Asian Journal of Current Research in Clinical Cancer
2021, Volume 1, Issue 2, Page No: 1-8

Available online at: www.galaxypub.co/page/journals

Galaxy Publication

Evaluating Dental Students' Awareness and Knowledge of Malignant Melanoma

İrfan Çelik[1], Gaye Keser[2]*, Filiz Namdar Pekiner[2]

[1]Department of Oral Diagnosis and Radiology, Faculty of Dentistry, Istanbul University, Istanbul, Turkey.
[2]epartment of Oral Diagnosis and Radiology, Faculty of Dentistry, Marmara University, Istanbul, Turkey.

***E-mail** ✉ gayekeser@hotmail.com

Received: 29 May 2021; **Revised:** 06 September 2021; **Accepted:** 14 September 2021

ABSTRACT

Globally, epidemiological studies have shown a higher risk of malignant melanoma. To properly counsel their patients, dental students must be well-versed in the latest facts on malignant melanoma. This study aimed to assess the understanding and awareness of third, fourth, and fifth-grade students about malignant melanoma. A questionnaire with 11 questions was administered to 229 students (93 in the third grade, 64 in the fourth grade, and 72 in the fifth grade) who were enrolled in Marmara University's Faculty of Dentistry for our study. This survey examined the level of awareness and knowledge of the students. There were 154 (67.25%) female students and 75 (32.75%) male students in the research. There was a statistically significant difference between the scores regarding the percentage of students who responded to the statement "Oral melanomas are more aggressive than skin involvement" (P = 0.000). The participation rate of third-grade students (30.11%) was much lower than that of fourth and fifth-grade students (45.31% and 48.61%; P1 = 0.004 and P2 = 0.000). There was a statistically significant difference in the percentage of students who responded to the statement "Oral melanoma lesions are usually asymptomatic" across grades (P = 0.000). The participation rate of third-grade students (15.05%) was much lower than that of fourth and fifth-grade students (39.06% and 58.33%, respectively; P1 = 0.002 and P2 = 0.000). The participation rate of fourth-grade students was much lower than that of fifth-grade students (P = 0.033). Providing dental students with the necessary education about malignant melanoma increases their understanding and awareness of this disease.

Keywords: Awareness, Malignant melanoma, Oral cancer, Dental students

How to Cite This Article: Çelik İ, Keser G, Pekiner FN. Evaluating Dental Students' Awareness and Knowledge of Malignant Melanoma. Asian J Curr Res Clin Cancer. 2021;1(2):1-8.

Introduction

Derived from pluripotent neural crest-based melanocyte cells, malignant melanoma is a very invasive tumor that generates melanin [1]. It is the third most frequent kind of skin cancer, making up just 3% of all skin cancer diagnoses each year, yet it is responsible for around 75% of all skin cancer fatalities. From a biological perspective, it is one of the most lethal and unpredictable neoplasms [2, 3].

The stratum basale of the skin's epidermis layer serves as the primary source of melanocytes. On a similar note, skin is where malignant melanoma is most commonly observed. Furthermore, melanocytes are derived from the stratum basale of the epithelial layer, which is the mucosal counterpart of the epidermis. Although they are less frequent than skin malignancies, malignant melanomas can develop on any mucosal site where melanocytes are present.

In the mouth cavity, nasopharynx, nasal mucosa, and paranasal sinuses, mucosal melanomas are most common [4]. According to the National Cancer Database Report on Cutaneous and Noncutaneous Melanoma, 91.2% of all melanomas occur in the skin, whereas ocular (5.2%), mucosal (1.3%), and unidentified primary melanomas (2.2%) are less frequent. The head and neck region accounts for around 25% of cutaneous melanomas, followed by the limbs at 40% and other body parts at the rest of the number. Over 50% of mucosal melanomas are found in the head and neck area, with the remainder mostly consisting of anorectal and urogenital mucosa [5]. Head and neck melanomas account for approximately 25% of all melanomas. Currently, mucosal melanomas account for

around 10% of all head and neck melanomas [4]. Mucosal melanoma is more dangerous than cutaneous melanoma because it spreads quicker and produces more metastases. Primary oral malignant melanoma affects four out of every ten million people each year [6]. Despite making up 0.2% to 8% of all malignant melanomas [3, 7-10], this tumor is necessary to distinguish from all other oral pigmentations and accounts for 0.5% of all malignancies of the oral cavity [7-11]. Jackson and Simpson [12] reported that oral malignant melanomas comprise fewer than 2% of total melanomas, however, Reddy *et al*. [13] reported an incidence of 0.3%-1.3%.

