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ORIGINAL ARTICLE

Assessment of Dental and Medical School students on the awareness of Oral Cancer

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Abstract:

Oral cancer (OC) is a public health problem due to its high prevalence in the world population. Due to its late diagnosis, this pathology has been causing many sequelae for the patient and constitutes a risk of death when treated in advanced stages. One of the main aggravating factors is the difficulty in its early identification, both by health professionals and the population, since there are no explicit symptoms in the initial stages or the changes are often like other oral lesions, such as ulcers. Thus, they can go unnoticed by the individual and even by a health professional. This study evaluated the level of knowledge about OC in medical and dental students at the University of Santo Amaro. The study was carried out through a questionnaire with 38 (thirty-eight) questions. With that, we established a comparative parameter between both courses to show if the students were well prepared to deal with oral and oropharyngeal cancer. The survey also aimed to show how oral health is being neglected within medicine, making future physicians feel unprepared to care for their patients.

Keywords: Mouth Neoplasms; Educational Measurement; Education, Higher; Public Health Dentistry.

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INTRODUCTION

Oral cancer (OC) is the fifth most frequent tumor in the Brazilian population, with approximately 15,000 new cases diagnosed every year[1]. The most common histological type is Squamous Cell Carcinoma (SCC), which is detected in around 90% of all cases diagnosed in the oral cavity, often occurring in the floor of the mouth and tongue[2].

Some oral lesions, such as leukoplakia, erythroplakia, actinic cheilitis, and lichen planus, are considered premalignant and may increase the risk for OC[3]. The close monitoring of diagnosed patients with premalignant lesions is essential and crucial for improving their chance of early treatment.

When considering the main predisposing factors to carcinogenesis, some factors influence SCC, especially unprotected sun exposure, alcohol consumption, tobacco, diet and nutrition, and viruses such as HPV (Human Papilloma Virus).[4]

Survival and treatment modalities depend on the stage of the disease. Delay on the diagnosis and advanced cancer stage is associated with increased mortality rates, treatment morbidity, increased cervical metastasis, and higher recurrence rates [2,5].

The main aggravating factor is the difficulty in early identification, both by health professionals and population, since there are no explicit symptoms in initial stages of OC, or the changes observed may look alike other oral lesions, such as ulcers. Therefore, OC features should be emphasized in undergraduate medical and dental schools.

A recent study indicated that dentists and dental students have deficits in knowledge regarding risk factors and premalignant lesions, which suggests the deficiency in dental curricula, shown mainly by the variation across European dental schools[6]. Another study that assessed medical students knowledge on OC, the curricular experiences influenced signs and symptoms identification and risk factors associated with Head and Neck Cancer [7].

Previous studies suggested that the difficulty in early diagnosis of OC was related to university curricula, therefore, this study aimed to evaluate the knowledge of undergraduate students regarding OC in medical and dentistry courses at University of Santo Amaro.

MATERIALS AND METHODS

Ethical concerns

This study was approved by the Research Ethics Committee of UNISA - University of Santo Amaro (CAAE: 33379920.7.0000.0081). All volunteers have signed an informed consent form.

Study design

This was an epidemiological and observational study, with a cross-sectional cohort, with the participation of 218 students (73 in dentistry and 145 in medical school).

The survey instrument was a 38-item questionnaire, developed by Dib[8], which is an adaptation of the questionnaire proposed by Horowitz et al[9]. All participants received a questionnaire via Microsoft Forms and had one week to answer it (Table 1).

Inclusion criteria

- Undergraduate students enrolled in dental or medical school, Santo Amaro University

Data analysis

Data were stored in a Microsoft Excel® (Microsoft, Redmond, WA, USA) spreadsheet, and statistical analysis was performed with Statistical Package for the Social Sciences (SPSS Inc., Chicago, Ill., USA). Descriptive statistical analysis with relative frequency was performed. ANOVA test was used to compare the total number of correct and incorrect answers between the students and courses.

