



# Evaluation of dental professional's knowledge, attitude, and practice on early diagnosis of oral premalignant lesions and oral cancer: A cross sectional study

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## Abstract

Oral cancer, encompassing malignancies of the oral cavity and associated structures, has been increasingly recognised as a significant public health issue worldwide. Detecting oral cancer in its earliest stages significantly enhances the chances of successful treatment and improved patient outcomes. The current study aims at evaluating knowledge, attitude and practice on early detection of oral premalignancies and oral cancer among dental professionals. A cross-sectional study was conducted among 198 dental professionals in Hyderabad, Telangana using 24-item questionnaire that comprised four components: demographic details, knowledge component, attitude component, and practice. Data collection was conducted in dental clinics. Descriptive statistics and frequency distribution were done to determine the mean values. Chi-square analysis was done to declare the association factor between different variables with knowledge, attitude and practice. The significant value was set at  $p < 0.05$ . The study analysed 198 dentists, with 65% having a commendable level of knowledge and 79% having a commendable attitude. Overall practice of dentists was found to be nearing 55% in following screening and diagnosis of oral cancers on regular basis. Age significantly impacted practice scores, with individuals above 35 exhibiting higher scores. Less than half (42.4%) of dental practitioners know how to use screening devices for diagnosing cancerous lesions. When it comes to practising oral cancer diagnostic activities, the response was found to be very less. (29.8%). The study highlights the dental professionals' knowledge, attitude and practices on early detection of oral premalignant lesions and oral cancer, emphasising the need for tailored interventions and educational programs with more focus on younger age group. There is room for improvement in terms of adopting good practices among the participants which further helps improve patient's survival rate. Incorporating oral cancer education into dental curricula can foster more favourable attitudes and a sense of responsibility.

**Keywords:** Oral Premalignant Lesions, Oral Cancer, Dental Professionals, Knowledge, Attitudes.

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## 1. Introduction

The battle against cancer remains a steadfast and complex challenge in modern healthcare. Among the myriad forms of this insidious disease, oral cancer is a significant concern, with its prevalence steadily rising and its

implications for individual lives and public health systems becoming increasingly evident. Oral cancer encompasses malignancies that affect various components of the oral cavity, including the lips, tongue, floor of the mouth, palate, gums, and even the salivary glands. The gravity of this

condition lies in its potential lethality and impact on essential functions like speech, swallowing, and mastication, all of which contribute to a person's quality of life [1]. Oral cancer, encompassing malignancies of the oral cavity and associated structures, has been increasingly recognised as a significant public health issue worldwide. Its prevalence has surged over recent decades, with a notable rise in developing and developed countries. The World Health Organization (WHO) estimates that oral cancer accounts for approximately 3% of all cancers globally, amounting to more than 354,000 new cases reported annually. The morbidity and mortality associated with oral cancer are particularly alarming, with more than 177,000 deaths attributed to this disease each year. Moreover, oral cancer places a considerable burden on healthcare systems, with its intricate treatment procedures and the potential need for extended rehabilitation and palliative care [2]. While oral cancer can affect anyone, certain risk factors have been consistently linked to its development. The most prominent risk factor is tobacco use in all its forms—smoking, chewing, or snuffing. The harmful chemicals in tobacco products can cause genetic mutations and trigger abnormal cell growth, laying the foundation for cancerous tumours. Another substantial risk factor is excessive alcohol consumption, which not only directly damages oral tissues but also amplifies the carcinogenic effects of tobacco. The subtlety of early-stage oral cancer symptoms often presents a considerable diagnostic challenge. The initial signs can be easily overlooked or mistaken for benign conditions, delaying diagnosis until the disease progresses. Common early indicators include persistent mouth sores, red or white patches on oral tissues, unexplained bleeding, numbness or pain in the mouth, difficulty chewing or swallowing, and even changes in voice quality. While potentially alarming, these manifestations can also be attributed to a range of non-cancerous issues, leading to underestimating the urgency of seeking medical attention [3]. In many cases, oral cancer is not identified until it has progressed to more advanced stages, where the tumours invade deeper tissues and potentially metastasise to other parts of the body. This underscores the critical need for heightened awareness among healthcare providers and the general population, encouraging timely screening and professional evaluation of suspicious symptoms [4]. While cancer research and treatments have progressed remarkably over the past decades, early detection remains an essential cornerstone in the fight against the disease. Early diagnosis increases the range of available treatment options and enhances the prospects of less aggressive interventions and potentially lowers healthcare costs. This emphasis on early detection aligns with the broader trend in healthcare towards preventive and personalised medicine, aiming to catch diseases at their nascent stages when they are most responsive to intervention. Through a comprehensive exploration of the disease's prevalence, risk factors, and clinical manifestations and by understanding the underlying factors that contribute to its development and recognising the various techniques and technologies employed in its early detection, healthcare professionals, policymakers, and the general public can collaborate to create a more effective strategy for tackling this global health concern [5, 6]. The present study was done to evaluate dental professionals' knowledge, attitude and practice on early detection of oral premalignant lesions and oral cancer.