UV exposure, pale skin, freckles, red hair, and sun sensitivity are common etiologic variables for cutaneous melanomas; however, no etiologic component other than ethnic variations has been identified for mucosal melanoma [14]. Sun exposure is not associated with oral malignant melanoma. Although there is currently no proof of a causal link, smoking, alcohol consumption, chronic denture irritation, and breathed environmental carcinogens all play significant roles [8, 15-17]. Additionally, recent research has shown that oral malignant melanoma cases have BAP1 expression (BRCA1-related protein, breast cancer gene) [18].

The World Health Organization (WHO) reports that while malignant melanoma is the cancer with the fastest global growth rate, annual incidence rates vary by population. Melanoma incidence is predicted to grow every ten to twenty years [19]. Geographically speaking, the rising incidence rate differs among "high incidence regions" like Australia, "medium incidence regions" like Canada and the USA, and "low incidence regions" like Scotland and India [2, 20]. In 2020, there were 16.171 new instances of cutaneous melanoma, making it the third most prevalent disease after breast and prostate cancer, according to the WHO's GLOBOCAN 2020 database, which is maintained by the International Agency for Research on Cancer (IARC). India, Uganda, and Japan have the highest rates of mucosal melanomas, although cutaneous melanomas are less prevalent in these nations. The GLOBOCAN 2020 database indicates that there are 324.635 new cases of cutaneous melanoma worldwide. About 173.844 of them are males, while 150.791 are women, and the overall number of deaths is 57.043. In 2018, there were 287.723 new cases and a total of 60.712 deaths. In Turkey, the number of new cases is 1.756, with 888 deaths recorded in 2020. Some researchers have claimed that the true prevalence is not greater in nations such as Uganda and Japan, but appears to be owing to the comparatively low cutaneous melanoma incidence in these racial groupings [5].

Oral malignant melanoma is a rare adult malignancy that affects persons under the age of 20 [6, 17]. Some studies cite decades 4-6. Incidence is highest [7, 14, 17], however, some refer to decades 4-7 [20-22] and 5-7 [23, 24]. The average age of people affected ranges from 55 to 56 years [6, 8, 22, 25]. Men were also shown to be more influential than women, according to research [2, 3, 6, 7, 14, 21-24, 26-28]. They make up 11% to 12.4% of all melanomas in Japan [14, 21, 26], and 0.2% to 8% in Europe and the United States [14, 21]. D'Silva *et al*. state that primary oral melanomas are infrequent, accounting for fewer than 2% of all melanomas in the United States [29].

The most frequent locations for oral malignant melanomas are the hard palate and maxillary gingiva [3, 4, 6-8, 14, 17, 21-23, 25, 26, 28, 30]. Other locations include the base of the mouth, buccal mucosa, tongue, and lips [3, 6-8, 17, 22, 23]. The lip is the area with the lowest prevalence of oral malignant melanoma [23].

Oral malignant melanoma has a worse prognosis than cutaneous melanoma, with a ten-year survival rate of less than 30% [17]. Other studies report varying 5-year survival rates, including 0%-20% [26], 13%-22% [5], 7% [22], 15%-38% [8], 5%-20% [21], 15%-30% [7], and 6.6%-40% [23].

The survival rate of metastatic lesions is quite low [6]. For metastatic melanoma, the mandible, tongue, and buccal mucosa are the most often affected areas [4-23]. The anatomic area of oral malignant melanoma is another prognostic factor that has a strong correlation with the overall survival rate [17, 23]. Wang *et al*. report that the survival rates for patients with oral malignant melanoma with varying tumor areas are, respectively, 51, 40, and 43 months for the gingiva, hard palate, and other regions. Comparing gingiva-affected oral malignant melanoma patients to those in other locations, the greater survival rate may be due to the ease of lesion inspection, diagnosis, and surgical access [31].

In general, the poor prognosis of oral melanoma is associated with limited access to extensive resection and a proclivity for early hematogenous spread. Younger patients have a better chance of surviving than older individuals [5]. The poor five-year survival rate highlights the necessity for urgent therapy and continuous follow-up [4].

Research on dental students' awareness and understanding of malignant melanoma in other countries has been published, but none on dental students in our nation. Assessing the knowledge and awareness of third-, fourth-, and fifth-grade pupils on malignant melanoma is the aim of the present investigation.