RESULTS

218 students agreed to participate in this study (145 of 800 enrolled in Medical School and 73 of 750 enrolled in Dental School, with adhesion percentages of 18.12% and 9.7%, respectively). 83% were female and 17% were male.

The average age between Medical Students was 21.59 years-old (standard deviation 4.63 years-old, ranging from 17 to 47 years-old, mean 21.5 years-old). Among Dental Students, the average age was 24.84 (standard deviation: 7.72, ranging from 17 to 59 years-old, mean 21 years-old).

When analyzing the predisposing factors to carcinogenesis, 13.3% of all participants were smokers (Table 2).

The question with the most correct answers in both courses was about the progression stage of cancer, with a mean of 93.58% of correct answers (Table 3). Among Dental Students, the question with the lowest percentage of correct answers was the question of

Table 1. Questionnaire applied to students. Correct answers have been highlighted.

Undergraduate course		**Medicial school**		**Dentistry**	
Questions	**Answer**	**n**	**%**	**n**	**%**
Gender	Male	25	17,24	12	16,44
	Female	120	82,76	61	83,56
Smoker?	No	121	83,45	68	93,15
	Yes	24	16,55	5	6,85
Regarding your knowledge about OC, what is your self-assessment?	Regular	59	40,69	25	34,25
	Excellent	7	4,83	7	9,59
	Insuficient	54	37,24	6	8,22
	Good	25	17,24	35	47,95
What is the cause of cancer?	Disordered cell growth	136	93,79	68	93,15
	Cell volumetric increase	3	2,07	0	0,00
	Attack of antibodies against foreign bodies	1	0,69	0	0,00
	Cell death	3	2,07	4	5,48
	Virus penetration into cells	2	1,38	1	1,37
Most affected gender by OC?	Female	35	24,14	9	12,33
	Male	110	75,86	64	87,67
If you found oral lesions suspected of being malignant, for whom would you refer?	Oncologist	61	42,07	50	68,49
	Dermatologist	14	9,66	0	0,00
	Otolaryngologist	19	13,10	50	68,49
	General practitioner	8	5,52	8	10,96
	Dentist	43	29,66	15	20,55
What is the most common type of OC?	I do not know	92	63,45	13	17,81
	Squamous cell carcinoma	22	15,17	49	67,12
	Ameloblastoma	3	2,07	5	6,85
	Salivary gland adenocarcinoma	17	11,72	3	4,11
	Kaposi's sarcoma	6	4,14	1	1,37
	Lymphoma	5	3,45	2	2,74
Which anatomical region is frequently affected by OC?	Buccal mucosa	29	20,00	12	16,44
	Tongue	39	26,90	34	46,58
	Floor of the mouth	10	6,90	16	21,92
	Palate	11	7,59	3	4,11
	I do not know	46	31,72	5	6,85
	Gingiva	10	6,90	3	4,11
Among those mentioned, what is the most common aspect in early-stage OC?	Hard nodule	24	16,55	24	32,88
	I do not know	62	42,76	6	8,22
	Painless Ulcer	38	26,21	38	52,05
	Severe pain	13	8,97	4	5,48
	Abundant Salivation	8	5,52	1	1,37
What is the most common age group for OC to occur?	18 to 39 years	35	24,14	10	13,70
	Above 40 years	78	53,79	59	80,82
	I do not know	18	12,41	4	5,48
	Under 18	0	0,00	0	0,00

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Table 1. Questionnaire applied to students. Correct answers have been highlighted.

