

Perceptions and Awareness of Dental Students toward Oral Tissues: A Cross-Sectional Study

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Abstract

Background: If oral mucosal lesions are detected early by the oral health practitioners, there will be a better prognosis for the lesions diagnosed. This cross-sectional study was designed to assess the perceptions and awareness of dental students of the Government Dental College and Hospital, Mumbai, toward oral tissues. **Materials and Methods:** A questionnaire was created to assess the perceptions and awareness of dental students towards oral tissues. This questionnaire had 25 questions with multiple choices. Options of these questions were based on 3-point and 5-point Likert scale. This questionnaire was converted into a Google Form and distributed among all the undergraduate students of the Government Dental College and Hospital, Mumbai, along with a declaration form via electronic methods such as Gmail and WhatsApp, after explaining to them the aim and objectives of the study. **Results:** A total of $n = 334$ dental students responded, yielding a response rate of 66.8%. Most dental students agreed that it is important to focus on oral soft tissues apart from oral hard tissues. Most participants believed that it is the role of the dentist to perform the complete oral examination. Lack of training, confidence, time, etc., were seen as barriers to at least some degree by participants. **Conclusion:** This study highlights the awareness of oral soft tissues among dental students and the importance of its academic reinforcement. This would definitely help budding dentists to work more on oral cancer prevention and detection, which ultimately may lead to a decrease in the incidence of oral cancers.

Keywords: Oral cancer prevention, oral health practitioners, oral mucosal lesions, oral soft tissues

INTRODUCTION

Body cavities such as the nasal cavity, orbital cavity, and oral cavity that communicate with the external surface are lined by mucous membranes. The surface of the oral cavity is covered by a mucous membrane called oral mucous membrane/oral mucosa. It is constantly lubricated by salivary secretions and is composed of squamous epithelium, basal lamina, lamina propria, and submucosa layer. It can be keratinized or nonkeratinized. Just like skin, it not only acts as a barrier against harmful agents and prevents dehydration but also displays a wide array of contrasting features with respect to the skin. For example, the oral mucosal epithelium is thicker than skin and lacks the adnexa present in skin; oral keratinocytes act faster and are more robust to inflammatory stimuli than dermal cells. Moreover, saliva provides a conducive environment and various growth factors such as salivary antimicrobial peptide,

histatin, epidermal growth factor, and keratinocyte growth factor that promote faster and scare-free wound healing, more akin to regeneration rather than repair.^[1,2] Moreover oral cavity is the mirror of some systemic diseases. Signs and symptoms of several lesions such as pemphigus, erythema multiforme, acute myeloid leukemia, and arthritis appear first in the oral cavity. Paleness of mucosa, angular cheilitis, pigmentations, lesions of the tongue, and swellings, points out other pathologies in the body. Thus, the oral mucosa is a specialized structure that needs as much attention as other tissues in the oral cavity.^[3]

Although oral mucosa has an innate capacity to heal by regeneration when exposed repeatedly to various insults such

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as thermal, mechanical, and chemical, it might come to lie in a state histologically and clinically intermediate between healthy and high-grade dysplasia/carcinoma *in situ*. These lesions are termed by WHO (2005) as potentially malignant disorders.^[4] Several of these lesions share morphological, cytological, chromosomal, genomic, and molecular similarities with epithelial malignancies but without frank invasion. Thus, individuals with potentially malignant disorders are at increased risk of developing oral carcinoma.^[5]

Patients often fail to seek dental care for oral mucosal lesions unless it bleeds or pain. This can be due to several reasons such as lack of education, awareness, or ignorance by the patient. By the time these patients report to oral health practitioners, most of these lesions have already progressed to potentially malignant disorders. Since outcomes for oral cancer vary significantly, whereby early lesions have better treatment outcomes than late-stage diseases^[6], a diagnostic delay could be a potential risk factor for developing advanced-stage oral cancer, as shown in a recent meta-analysis.^[7]

