



# The Effects of Educational Levels on the Knowledge of Risk Factors and Awareness of Oral Cancer in a Turkish Population: A Cross-sectional Electronic Media Based Survey Study

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## OBJECTIVE

The aim of this survey study was to evaluate the effects of educational levels on knowledge about the symptoms and risk factors and the awareness of the oral cancer in a Turkish population.

## METHODS

In this cross-sectional study, a 17-item close-ended questionnaire was prepared that required 3-5 min to complete. The questions were prepared electronically through Survey Monkey, distributed by social media and the participants gave their answers on their electronic devices. Descriptive statistics of demographic variables and other data were reported as percentages and statistical analyses were performed using the Chi-square test.

## RESULTS

A total of 3246 people participated in the survey. About 64% of the respondents stated that they had previously heard of "oral cancer." A statistically significant difference was determined in the awareness and knowledge of oral cancer concerning educational levels of participants (<0.001). About 88.22% of the participants stated that non-healing wounds were symptoms of cancer. In addition, they stated that red (44.93%) and white patches (42.09%) were to be expected as an early symptom of oral cancer.

## CONCLUSION

Despite some encouraging results, it is necessary to increase the level of consciousness of the general population, especially those below the university education level, with various education and awareness programs to reduce morbidity and mortality.

**Keywords:** Awareness; educational level; electronic survey; knowledge; oral cancer; public health.

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## Introduction

According to the latest data published by the World Health Organization (WHO) 377.713 lip and oral cavity cancers were observed worldwide in 2020 and 177.757 of which resulted in death.[1] The

GLOBOCAN 2020 data also indicate that 233.834 new cases of cancer were detected in Turkey. Of these, 2103 are lip and oral cavity cancer; 592 of them resulted in the death of the patient.[2]

Oral cancer is the most common type of head and neck cancer with good clinical outcomes and low mor-

Received: April 09, 2021

Accepted: April 10, 2021

Online: June 16, 2021

Accessible online at:

www.onkder.org

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tality when diagnosed and treated at an early stage.[3] About half of oral cancers arise from oral potentially malignant disorders in the mouth. Related to these lesions, certain screening guidelines have been created. [4] However, many people overlook or disregard both precancerous lesions and malignant lesions until the symptoms become severe. Therefore, the majority of oral cancers are diagnosed at very late stage with associated high mortality. Screening of asymptomatic populations, together with increasing general public awareness of early signs and symptoms, increases the patient's chance of early diagnosis and treatment.

Individual lifestyles also affect the occurrence of oral cancers. The most important lifestyle-related behavioral risk factors for oral cancer are tobacco use, tobacco chewing, heavy alcohol consumption, and dietary micronutrient deficiency.[5] Tobacco smoking and heavy alcohol consumption are among the main risk factors for the disease in developed countries. In addition, concomitant use of alcohol and tobacco has a synergistic effect on oral carcinogenesis.[6,7]

The aim of this study was to evaluate the effects of educational levels on knowledge about the symptoms and risk factors as well as the awareness of the oral cancer in a Turkish population.

## Materials and Methods

In this cross-sectional study, the questions were prepared electronically through SurveyMonkey and the participants gave their answers on their electronic devices. The survey was advertised to the population by the social media canals. WhatsApp groups were mostly used in the distribution of the survey, and the people sent were asked to be shared with their own groups if they wanted. In addition, it was also shared by different accounts on varied social media applications to reach large groups. The survey was conducted from March to September 2019. During this time, repeated posts were made on social media and the survey was completed with 3246 participants.

A 17-item close-ended questionnaire that requires 3-5 min to complete was employed. The survey consisted of 17 questions including the following sections: Demographic questions (n=5), oral cancer awareness (n=7), knowledge of risk factors (n=3), and attitudes about oral health (n=2). The questions were directed to the participants as shown in Table 1. The questions of this study were modified by examining survey-based publications[8-16] of other countries in this field.

The first part of the survey included five demographic questions related to age, gender, profession, home city, and level of education. Education level was classified as primary school, secondary school, high school, and university/doctor of philosophy. Questions 6 and 7 focused on whether the participants visit the dentist previously and whether they prefer to go for regular check-ups. Answer categories for questions 8, 10, and 16 were “no” and “yes” and the answers were expected to tick mark only the most suitable one. Furthermore, the participants were questioned which specialty they would seek assistance if they suspect non-healing lesion in question 9. The patients' awareness of oral cancer was assessed by asking in question 11 if they had ever heard of oral cancers. The answer categories for the question were “yes” and “no.” In the same question, it was also asked where the participants learned this information and here participants could mark more than one option. Likewise, they could mark more than one option in questions 12 and 13, regarding risk factors and early symptoms of oral cancer to evaluate their knowledge base. Questions 14 and 15 concerned the participants' smoking and alcohol consumption. We aimed to evaluate individual oral cancer beliefs using a question asking if oral cancer is a contagious disease or not. The last question, was if they have ever known a person diagnosed with oral cancer and the answer categories for the question was “yes,” “no,” or “I have/had oral cancer.”

