# Knowledge and Awareness of Potentially Malignant Disorders and Oral Cancer among Undergraduate and Graduate Dental Students

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Abstract-
Aims and objective- To assess and compare the knowledge and awareness (KA) of potentially malignant disorders (PMDs) and oral cancer among undergraduate and graduate dental students of a private university.

Methods- This was a descriptive cross-sectional study conducted among 212 dental students. The study participants included undergraduates (UG) and the graduates dental students enrolled at Riyadh Elm University, Riyadh, Saudi Arabia. A self-administered, structured questionnaire written in both Arabic and English languages was administered to the participants using online survey. The knowledge, awareness, and practice of potentially malignant disorders and oral cancer were assessed using a 14 items questionnaire with yes/no responsesand it consisted of three sections: demographic data, knowledge and awareness based questions (1-10), and practice-based questions (11-14). Descriptive statistics and Chi-square tests were applied to the data. Statistical significance was determined at p-value <0.001.

Results- From among the 212 participants, about 127 were under graduate and 85 were graduate dental students. Majority were Males (n=110; 51.9%]) than females (n=102; 48.1%). The age groups of participants were between 18- 30 years. Majority of the graduates, 72 (84.7%), were confident of their degree of knowledge of potentially malignant disorders (PMDs) compared to only 36 (59%) of clinical undergraduates and 28 (42.4%) of preclinical undergraduate dental students.

Conclusion- The overall, knowledge, awareness and practice of graduate dental students was good and acceptable, compared to undergraduates. However, the undergraduate clinical dental students had good knowledge and awareness compared to preclinical undergraduates.

## Introduction

Oral and maxillofacial pathology is a major basic science course, which bridges medicine and dentistry. It is therefore important for both dental and medical students to learn and be fully aware of oral pathological lesions in order to improve the general health of the society. In fact, both theoretical and practical courses related to this field are becoming an indispensable part of general dentistry education according to a study conducted by Shahryar M *et al.* [1].

Swati S *et al.* stated that the foundation of dental students is built on their ability to identify pathological diseases [2]. This can be achieved by reading books, exhaustive literature, and following the prescribed curriculum. Oral pathology is the dental specialty that identifies and manages diseases affecting oral and maxillofacial regions. Additionally, it investigates the etiology, processes, and impacts of these diseases. In this discipline, students are uniquely trained to professionally address both the diagnosis and treatment of oral diseases, which will facilitate a rapid critical connection between oral and systemic diseases and combine expertise in histopathological diagnosis with clinical diagnosis and treatment outcome.

Shaila et alstated that oral squamous cell carcinoma is one ofthe leading causes of mortality in India [4]. The screening and the early detection of the premalignant and malignant lesions are the only means for controlling the disease. In this regard, increasing the public awareness and early diagnosis can significantly improve oral cancer surveillance and prevent the delaying factors as stated by Akshaya SB (2015) in their study [5]. General dental practitioners can play a great role in this direction. To achieve this, it is important to have sufficient knowledge and awareness among dentists for detection and early diagnosis. Nevertheless, it has been shown in Maud Roume et al.'s study that dentists had an issue diagnosing and managing various oral mucosal diseases and highlighted a lack of graduate and postgraduate training on this topic [3].

A review of the literature suggests that there is a lack of adequate knowledge among dentists, physicians, nurses, dental and medical students, and the public in previously conducted studies [6-9]. In a single centered study conducted back in 2014 in Saudi Arabia, Kujan et al. reported that 81% of the respondents were knowledgeable of oral cancer. A similar percentage (87%) were,ready to perform systematic oral examination to detect changes related to oral malignancy. However, the study marked that there is a need to reinforce the undergraduate study curriculum regarding the prevention and early detection of oral cancer [10].

Previously, reported data on knowledge and awareness of potentially premalignant disorders and oral cancer among dental students in Saudi Arabia were limited. Therefore, the present study aimed to assess and compare the knowledge and awareness of potentially malignant disorders and oral cancer among undergraduate and graduate dental students of a private university in Riyadh, Saudi Arabia.