Unknowingly oral health practitioners often fail to observe the oral mucosal lesions, if they are not the chief complaint. We wanted to identify the lacunae that caused the oral health practitioners to focus more on the oral hard tissues. Since dental students of today will grow to become the dentists of tomorrow, it was necessary to identify if there was any difficulty in understanding and practicing the concepts related to oral tissues and their lesions. Identifying these grey areas would help to channelize the limited resources in that direction, which would ultimately bring down the incidence of oral carcinomas over a period of time. This deficiency in the awareness needs an urgent call for addressal, thus present study aim to evaluate and assess the perceptions and awareness of dental students of Government Dental College and Hospital, Mumbai toward oral tissues.

Aim and objectives

This cross-sectional study aimed to assess the perceptions and awareness about oral tissues among the dental students of Government Dental College and Hospital, Mumbai.

The objectives of this study were to:

1. To create awareness regarding the importance of examination of oral soft and hard tissues among the dental students of GDC and H, Mumbai and
2. Make the dental students of GDC and H, Mumbai, aware of the consequences due to negligence of oral tissues.

MATERIALS AND METHODS

Considering the significance of awareness about the oral tissues and associated lesions, a customized questionnaire was designed, consisting of 25 questions with multiple responses based on 3-point and 5-point Likert scale. Ethical committee approval was taken. This questionnaire was converted into a Google Form and distributed among all the undergraduate students of Government Dental College and Hospital Mumbai

along with a consent cum declaration form via an electronic method like Gmail and Whats app, after explaining to them the aims and objectives of the study. All the participants were requested to respond to the Google form within a stipulated time of 15 days. Responding participants who did not comply with the time limit of 15 days, were not included in the study.

Only those who wished to participate voluntarily in this study were selected. The survey content was validated through a literature review and the expert opinion of oral pathology specialists. Responses were recorded and tabulated, and statistical evaluation was carried out for the study. The result was compared based on age, sex, and academic year of the dental students from the Government Dental College and Hospital, Mumbai. The information filled by the participant was kept confidential and was used exclusively for study and publication purposes.

Inclusion criteria

All undergraduate students of Government Dental College and Hospital, Mumbai, admitted in the B. D. S. course, who voluntarily agreed to participate, were included in this study. Each academic year had 100 students.

Exclusion criteria

1. Students undergoing courses other than B. D. S such as dental mechanics, dental hygienists, and other diploma courses
2. The students who were not willing to participate.

The sample size was determined using the estimates from the parent article and using a single proportion formula as below,

Where P = Estimate of the expected proportion, d = Desired level of absolute precision

Assuming the current error prevalence/event rate to be at least 30%; keeping a 5% confidence limit, for $P = 0.05$

$$n = 1.96 \times 1.96 (0.3 \times [1 - 0.3]) / 0.05 \times 0.05 = n = 323$$

Statistical analysis

Data collected were compiled onto an MS Office excel worksheet and were subjected to statistical analysis using an appropriate package like SPSS software which is a statistical software developed by IBM, USA. SPSS version 21 was used for statistical analysis in this study. Descriptive statistics such as frequency (n) and percentage (%) of categorical data, mean and standard deviation of numerical data in each group were depicted. The association of variables (2 categorical) was done using the Chi-square test. Keeping alpha error at 5%, beta error at 20%, power at 80%, value of $P < 0.05$ was considered statistically significant.^[8]

RESULTS

Three hundred and thirty-four dental students participated in this survey. One hundred and thirty-six participants were females and 198 participants were males. The age distribution is shown in Figure 1. Gender-wise distribution is shown in Figure 2.