Undergraduate course		**Medicial school**		**Dentistry**	
Questions	**Answer**	**n**	**%**	**n**	**%**
Of these symptoms, which one or which do you think have to do with OC?	All alternatives	119	82,07	61	83,56
	Difficulty in speaking	3	2,07	2	2,74
	Fast weight loss	2	1,38	4	5,48
	Difficulty swallowing	5	3,45	1	1,37
	Difficulty chewing	6	4,14	3	4,11
	I do not know	10	6,90	2	2,74
OC is diagnosed more often at what stage in Brazil?	I do not know	47	32,41	12	16,44
	Advanced	70	48,28	42	57,53
	Pre-malignant	19	13,10	12	16,44
	Early	9	6,21	7	9,59
Which is the most commonly condition associated with OC?	I do not know	59	40,69	8	10,96
	Oral herpes	43	29,66	7	9,59
	Leukoplakia	13	8,97	46	63,01
	Candidiasis	12	8,28	6	8,22
	Pemphigus Vulgaris	0	0,00	3	4,11
	Stomatitis	18	12,41	3	4,11
Are the following habits related to OC? (Yes/No)					
Use of injectable drugs	No	90	62,07	45	61,64
	Yes	55	37,93	28	38,36
Previous diagnosed cancer	Yes	106	73,10	58	79,45
	No	39	26,90	15	20,55
Alcohool consumption	No	41	28,28	15	20,55
	Yes	104	71,72	58	79,45
Smoker	Yes	135	93,10	66	90,41
	No	10	6,90	7	9,59
Family history of cancer	Yes	136	93,79	66	90,41
	No	9	6,21	7	9,59
Emotional stress	Yes	105	72,41	47	64,38
	No	40	27,59	26	35,62
Low consumption of fruits and vegetables	No	79	54,48	38	52,05
	Yes	66	45,52	35	47,95
Oral sex	No	51	35,17	38	52,05
	Yes	94	64,83	35	47,95
Poorly adapted prosthesis	Yes	85	58,62	36	49,32
	No	60	41,38	37	50,68
Teeth in poor condition	No	47	32,41	49	67,12
	Yes	98	67,59	24	32,88
Consumption of spicy foods	No	88	60,69	40	54,79
	Yes	57	39,31	33	45,21
Poor oral hygiene	Yes	99	68,28	35	47,95
	No	46	31,72	38	52,05
Direct contamination	No	112	77,24	64	87,67
	Yes	33	22,76	9	12,33

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Table 1. Questionnaire applied to students. Correct answers have been highlighted.

Undergraduate course		**Medicial school**		**Dentistry**	
Questions	**Answer**	**n**	**%**	**n**	**%**
Sun exposure	No	80	55,17	13	17,81
	Yes	65	44,83	60	82,19
Hot drinks and food	Yes	67	46,21	25	34,25
	No	78	53,79	41	56,26
Obesity	No	93	64,14	48	65,75
	Yes	52	35,86	25	34,25
You feel properly informed on OC by the public health system and your dentist?	No	131	90,34	63	86,30
	I do not know	9	6,21	4	5,48
	Yes	5	3,45	6	8,22
What is your level of confidence in performing diagnostic procedures for OC?	I do not know	50	34,48	9	12,33
	Low	43	29,66	51	69,86
	High	17	11,72	13	17,81
Did you undergo any training for the diagnosis of oral cancer?	I do not know	62	42,76	10	13,70
	No	80	55,17	28	38,36
	Yes	3	2,07	35	47,95
When was the last time you attended a continuing education course on OC?	I do not remeber	15	10,34	19	26,03
	Never	120	82,76	16	21,92
	Last year	5	3,45	27	36,99
	Past 2 to 5 years	5	3,45	11	15,07
	More than 5 years	0	0,00	0	0,00
Are you interested in attending a continuing education course on OC in the future?	Yes	112	77,24	69	94,52
	I do not know	23	15,86	2	2,74
	No	10	6,90	2	2,74
In your opinion, what is the importance of the dentist in the prevention and early diagnosis of OC in the future?	High	135	93,10	73	100,00
	Average	7	4,83	0	0,00
	Regular	2	1,38	0	0,00
	Low	0	0,00	0	0,00
	I do not know	1	0,69	0	0,00

Table 2. Characteristics of the participants.