## Materials and Methods

### Study design

This is a cross-sectional, institutional-based study conducted among 212 undergraduate and graduate dental students of Riyadh Elm University (REU), Saudi Arabia.

### Inclusion and exclusion criteria

The study included those dental students who were willing and available to participate and excluded are those dental students not willing to participate in the study and incomplete questionnaires.

### Ethical statement

The participants of the study were informed about the purpose and objective of the research and informed consent

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was obtained. Ethical clearance from the Institutional Review Board of REU with approval no. FRP//2019/192/59/61 was obtained.

### Data collection

A self-administered structured questionnaire written in English and Arabic local language was distributed by survey among 212 dental students, which included 127 undergraduates and 85 graduates. Among the undergraduates 66 were belonged to preclinical levels (1st year to 3rd year) and 61 were clinical level(4th to 6th year) dental students. Males 110 (51.9%) and females102 (48.1%) aged between 18 and 30 years were included. The questions were both open-ended and close-ended. Information was obtained from demographic data of participants, which includes age, gender, and education level. The questionnaire was divided into two parts namely knowledge, awareness and practice. The questionnaire [**Appendix 1**] consisted of fourteen questions of knowledge, awareness- based [1-9]and practice-based questions [10-14].

**Instrument validity and Reliability:** A pilot study was conducted to test the validity and feasibility of the study. The content authenticity of the questionnaire was checked on a sample of 25 dental patients to assess the practicability, cogency, and rendition of the answers. The face validity of the questionnaire was established by taking opinions from oral pathologists and dental public health experts. Cronbach's coefficient was found to be 0.80, indicating adequate internal consistency of the study instrument.

### Data analysis

The collected data were analyzed using SPSS Statistics, Version 23, IBM Inc (Chicago, USA). Descriptive frequencies and Chi-square test was used for intergroup comparisons. The confidence interval was set at 95%, and statistical significance was set at p-value <0.001.

### Results:

A total of 237 participants initially agreed to take part in the study. However, 25 did not complete the questionnaire due to time constraints and were dropped from the final data analysis. The response rate was 89.4%.

### Distribution of Study Participants

A total of 212 participants were finalized in the students and completed the questionnaire. From among the 212 participants, about 127 were undergraduates and 85 graduate dental students. Among 127 undergraduates, 66 were preclinical level (1st year -3rd year) and about 61 were clinical level (4th year-6th year) dental students.Majority were Males (n=110; 51.9%]) than females (n=102; 48.1%). The age groups of participants were between 18- 30 years. The majority of the dental students were undergraduates 127(59.9%), compared to 85 (40.1%) graduates.The demographic details of the participants are shown in **Table 1.**

Table 1: Demographic distribution of study participants

| Age Group | Frequency | Percent |
|---|---|---|
| 18-21 Years | 36 | 17.0 |
| 21-25 Years | 104 | 49.1 |
| 25-30 Years | 48 | 22.6 |
| 30 Years and above | 24 | 11.3 |
| Total | 212 | 100.0 |
| **Gender** | **Frequency** | **Percent** |
| Male | 110 | 51.9 |
| Female | 102 | 48.1 |
| Total | 212 | 100.0 |
| **Education level** | **Frequency** | **Percent** |

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| | | |
|---|---|---|
| UG - Preclinical | 66 | 31.1 |
| UG - Clinical | 61 | 28.8 |
| Graduate | 85 | 40.1 |
| Total | 212 | 100.0 |

The educational level of the participants was highly variable, there were 66(31.1%) undergraduateUG (preclinical), 61 (28.8%) ,undergraduate UG (clinical), and 85 (40.1%) graduates as shown in **Table 2.**

Table 2: Distribution of study participants according to level of education

| Education level | Frequency (n) | Percentage (%) |
|---|---|---|
| UG - Preclinical | 66 | 31.1 |
| UG - Clinical | 61 | 28.8 |
| Graduate | 85 | 40.1 |
| Total | 212 | 100.0 |

**Knowledge of potentially malignant disorders (PMDs) and oral cancer among undergraduate and graduate dental students:**

The level of the participants' knowledge of oral cancer and potentially malignant disorders (PMDs) was compared among different educational levels of students .