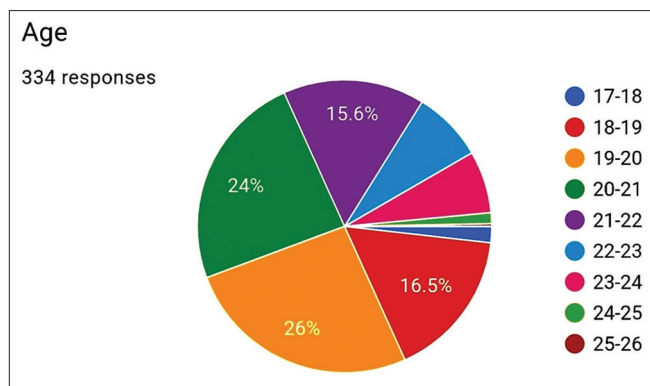


Figure 1: Pie chart showing age wise distribution of participants in this study

Responses to questions were based on either 3-point or 5-point Likert scale. We collected the data from each academic year, i.e. the 1st year, the 2nd year, the 3rd year, the final year, and the interns. We compiled the data from each academic year and when this data was subjected to statistical analysis, we could not find any statistically significant difference ($P > 0.05$) for the frequencies between the groups. However, when we amalgamated the academic years based on their clinical orientation, exposure, and knowledge and divided them into two groups, i.e. Group A – 3rd year, 4th year, interns, and Group B – 1st year, 2nd year, we could find a statistically significant difference for the frequencies between the groups. This amalgamation was also done because we wanted to assess the impact of clinical exposure and knowledge of clinical subjects, on the participants as they moved up the ladder of academic years.

Each academic year had 100 students. Three hundred and thirty-four students had responded to our survey. One hundred and fifty-eight participants constituted Group A (47.30%) and 176 (52.69%) participants constituted Group B. The response rate of the current study was 66.8%. The response rate was much lower than similar studies done in South Carolina (79.1%), Texas (79%), and Kuwait (97%).^[19-21] Although the response rate was low, a comparable number of students from different academic years participated in the study.

The questions evaluated the awareness regarding soft-tissue examination by dental students, which revealed statistically significant differences in most of the questions ($P \leq 0.05$). However, for a few questions, statistically nonsignificant differences were found ($P > 0.05$). For instance 144 (91.13%) participants from Group A, 164 (93.18%) participants from Group B said no to the question that the dentist should think only about the teeth. However, the difference was statistically nonsignificant for the frequencies between the groups ($P > 0.05$).

Responses to all the questions are shown in Tables 1 and 2.

DISCUSSION

Knowledge of dental students

This study aimed to explore dental students' perceptions and awareness toward oral tissues. Results of this study suggest that

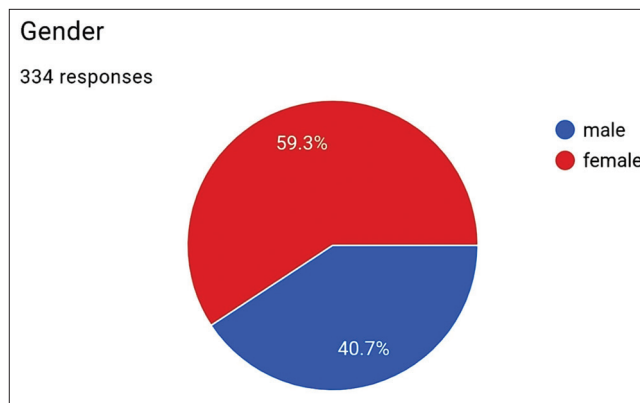


Figure 2: Pie chart showing gender wise distribution of participants in this study

most of the dental students admit that knowledge of oral soft tissues is important. They are also aware that the oral cavity is the face of some of the systemic diseases. They believe that it is absolutely essential to focus on nonchief complaint-related issues of the patient also, after addressing their chief complaint and performing the complete oral mucosal examination. Most of the dental students who participated in this study agreed that they should not restrict their knowledge to teeth only but rather should focus on all the oral soft tissues like periodontium. However, unfortunately, responses from a high majority of these students implicated that they lacked clinical knowledge about the importance of saliva. This highlights the lacuna in their knowledge regarding oral physiology and oral pathology. Limited knowledge of such basic concepts could lead to the incomplete understanding of tougher concepts like oral carcinomas. For such reasons, Ogden and Mahboobi^[9] had advised implementing work-based assessments to know such lacunae within the curriculum before the dental students graduate.