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## 2. Materials and Method

A cross-sectional study was conducted on the knowledge, attitude and practice among dental professionals on early detection of oral premalignant lesions and oral cancer in Hyderabad in Telangana.

### 2.1. Questionnaire formulation

The investigator formulated the questionnaire to evaluate dental professionals' knowledge, attitude and practice on early detection of oral premalignant lesions and oral cancer. The questionnaire comprised four components: demographic details, knowledge component, attitude and practices [7,8]. The questionnaire was designed based on previous literature. The original version of the questionnaire was made in English and consisted of close-ended questions. The responses of the questionnaire were rated on a 2-point dichotomous scale ranging from yes and no. Participants were asked to answer the questionnaire anonymously.

### 2.2. Details of the pilot study

A pilot study was conducted among 30 participants. The pilot study was done to check the feasibility of the study and to note any difficulties encountered during the study. A 27-item self-administrated questionnaire was designed based on the literature review and objectives of the study. The face validity was established by giving the questionnaire to five dental practitioners and having them evaluate if the questions were understood and interpreted correctly. The content validity was checked by giving the questionnaire to five experts who were professors of their respective departments and dentists who are active in clinical practice for a few years related to the topic of this study and having them evaluate if the questions effectively related and answered the objectives of the study under investigation. The participants filled out a questionnaire and the suggestions given by them were noted down. Any ambiguity and inadequacies detected were rectified. A final 22-item questionnaire was developed, and internal consistency was assessed as Cronbach's alpha = 0.75.

#### 2.2.1. Questionnaire

Age:

Gender :

1. Oral premalignant and malignant lesions occur only if the patient has deleterious habits
2. Oral cancer and precancer can be diagnosed at early stages through thorough examination of oral mucosa
3. Do you have thorough idea on how oral premalignant and oral cancer appear?
4. Oral cancer can be detected by chair side diagnostic devices
5. Have you ever heard about autofluorescence based devices to diagnose oral cancer?
6. Do you have an idea on how to use the devices that are helpful in diagnosing oral precancer and cancer
7. Oral Premalignant and malignant lesions are always symptomatic
8. Routine screening of the patients can help in early diagnosis of oral cancer
9. Do you feel there is a need to perform oral cancer screening all the patients?
10. Do you feel there is a need to educate people about routine self oral examination for any suspicious lesions?
11. There is a need for mass education programmes on oral cancer prevention and diagnosis

12. Appropriate training of all the primary health care practitioners for screening of oral cancer is necessary
13. Early detection of high risk lesions through routine screening improves survival rate of the patient
14. Do you feel that all the primary health care practitioners and dental professionals must incorporate oral cancer diagnostic devices in their practice?
15. Do you agree that all the red and white lesions require biopsy to diagnose oral cancer?
16. Do you examine the oral mucosa of the patients for as a part of routine dental checkup?
17. Do you record the habitual history of all the patients before examination?
18. Have you incorporated any oral cancer diagnostic activities in your practice?
19. Have you ever used autofluorescence based devices for oral cavity examination?
20. Do you educate the patients on routine oral cavity examination in your practice?
21. Do you educate your patients on oral cancer prevention, risk factors and early detection of suspicious lesions?
22. Have you ever been a part/ conducted any screening and education programmes on oral cancer diagnosis and prevention?