Materials and Methods

On 05.03.2021, the Marmara University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee accepted the examination procedure, which was assigned the protocol number 09.2020.1378. In all, 229 students from Marmara University Faculty of Dentistry—93 in the third grade, 64 in the fourth, and 72 in the fifth—were involved in this study. A questionnaire consisting of eleven questions was presented to the participants whose awareness and knowledge were evaluated. Multiple-choice questions that just requested class information—not names—were asked. Participation was voluntary and open to all children starting in third grade and continuing through fifth grade.

Statistical analysis

Statistical analysis is done with Minitab 17 Statistical Software. Both qualitative data and descriptive statistics (mean, standard deviation, and frequency) were compared using the chi-square test. The P = 0.05 threshold was used to determine significance.

Results and Discussion

75 (32.75%) of the 229 students who participated in the study were male, while 154 (67.25%) were female. About 64 pupils (27.95%) were in the fourth grade, 72 children (31.44%) were in the fifth grade, and 93 students (40.61%) were in the third grade. The percentage of men (37.3%) and women (44.16%) who participated in the statement "Malignant melanoma ranks third among skin cancers with a rate of 3%" did not vary statistically significantly (P = 0.142). Additionally, there was no statistically significant difference in the percentage of respondents who said, "Surgery is the primary treatment for malignant melanoma," by gender (P = 0.545). Men (70.67%) were far less likely than women (85.71%) to answer the question, "Do you think malignant melanoma is an important disease?" (P = 0.022). Women answered the question, "Do you think that sunscreen should be used to prevent malignant melanoma?" at a much greater proportion than males (33.33%) (P = 0.000). Women (65.58%) were substantially more likely than males (52.0%) to correctly answer the question, "State the clinical features of primary oral melanoma lesion," with the correct answers being nodular/smooth-surfaced, slow-growing, irregularly shaped, and bronze/brown/black lesions (P = 0.048) **(Table 1)**.

Regarding the participation rate to the statement, "Malignant melanoma ranks third among skin cancers with a rate of 3%," there was a statistically significant difference across grades (P = 0.000). Third-grade students' response rate to the question (24.73%) was substantially lower than that of fourth-grade students (42.19%) (P = 0.035). Since the sample size for the Chi-square test was less than five, there were no findings on the degree of significance between the third and fifth grades. Fourth-grade students' participation percentage was much lower than that of fifth-grade students (63.89%) (P = 0.014) **(Table 2)**.

Our study found that there was a statistically significant difference between grades in the participation rate to the statement, "Oral melanomas are more aggressive than skin involvement" (P = 0.000). The third-grade participation rate (30.11%) was much lower than the fourth- and fifth-grade participation rates (45.31% and 48.61%; P1 = 0.004 and P2 = 0.000) **(Table 2)**.

Third-grade students' participation rate (15.05%) was significantly lower than that of fourth-grade students (39.06%) and fifth-grade students (58.33%) (P1 = 0.002 and P2 = 0.000), and fourth-grade students' participation rate was significantly lower than that of fifth-grade students (P = 0.033). This difference in participation rate to the statement "Oral melanoma lesions are usually asymptomatic" was statistically significant (P = 0.000) **(Table 2)**.

The statement "Primary treatment for malignant melanoma is surgery" was statistically significantly different among grades in terms of participation rate (P = 0.000). Compared to the fourth and fifth classes (32.81% and 59.72%), the third-grade participation rate (13.98%) was considerably lower (P1 = 0.008 and P2 = 0.000). Fourth-grade students' participation rates were much lower than those of fifth-grade students (P = 0.003) **(Table 2)**.

The percentage of students who answered the question, "Do you think malignant melanoma is an important disease?" varied statistically significantly by grade (P = 0.000). Fourth-grade students' participation percentage was substantially lower than that of fifth-grade students (94.44%) (P = 0.007) **(Table 2)**.

Additionally, the percentage of students who answered the question, "Do you think that sunscreen should be used to prevent malignant melanoma?" varied statistically significantly by grade (P = 0.001). Third graders'

participation percentage (37.63%) was much lower than that of fourth and fifth graders (59.38% and 69.44%, respectively; P1 = 0.027 and P2 = 0.000). Between the fourth and fifth grades, there was no statistically significant change **(Table 2)**.