A significant proportion of dental students knew that chronic irritation from some dental treatments can induce oral malignancy. However, nearly a quarter percentages of these students were clueless regarding the concept asked in this question. This indicates that dental students lack knowledge regarding oral carcinomas also. In several other studies, it has been found that dental students feel they have insufficient knowledge about the early detection of oral cancer.^[10-13] In studies by Awan *et al.*,^[14] Brzak *et al.*,^[15] and McCready *et al.*,^[11] more than 90% of the students requested to receive more information regarding oral cancer. Thus, there is a need for a change in teaching programs which increases the understanding and learning of the early signs and symptoms of oral lesions. There is also a need for the increased involvement of the students in the examination and biopsies of malignant and premalignant lesions.^[5,16-21] In the long run, such changes in educational strategy would help to improve knowledge, skills, and judgment of dental students. These dental students might then understand and integrate a complete oral mucosal examination into routine practice.^[22] A study by Seoane *et al.*^[7] highlighted that providing continuous education

Table 1: Comparison of responses by the participants to the questions based on 3points Likert's scale

	GROUP-A(%) TOTAL=158	GROUP-B(%) TOTAL=176	TOTAL	CHI-SQUARE TEST	df	P
don't know	2(1.27%)	4(2.27%)	6(1.8%)	1.801a	2	0.406*
no	144(91.14%)	164(93.18%)	308(92.22%)			
yes	12(7.59%)	8(4.55%)	20(5.99%)			
don't know	1(0.63%)	10(5.68%)	11(3.29%)	6.960a	2	.031
No	16(10.13%)	14(7.95%)	30(8.98%)			
yes	141(89.24%)	152(86.36%)	293(87.72%)			
don't know	1(0.63%)	28(15.91%)	29(8.68%)	24.632a	2	.000
no	10(6.33%)	8(4.55%)	18(5.39%)			
yes	147(93.04%)	140(79.55%)	287(85.93%)			
don't know	36(22.78)	67(38.07%)	103(30.84%)	9.353a	2	.009
no	28(17.72%)	28(15.91%)	56(16.77%)			
yes	94(59.49%)	81(46.02%)	175(52.40%)			
don't know	5(3.16%)	42(23.86%)	47(14.07%)	30.212a	2	.000
no	9(5.7%)	5(2.84%)	14(4.19%)			
yes	144(91.14%)	129(73.3%)	273(81.74%)			
don't know	41(25.95%)	67(38.07%)	108(32.24%)	14.642a	2	.001
no	45(28.48%)	22(12.5%)	67(20.06%)			
yes	72(45.57%)	87(49.93%)	159(47.6%)			

P marked as (*) is nonsignificant; value of $P < 0.05$ implies statistically significant difference whereas value of $P > 0.05$ implies statistically nonsignificant difference

through scientific literature can provide a positive preventive attitude in oral cancer. This finding is useful and can be applied on the interns, who, for the whole year, due to hectic schedules are not able to revisit the theory.

Overall in most of the questions, it was found that the majority of the participants from Group A had more awareness and knowledge of oral tissues as compared to Group B [Tables 1 and 2]. Similar findings were also observed by Bhagvathula *et al.*^[10] A significant association was found between the academic year of study in the dental college, and perceptions and awareness of the oral tissues and associated lesions. This can be explained on the basis of increased clinical exposure with a rise in the academic year.^[23] Considering the theoretical knowledge, it was interesting to observe that the students of Group B did not significantly lag behind their academic seniors. This can be explained by the extensive education and training curriculum of GDCandH, Mumbai, where lectures on some clinical subjects start from the very 1st year.

