.001* |
| | No | 68.43 | 33.53 | 16.87 | 40.05 | | | | |

*Chi-square test, P < 0.05 is statistically significant.

P: Statistical difference between third-year, fourth-year, and fifth-year; P1: Statistical difference between third-year and fourth-year; P2: Statistical difference between third-year and fifth-year; P3: Statistical difference between fourth-year and fifth-year

Shah et al.[21] have reported that men are more exposed to risk factors; therefore, they are more likely to be affected by oral cancer. However, it is thought that women and young individuals may be more prone to oral cancer in relation to HPV infection.[22,23]

Smoking was identified as a risk factor by 97.88% of the students participating in the study and chewing tobacco and alcohol use were found to be risk factors for oral cancer development by 85.87% and 78.38% of the participants, respectively. Besides, 66.95% of the students reported that they questioned the patients' tobacco and alcohol use. In a study by Gunjal et al.,[13] smoking, chewing tobacco, and alcohol use were identified as risk factors by 99.0%, 92.7%, and 91.7% of the dentistry students, respectively. About 96.6% of the students reported that they recorded tobacco and alcohol use in the anamnesis of their patients. In a study by Keser and Pekiner,[14] tobacco chewing and alcohol use were identified by 98% and 87.4% of the students as a risk factor, respectively. Furthermore, 86.4% of the students reported that they asked their patients about tobacco use and 90.4% stated that they asked about alcohol use.[15] Immunodeficiency, previous oral cancer lesion, and malnutrition were identified as risk factors for oral cancer development by 83.7%, 83.5%, and 81.5% of the students who participated in the study, respectively.

In the study by Gunjal et al.,[13] immunodeficiency was reported as a risk factor by 93.7% of the students. In the study by Keser and Pekiner,[14] previous oral cancer lesion was cited as a risk factor by 94.9% of the students. In this study, 79.3% of the students stated HPV as a risk factor for the development of oral cancer. In the studies by Gunjal et al. (90.3%), Keser and Pekiner (91.9%), and Sallam et al.[24] (88.2%), the proportion of participants who were able to mark HPV as a risk factor was higher. In this study, 75.02% of the students stated old age as a risk factor for oral cancer. This rate was 83% in the study by Gunjal et al., 62.1% in the study by Keser and Pekiner, and 28.6% in the study by Soares et al.[25]

In the present study, 22.47% of the participants stated that they informed their patients about the risk factors for oral cancer. About 43.32% advised patients to avoid the risk factors of oral cancer. In a study on oral cancer awareness of Turkish patients in 2019, patients stated that they had knowledge about oral cancer but were not aware of the early symptoms and risk factors.[26] Therefore, dental students should be especially encouraged to inform patients about the early signs and risk factors of oral cancer.

The most common sites of oral cancer were reported by the participants as the floor of the mouth and the sublingual area (38.8%). This was similar to the results of other studies examining the level of awareness of oral cancer.[14,20,27,28] While 34.1% of the participants identified leukoplakia and erythroplakia as the most probable lesions, 43.8% of the students marked the "I don't know" option. In other studies, a higher proportion of participants identified leukoplakia and erythroplakia as the most likely precancerous lesions.[14,19,20] In this study, the most common type of cancer in the oral cavity was reported as SCC (57.9%), while the age group with the highest probability of developing oral cancer was reported to be 40 to 60 years (46.3%). In the study by Keser and Pekiner,[14] these rates were 71.2% and 66.2%, respectively. The fact that the study by Keser and Pekiner was carried out with students from only one university may cause this difference.

While 43.32% of the participants in the study stated that they performed a routine oral examination, 59.94% of them reported that they examined head and neck lymph nodes in suspected patients. In the study by Keser and Pekiner,[14] these rates were 19.7% and 35.3%, respectively, and in the study by Gunjal et al.,[13] they were 85.9% and 95.1%, respectively. These differences might be due to the differences in year of study and sample size.

In the present study, 13.83% of the

participants stated that they thought they were knowledgeable enough to detect oral cancer. Moreover, 55.1% of them stated that oral cancer awareness-raising campaigns were effective, while 97.9% of the students asserted that more awareness campaigns should be carried out. In the study by Gunjal et al.,[13] a higher proportion of participants stated that they had sufficient knowledge to detect oral cancer (34.5%). In the same study, 56.8% of the participants stated that awareness-raising campaigns were effective, while 88.8% of them stated that more awareness-raising campaigns were needed. These differences might be due to the presence of both dentistry students and medical students in the study by Gunjal et al.[13]

The actual risk factors for oral cancer were known to most dental students who participated in the study. However, a sizeable portion of the students mistakenly cited situations that were not among genuine risk factors for oral cancer. Moreover, the rate of participants who informed their patients about risk factors was very low. The knowledge level of the participants about the diagnostic procedures and symptoms of oral cancer was not sufficient. Most of the participants stated that they felt incompetent at detecting oral cancer. The lack of education and insufficient self-confidence seem to be the main reasons for this incompetence. However, it was indicated that as the education year increases, the students' level of knowledge also increases. This shows that the repetition of the lessons ensures that they stick in students' memory.

The present study has several limitations. The survey used in the study was delivered to third, fourth, and fifth-year dental students only registered with the TDA. Therefore, the sample size was small and it would be more useful to carry out further studies with a larger sample size. Moreover, since the answers were subjective, they may not fully reflect the students' real level of knowledge and daily professional practices.

## Conclusion

It was indicated in this study that dental students in Turkey lacked the adequate level of knowledge and awareness about the prevention and early diagnosis of oral cancer. As there were students who did not participate in this study, the results cannot be generalized entirely. However, the study is the most comprehensive research ever done in Turkey on oral cancer awareness and knowledge levels of students. In this regard, it provides important insights concerning dental students' level of knowledge, attitude, and clinical practice.

Dentistry students should have sufficient knowledge about oral cancer. In undergraduate education, an educational strategy should be developed to provide up-to-date information on risk factors that facilitate early diagnosis, diagnostic procedures, oral examination, and auxiliary diagnostic tools. Updating the knowledge and practice of dentistry students about premalignant and malignant oral lesions with continuous education and case-based courses will be useful for early diagnosis and prevention of oral cancer. The importance of oral mucosa examination should be emphasized in the undergraduate curriculum and through clinical training, dental students should be encouraged to make oral mucosa examinations a routine practice.

## Conflict of Interests

Authors have no conflict of interests.

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