

Knowledge and Awareness Assessment of Dental Students About Malignant Melanoma

Abstract

Background: Epidemiological studies have shown an increased tendency to malignant melanoma worldwide. Dentistry students need comprehensive up-to-date information about malignant melanoma to give their patients correct advice. The purpose of this study is to assess 3rd, 4th, and 5th grade students' level of knowledge and awareness about malignant melanoma. **Materials and Methods:** In our study, a questionnaire consisting of 11 questions was applied to a total of 229 students, 93 3rd grade, 64 4th grade, and 72 5th grade students who were educated at Marmara University, Faculty of Dentistry. In this survey, students' level of knowledge and awareness was examined. **Results:** A total of 75 (32.75%) male and 154 (67.25%) female students were included in the study. There was a statistically significant difference between grades in terms of participation rate to the statement "Oral melanomas are more aggressive than skin involvement" ($P = 0.000$). Participation rate of 3rd grades (30.11%) was significantly lower than 4th grades (45.31%) and 5th grades (48.61%) ($P_1 = 0.004$; $P_2 = 0.000$). There was a statistically significant difference between grades in terms of participation rate to the statement "Oral melanoma lesions are usually asymptomatic" ($P = 0.000$). Participation rate of 3rd grades (15.05%) was significantly lower than 4th grades (39.06%) and 5th grades (58.33%) ($P_1 = 0.002$; $P_2 = 0.000$). Participation rate of 4th grades was significantly lower than 5th grades ($P = 0.033$). **Conclusion:** Providing the necessary training on malignant melanoma will improve the knowledge and awareness of dentistry students.

Keywords: Awareness, malignant melanoma, oral cancer

Introduction

Malignant melanoma is a notably aggressive tumor which produces melanin and originated from pluripotent neural crest-based melanocyte cells.^[1] Malignant melanoma is biologically one of the most deadly and unpredictable one of all neoplasms. With being the 3rd most common skin cancer, it is only 3% of all skin cancers diagnosed in each year. Yet, it forms approximately 75% of all skin cancer-related deaths.^[2,3]

Melanocytes are mainly based on the stratum basale of the epidermis layer of skin. On a related point, malignant melanoma is most frequently seen on the skin. In addition, melanocytes are also based on the stratum basale of the epithelial layer which is equivalent of epidermis in mucosas. Malignant melanomas can appear on any mucosal location with melanocytes, though they are not as common as skin cancers.

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The most widespread regions of mucosal melanomas are nasal mucosa, paranasal sinuses, oral cavity, and nasopharynx, respectively.^[4] According to the National Cancer Database Report on Cutaneous and Noncutaneous Melanoma, 91.2% of all melanomas are observed on skin, whereas ocular (5.2%), mucosal (1.3%), and unknown primary melanomas (2.2%) are seen less frequent. Approximately 25% of cutaneous melanomas are observed in the head-and-neck region, 40% in the extremities, and the rest are observed on the body parts. Mucosal melanomas are observed more than half on the head-and-neck region, and the rest mainly consist of urogenital and anorectal mucosa.^[5] About 25% of all melanomas are head-and-neck melanomas. In the meantime, approximately 10% of all head-and-neck melanomas are mucosal melanomas.^[4] Mucosal melanoma is more aggressive due to being faster propagative and building up more frequent metastasis, compared to cutaneous melanoma. Primary oral malignant melanoma prevalence is 4 in

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a 10 million population, per year.^[6] While this neoplasm accounts for 0.2%–8% of all malignant melanomas,^[3,7-10] it accounts for 0.5% of all oral cavity cancers and is an important neoplasm that needs to be differentiated from all other oral pigmentations.^[7-11] Jackson and Simpson^[12] reported that oral malignant melanomas account for <2% of all melanomas, whereas Reddy *et al.*^[13] stated 0.3%–1.3% incidence.