The sample size was estimated based on the pilot study, the sample size was determined using the formula,  $N = z^2pq / d^2$ , it was 198. An area sampling method was followed to recruit the desired representative sample from Hyderabad. Hyderabad is divided into five zones: South Zone, East Zone, West Zone, North Zone and Central Zone. Approximately 35 to 40 dentists were selected from each zone until the desired sample size was acquired. Participants who were willing to answer the questionnaire were included in the study. Participants who were not willing to answer and those who answered incompletely were excluded.

### 2.3. Organisation of the survey

The ethical clearance was obtained from the Institutional Review Board of Saveetha Dental College, Chennai, Tamil Nadu. (IHEC/SDC/OMED-1608/22/331). The study was systematically scheduled to spread over a period of two months, from November 2022 to December 2022.

### 2.4. Data collection

The dentists were addressed in their respective clinics. The receptionist provided the practitioner with study information, an acknowledgement from the institution, and the researcher's identification, which the outpatient monitoring staff conveyed to the practitioner's office. When participants were contacted, the study was explained in person, and the questionnaire was administered after verbal consent was obtained. The participants were given sufficient time to complete the questionnaire collected the same day after completion.

### 2.5. Statistical analysis

The data collected was compiled and checked for completeness. The findings obtained were coded and entered into Microsoft Excel 2016. The analysis was done using Statistical Package for Social Sciences (SPSS 24.0 version). Descriptive statistics and frequency distribution were done to determine the mean values. Chi-square analysis was done to

declare the association factor between different variables with knowledge, attitude and practice. The significant value was set at  $p < 0.05$ . Tables and graphs were generated using Microsoft Word.

## 3. Results

Of the 198 participants in the study, only 30.3% were male dentists, while 69.7% were female dentists. The mean age of the participants was found to be  $31.3 \pm 3.12$  years. Table 1 presents the frequency distribution of the Knowledge score categorised as "good" and its corresponding association with age and gender. Furthermore, Figure 1 illustrates the proportional distribution of the knowledge score. The study results indicate that a majority of the participants, precisely 65%, exhibited a commendable level of knowledge, whereas a minority of 35% demonstrated a poor level of knowledge. Based on the available data, it is evident that the mean knowledge score is  $5.66 \pm 1.87$ . This finding indicates that, on average, the participants possessed a moderately elevated level of knowledge. The presence of a standard deviation value of 1.87 suggests the existence of discernible variability in the knowledge scores observed within the participant group. The table and graph presented herein offer additional elucidation regarding the dispersion of knowledge scores across distinct age cohorts and genders, demonstrating a consistent trend of elevated knowledge scores as age advances. The aforementioned findings underscore the significance of age and gender as influential factors in shaping levels of knowledge. Table 2 presents a comprehensive overview of the frequency distribution of favourable attitude scores and its correlation with age and gender. Figure 2 illustrates the proportional distribution of the attitude score. The study results indicate that most participants, precisely 79%, exhibited a commendable level of attitude, whereas a minority of 21% demonstrated poor attitude. The data presented herein demonstrates a positive correlation between age and the proportion of individuals exhibiting a favourable attitude. The statistical analysis conducted in this study includes using the chi-square test to examine the relationship between age and attitude. The results of this test revealed a p-value of 0.001, thereby indicating a noteworthy and meaningful association between age and attitude. The chi-squared p-value of 0.21 suggests that there is insufficient evidence to establish a significant relationship between gender and attitude. In aggregate, the collective average for attitude is  $4.32 \pm 1.03$ . This finding implies that, on average, the participants in the study exhibit a marginally favourable disposition. Notably, although age seemingly exerts influence on the formation of attitudes, gender does not exhibit a similar effect. In Table 3, the frequency of good practice is analysed in relation to age and gender. The results indicate that older individuals exhibit a higher frequency of good practice than younger individuals. Additionally, the data suggests no significant difference in the frequency of good practice between genders. These findings highlight the importance of age as a factor influencing the adoption of good practices. Figure 3 shows the distribution of percentage distribution of practice scores. 55% of the participants had a good practice score, while 45% of the participants had a poor practice score. This suggests that there is room for improvement in terms of adopting good practices among the participants. The data also reveals that age may significantly impact practice scores, as the chi-square test