Identifying the most prevalent locations of oral melanoma was a question in our survey that showed a statistically significant difference between grades in terms of accurate response rate (hard palate and maxillary gingiva) (P = 0.000). Third graders' correct response rate (6.82%) was substantially lower than that of fourth and fifth graders (22.03% and 37.50%, respectively; P1 = 0.007 and P2 = 0.000). Between the fourth and fifth grades, there was no statistically significant change **(Table 2)**.

For the question "Identify the most common type of malignant melanoma," there was a statistically significant difference between grades in the rate of right answers (superficial spreading melanoma) (P = 0.018). Compared to the third and fifth grades (31.18% and 36.11%), the fourth grade's correct answer rate (53.13%) was substantially higher (P1 = 0.006 and P2 = 0.046). Between the third and fifth grades, there was no statistically significant change **(Table 2)**.

For the question "State the clinical features of primary oral melanoma lesion," there was a statistically significant difference between classes in the rate of right answers (nodular/smooth-surfaced, slow-growing, irregularly shaped, and bronze/brown/black lesions) (P = 0.003). Compared to the third and fifth grades (62.37% and 73.61%, respectively), the fourth grade's correct response rate (45.31%) was much lower (P1 = 0.003 and P2 = 0.001) **(Table 2)**.

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 (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%)	
The 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 Wrong answer	26 (34.67%) 49 (65.33%)	63 (40.91%) 91 (59.09%)	89 (38.86%) 140 (61.14%)	0.363
Nodular melanoma					
Superficial spreading melanoma					
Acral lentiginous melanoma					
Lentigo malignant melanoma					
State the clinical features of the 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

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

Statement	Answer	3rd Grade	4th Grade	5th 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%)	
The 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%)	
	Wrong answer	86 (92.47%)	61 (95.31%)	63 (87.50%)	210 (91.70%)	
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 Wrong answer	29 (31.18%) 64 (62.82%)	34 (53.13%) 30 (46.88%)	26 (36.11%) 46 (63.89%)	89 (38.86%) 140 (61.14%)	0.018*
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 Wrong answer	58 (62.37%) 35 (37.63%)	29 (45.31%) 35 (54.69%)	53 (73.61%) 19 (26.39%)	140 (61.14%) 89 (38.86%)	0.003*
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

Rarely, oral mucosal melanoma is more likely than other mouth malignancies to invade tissues locally and spread to other parts of the body. On the upper jaw's oral mucosa, it is four times more prevalent, usually on the palate or alveolar gingiva. According to research by Ivanov *et al*. [32] on medical students' attitudes and knowledge about sun protection practices and skin cancer. Two-thirds (67.8%) of participants correctly recognized basal cell carcinoma as the most frequent kind of skin cancer, reflecting the students' broad knowledge of the disease. In our study, the statement "Malignant melanoma ranks third among skin cancers with a rate of 3%" was statistically significantly different for each grade in terms of participation rate (P = 0.000). The third-grade participation rate (24.73%) was substantially lower than the fourth-grade participation rate (42.19%) to the question (P = 0.035), and the fourth-grade participation rate was significantly lower than the fifth-grade participation rate (63.89%) (P = 0.014).

According to a different study on skin cancer among medical students by Patel *et al*. [33], women were much more likely than men to participate (85.8%) in the statement that "sun exposure is the most important risk factor causing skin cancer," and they also used sunscreen more frequently than men. According to survey research by Ivanov *et al*. [32], one-third of medical students (33.1%) said they usually or always wore sunscreen when they were outside. According to this study, there was a difference in sunscreen use between male and female students, with female students using sunscreen at a higher rate (43.8%) than male students (21.1%) (P = 0.022). In line with these findings, women in our survey answered the question, "Do you think that sunscreen should be used to prevent malignant melanoma?" at a considerably greater rate (63.64%) than males (33.33%) (P = 0,000). Numerous survey studies that assessed medical students' sun protection practices also supported the findings [34-36]. These findings could be connected to the fact that men are more likely than women to develop malignant melanoma [2, 3, 6, 7, 14, 21-24, 26-28]