Common etiologic factors for cutaneous melanomas are UV exposure, fair skin, freckles, red hair, and sun sensitivity. No etiologic factor other than ethnic differences has been defined for mucosal melanoma.^[14] Oral malignant melanoma is not related to sun exposure. However, alcohol intake, smoking, chronic irritation due to dentures, and inhaled environmental carcinogenic play important role although no direct relationship has been proved yet.^[8,15-17] Besides, latest studies emerged BAP1 expression (BRCA1-related protein, Breast Cancer gene) in oral malignant melanoma cases.^[18]

According to the World Health Organization (WHO), although the number of malignant melanoma is growing faster worldwide than any other cancer, yearly increase in incidence rates differs in populations. Predictions are that melanoma incidences double in every 10–20 years.^[19] Increasing incidence rate varies geographically between “high incidence regions” such as Australia, “medium incidence regions” such as Canada and the USA, and “low incidence regions” such as Scotland and India.^[2,20] According to the GLOBOCAN 2020 database of the WHO, The International Agency for Research on Cancer (IARC), the number of new cutaneous melanoma cases seen in 2020 is 16.171, being the 3rd most common cancer after breast and prostate cancer. Mucosal melanomas are most common in India, Uganda, and Japan; however, cutaneous melanomas are less common in these countries. According to GLOBOCAN 2020 database, the number of new cutaneous melanoma cases is 324.635 globally. About 173.844 of these are men, whereas 150.791 are women and total number of death is 57.043. As for 2018, the number of new cases was 287.723 and total number of death was 60.712. The number of new cases is 1.756 and total number of death is 888 in 2020 in Turkey. Some researchers have suggested that the actual incidence is not higher in the countries such as Japan and Uganda but appears to be due to relatively low cutaneous melanoma incidence in these racial groups.^[5]

Oral malignant melanoma is an adult neoplasm observed rarely under 20 years of age.^[6,17] Some researchers remark decades 4–6. Incidence is the highest,^[7,14,17] whereas others point to decades 4–7^[21,22] and some 5–7.^[23,24] The average age of affected people is 55–56.^[6,8,22,25] Studies also revealed that men were affected more compared to women.^[2,3,6,7,14,21-24,26-28] They account for 11%–12.4% of all melanomas in Japan,^[14,21,26] and 0.2%–8% in the Europe and

USA.^[14,21] Primary oral melanomas are rarely detected and account for <2% of all melanomas in the USA according to D’Silva *et al.*^[29]

Oral malignant melanomas are most common in hard palate and maxillary gingiva.^[3,4,6-8,14,17,21-23,25,26,28,30] Other regions where it is seen are base of the mouth, buccal mucosa, tongue, and lips.^[3,6-8,17,22,23] Lips are the region that oral malignant melanoma incidence is the least.^[23]

Oral malignant melanoma has much worse prognose compared to cutaneous equivalent.^[17] Ten-year survival rate is <30%.^[28] In some studies, 5-year survival rate is stated as 0%–20%^[26] and 13%–22%,^[5] 7%,^[22] 15%–38%,^[8] 15%,^[21] 5%–20%,^[7] 15%–30%,^[4] and 6.6%–40%^[23] in other studies.

The rate of survival of metastatic lesions is extremely poor.^[6] The most common regions for metastasis melanoma are buccal mucosa, tongue, and mandible.^[4,23] Another prognostic indicator of oral malignant melanoma that is significantly related to the general survival rate is anatomic region.^[17,23] According to Wang *et al.*, survival rate of oral malignant melanoma patients who have different tumor regions are 51, 40, and 43 months for gingiva, hard palate, and other regions, respectively. The higher survival rate of gingiva-affected oral malignant melanoma patients may be resulted from the ease of the inspection of lesion, therefore, ease of diagnosis, and access during surgery compared to other regions.^[31]

In general, the poor prognosis for oral melanoma is linked with difficulty of access to wide resection and tendency for early hematogenous metastasis. The survival rate of younger patients is higher compared to older patients.^[5] Five-year survival rate is low that increasing the importance of aggressive treatment need and subsequent follow-up.^[4]

Although there are studies on malignant melanoma knowledge and awareness in other nations in the literature, there is none on dental students’ knowledge in our country. The purpose of this study is to assess 3rd, 4th, and 5th grade students’ level of knowledge and awareness about malignant melanoma.