results indicate. Additionally, gender does not appear to influence practice scores significantly, as indicated by the high p-value. The data from Table 4 reveals interesting insights into the knowledge, attitudes, and practices of different genders and age groups. It provides a comprehensive understanding of how these factors vary among individuals of various demographics. Specifically, the table provides information on gender and age groups. The findings indicate that there are significant differences in knowledge, attitude, and practice scores between males and females. Additionally, age appears to impact these variables significantly, with individuals above the age of 35 exhibiting higher scores than those below 35. These results suggest that gender and age are important factors to consider when designing interventions and educational programmes to improve knowledge, attitudes, and practices related to the subject under study.

#### 4. Discussion

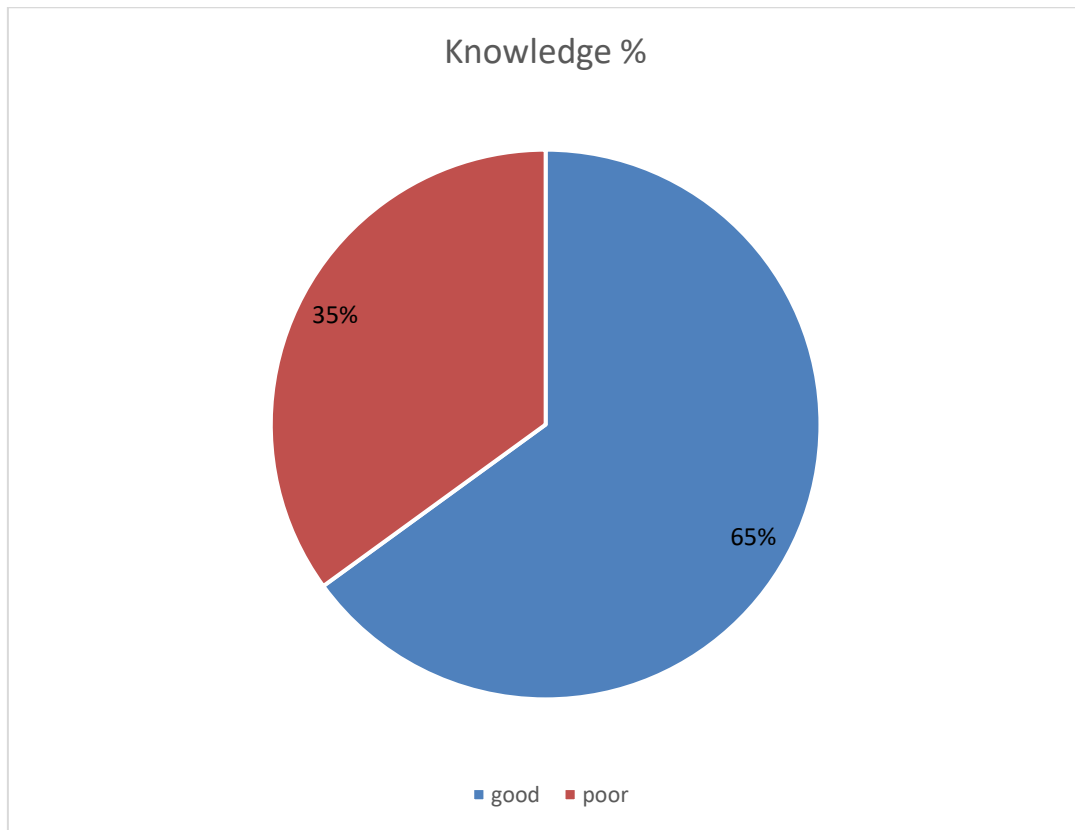
Oral cancer constitutes a significant global public health concern, with high morbidity and mortality rates. Early detection and timely intervention are crucial in improving patient outcomes. Dental professionals, including dentists and dental students, play a pivotal role in oral cancer prevention, detection, and patient education. The present study explored the current state of knowledge, attitudes, and practices of dental doctors and dental students concerning oral cancer, highlighting the implications for oral cancer management and prevention [6]. Of the 198 participants in the study, only 30.3% were male dentists, while 69.7% were female dentists. This gender disparity in the dental profession indicates a wider trend in healthcare, where women are increasingly outnumbering men. The reasons behind this shift include greater gender equality in education and career opportunities and changing societal attitudes towards traditionally male-dominated fields. As a result, the dental industry is becoming more diverse and inclusive, with the potential for new perspectives and approaches to patient care. The mean age of the participants was found to be  $31.3 \pm 3.12$  years, indicating that the majority of the participants fell within the age range of 28.18 to 34.42 years. This finding suggests that the study sample consisted mainly of young adults in their early thirties. The narrow standard deviation of 3.12 years also indicates a relatively homogeneous age distribution among the participants, which may have minimized the potential confounding effects of age on the study results. Almost all (99%) dental professionals who participated in the current study agreed that routine screening for all the patients at the initial stages would help diagnose cancer and precancer lesions, which further helps in treating them successfully with proper prognosis and improved survival rate. These results were homogeneous with studies by Jaber M. A [7] and Kiran G. et al. [6]. The majority of the dental professionals (70.7%) responded that the occurrence of oral cancers is mainly due to various deleterious habits, which is in accordance with a study done by Nazar H [8] and Khatri JM et al. [9], where they found out that 95.8% and 80.8% dentists respectively enquired about the habits like smoking, usage of tobacco, drinking