Descriptive statistics of demographic variables and other data were reported as percentages and statistical analysis was performed by Statistical Package for Social Science 20. Chi-square test was used for the evaluation of independent groups and  $p < 0.05$  was considered to indicate statistical significance.

This retrospective study has been reviewed and approved by the Research Ethics Committee of Istanbul University (Number: 04-2019) in compliance with the Helsinki Declaration.

## Results

The answers to each question are summarized in Table 1. A total of 3246 people participated in the survey; of them 67% were female and 33% were male. The age range was between 19 and 69-years-old. Regarding the educational level, 22.8% of participants were below university level (primary school, secondary school, and high school) and 77.2% of them were university level and above. The statistical results of the knowledge of risk factors, awareness of oral cancer and attitudes about oral health according to education levels of participants

**Table 1** Survey questions and answers

| The order of the questions  | Demographic questions |               |                                  |
|---|-----------------------|---------------|----------------------------------|
| 1 Age   |                       |               |                                  |
| 2 Gender  |                       |               |                                  |
| 3 Profession  |                       |               |                                  |
| 4 Home city   |                       |               |                                  |
| 5 Education levels  |                       |               |                                  |
| Oral cancer awareness questions   | <b>Yes (%)</b>        | <b>No (%)</b> |                                  |
| 8 Does the dentist tell you about the health of the soft tissues (tongue, gums, cheeks, lips, etc.) in your mouth when you visit her/him? | 1414 (44)             | 1832 (56)     |                                  |
| 9 Would you consider consulting a doctor if you notice any sores in your mouth?   | 3131 (96)             | 115 (4)       |                                  |
| Which specialty would you prefer to go if you suspect?  |                       |               |                                  |
| Yes, primary care physician   | 361 (11)              |               |                                  |
| Yes, dentist  | 1866 (57)             |               |                                  |
| Yes, ear nose and throat specialist   | 381 (12)              |               |                                  |
| Yes, internal medicine specialist   | 294 (9)               |               |                                  |
| Yes, dermatologist  | 229 (7)               |               |                                  |
| No, I wouldn't consider consulting a doctor   | 115 (4)               |               |                                  |
| 10 Do you think that some changes in the mouth can be a symptom of many diseases?   | 2848 (88)             | 398 (12)      |                                  |
| 11 Have you ever heard of oral cancer? If your answer is yes, from where have you heard that?   | 2092 (64)             | 1154 (36)     |                                  |
| Internet  | 861 (27)              | 2385 (73)     |                                  |
| Newspaper   | 234 (7)               | 3012 (93)     |                                  |
| Magazine/Books/Article  | 444 (14)              | 2802 (86)     |                                  |
| Social circle   | 853 (26)              | 2393 (74)     |                                  |
| Seminar/Congress  | 292 (9)               | 2954 (91)     |                                  |
| Television  | 425 (13)              | 2821 (87)     |                                  |
| Doctors   | 495 (15)              | 2751 (85)     |                                  |
| School  | 581 (18)              | 2665 (82)     |                                  |
| 16 Is oral cancer a contagious disease?   | 707 (22)              | 2539(78)      |                                  |
| 17 Have you ever met a person diagnosed with oral cancer?   | 327 (10)              | 2917(90)      |                                  |
| Knowledge of risk factors questions   |                       |               |                                  |
| 12 Which of the following do you think the causes of oral cancer?   |                       |               |                                  |
| Smoking   | 2629 (81)             | 617 (19)      |                                  |
| Alcohol Consumption   | 1619 (50)             | 1627 (50)     |                                  |
| Use of tobacco products (pipe, hookah, etc.)  | 2476 (76)             | 770 (24)      |                                  |
| HPV   | 1560 (48)             | 1686 (52)     |                                  |
| Not consuming enough fruits and vegetables  | 615 (19)              | 2631 (81)     |                                  |
| Drinking hot beverages, eating hot foods  | 1270 (39)             | 1976 (61)     |                                  |
| Improper dentures   | 1131 (35)             | 2115 (65)     |                                  |
| Bad oral health   | 2155 (66)             | 1091 (34)     |                                  |
| Genetics  | 1510 (47)             | 1736 (53)     |                                  |
| Infection   | 1907 (59)             | 1339 (41)     |                                  |
| HSV   | 1551 (48)             | 1695(52)      |                                  |
| 13 Which of the following can be an early sign of oral cancer?  |                       |               |                                  |
| Red lesions   | 1458 (45)             | 1788 (55)     |                                  |
| White lesions   | 1366 (42)             | 1880 (58)     |                                  |
| Bleeding  | 1606 (49)             | 1640 (51)     |                                  |
| Non-healing wound   | 2864 (88)             | 382 (12)      |                                  |
| Mouth ulcer   | 1152 (35)             | 2094 (65)     |                                  |
| HSV   | 995 (31)              | 2251 (69)     |                                  |
| 14 Do you consume alcohol?  | 506 (16)              | 1620 (50)     | Social consumer (%)<br>1120 (35) |
| 15 Do you use cigarettes/ tobacco and other tobacco products?   | 816 (25)              | 1977 (61)     | Social consumer (%)<br>453 (14)  |
| Attitudes about oral health questions   |                       |               |                                  |
| 6 Have you ever visited a dentist?  | 3168 (98)             | 78 (2)        |                                  |
| 7 Do you visit the dentist regularly?   | 1329 (41)             | 1917 (59)     |                                  |