Most participants felt that dentists were the most suitable health practitioner to perform the complete oral mucosal examination and not the dental hygienist or physicians. They also believed complete oral mucosal examination should be done for all patients, be it a new patient, follow-up patient, or a patient who is at high risk of developing oral cancer. Furthermore, a significant number of participants in this study did not believe that patients would be self-aware of oral mucosal changes. These results indicate that dental students admit that completing oral examinations is their responsibility. These findings are consistent with other studies conducted by Ogden and Mahboobi^[9], Awan *et al.*^[14], Carter and Ogden^[12], and Fotedar *et al.*^[18] However, they contradict with a study by Brzak *et al.*^[15]

where the majority of the undergraduate dental students chose to refer oral cancer patients to a plastic surgeon specialist.

Barriers to performing a complete oral mucosal examination

There can be many reasons as to why dental students avoid performing the complete oral mucosal examination. These barriers should be identified because they hinder dental students' ability to perform a complete oral mucosal examination or even demotivate them, in the long run, to do so.^[24-27] Identifying these barriers would also help to judiciously channelize the limited resources that the state has. Lack of training, confidence, time, lack of advanced diagnostic aids, and poor financial background are the few barriers reported in the literature.

The most prevalent barrier highlighted by participants was a lack of training. Similar findings were also reported by Allen *et al.*^[28] Lack of confidence was also seen as a barrier to complete oral mucosal examination. In several other studies, even dentists reported a lack of confidence in detecting oral cancer.^[24-27] This necessitates the need for a change in the teaching program with an increased focus on the oral mucosa and its associated lesions. Such changes, along with adequate training, would help dental students and make them feel confident over a period of time. Participants also reported that lack of time would be a barrier to performing the complete oral mucosal examination. However, it takes approximately 12 min to perform a thorough oral mucosal examination.^[25] Overcoming this issue would involve purposefully reserving adequate time in an appointment to perform a complete oral mucosal examination. However, with practice, there would be an integration of complete oral mucosal examination in

Table 2: Comparison of responses by the participants to the questions based on 5-point Likert scale