Materials and Methods

The study protocol of this study was approved by Marmara University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee on 05.03.2021 with protocol number 09.2020.1378. A total of 229 students including 93 3rd grade, 64 4th grade, and 72 5th grade, studying in Marmara University Faculty of Dentistry were included in this study. The participants whose level of knowledge and awareness was assessed were given an 11-question survey. The questions were multiple choice, and they only asked for class information not names. All students were invited to participate on a voluntary basis beginning in 3rd grade and ending in 5th grade.

Statistical analysis

Minitab 17 Statistical Software is used for statistical analysis. Chi-square test was used to compare descriptive statistics (mean, standard deviation, and frequency) as well as qualitative data. Significance was assessed at $P = 0.05$ level.

Results

A total of 229 students were included in the study and 75 (32.75%) of them were male, whereas 154 (67.25%) of them were female. About 93 (40.61%) of the students were in 3rd grade, 64 (27.95%) were in 4th grade, and 72 (31.44%) were in 5th grade students. There was no statistically significant difference between women (44.16%) and men (37.3%) in terms of the participation rate to the statement “Malignant melanoma ranks third among skin cancers with a rate of 3%.” ($P = 0.142$). Moreover, there was no statistically significant difference between gender in terms of participation rate to the statement “Primary treatment for malignant melanoma is surgery.” ($P = 0.545$). Participation rate of women (85.71%) was significantly higher than men (70.67%) to the question “Do you think malignant melanoma is an important disease?” ($P = 0.022$). Participation rate of women (63.64%) was significantly higher than men (33.33%) to the question “Do you think that sunscreen should be used to prevent malignant melanoma?” ($P = 0.000$). Correct answer (nodular/smooth-surfaced, slow growing, irregularly shaped, and bronze/brown/black lesions) rate of women (65.58%) were significantly higher than men (52.0%) to the statement “State the clinical features of primary oral melanoma lesion.” ($P = 0.048$) [Table 1].

There was a statistically significant difference between grades in terms of participation rate to the statement “Malignant melanoma ranks third among skin cancers with a rate of 3%.” ($P = 0.000$). Participation rate of 3rd grades (24.73%) was significantly lower than 4th grades (42.19%) to the question ($P = 0.035$). The level of significance between the 3rd grade and 5th grade did not yield any results because the sample size of the Chi-square test was <5 . Participation rate of 4th grades was significantly lower than 5th grades (63.89%) ($P = 0.014$) [Table 2].

A statistically significant difference between grades in terms of participation rate to the statement “Oral melanomas are more aggressive than skin involvement” was present in our study ($P = 0.000$). Participation rate of 3rd grades (30.11%) was significantly lower than 4th grades (45.31%) and 5th grades (48.61%) ($P_1 = 0.004$; $P_2 = 0.000$) [Table 2].

There was a statistically significant difference between grades in terms of participation rate to the statement “Oral melanoma lesions are usually asymptomatic” ($P = 0.000$). Participation rate of 3rd grades (15.05%) was significantly lower than 4th grades (39.06%) and 5th grades (58.33%) ($P_1 = 0.002$; $P_2 = 0.000$).

Participation rate of 4th grades was significantly lower than 5th grades ($P = 0.033$) [Table 2].

There was a statistically significant difference between grades in terms of participation rate to the statement “Primary treatment for malignant melanoma is surgery” ($P = 0.000$). Participation rate of 3rd grades (13.98%) was significantly lower than 4th grades (32.81%) and 5th grades (59.72%) ($P_1 = 0.008$; $P_2 = 0.000$). Participation rate of 4th grades was significantly lower than 5th grades ($P = 0.003$) [Table 2].

There was a statistically significant difference between grades in terms of participation rate to the question “Do you think malignant melanoma is an important disease?” ($P = 0.000$). Participation rate of 4th grades was significantly lower than 5th grades (94.44%) ($P = 0.007$) [Table 2].

Moreover, there was a statistically significant difference between grades in terms of participation rate to the question “Do you think that sunscreen should be used to prevent malignant melanoma?” ($P = 0.001$). Participation rate of 3rd grades (37.63%) was significantly lower than 4th grades (59.38%) and 5th grades (69.44%) ($P_1 = 0.027$; $P_2 = 0.000$). There was no statistically significant difference between 4th grades and 5th grades [Table 2].