HPV: Human papillomavirus; HSV: Herpes simplex virus

are summarized in Tables 2 and 3. The respondents were from different regions of Turkey. The commonest part was the Marmara Region (63.2%), following by the Central Anatolia Region (14.15%), the Aegean Region (7.4%), and the Mediterranean Region (6.7%).

The vast majority agreed that smoking (81%) and other use of tobacco products (76.29%) can cause oral cancer. When smoking was evaluated, there was a statistically significant difference and was observed among genders (<0.001), more common in males.

Of the 78 people (between 20 and 29 ages) who have never visited a dentist, 53% of them had not heard of oral cancers. About 64% of those surveyed had heard of oral cancer previously, and their awareness of the early symptoms of oral cancer was higher than those who did not. There was no statistical difference among participants who have visited a dentist according to their

education levels ( $p=0.016$ ). However, statistical difference was observed about regular check-ups to the dentist that it was observed more common in university graduates and above (<0.001). About 50% of those who think oral cancer was contagious had not heard of oral cancer previously, and 60% of them were under the age of 30 years. In addition, a statistically significant difference was found between health-care providers and other groups in the question of whether oral cancer is contagious (<0.001). Three hundred and twenty-seven participants stated that they knew someone who had been diagnosed with oral cancer.

## Discussion

Oral cancer is a disease that has increased worldwide recently but has not been fully understood. Early diag-

**Table 2** The knowledge of risk factors and early signs of oral cancer according to educational level of participants

| The questions of risk factors and early signs of oral cancers  | Below university level<br>(n=739) | University level/above<br>(n=2507) | p*     |
|--|-----------------------------------|------------------------------------|--------|
| Which of the following do you think the causes of oral cancer? |                                   |                                    |        |
| Smoking  | 515 (69.7)                        | 2114 (84.3)                        | <0.001 |
| Alcohol Consumption  | 303 (41.0)                        | 1316 (52.5)                        | <0.001 |
| Use of tobacco products (pipe, hookah, etc.)                   | 451 (61.0)                        | 2025 (80.8)                        | <0.001 |
| HPV  | 232 (31.4)                        | 1328 (53.0)                        | <0.001 |
| Not consuming enough fruits and vegetables                     | 103 (13.9)                        | 512 (20.4)                         | <0.001 |
| Drinking hot beverages, eating hot foods                       | 212 (28.7)                        | 1058 (42.2)                        | <0.001 |
| Improper dentures  | 168(22.7)                         | 963 (38.3)                         | <0.001 |
| Bad oral health  | 441 (59.7)                        | 1715 (68.4)                        | <0.001 |
| Genetics   | 217 (29.4)                        | 1293 (51.6)                        | <0.001 |
| Infection  | 388 (52.5)                        | 1519 (60.6)                        | <0.001 |
| HSV  | 293 (39.6)                        | 1258 (50.2)                        | <0.001 |
| Which of the following can be an early sign of oral cancer?    |                                   |                                    |        |
| Red lesions  | 268 (36.3)                        | 1190 (47.5)                        | <0.001 |
| White lesions  | 237 (32.1)                        | 1129 (45.0)                        | <0.001 |
| Bleeding   | 353 (47.8)                        | 1253 (50.0)                        | 0.017  |
| Non-healing wound  | 607 (82.1)                        | 2257 (90.0)                        | <0.001 |
| Mouth ulcer  | 188 (25.4)                        | 964 (38.5)                         | <0.001 |
| HSV  | 188 (25.4)                        | 807 (32.2)                         | 0.003  |