		1º Year		**2º Year**		**3º Year**		**4º Year**		**Total of each course**		**Total of both courses**	
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Gender	Female (Dentistry)	10	76,92	14	82,35	15	88,24	22	84,62	61	83,56	181	83,03
	Female (Medicine)	68	87,18	27	84,38	20	68,97	5	83,33	120	82,76		
	Male (Dentistry)	3	23,08	3	17,65	2	11,76	4	15,38	12	16,44	37	16,97
	Male (Medicine)	10	12,82	5	15,63	9	31,03	1	16,67	25	17,24		
Smoker?	No (Dentistry)	12	92,31	17	100,00	15	88,24	24	92,31	68	93,15	189	86,70
	No (Medicine)	67	85,90	26	81,25	23	79,31	5	83,33	121	83,45		
	Yes (Dentistry)	1	7,69	_	0,00	2	11,76	2	7,69	5	6,85	29	13,30
	Ye (Medicine)	11	14,10	6	18,75	6	20,69	1	16,67	24	16,55		

management of suspected oral lesions, with 20.55% of correct answers. Between Medical Students, the lowest percentage of correct answers was about the lesion most associated with OC (premalignant oral lesions), with a total of 8.97% of correct answers (Table 4).

Through comparative analysis, it was possible to verify that 88.99% of the participants did not feel properly educated by the public health system or the dentist regarding this pathology. However, 95.41% believed that the dentist is of great importance in the prevention and early diagnosis of OC.

Regarding the level of confidence of students in terms of carrying out diagnostic procedures for suspicious injuries, about 69.86% of dentistry participants reported having a low level of confidence, considering that 34.48% of medical students were unable to say whether they were fit for such conduct.

In both courses, we noticed that 83.03% of the participants were interested in attending a continuing education course on oral cancer.

Table 3. Question with the highest percentage of correct answers in the questionnaire.

Question	Correct answer	1º Year		2º Year		3º Year		4º Year		
		Total	%	Total	%	Total	%	Total	%	p***
What is the cause of cancer?*	Disordered cell growth	13	84,62%	17	94,12%	17	94,12%	26	96,15%	0.2958
What is the cause of cancer?**	Disordered cell growth	78	91,03%	32	93,75%	29	100,00%	6	100,00%	

* Dentistry students / ** Medicine students / *** One-way ANOVA.

Table 4. Question with the lowest percentage of correct answers in the questionnaire.

Question	Correct answer	1º Year		2º Year		3º Year		4º Year		
		Total	%	Total	%	Total	%	Total	%	p***
If you found oral lesions suspected of being malignant, for whom would you refer?*	Dentist	13	30,77	17	17,65	17	17,65	26	19,23	0.0479
Question	Correct answer	1º Year		2º Year		3º Year		4º Year		
		Total	%	Total	%	Total	%	Total	%	
Which is the most commonly condition associated with OC?**	Leukoplakia	78	8,97%	32	3,13	29	13,79	6	16,67	

* Dentistry students / ** Medicine students / *** One-way ANOVA.

DISCUSSION

OC represents 3% of all types of cancer diagnosed in the world and, 85% to 95% of oral malignant lesions detected in the oral cavity are SCC[4,10]. The main risk factors for the development of OC in the Western countries are the consumption of tobacco and alcohol; together, they have a synergic effect and greatly increase the risk factor over the years; HPV (mainly type 16) and some bacteria are described in the literature as other predisposing factors[10]. Besides the initiation and promotion factors to oral carcinogenesis, it is essential that physicians and dentists are prepared to perform clinical identification of oral premalignant lesions, to significantly decrease the risk of the malignant conversion of these lesions.

The impact of curriculum in Medical School may influence the knowledge related to oncology. Some studies show that medical graduating students are still deficient regarding certain risk factors, oral screening guidelines, and head and neck examination techniques[7]. Some authors suggest that more internship hours, focused on oncology, may have a positive impact on students' progression in the knowledge of oncology[7,11,12].

Our findings reinforce this assertion in the Medicine students' group, since their knowledge of potentially malignant oral lesions is limited. Consequently, these students do not have adequate expertise to diagnose OC in the oral cavity and oropharynx.