A significant difference was found in all study questions based on the participants' educational level. The three examples of potentially malignant disorders (i.e., leukoplakia, erythroplakia, and oral submucous fibrosis) were to known to more than three quarters of graduates 67 (78.8%); however, the clinical undergraduates and preclinical undergraduates were less knowledgeable of these disorders, 34 (55.7%) and 22 (33.3%) respectively (P < 0.001).  The majority of graduates, 67 (78.8%), were conscious that the three aforementioned types of PMDs can turn into oral cancer. compared to 34 (55.7%) clinical undergraduates and 22 (33.3%) preclinical undergraduates (*P*< 0.001). In addition, a significantly greater proportion of graduates77 (90.6%)reported that leukoplakia is a non-scrapable grayish white lesion compared to 40 (65.6%) clinical undergraduates and 27 (40.9%) preclinical undergraduates (*P* < 0.001). The knowledge of preclinical undergraduates was less compared to other study groups. Similarly, a greater percentage of graduates, 83 (97.6%), knew that pain, bleeding, ulceration, and rapid growth are signs and symptoms of oral cancer compared to clinical, 50 (82%), and preclinical, 31 (47%), undergraduates (*P*< 0.001).

Furthermore, around two-thirds of graduates, 55 (64.7%), were confident of the fact that the lateral border of the tongue is the most common location for oral cancer, compared to clinical UG, 30 (49.2%), and 26 (39.4%) preclinical UG(*P* = 0.018).

Majority of the graduates, 72 (84.7%), were confident of their degree of knowledge of potentially malignant disorders (PMDs) compared to only 36 (59%) of clinical undergraduates and 28 (42.4%) of preclinical undergraduates (P < 0.001). The Overall knowledge of preclinical undergraduates was less compared to other study groups.

**Awareness of potentially malignant disorders (PMDs) and oral cancer among undergraduate and graduate dental students:**

The level of the participants' awareness of potentially malignant disorders (PMDs) and oral cancer was compared among different educational levels of students. Majority of the graduate participants, 78 (91.8%), and preclinical undergraduates, 60 (90.9%), were aware that some of premalignant disorders may develop into cancer; however, a slightly lower percentage, yet significant, of clinical undergraduates believed it (*P* = 0.008).More than three quarters of the graduates, 71 (83.5%), were aware that the delay in the diagnosis of oral cancer may lead to metastasis compared to only 19 (31.1%) clinical UG and 12 (18.2%) preclinical UG (*P* < 0.001). Almost all of the graduates,

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79 (92.9%), reported that lymph nodes examination is essential for cancer staging, while a slightly lower percentage of preclinical, 53 (80.3%), and clinical 77 (79%), UG agreed on this ($P< 0.001$) as shown in **Table 3.**

Table 3: Comparison of knowledge and Awareness of Potentially malignant disorders (PMDs) and oral cancer among undergraduate and graduate dental students