	GROUP-A(%) TOTAL=158	GROUP-B(%) TOTAL=176	TOTAL	CHI-SQUARE TEST	df	P
agree	89(56.63%)	93(52.84%)	182(54.49%)	65.457a	4	.000
disagree	9(5.7%)	10(5.68%)	19(5.69%)			
strongly agree	44(27.85%)	9(5.11%)	53(15.87%)			
strongly disagree	8(5.6%)	3(1.7%)	11(3.29%)			
undecided	8(5.6%)	61(34.66%)	69(26.66%)			
agree	57(36.08%)	93(52.84%)	150(44.91)	70.908a	4	.000
disagree	0(0%)	7(3.98%)	7(2.1%)			
strongly agree	89(56.33%)	32(18.18%)	121(36.23%)			
strongly disagree	8(5.06%)	5(2.84%)	13(3.89%)			
undecided	4(2.53%)	39(22.16%)	43(12.87%)			
agree	85(53.8%)	100(56.82%)	185(55.39%)	55.808a	4	.000
disagree	6(3.8%)	9(5.11%)	15(4.49%)			
strongly agree	52(32.91%)	12(6.82%)	64(19.16%)			
strongly disagree	6(3.8%)	4(2.27%)	10(2.99%)			
undecided	9(5.7%)	51(28.98%)	60(17.96%)			
agree	16(10.13%)	36(20.45%)	52(15.57%)	21.003a	4	.000
disagree	86(54.43%)	83(47.16%)	169(50.6%)			
strongly agree	13(8.23%)	22(12.5%)	35(10.48%)			
strongly disagree	31(19.62%)	12(6.82%)	43(12.87%)			
undecided	12(7.59%)	23(13.07%)	35(10.48%)			
agree	55(34.81%)	59(33.52%)	114(34.13%)	7.615a	4	0.107*
disagree	47(29.75%)	49(27.84%)	96(28.74%)			
strongly agree	11(6.96%)	3(1.7%)	14(4.19%)			
strongly disagree	5(5.11%)	9(5.11%)	14(4.19%)			
undecided	40(25.32%)	56(31.82%)	96(28.74%)			
agree	86(54.43%)	95(53.98%)	181(54.19%)	26.970a	4	.000
disagree	3(1.9%)	3(1.7%)	6(1.8%)			
strongly agree	46(29.11%)	28(15.91%)	74(22.16%)			
strongly disagree	10(6.33%)	3(1.7%)	13(3.89%)			
undecided	13(8.23%)	47(26.7%)	60(17.96%)			
agree	72(45.57%)	88(50%)	160(47.9%)	11.439a	4	.022
disagree	20(12.66%)	7(3.98%)	27(8.08%)			
strongly agree	23(14.56%)	18(10.23%)	41(12.28%)			
strongly disagree	2(1.27%)	4(2.27%)	6(1.8%)			
undecided	41(25.95%)	59(33.52%)	100(29.94%)			
agree	59(37.34%)	61(34.46%)	120(35.93%)	25.627a	4	.000
disagree	29(18.35%)	29(16.48%)	58(17.37%)			
strongly agree	22(13.92%)	2(1.14%)	24(7.19%)			
strongly disagree	3(1.9%)	5(2.84%)	8(2.4%)			
undecided	45(28.48%)	79(44.89%)	124(37.13%)			
agree	90(56.96%)	92(52.27%)	182(54.49%)	29.410a	4	.000
disagree	23(14.56%)	16(9.09%)	39(11.68%)			
strongly agree	32(20.25%)	18(10.23%)	50(14.97%)			
strongly disagree	3(1.9%)	2(1.14%)	5(1.5%)			
undecided	10(6.33%)	48(27.27%)	58(17.37%)			
agree	86(54.43%)	85(48.3%)	171(51.2%)	7.929a	4	.094
disagree	25(15.82%)	18(10.23%)	43(12.87%)			
strongly agree	28(17.72%)	36(20.45%)	64(19.16%)			
strongly disagree	2(1.27%)	8(4.55%)	10(2.99%)			
undecided	17(10.76%)	29(16.48%)	46(13.77%)			
agree	79(50%)	75(42.61%)	154(46.11%)	15.384a	4	.004
disagree	32(20.25%)	22(12.5%)	54(16.17%)			

Contd...

Table 2: Contd...