A statistically significant difference between grades in terms of correct answer (hard palate and maxillary gingiva) rate to the question “Identify the most common regions of oral melanoma” was portrayed in our study ($P = 0.000$). Correct answer rate of 3rd grades (6.82%) was significantly lower than 4th grades (22.03%) and 5th grades (37.50%) ($P_1 = 0.007$; $P_2 = 0.000$). There was no statistically significant difference between 4th grades and 5th grades [Table 2].

There was a statistically significant difference between grades in terms of correct answer (superficial spreading melanoma) rate to the question “Identify the most common type of malignant melanoma” ($P = 0.018$). Correct answer rate of 4th grades (53.13%) was significantly higher than 3rd grades (31.18%) and 5th grades (36.11%) ($P_1 = 0.006$; $P_2 = 0.046$). There was no statistically significant difference between 3rd grades and 5th grades [Table 2].

There was a statistically significant difference between grades in terms of the correct answer (nodular/smooth-surfaced, slow growing, irregularly shaped, and bronze/brown/black lesions) rate to the question “State the clinical features of primary oral melanoma lesion” ($P = 0.003$). Correct answer rate of 4th grades (45.31%) was significantly lower than 3rd grades (62.37%) and 5th grades (73.61%) ($P_1 = 0.003$; $P_2 = 0.001$) [Table 2].

Discussion

Oral mucosal melanoma is a rare cancer that has a higher proclivity for metastasizing and locally invading tissues than other oral cancers. It is four times more common

Table 1: Evaluation of knowledge level and awareness about malignant melanoma by gender

Statement	Answer	Male (%)	Female (%)	Total (%)	P
Malignant melanoma ranks third among skin cancers with a rate of 3%	Agree	28 (37.3)	68 (44.16)	96 (41.92)	0.142
	Disagree	0	5 (3.2)	5 (2.18)	
	No idea	47 (62.67)	81 (52.6)	128 (55.90)	
Oral melanomas are more aggressive than skin involvement	Agree	30 (40)	62 (40.26)	92 (40.17)	0.543
	Disagree	5 (6.67)	17 (11.04)	22 (9.61)	
	No idea	40 (53.33)	75 (48.70)	115 (50.22)	
Oral melanoma lesions are usually asymptomatic	Agree	25 (33.33)	56 (36.36)	81 (35.37)	0.760
	Disagree	13 (17.33)	30 (19.48)	43 (18.78)	
	No idea	37 (49.33)	68 (44.16)	105 (45.85)	
Primary treatment for malignant melanoma is surgery	Agree	28 (37.33)	49 (31.82)	77 (33.62)	0.545
	Disagree	12 (16)	33 (21.43)	45 (19.65)	
	No idea	35 (46.67)	72 (46.75)	107 (46.72)	
Do you think malignant melanoma is an important disease?	Agree	53 (70.67)	132 (85.71)	185 (80.79)	0.022*
	Disagree	3 (4)	2 (1.3)	5 (2.18)	
	No idea	19 (25.33)	20 (12.99)	39 (17.03)	
Do you think that sunscreen should be used to prevent malignant melanoma?	Agree	25 (33.33)	98 (63.64)	123 (53.71)	0.000*
	Disagree	11 (14.67)	4 (2.60)	15 (6.55)	
	No idea	39 (52.00)	52 (33.77)	91 (39.74)	
Have a patient referred to the upper center with a skin lesion suspected of cancer?	Agree	0	1	1	N/A
	Disagree	51	128	179	
	No idea	24	25	49	
Identify the most common regions of oral melanoma. (Please select only one option)	Correct answer	14 (18.67)	32 (20.78)	46 (20.09)	0.708
	Wrong answer	61 (81.33)	122 (79.22)	183 (79.91)	
Equally frequent in all regions					
Floor of mouth and sublingual					
Hard palate and maxillary gingiva					
Tongue back and cheek/lip mucous membrane					
Sublingual and soft palate					
No idea					
Identify the most common type of malignant melanoma. (Please select only one option)	Correct answer	26 (34.67)	63 (40.91)	89 (38.86)	0.363
	Wrong answer	49 (65.33)	91 (59.09)	140 (61.14)	
Nodular melanoma					
Superficial spreading melanoma					
Acral lentiginous melanoma					
Lentigo malignant melanoma					
State the clinical features of primary oral melanoma lesion. (Please select only one option)	Correct Answer	39 (52)	101 (65.58)	140 (61.14)	0.048*
	Wrong answer	36 (48)	53 (34.42)	89 (38.86)	
Nodular/smooth-surfaced, slow growing, irregularly shaped, bronze/brown/black lesions					
Erosive/smooth-surfaced, fast growing regularly shaped, yellow/white/brown lesions					
Completely smooth-surfaced, irregularly shaped, red/white lesions					