| Question | Response | UG - Preclinical | | UG – Clinical | | Graduates | | Chi sq | P value |
|---|---|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % | | |
| Do You know which of these potentially malignant disorders are? | I don't know | 23 | 34.8 | 6 | 9.8 | 14 | 16.5 | 54.119 | <0.001** |
| | Leukoplakia | 8 | 12.1 | 14 | 23.0 | 3 | 3.5 | | |
| | Erythroplakia | 8 | 12.1 | 7 | 11.5 | 1 | 1.2 | | |
| | OSMF | 5 | 7.6 | 0 | 0.0 | 0 | 0.0 | | |
| | All the above | 22 | 33.3 | 34 | 55.7 | 67 | 78.8 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Are you aware that some of the Premalignant disorders may turn into cancer? | Yes | 60 | 90.9 | 46 | 75.4 | 78 | 91.8 | 9.704 | 0.008* |
| | No | 6 | 9.1 | 15 | 24.6 | 7 | 8.2 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Do you know which of the premalignant disorders have potential to turn into oral cancer? | Don't know | 23 | 34.8 | 6 | 9.8 | 14 | 16.5 | 54.199 | <0.001** |
| | Leukoplakia | 8 | 12.1 | 14 | 23.0 | 3 | 3.5 | | |
| | Erythroplakia | 8 | 12.1 | 7 | 11.5 | 1 | 1.2 | | |
| | All the above | 22 | 33.3 | 34 | 55.7 | 67 | 78.8 | | |
| | Speckled Leukoplakia | 5 | 7.6 | 0 | 0.0 | 0 | 0.0 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Which one of these is non- scrapable greyish white lesion? | Leukoplakia | 27 | 40.9 | 40 | 65.6 | 77 | 90.6 | 52.889 | <0.001** |
| | Erythroplakia | 0 | 0.0 | 0 | 0.0 | 1 | 1.2 | | |
| | Candidiasis | 23 | 34.8 | 18 | 29.5 | 6 | 7.1 | | |
| | None of the above | 16 | 24.2 | 3 | 4.9 | 1 | 1.2 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Are you aware that pain, bleeding, ulceration and rapid growth are the signs and symptoms for oral cancer | Yes | 31 | 47.0 | 50 | 82.0 | 83 | 97.6 | 55.514 | <0.001** |
| | No | 35 | 53.0 | 11 | 18.0 | 2 | 2.4 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Are you aware that delay in diagnosis of oral cancer may lead to metastasis? | Yes | 12 | 18.2 | 19 | 31.1 | 71 | 83.5 | 26.214 | <0.001** |
| | No | 54 | 81.8 | 42 | 68.9 | 14 | 16.5 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Are you aware that lymph node | Yes | 53 | 80.3 | 47 | 77.0 | 79 | 92.9 | 73.426 | <0.001** |
| | No | 13 | 19.7 | 14 | 23.0 | 6 | 7.1 | | |

| examination is important to determine if the lesion is benign or malignant | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
|---|---|---|---|---|---|---|---|---|---|
| Do you know the most common location for oral cancer among these? | Lateral border of the tongue | 26 | 39.4 | 30 | 49.2 | 55 | 64.7 | 8.069 | 0.018* |
| | Buccal mucosa | 23 | 34.8 | 14 | 23.0 | 16 | 18.8 | | |
| | Palate | 17 | 25.8 | 7 | 11.5 | 6 | 7.1 | | |
| | Gingiva | 0 | 0.0 | 10 | 16.4 | 8 | 9.4 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Do you think you have sufficient Knowledge of Oral cancer and potentially malignant disorders? | Yes | 28 | 42.4 | 36 | 59.0 | 72 | 84.7 | 27.026 | <0.001** |
| | No | 38 | 57.6 | 25 | 41.0 | 13 | 15.3 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |

**-highly significant (p<0.001), *-Significant (p<0.05)

### Practice related to PMDs and oral cancer

The majority of graduates 89.4% examined patients for oral screening for early detection and diagnosis of oral cancer cases. However, 68.9% of clinical UG and 43.9% of preclinical UG, did oral screening. The majority of graduates, 59 (69.4%), always advised suspected cases of oral cancer to do biopsy, while the majority of clinical UG, 26 (42.6%) sometimes did that and most of the preclinical UG, 46 (69.7%), rarely advised them (P < 0.001). A greater proportion of graduates, 72 (84.7%), and preclinical UG, 54 (81.8%), referred patients with suspected oral cancer to a specialist for further investigation compared to 37 (60.7%) clinical UG (P = 0.002). Despite their relatively good knowledge and practice, participating graduates, 77 (90.6%), and preclinical UG, 59 (89.4%), believed that they need further education on PMDs and oral cancer through continuing dental education (CDE) programs, seminars, lectures compared to other study group comprising of clinical UG with only, 41 (67.2%) of the participants agreed for it (P <0.001) as shown in **Table 4.**