\*Chi-square test; HPV: Human papillomavirus; HSV: Herpes simplex virus

**Table 3** Oral cancer awareness and oral health attitudes according to education levels of participants

| The questions of awareness of oral cancer and attitudes about oral health | Below university level<br>(n=739) | University level/above<br>(n=2507) | p*     |
|---|-----------------------------------|------------------------------------|--------|
| Have you ever visited a dentist? (Yes)                                    | 712 (96.3)                        | 2456 (98.0)                        | 0.016  |
| Do you visit the dentist regularly? (Yes)                                 | 222 (30.0)                        | 1107 (44.2)                        | <0.001 |
| Have you ever heard of oral cancer? (Yes)                                 | 369 (49.9)                        | 1723 (68.7)                        | <0.001 |

\*Chi-square test

nosis of oral cavity cancers is a major factor in obtaining good outcomes for patients.[17] However, the majority of oral cancers are diagnosed at a very late stage. Attendance at a doctor in the early stages has a positive impact on the prognosis of the disease. It has been stated that a longtime interval from the first symptom to patient referral for definitive diagnosis is an important risk factor for death from oral cancer.[18]

With this study, awareness of oral cancer, knowledge of risk factors, and early symptoms in Turkish society were assessed in 3246 participants. Similar studies have been conducted in many countries with different numbers of participants and their awareness levels have been reported. The rate of awareness of oral cancers in Turkish society was 64%. In the previous studies for Turkish society, these rates were 39.3%[16] and 48.9%.[19] This difference may be related to the way of surveys were conducted. In our study, we may have reached a certain socio-cultural level due to the use of social media for distribution. On the contrary, other studies were conducted among patients who visited to the dental faculty. Other countries awareness rates have been reported as follows; UK[20] 95.6%, UK[21] 80%, Yemen[14] 71.5%, Jordan[22] 45.6%, Saudi Arabia[15] 53.6%, Iran[23] 54.7%, Portugal (Oporto)[24] 23.7%, Sudan (Omdurman)[25] 85.6%, Riyadh[26] 62.4%, India (Chandigarh)[27] 85.8%, and Spain[28] 22%. In the UK, there are many effective awareness programs hold in every year, thus the high rate may reflect the results of this policy.

Approximately half of the participants stated that they visited the dentist previously. When compared the results according to education levels, there was no statistical difference. Regarding the regular check-up question, a significant portion of the participants who gave a positive answer were university graduates. This situation has shown that the awareness and importance of going to regular check-up are not sufficient in our country and that those who go regularly are above a certain education level. Regular examination is the most effective way to detect early stage oral cancer or potentially malignant lesions of oral mucosa and to increase patients' survival rates.[29]

The risk factors of oral cancer such as smoking and alcohol consumption were known most of the participants which were compatible with another study from Turkey by Misirlioglu et al.[19] Aydın and Akbulut[30] showed that smoking was frequent among the working group but no gender predisposition, on the contrary, our study was showed male predisposition.

One of the most interesting responses was about the dentists' soft tissue examination. About 56.44% of the patients stated that they did not receive any information about their soft-tissue examination. No statistical difference was observed in the answer of this question according to patients' educational levels. This may be due to the fact that dentists place less importance on this examination and only focus on the dental procedures or they perform the soft tissue examination but do not inform the patient. Examination of the tongue, gingiva, buccal mucosa, lips, and sulcus should be routinely performed by dentists at each check-up and patients should be informed about the health of their oral soft tissues.

The option of preferring to visit a dentist rather than another medical professional for the non-healing mass was the most common response, more than 50% of the participants. Therefore, dentists play an important role in the evaluation of mouth lesions in a population. It has been shown that increasing the attention and experience of dentists on this issue has a positive effect on early diagnosis and control of mouth lesions.[31]

The idea that oral cancers are a contagious disease is often misunderstood by the general population. When the ratio of those who think that it is contagious was 22% in Turkey, these rates are 10.8% in India[13] 19.5% in Yemen[14] and 17% in Saudi Arabia.[15] Regarding this question, a statistically significant difference was found between health-care providers and other groups in the present study.