According to a survey research on melanoma awareness among medical students by Kalil *et al*. [37], senior students were more likely than first-year students to correctly identify the areas where malignant melanoma is more prevalent. However, when asked where melanoma is most commonly seen, it was found that 24.59% of final-year students and 79.66% of first-year students were unable to identify the right response. Third-grade students' accurate response rate (6.82%) was substantially lower in our study than that of fourth and fifth grades (22.03% and 37.50%, respectively; P1 = 0.007 and P2 = 0.000). 30.51% of first-year students and 97.54% of

senior students in the Kalil *et al*. [37] survey research had accurate knowledge. According to our research, when asked to "State the clinical features of primary oral melanoma lesion," fourth graders' correct response rate (45.31%) was substantially lower than that of fifth graders (73.61%) (P1 = 0.03 and P2 = 0.001). Additionally, according to the authors, 97.54% of senior students and 30.51% of first-year students obtained the right answers. Similarly, when asked to "State the clinical features of primary oral melanoma lesion," fourth graders' accurate response rate (45.31%) was substantially lower than that of fifth graders (73.61%) in our research (P1 = 0.03 and P2 = 0.001).

Conclusion

Despite their low occurrence, oral malignant melanomas have a terrible prognosis, and early detection is essential to lowering their fatality rates. Therefore, in addition to the skin examination, the oral examination must be part of the whole-body assessment. As far as we are aware, this was the first study in Turkey to evaluate dentistry students' awareness and understanding of malignant melanoma. As future dentists, dental students are essential to the prevention of oral malignant melanoma. We anticipate that the information generated will help expand the body of research in these fields, finding knowledge gaps, and designing and implementing future treatments aimed at reducing and preventing oral malignant melanoma lesions in dentistry students.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

References

1. Shangase SL, Zwane NB, Singh S. Oral medicine case book 70: oral malignant melanoma. S Afr Dent J. 2015;70(5):216-9.
2. Sharma K, Mohanti BK, Rath GK. Malignant melanoma: a retrospective series from a regional cancer center in India. J Cancer Res Ther. 2009;5(3):173-80.
3. Panda S, Dash S, Besra K, Samantaray S, Pathy PC, Rout N. Clinicopathological study of malignant melanoma in a regional cancer center. Indian J Cancer. 2018;55(3):292-6.
4. Zito PM, Mazzoni T. Oral melanoma. In: StatPearls. Treasure Island, FL: StatPearls Publishing; 2020.
5. Neville BW, Damm D, Allenc R, Bouquot JE. Oral and maxillofacial pathology. 3rd ed. Philadelphia, PA: WB Saunders; 2009.
6. Ashok S, Damera S, Ganesh S, Karri R. Oral malignant melanoma. J Oral Maxillofac Pathol. 2020;24(Suppl 1):S82-5.
7. Kumar V, Vishnoi JR, Kori CG, Gupta S, Misra S, Akhtar N. Primary malignant melanoma of oral cavity: a tertiary care center experience. Natl J Maxillofac Surg. 2015;6(2):167-71.
8. Bhullar RP, Bhullar A, Vanaki SS, Puranik RS, Sudhakara M, Kamat MS. Primary melanoma of oral mucosa: a case report and review of literature. Dent Res J (Isfahan). 2012;9(3):353-6.
9. Guevara-Canales JO, Gutiérrez-Morales MM, Sacsaquispe-Contreras SJ, Sánchez-Lihón J, Morales-Vadillo R. Malignant melanoma of the oral cavity. Review of the literature and experience in a Peruvian population. Med Oral Patol Oral Cir Bucal. 2012;17(2):e206-11.
10. Delgado Azañero WA, Mosqueda Taylor A. A practical method for clinical diagnosis of oral mucosal melanomas. Med Oral. 2003;8(5):348-52.
11. Hicks MJ, Flaitz CM. Oral mucosal melanoma: epidemiology and pathobiology. Oral Oncol. 2000;36(2):152-69.
12. Jackson D, Simpson HE. Primary malignant melanoma of the oral cavity. Oral Surg Oral Med Oral Pathol. 1975;39(4):553-9.
13. Reddy CR, Rao TR, Ramulu C. Primary malignant melanoma of the hard palate. J Oral Surg. 1976;34(10):937-9.