Table 4: Practice related to PMDs and oral cancer among undergraduate and graduate dental students

| Question | Response | UG - Preclinical | | UG – Clinical | | Graduates | | Chi sq | P value |
|---|---|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % | | |
| Do you examine patients for oral screening for early diagnosis of oral cancer | Yes | 29 | 43.9 | 42 | 68.9 | 76 | 89.4 | 36.114 | <0.001** |
| | No | 37 | 56.1 | 19 | 31.1 | 9 | 10.6 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Do you advice biopsy for suspected cases of oral cancer? | Some times | 19 | 28.8 | 26 | 42.6 | 17 | 20.0 | 93.164 | <0.001** |
| | Rarely | 46 | 69.7 | 17 | 27.9 | 9 | 10.6 | | |
| | Always | 1 | 1.5 | 18 | 29.5 | 59 | 69.4 | | |
| | Never | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Do you educate and instruct | Some times | 15 | 22.7 | 17 | 27.9 | 19 | 22.4 | 14.401 | 0.025* |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| the patients having smoking and alcohol consumption habits | Rarely | 1 | 1.5 | 2 | 3.3 | 2 | 2.4 | | |
| | Always | 41 | 62.1 | 25 | 41.0 | 57 | 67.1 | | |
| | Never | 9 | 13.6 | 17 | 27.9 | 7 | 8.2 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Do You refere the patients with oral cancer to specialist for further investigation and treatment | Yes | 54 | 81.8 | 37 | 60.7 | 72 | 84.7 | 12.870 | 0.002* |
| | No | 12 | 18.2 | 24 | 39.3 | 13 | 15.3 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |
| Do you need further education on oral cancer and premalignant disorders through CDE programs | Yes | 59 | 89.4 | 41 | 67.2 | 77 | 90.6 | 16.501 | <0.001** |
| | No | 7 | 10.6 | 20 | 32.8 | 8 | 9.4 | | |
| | Total | 66 | 100.0 | 61 | 100.0 | 85 | 100.0 | | |

**-highly significant (p<0.001), *-Significant (p<0.05)

## Discussion

Oral health is an integral component of general health, which can be interrupted by several oral mucosal lesions. Those lesions are numerous in types and have multiple origins, which may go underdiagnosed where there is a 30% chance that the patient presents with an advanced stage of oral malignancy due to a delay in diagnosis [11]. Yet, the regular and attentive screening of the oral mucosa in clinics or hospitals can help elicit a precise and rapid detection of any abnormal oral pathologies (OP) at a relatively early stage of the disease. Lesions such as squamous cell carcinoma require early identification, as this will provide early treatment and a better prognosis. In fact, the ability to identify suspicious lesions was found to be significantly associated with the dentists' knowledge of oral cancer and PMDs in Hassona et al.'s study. (r = 0.28; P < 0.001) [12]. However, the delay in providing correct diagnosis for these patients can negatively affect the prognosis and increase the morbidity and mortality rates [13]. In light of this, the role of a dental professional is to identify, diagnose and supervise the treatment of oral pathologies (OP), and/or to refer patients to the appropriate specialists. Graduate students observed in this study were mostly knowledgeable of oral cancer and PMDs compared to preclinical and clinical undergraduates.