* $P < 0.05$, Chi-square test. N/A: Not applicable

on the oral mucosa of the upper jaw, most commonly on the palate or alveolar gingiva. In the survey, a study conducted by Ivanov *et al.*^[32] on the knowledge and attitudes of medical students regarding skin cancer and sun protection behaviors, it was stated that the students generally had information about skin cancer and that two-thirds (67.8%) of participants had correctly identified basal cell carcinoma as the most common skin cancer. In

our study, there was a statistically significant difference between grades in terms of participation rate to the statement “Malignant melanoma ranks third among skin cancers with a rate of 3%” ($P = 0,000$). Participation rate of 3rd grades (24.73%) was significantly lower than 4th grades (42.19%) to the question ($P = 0.035$) and participation rate of 4th grades was significantly lower than 5th grades (63.89%) ($P = 0.014$).

Table 2: Evaluation of knowledge level and awareness about malignant melanoma according to grades

Statement	Answer	3 rd Grade	4 th Grade	5 th Grade	Total	P
Malignant melanoma ranks third among skin cancers with a rate of 3%	Agree	23 (24.73)	27 (42.19)	46 (63.89)	96 (41.92)	0.000*
	Disagree	2 (2.15)	3 (4.69)	0 (0.00)	5 (2.18)	
	No idea	68 (73.12)	34 (53.13)	26 (36.11)	128 (55.9)	
Oral melanomas are more aggressive than skin involvement	Agree	28 (30.11)	29 (45.31)	35 (48.61)	92 (40.17)	0.000*
	Disagree	2 (2.15)	7 (10.94)	13 (18.06)	22 (9.61)	
	No idea	63 (67.74)	28 (43.75)	24 (33.33)	115 (50.22)	
Oral melanoma lesions are usually asymptomatic	Agree	14 (15.05)	25 (39.06)	42 (58.33)	81 (35.37)	0.000*
	Disagree	17 (18.28)	12 (18.75)	14 (19.44)	43 (18.78)	
	No idea	62 (66.67)	27 (42.19)	16 (22.22)	105 (45.85)	
Primary treatment for malignant melanoma is surgery	Agree	13 (13.98)	21 (32.81)	43 (59.72)	77 (33.62)	0.000*
	Disagree	26 (27.96)	9 (14.06)	10 (13.89)	45 (19.65)	
	No idea	54 (58.06)	34 (53.13)	19 (26.39)	107 (46.72)	
Do you think malignant melanoma is an important disease?	Agree	68 (73.12)	49 (76.56)	68 (94.44)	185 (80.79)	0.000*
	Disagree	0 (0.00)	3 (4.69)	2 (2.78)	5 (2.18)	
	No idea	25 (26.88)	12 (18.75)	2 (2.78)	39 (17.03)	
Do you think that sunscreen should be used to prevent malignant melanoma?	Agree	35 (37.63)	38 (59.38)	50 (69.44)	123 (53.71)	0.001*
	Disagree	7 (7.53)	3 (4.69)	5 (6.94)	15 (6.55)	
	No idea	51 (56.04)	23 (25.27)	17 (18.68)	91 (100)	
Have a patient referred to the upper center with a skin lesion suspected of cancer?	Agree	0 ()	0 ()	1 ()	1 ()	N/A
	Disagree	57 ()	52 ()	70 ()	179 ()	
	No idea	36 ()	12 ()	1 ()	49 ()	
Identify the most common regions of oral melanoma. (Please select only one option)	Correct answer	6 (6.82)	13 (22.03)	27 (37.50)	46 (21)	0.000*
	Wrong answer	82 (93.18)	46 (77.97)	45 (62.50)	183 (79)	
	Equally frequent in all regions					
	Floor of mouth and sublingual					
	Hard palate and maxillary gingiva					
Identify the most common type of malignant melanoma. (Please select only one option)	Correct answer	29 (31.18)	34 (53.13)	26 (36.11)	89 (38.86)	0.018*
	Wrong answer	64 (62.82)	30 (46.88)	46 (63.89)	140 (61.14)	
	Nodular melanoma					
	Superficial spreading melanoma					
	Acral lentiginous melanoma					
State the clinical features of primary oral melanoma lesion. (Please select only one option)	Correct answer	58 (62.37)	29 (45.31)	53 (73.61)	140 (61.14)	0.003*
	Wrong answer	35 (37.63)	35 (54.69)	19 (26.39)	89 (38.86)	
	Nodular/smooth-surfaced, slow growing, irregularly shaped, bronze/brown/black lesions					
Completely smooth-surfaced, irregularly shaped, red/white lesions	Erosive/smooth-surfaced, fast growing regularly shaped, yellow/white/brown lesions					