14. Cawson RA, Odell EW. Cawson's essentials of oral pathology and oral medicine. 8th ed. London: Elsevier; 2008.
15. Ali EA, Karrar MA, El-Siddig AA, Zulfu A. Oral malignant melanoma: a rare case with unusual clinical presentation. Pan Afr Med J. 2015;22:113.
16. Rapini RP, Golitz LE, Greer RO Jr, Krekorian EA, Poulson T. Primary malignant melanoma of the oral cavity. A review of 177 cases. Cancer. 1985;55(7):1543-51.
17. Mohan M, Sukhadia VY, Pai D, Bhat S. Oral malignant melanoma: systematic review of literature and report of two cases. Oral Surg Oral Med Oral Pathol Oral Radiol. 2013;116(4):e247-54.
18. Song H, Wang L, Lyu J, Wu Y, Guo W, Ren G. Loss of nuclear BAP1 expression is associated with poor prognosis in oral mucosal melanoma. Oncotarget. 2017;8(17):29080-90.
19. Lens MB, Dawes M. Global perspectives of contemporary epidemiological trends of cutaneous malignant melanoma. Br J Dermatol. 2004;150(2):179-85.
20. Wu E, Golitz LE. Primary noncutaneous melanoma. Clin Lab Med. 2000;20(4):731-44.
21. Tarakji B, Umair A, Prasad D, Alsakran Altamimi M. Diagnosis of oral pigmentations and malignant transformations. Singapore Dent J. 2014;35C:39-46.
22. Rajendran R, Sivapathasundharam B, editors. Shafer's textbook of oral pathology. 7th ed. India: Elsevier; 2012.
23. Singh D, Pandey P, Singh MK, Kudva S. Prevalence of malignant melanoma in anatomical sites of the oral cavity: a meta-analysis. J Oral Maxillofac Pathol. 2019;23(1):129-35.
24. Smith MH, Bhattacharyya I, Cohen DM, Islam NM, Fitzpatrick SG, Montague LJ, et al. Melanoma of the oral cavity: an analysis of 46 new cases with emphasis on clinical and histopathologic characteristics. Head Neck Pathol. 2016;10(3):298-305.
25. Grosky M, Epstein JB. Melanoma arising from the mucosal surfaces of the head and neck. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1998;86(6):715-9.
26. Nwoga MC, Effiom OA, Adeyemi BF, Soyele OO, Okwuosa CU. Oral mucosal melanoma in four Nigerian teaching hospitals. Niger J Clin Pract. 2019;22(12):1752-7.
27. Barker BF, Carpenter WM, Daniels TE, Kahn MA, Leider AS, Lozada-Nur F, et al. Oral mucosal melanomas: the WESTOP Banff workshop proceedings. Western society of teachers of oral pathology. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1997;83(6):672-9.
28. Daley T, Darling M. Nonsquamous cell malignant tumours of the oral cavity: an overview. J Can Dent Assoc. 2003;69(9):577-82.
29. D'Silva NJ, Kurago Z, Polverini PJ, Hanks CT, Paulino AF. Malignant melanoma of the oral mucosa in a 17-year-old adolescent girl. Arch Pathol Lab Med. 2002;126(9):1110-3.
30. Tanaka N, Mimura M, Ogi K, Amagasa T. Primary malignant melanoma of the oral cavity: assessment of outcome from the clinical records of 35 patients. Int J Oral Maxillofac Surg. 2004;33(8):761-5.
31. Wang R, Jing G, Lv J, Song H, Li C, Wang X, et al. Interferon-α-2b as an adjuvant therapy prolongs survival of patients with previously resected oral muscosal melanoma. Genet Mol Res. 2015;14(4):11944-54.
32. Ivanov NN, Swan A, Guseman EH, Whipps J, Jensen LL, Beverly EA. Medical students' knowledge, attitudes, and behaviors with regard to skin cancer and sun-protective behaviors. J Am Osteopath Assoc 2018;118(7):444-54.
33. Patel SS, Nijhawan RI, Stechschulte S, Parmet Y, Rouhani P, Kirsner RS, et al. Skin cancer awareness, attitude, and sun protection behavior among medical students at the university of Miami miller school of medicine. Arch Dermatol. 2010;146(7):797-800.
34. Isvy A, Beauchet A, Saiag P, Mahé E. Medical students and sun prevention: knowledge and behaviours in France. J Eur Acad Dermatol Venereol. 2013;27(2):e247-51.
35. Rodríguez-Gambetta P, Moscoso-Porras MG, Taype-Rondan A. Factors associated with regular sunscreen use by medical students of a Peruvian university. J Prev Med Hyg. 2016;57(3):E172-7.
36. Purim KS, Wroblevski FC. Sun exposure and protection among medical students in Curitiba (PR). Rev Bras Educ Med. 2014;38(4):477-85.
37. Kalil LL, Prado EH, Resende RV, Pimenta MR, Wainstein AJ, Drummond-Lage AP. Melanoma awareness among medical students. J Cancer Educ. 2021;36(4):677-81.