Oral cancers are amongst the leading cancerous lesions, accounting for approximately 30% of the cancer burden. In the present study, most of the graduate participants, 78 (91.8%), and preclinical undergraduates, 60 (90.9%), were aware that some of premalignant disorders may develop into cancer; however, a slightly lower percentage, yet significant, of clinical undergraduates believed that this may occur (P = 0.008). Nevertheless, only the majority of graduates, 67 (78.8%), were conscious that the three aforementioned types of PMDs can turn into oral cancer, opposite to only 34 (55.7%) clinical undergraduates and 22 (33.3%) preclinical undergraduates (P< 0.001). The four cardinal signs of oral malignancy which necessitate further investigations include the following: erythroplakia, leukoplakia, erythroleukoplakia and ulceration. In this study, 123 (58%) of the enrolled participants knew all these signs. While graduates were mostly aware of these signs, undergraduates were less aware. Although ulceration is the most common presentation, a white or red patch is also possible. The greyish white non-scrapable lesion, leukoplakia, was mostly known to graduates (90.6%) compared to undergraduates. In Jayasinghe et al.'s study, however, there was a lack of knowledge among the majority of dental students (57.8%) of what a leukoplakia is. In the latter study, a lower percentage of dental students (28.9%) were ignorant that erythroplakia is a potentially malignant disorder (PMD). Although erythroplakia is less preventable than leukoplakia, the former lesion is more potentially malignant [14]. It is noteworthy that benign hairy leukoplakia is not a PMD. This requires that dentists be able to differentiate clinically similar lesions during oral examination. In Soares et al.'s study, students were not able to sufficiently recognize the clinical features of oral lesions [15].

Premalignant lesions, which are easily distinguishable, often precede oral cancerthis fact was known to majority 184 (86.8%), of the participants in this study. The evaluation of those premalignant lesions is mainly done through

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biopsies that thoroughly study the cells' histology [16]. Of all the participants, 78 (26.8%) always advised suspected cases of oral cancer to do biopsy, the majority of which, 59 (75.6%), were graduates. In Kuwait, however, only 32.9% of the observed dental students stated that biopsy should be performed for all suspicious lesions [17]. However, almost all of them, 163 (91.3%) referred them to a specialist. A percentage similar to that recorded by Dumitrescu et al. where 92.9 % of the participants believed that cases presenting with suspicious oral lesions should be directly referred to specialists. A thorough examination of the lymph nodes is also necessary for detecting cancer metastasis, where non-tender and fixed nodes tend to be very suspicious for malignancy [18]. In the present study, most of the participants knew that examination of the lymph nodes is essential for cancer staging.

Therefore, an adequate knowledge of the oral lesions' differential diagnosis is a must. Almost all of the graduates (89.4%) observed patients' oral cavity for an early detection of oral cancer compared to a significantly lower percentage of preclinical and clinical undergraduates. A relatively lower percentage (79.3%) of dentists in Bologna regularly examined the patients' oral mucosa for the purpose of screening [19]. Similarly, 71.3 % of the participants in Dumitrescu et al. study agreed that oral cancer examinations should be regularly performed for patients older than 20 years [20].

The majority of the observed sample observed in this study believed that they need further education on oral cancer and PMDs. This echoes the results of Frola et al.'s study where 96.7 % of the participants were in need of more information about this subject [19]. In a study performed in South Carolina, 65% of dental students were aware that the lateral border of the tongue is the most common site for oral cancer [21]. A higher percentage of 111 (85.12%) of students enrolled in this study were knowledgeable of this fact, where most of those who guessed the question right were graduates. Romanian undergraduates had a relatively better knowledge of the sites affected by oral cancer, where 87.7% of them knew that the tongue is the most commonly affected site [20].Around two-thirds, 136 (64%), of study participants thought that they had sufficient knowledge about oral cancer and PMDs which is way higher than the percentage reported by Horowitz et al. in their survey, where only one-quarter of general dental practitioners believed that they were sufficiently trained in providing oral cancer examinations. More graduates were satisfied with their degree of knowledge; similar to what was noted in Radman et al.'s study where a significantly larger number of fifth year students believed that they were adequately informed about oral cancer [21].