alcohol as they were aware of the risk factors in developing oral cancer. This kind of knowledge by dental professionals about risk factors causing oral cancer coincided with many studies earlier and similarly in previous studies in the literature. The majority of dentists stated that the use of tobacco in any form and the consumption of alcohol as the main risk factors for oral cancer occurrence [10,11]. Less than half (42.4%) of dental practitioners know how to use screening devices for diagnosing cancerous lesions. Many of them believe that the lesion's signs, symptoms, and clinical appearance are sufficient to diagnose these lesions, and if doubtful, mandatory biopsy is advised for definitive diagnosis. These results were in agreement with studies done by Macpherson et al [12] and Saleem L et al [13]. In current study, 65% of the dental practitioners had a good knowledge about the risk factors, signs and symptoms, diagnosis and treatment plans.

Dental doctors serve as frontline healthcare providers in oral cancer detection. A comprehensive understanding of oral cancer risk factors, clinical presentations, and diagnostic techniques is essential. Studies have indicated varying levels of knowledge among dental professionals. In a study by Sandhu et al. [14], researchers found that while dental students demonstrated a basic knowledge of oral cancer, they lacked proficiency in recognising early signs and risk factors. In contrast, practising dentists exhibited higher levels of knowledge due to clinical experience [15]. In the present study, all the participants (100%) showed a positive attitude that there is a need to conduct various awareness and educational programs on oral cancer screening and diagnosis at the initial stages, which further helps improve patients' survival rate. Various studies that were done earlier in the literature showed similar results, where dental practitioners were keen to attend educational programmes in oral cancer prevention and screening [16, 17, 18]. The majority of the dentists (90%) believe that it is always better to educate patients about the self-examination of the oral cavity as few of the precancerous and cancerous lesions will be asymptomatic in the earlier stages as a result of which there will be a delay in approaching the doctor for further examination thus showing the effect on the prognosis [13] stated that there is a need to educate patients about the early signs of oral cancer as some of the cancers might be asymptomatic and can occur as painless small swellings in the oral cavity as it is of great concern to emphasise the critical role of primary prevention of oral cancer. Less than half (40%) of the dentists stated that there is a need for biopsy for all white and red lesions occurring in the oral cavity, and the majority of them were contrary because oral lesions have the potential to manifest a wide range of underlying conditions, from benign to malignant. The decision to perform a biopsy for such lesions is complex, often influenced by factors such as clinical presentation, patient history, and healthcare provider's experience. Most of the time, it is advised to take a biopsy when there is the presence of non-healing ulcers for a duration of more than three weeks. These statements agreed with the statements given by dental professionals in studies conducted by Saleem L et al [13], Nazar HS [8].