A previous research[13] conducted in our study center with 50 dental students, comparing the knowledge between students in the first or in the last year of Dental School, showed a significant correlation between right and wrong answers given by them. Dental Students in the last period of graduation had a higher percentage of correct answers when asked about etiological factors and prevention of OC, when compared to the other group. Another study[13] demonstrated inconsistencies in the

knowledge concerning the recognition of risk factors of OC, for students in the early stages of the dental course.

68.49% of dental students and 42.07% of medical students answered that they would refer the patient to an oncologist if they found a suspicious lesion. Only 20.55% (15 out of 73 dental school students) would refer the patient to the dentist. These findings indicate that the students fail to refer the patients to the oral medicine specialist, thus suggesting that they either have insufficient knowledge or restricted clinical experience in terms of diagnosis and/or treatment of presumed malignant lesions. The clinical conduct, in those situations, would be to send the patient to the oral medicine specialist and, only after the OC hypothesis is confirmed, the patient would be referred to the oncologist. Subsequently, the treatment would be conducted by a multidisciplinary team.

The question with the highest percentage of correct answers in both courses was: "Cancer occurs because of ...". In this question, students had five alternatives to choose from; 93.58% (204 of the total 218 participants) of them answered that cancer occurs due to the disordered growth of cells

In opposition, very few medical students (8.97%, 13 out of 145 participants) answered that leukoplakia was a premalignant lesion. According to Mohyuddin et al.[7], the mandatory otolaryngology rotation for Chicago College of Medicine students during the clinical years did not result in a statistically significant knowledge about OC. Based on these assertions, Cecilio-Fernandes et al. [11] suggested that a good way to improve the knowledge about OC in medical school could be a mixing of teaching techniques, associating small tutor groups to support problem-based teaching[11].

Analyzing other studies that addressed this topic in dental schools, most students claimed that most knowledge about OC came from their undergraduate course, but as in our study, the difficulty lies in applying the knowledge in each situation [14,15].

Regarding the importance of the dentist in the prevention and diagnosis of OC, almost all medical and dental students (93.10% and 100% respectively) believed that the dentist has a fundamental role, as well as in other studies that used similar surveys [15,16].

Our study has limitations, and the poor response rate is an unquestionable one. The adhesion percentage was 18.12 % among Medical Students and 9.7% among Dental Students. Our findings were similar to Mohyuddin et al[7] study. These authors believe that the low response rate might be related to the fact that only students familiar with the topic were willing to respond to the survey.

Our study corroborated this fact. When asked about the confidence level to diagnose OC, 69.86% of dental students had a low confidence level, while 34.48% of medical students chose the option "I do not know." The students did not feel in diagnosing those lesions. These results might directly influence the diagnosis and the patients' survival rate. Those flaws will persuade students' resourcefulness in clinical life, which will directly affect confidence in making a diagnosis.

Seoane et al[17] proposed a clinical guideline for referral of patients with suspicious lesions. The specificity in the diagnosis of OC was significantly higher amongst the students that participated in a 2-hour workshop in which the guidelines for the referral of suspicious lesions were discussed, even after 3 months of training.

When asked about their interest in attending a continuing education course on OC, a great willingness of academics to attend the course was observed, with 94.52% of medical students and 77.24% of dental students answering yes when they were questioned. The student's eagerness to learn more and thus be able to make the early diagnosis and treat or refer their patient correctly was made explicit.

Nowadays, OC is considered a public health problem due to its high incidence. 86.30% of dental students and 90.34% of medical students chose the option "no" when asked if they felt properly informed about the subject by the public health system or their dentist. When it comes to oral health, the dentist has a fundamental role in prevention and early diagnosis, with 95.41% of the students of both courses agreeing with the importance of this professional in the prevention and early diagnosis of OC.

CONCLUSION

Participants understood the importance of the dissemination of knowledge to keep the population properly informed. However, it also shows how the subject is out of date within the health area, as dental and medical students presented difficulties in some situations.

Overall, medical students were not able to identify the most common lesions caused by OC, thus maintaining a low rate of correct answers for questions related to this subject. Dental students, however, had a greater number of correct answers, but still insufficient to be considered suitable in terms of OC proper diagnosis.

CONFLICT OF INTEREST

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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