A significant association was found between the educational level in dental school and the knowledge and awareness of oral cancer and PMDs. It was observed, in a study similar to that presented in Romania, where the students' knowledge of this topic significantly improved with the year of study,as they approach higher study levels [20]. However, no clear association was found in Arab countries such as United Arab emirates (UAE) between the academic year in dental college and the knowledge of oral cancer [23]. The reason why students of more advanced years of study have a greater knowledge of oral cancer and PMD is that clinical undergraduates and graduates have increased opportunities to confront patients with cancer or suspicious oral lesions compared to undergraduates. Additionally, students enrolled in higher academic years have attended a greater variety of lectures and seminars.

**Strengths and Limitations**

Many studies were carried out on oral lesions in other parts of the world, but minimal studies were reported in Saudi Arabia among dental students. Therefore, this study was the first of its kind in Saudi Arabia, which targeted the undergraduates and graduate dental students to assess their knowledge, awareness, and practice of potentially malignant disorders and oral cancer. This study is an institution-based study targeted at a single private university and is not representative of the whole dental professionals in Saudi Arabia. Therefore, further studies should be carried out in multiple universities and locations involving many dental students and practitioners of Saudi Arabia.

## Conclusion

The overall, knowledge and awareness and practice of graduate dental students were found good and acceptable compared to undergraduates. The undergraduate clinical dental students had good knowledge and awareness than preclinical undergraduates.

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**Appendix 1:**
**Survey Questionairre**
**Section I : Demographic details**
**Age**
18-21Years
21-25 Years
25-30Years
30 Years

**Gender**
1.Male
2.Female

**Education Level of Dnetal students:**
1.UG preclinical (1-3rd year )
2.UG clinical (4th - 6th year)
3.Graduates /Interns

**Section II: Knowledge and Awareness based questions (1-9)**
**1. Do you know which of these are potentially malignant disorders?**
1. Leukoplakia
2. Erythroplakia
3. Oral submucous fibrosis
4. All of the above
5. I don't know

**2. Do you know that the potentially malignant disorders can turn into cancer?**
1. Yes
2. No
3. I Don't know

**3. Do you know which premalignant disorder has more potential to turn into oral cancer**
1. leukoplakia

2. Erythroplakia

3. Speckled lesion /Red & white

4. All the above.

5. None of the above

**4.Which one of these is the name of a white lesion which is non scrapable**

1 Leukoplakia

2. Erythroplakia

3. Candidiasis

4 none of the above

**5. Are you aware that examination of lymph nodes is necessary to determine if the lesion is benign or malignant:**

1. Yes

2. No

3. Dont know

**6. Do you know that pain, bleeding ulceration and rapid growth are sign and symptoms for oral cancer ?**

1.Yes

2.No

3.I don't know

**7 Are you aware that delay diagnosis of oral cancer can cause metastasis?**

1.Yes

2. No

3.I don't know

**8. Do you know which is the most common location for oral cancer**

1.Later border of tongue

2.Buccal mucosa

3.Palate

4.Gingiva

5. I dont know

**9. Do you have enough knowledge about oral cancer and potentially malignant disorders?**

**1.Yes**

**2.No**

**3. I don't know**

Section III. Practice based questions (10-14)

**10. Do you examine patients for oral screening for early diagnosis of oral cancer?**

1.Yes.

2.No

3. Don't know

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**11. Do you advice biopsy in suspected cases of oral cancer**

1.Always

2. Sometimes

3. Rarely

4. Never

**12. Do you educate and instruct the patients who have habit of tobacco and alcohol consumption**

1.Always

2.Sometimes, if necessary

3.Never

**13. Do you refer the patients with Oral Cancer to a specialist for further investigation and treatment planning ?**

1. Yes

 2. No

3. Sometimes

4. Never

**14. Do you need further education on oral cancer and potentially malignant disorders through CDE programs**

1. Yes

2.No

3. I don't know