**Table 1:** Frequency of good knowledge and its association with age and gender

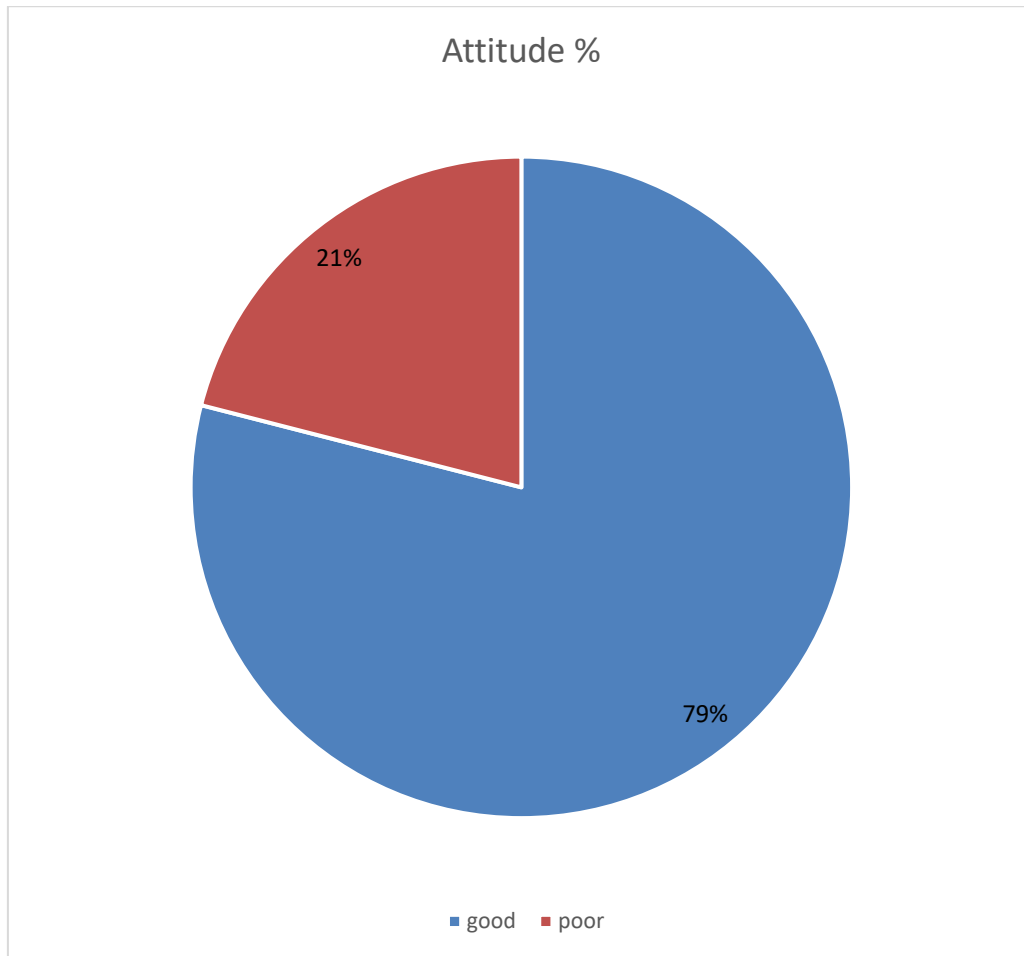
Questions	Mean value± S.D.	Frequency Total=198	Percentage	Age (chi square)P value	Gender (chi square)P value
1	1.70 ± 0.45	140	70.7	0.001*	0.001*
2	1.98± 0.12	195	98.5	0.99	0.55
3	1.76± 1.98	152	76.8	0.001*	0.27
4	1.70± 1.76	139	70.2	0.001*	0.17
5	1.76± 1.70	151	76.3	0.001*	0.006*
6	1.42± 1.76	84	42.4	0.001*	0.06
7	1.90± 1.42	179	90.4	0.001*	0.19
8	1.98± <b>1.90</b>	196	99.0	0.001*	0.09
TOTAL Mean	5.66 ± 1.87				