Another important question in the survey was about human papillomavirus (HPV). Because HPV-associated head and neck cancers are increasing every year. It is known that HPV plays a major role in oropharyngeal cancer.[32-34] Oropharyngeal cancers, formerly evaluated in the oral cavity, have now been excluded from oral cavity cancers, as they have been shown to be closely linked to high-risk HPV. Recent studies have started to show that sinonasal tract is the second most common anatomic region of the head and neck where high risk HPV-related carcinomas can arise[35] and HPV-related oral cavity cancers are still controversial. In line with knowledge from various sources, such as communication digital tools, internet, patients are increasingly concerned about HPV. For this reason, in the questionnaire, the HPV option was placed among the factors that can cause oral cancers, and the awareness of the participants on this subject was analyzed. The fact that 48% of the participants marked HPV as a risk factor for oral cancers indicates that dentists should raise their patients' awareness on this issue more. University and above graduates signifi-



cantly more marked this option than others. Increasing concerns of patients should be resolved with the correct information and patients should be warned about HPV-related cancer types and its vaccine.

In oral cancers, the morbid effect of late diagnosis on the quality of life and mortality of the patient should be taken into consideration. Most of the patients in Turkey generally do not care about the mild symptoms and only if the symptoms occur severely, will they consult a physician. Thus, most oral cancers are diagnosed at an advanced stage.[36] In this regard, it is important that dentists perform comprehensive clinical and radiological interpretations and examinations of the oral cavity and that the public should gain the habit of visiting regularly. To date, no public health screening campaign about oral cancer has been carried out about oral cancer in this country. However, some awareness programs are planned every year by The Society of Head and Neck Cancer of Turkey but, unfortunately these programs do not reach a large population.

Three hundred and twenty-seven participants stated that they knew someone who had been diagnosed with oral cancer and almost all their answers about symptoms and risk factors were all correct when comparing the others which shows how important to know the disease.

It should also be taken into consideration that not only giving information but also motivation to change attitudes and behaviors about the risk factors. Oral cancer knowledge and awareness studies should be handled separately and future studies should be programmed according to their results. Studies indicate that solely increasing knowledge does not create the desired change in attitudes and behavior.[37] Early diagnosis of oral cancers will be possible with awareness-raising activities and well-equipped physicians that appeal to the general public. For example, in a study from India, the level of awareness increased after intervention in health education, and the people participating in the study noticed their own lesions as a result of oral examinations. [27] Another good example from Papua New Guinea that their National Health Plans has been focused on reducing oral cancer with international collaboration.[38]

There may be some bias that limits this study and also affects the outcomes. The different response options we provided to the participants; they may have been a guide for the person who filled out the questions. Even if she/he did not know the answer, the people might have marked the random options. This may cause the results to be better than they should have been. Another limitation is that the majority of those who answer the

questions are mostly university and above graduates. One of the reasons of that may be that the survey was distributed via social media. Using social media and answering these electronic surveys may be easier and common for the people above a certain social level. However, it is a fact that an electronic survey is a much more convenient way to reach large population from different regions. In this context, our study is one of the surveys with the highest number of participants from different regions of Turkey. However, well-designed population-based studies are needed to evaluate the society in more detail about oral cancer awareness.

## Conclusion

The vast majority participants of the study knew the risk factors of oral cancer; however, there was a group that has not heard oral cancers previously and did not know the early symptoms. The participants with below university education level are more likely to demonstrate lower awareness and knowledge about risk factors compared to university and above levels. Therefore, this group should be targeted first by educational programs such as media, posters, brochures, and booklets to provide knowledge about oral cancer and to increase the likelihood of achieving early diagnosis and prevention rate of oral cancer. In addition, the initiation of public education programs and the help of audiovisual channels can play an important role in the early diagnosis of oral cancers through self-examination. Dentists and primary care physicians must take a critical role in increasing knowledge, decreasing predisposing factors, increasing the probability of early diagnosis and increasing survival rate. Most importantly, state health policies should be made in this regard by the government health system.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** All authors declared no conflict of interest.

**Ethics Committee Approval:** The study was approved by the Istanbul University Faculty of Medicine Clinical Research Ethics Committee (No: 04, Date: 22/02/2019).

**Financial Support:** None declared.

**Authorship contributions:** Concept – M.S.T., Ö.Ç., I.İ.İ., D.D.S.; Design – M.S.T., Ö.Ç., I.İ.İ., D.D.S.; Supervision – M.S.T.; Funding – None; Materials – None; Data collection and/or processing – Ö.Ç., I.İ.İ., D.D.S.; Data analysis and/or interpretation – M.S.T., Ö.Ç.; Literature search – Ö.Ç., I.İ.İ., D.D.S.; Writing – M.S.T., Ö.Ç., I.İ.İ., D.D.S.; Critical review – M.S.T.

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