	GROUP-A(%) TOTAL=158	GROUP-B(%) TOTAL=176	TOTAL	CHI-SQUARE TEST	df	P
strongly disagree	1(0.63%)	6(3.41%)	7(2.1%)			
undecided	32(20.25%)	63(35.8%)	95(28.44%)			
agree	89(56.33%)	89(50.57%)	178(53.29%)	11.944a	4	.018
disagree	25(15.83%)	15(8.52%)	40(11.98%)			
strongly agree	24(15.19%)	28(15.91%)	52(15.57%)			
strongly disagree	5(3.41%)	6(3.41%)	11(3.29%)			
undecided	15(9.49%)	38(21.59%)	53(15.87%)			
agree	80(50.63%)	84(47.73%)	164(49.1%)	21.180a	4	.000
disagree	33(20.89%)	16(9.09%)	49(14.67%)			
strongly agree	25(15.82%)	22(12.5%)	47(14.07%)			
strongly disagree	1(0.63%)	5(2.84%)	6(1.8%)			
undecided	19(12.03%)	49(27.84%)	68(20.36%)			
agree	97(61.39%)	87(49.93%)	184(55.9%)	27.262a	4	.000
disagree	8(5.06%)	4(2.27%)	12(3.59%)			
strongly agree	25(15.82%)	17(9.66%)	42(12.57%)			
strongly disagree	9(5.7%)	5(2.84%)	14(4.19%)			
undecided	19(12.03%)	63(35.8%)	82(24.55%)			
agree	95(60.13%)	99(56.25%)	194(58.08%)	13.887a	4	.008
disagree	0(0%)	5(2.84%)	5(1.5%)			
strongly agree	44(27.85%)	39(22.16%)	83(24.85)			
strongly disagree	8(5.06%)	4(2.27%)	12(3.59%)			
undecided	11(6.96%)	29(16.48%)	40(11.98%)			
agree	45(28.48%)	60(34.09%)	105(31.44%)	3.616a	4	0.461*
disagree	39(24.68%)	37(21.02%)	76(22.75%)			
strongly agree	13(8.23%)	13(7.39%)	26(7.78%)			
strongly disagree	11(6.96%)	6(3.41%)	17(5.09%)			
undecided	50(31.65%)	60(34.09%)	110(32.93%)			
agree	84(53.16%)	74(42.05%)	158(47.31%)	15.129a	4	.004
disagree	16(10.13%)	8(4.55%)	24(7.19%)			
strongly agree	16(10.13%)	28(15.91%)	44(13.17%)			
strongly disagree	9(5.7%)	5(2.84%)	14(4.19%)			
undecided	33(20.89%)	61(34.66%)	94(28.14%)			
agree	66(41.77%)	70(39.77%)	136(40.72%)	16.612a	4	.002
disagree	8(5.06%)	9(5.11%)	17(5.09%)			
strongly agree	63(39.87%)	56(31.82%)	119(35.63%)			
strongly disagree	11(6.96%)	5(2.84%)	16(4.79%)			
undecided	10(6.33%)	36(20.45%)	46(13.77%)			
agree	82(51.9%)	84(47.73%)	166(49.7%)	11.314a	4	.023
disagree	1(0.63%)	1(0.57%)	2(0.6%)			
strongly agree	42(26.58%)	34(19.32%)	76(22.75%)			
strongly disagree	8(5.06%)	4(2.27%)	12(3.59%)			
undecided	25(15.82%)	53(30.11%)	78(23.35%)			

P marked as (*) is nonsignificant; value of $P < 0.05$ implies statistically significant difference whereas value of $P > 0.05$ implies statistically nonsignificant difference

routine practice with the decreased time needed per patient for complete oral mucosal examination. In our study majority of participants agreed that the inclusion of oral pathologies in dental insurance cover will lead to better management of oral soft-tissue lesions. This would also incentivize the dentist. This could be important to a small number of dental students who felt that financial barriers hinder oral health practitioners from performing the complete oral mucosal examination.

In this study, most of the dental students understood the importance of oral pathology specialists and the subjects that lay the foundation for understanding the human body, like general medicine and general surgery. Most of the dental students in this study agreed that they would feel comfortable in informing patients when they suspect a suspicious lesion. They also agreed that they would promptly refer such patients to an oral pathology specialist for the same. However, at the same time, a significant percentage of participants also believed that

patients would not promptly attend oral pathology specialist appointments. Clearly, there is a need to increase awareness among patients also, apart from dental students, regarding oral soft tissues and associated lesions.

Study limitations

The study has some limitations that should be taken into consideration. The study was conducted on dental students in a single institution in Mumbai and may not be generalized to other regions. In addition, the data presented here are self-reported, so some of the respondents may provide more extreme responses than others due to their motivations and beliefs. The possibility of recall bias also cannot be ignored. However, we believe that the participating dental students were honest to provide appropriate responses. However, National level multifaceted studies are further needed to assess dental students' perceptions and awareness about oral tissues at the national level.

CONCLUSION

This study highlights the awareness of oral soft tissues among dental students and the importance of its academic reinforcement. This would definitely help the budding dentist to work more on oral cancer prevention and detection, which ultimately may lead to a decrease in the incidence of oral cancers. Furthermore, studies with huge data and population should be conducted, which eventually may lead to the welfare of humankind from these deadly diseases.

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Conflicts of interest

There are no conflicts of interest.

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