**Figure 1:**Percentage distribution of knowledge

**Table 2:** Frequency of good Attitude and its association with age and gender

Questions	Mean value	Frequency Total= 198	Percentage	Age (chi square) P value	Gender (chi square) P value
9	1.75 ± 0.43	149	75.3	0.001*	0.21
10	1.98 ± 0.10	196	99.0	0.07	1.00
11	2.00 ± 0.01	198	100.0	0.001*	0.002*
12	2.00 ± 0.01	198	100.0	0.001*	0.004*
13	2.00 ± 0.01	198	100.0	0.001*	0.002*
14	1.90 ± 0.29	179	90.4	0.06*	0.009*
15	1.40 ± 0.49	81	40.9	0.08*	0.161
Total mean	4.32 ± 1.03				



**Figure3:** Attitude

**Table 3:** Frequency of good Practice and its association with age and gender

Questions	Mean value	Frequency Total= 198	Percentage	Age (chi square)P value	Gender (chi square)P value
16	1.94 ± 0.21	188	94.9	0.001*	0.49
17	1.96 ± 0.17	192	98.5		1.00
18	1.29 ± 0.45	59	29.8		0.02*
19	1.19 ± 0.39	39	19.7		0.08
20	1.36 ± 0.48	72	36.4		0.87*
21	1.79 ± 0.40	158	79.8		0.055
22	1.41 ± 0.50	95	48.0		0.08
Total Mean	3.12 ± 1.18				