* $P < 0.05$, Chi-square test. N/A: Not applicable

In another research conducted by Patel *et al.*^[33] on skin cancer between medical students, participation rate of women (85.8%) was significantly higher than men (70.8%) to the statement “Sun exposure is the most important risk factor causing skin cancer,” and it was reported that women used sunscreen at a higher rate than men. In the survey study conducted by Ivanov *et al.*,^[32] a third of medical students (33.1%) reported

that they used some form of sunscreen when they were out, usually or all the time. This study stated that this behavior differed between male and female students, and female students (43.8%) used sunscreen more than male students (21.1%) ($P = 0.022$). Similar to these results, in our study, participation rate of women (63.64%) was significantly higher than men (33.33%) to the question “Do you think that sunscreen should be used to prevent

malignant melanoma?” ($P = 0,000$). The sun protection behaviors of medical students evaluated in many survey studies also confirmed results.^[34-36] These data may be correlated with men being at a higher risk than women for malignant melanoma.^[2,3,6,7,14,21-24,26-28]

The survey study conducted by Kalil *et al.*^[37] on melanoma awareness between medical students stated that the rate of correct answers given by senior students to the regions where malignant melanoma is most common was higher than the 1st year students. However, when asked about the place where melanoma is seen most frequently, it was observed that 79.66% of 1st year students and 24.59% of final-year students did not know the correct answer. In our study, the correct answer rate of 3rd grades (6.82%) was significantly lower than 4th grades (22.03%) and 5th grades (37.50%) ($P1 = 0.007$; $P2 = 0.000$). In the survey study conducted by Kalil *et al.*, 30.51% of 1st-year students and 97.54% of senior students had correct knowledge. According to our study, the correct answer rate of 4th grades (45.31%) was significantly lower than 5th grades (73.61%) to the question “State the clinical features of primary oral melanoma lesion” ($P1 = 0.03$; $P2 = 0.001$). The authors also reported that 30.51% of 1st-year students and 97.54% of senior students had correct answers. Similarly, the correct answer rate of 4th grades (45.31%) was significantly lower than 5th grades (73.61%) to the question “State the clinical features of primary oral melanoma lesion” in our study ($P1 = 0.03$; $P2 = 0.001$).

Conclusion

Early diagnosis is critical in reducing the mortality rates of oral malignant melanomas that show poor prognosis despite their low prevalence. For that reason, it is essential to include the oral examination in the whole-body examination in addition to the skin examination. To our knowledge, this was the first study assessing the knowledge and awareness of dental students on malignant melanoma in Turkey. Dentistry students play a vital role in the prevention of oral malignant melanoma as future dentists. We hope that the resulting data will be useful in building the existing knowledge base in these areas, identifying knowledge gaps, and in the design and implementation of future oral malignant melanoma lesions reduction and prevention interventions targeting dental students.

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Conflicts of interest

There are no conflicts of interest.

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