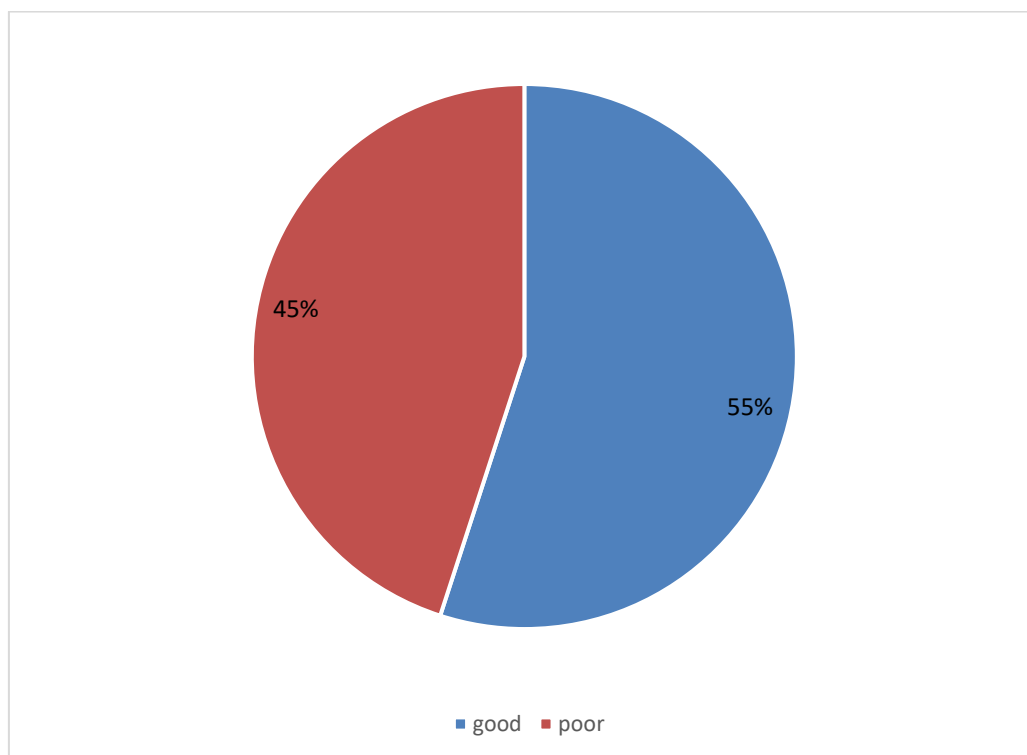


Figure 3: Practice

Table 4: Knowledge, attitude, and practice among gender and age group

Variable		N%	Knowledge Mean (SD)	P value	Attitude Mean (SD)	P value	Practice Mean (SD)	P value
Gender	Male	60 (30.3%)	1.21 (0.02)	0.042*	1.14 (0.02)	0.17*	1.37 (0.36)	0.04*
	Female	138 (69.7%)	1.55 (0.23)		1.21 (0.23)		1.56 (0.42)	
Age	<35		1.33 (0.05)	0.001*	1.42 (0.05)	0.001*	1.32(0.15)	0.001*
	>35		1.45 (0.13)		1.64 (0.13)		1.44 (0.32)	

\*statistical significant difference p < 0.05

In the current study, 79% of positive attitude was recorded from the study population about the diagnosis and screening of oral cancers. Attitudes of dental doctors and Yeladandi et al., 2024

dental students significantly impact their commitment to oral cancer prevention and management. Positive attitudes may lead to improved patient education, early detection, and referrals for specialised care [9]. A study by Mehrotra et

al.[19] revealed that dental students were optimistic about including oral cancer screenings in their routine clinical practice. Dental professionals' attitudes are influenced by their perceived competency in conducting oral cancer examinations [20]. Incorporating oral cancer education into dental curricula can foster more favourable attitudes and a sense of responsibility. In the present study, nearly all the dentists (98.5%) maintained a habit of recording the habitual history as a part of their routine check-up and examining the oral mucosa for changes and the presence of other lesions apart from their chief complaint. However, when it comes to practising oral cancer diagnostic activities, the response was found to be negative (29.8%). These results concord with the study results of Bataineh AB et al.[21] where only 11% of practitioners accepted that they had performed a biopsy as a part of oral cancer diagnostic activity. This could be because of a lack of theoretical and practical skills to perform a biopsy by dentists as a part of routine examination, as only 19.8% of dentists accepted that they knew the biopsy procedure and only 5.4% of dentists claimed that they performed when needed routinely in the same study. Only about 19% of dentists have used autofluorescence devices for scanning the oral cavity because though it offers many advantages, non-invasive, less time-consuming, chair-side, highly sensitive and early predictor of lesions many dentists believe that biopsy is the gold standard for diagnosing the cancerous lesions and these devices can act as adjunct to it but cannot confirm the diagnosis [22]. Overall practice of dentists was found to be nearing 55% in following screening and diagnosis of oral cancers on regular basis. Practices of dentists in relation to oral cancer encompass clinical examinations, patient education, and referrals. Regular oral examinations, especially during routine dental visits, offer opportunities for early detection. However, studies indicate inconsistency in the frequency and comprehensiveness of these examinations. Barriers such as lack of time, inadequate training, and discomfort discussing cancer risk factors with patients have been reported [14,20]. Dental professionals must enhance their practices by integrating comprehensive oral cancer screenings, risk factor assessments, and effective communication strategies into routine patient care [23]. Effective management of oral cancer requires collaboration between dental professionals and the broader healthcare community. Dental doctors and students serve as crucial advocates in preventing, detecting, and managing oral cancer. To optimise their role, continuous educational interventions, such as workshops and seminars, should be implemented to enhance their knowledge and competence. Positive attitudes and patient-centred practices should be promoted to ensure comprehensive oral cancer care and ultimately contribute to improved patient outcomes [24].

## 5. Conclusion

This study provides valuable insights from dental professionals' knowledge, attitude, and practice regarding the early detection of oral premalignant lesions and oral cancer. Improving knowledge, attitudes, and practices in this critical area can contribute significantly to early detection and improved patient outcomes. All the participants (100%) showed a positive attitude that there is a need to conduct various awareness and educational programs on oral cancer

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screening and diagnosis at the initial stages. Further research and targeted interventions are warranted to enhance the proficiency of dental professionals in this crucial aspect of oral health care.

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