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Knowledge, Attitude And Practice In Oral Cancer Among Dental Hygienists In Libya

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Abstract
Background: *Oral cancer remains a global health problem. Lack of awareness leads to inadequate watchfulness regarding early signs/symptoms despite the ease of visual oral inspection. Dental hygienists play an important role in early detection of oral cancerous lesions. Evidence on the awareness and knowledge level of oral cancer and its associated risk factors among dental hygienists in Libya is scarce. The aim of this study was to assess knowledge, attitudes, and practice (KAP) regarding OC among dental hygienists in Libya.*
Materials and methods: *Administered questionnaires were distributed on dental hygienists (through Google Forms). The questionnaire included four sections: sociodemographic information, oral cancer knowledge, attitudes toward oral cancer, and clinical practices related to oral cancer. Participants' responses to the questionnaire were analyzed using descriptive statistics.*
Results: *Responses were received from 100 participants (60% women and 40% men). Overall, there is a good knowledge of the real risk factors among the participants (86%, 83%, and 71%) regarding the following risk factors smoking, alcohol, and poor diet respectively.*
The analyze related to the knowledge of non- risk factors, Just over half of the respondents correctly indicated that family history, poor oral hygiene, and poor fitting prosthesis are not risk factors for OC onset (57%; 55%; and 51%, respectively). The majority of respondents (80% & 77% respectively) correctly identified leukoplakia and erythroplakia as oral potentially malignant disorders. The totality 81% of DHs believed they needed continuous updates in the future. With regard to practice, high percentage of DHs stated to perform an extra/intraoral examination and carried out palpation of the lymph nodes.
Conclusions: *Overall, this study highlighted the importance of introducing continuous education and training courses to dental hygienists which could increase oral cancer prevention and survival rates among oral cancer patients.*
Keywords: *Oral cancer; dental hygienists; Libya; awareness; knowledge; attitude; practice.*

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I. Introduction

Oral cancer (OC) is a significant public health issue, representing the 18th most common cancer worldwide, with more than 377,713 (2%) new cases of oral cancer and almost 177,757 (1.8%) deaths reported in 2020[1]. Unfortunately, only about half of these cases would survive 5 years since diagnosis and it has not improved in the last few decades. Oral cancer is an aggressive cancer with poor prognosis and is considered a major cause of morbidity and not mortality worldwide[2]. However, this incidence shows wide variation among different geographic regions[3]. It is higher in developing countries than developed countries[4]. In Libya, the epidemiological data have estimated that oral and pharyngeal cancer ranked the seventh with approximately 1.7% of all cancers death[5].

The stage of oral cancer is directly related to the 5-year survival rate. The prognosis at early stage is relatively good with survival rates around 84%, while it worsens drastically for the advanced stages, whose survival rates are around 39%[6]. The main factor related to these poor prognostic data is the diagnostic delay; in fact, in a significant percentage of patients, OC is often identified at late stages (III or IV) [7], resulting in a more aggressive treatments and poorer prognosis[8]. This is because patients do not recognize early signs and symptoms of OC and require medical attention in an advanced stage of the disease; also, many of them are unaware that the oral cavity can be the site of malignant lesions[9]. In addition to the lack of public awareness, diagnostic delay by primary care providers contributes to higher patient mortality and morbidity[10]. The main causes of professional delay include inadequate oral examination, poor knowledge about the disease, its risk factors, such as tobacco use, alcohol consumption and oral Human papillomavirus (HPV) infection[9], and lack of attitude and practice

related to OC[11]. These data contrast with the need for early diagnosis that is crucial to prolong the patient's life[12]. To date, the main tool for the OC screening is the visual inspection[13]. The majority of oral cancer cases is preceded by oral potentially malignant disorders (OPMDs); therefore, there are chances for earlier detection which could improve prognosis and the quality of life for these patients[14]. To improve visual inspection, some diagnostic tools, such as optical fluorescence imaging, have been proposed; however, their clinical efficacy is controversial and the practitioner training plays a key role[15].

Oral cancer screening leading to early diagnosis and improved mortality[16, 17]. A gap in knowledge and practice has been demonstrated amongst dentists and dental hygienists (DHs), suggesting underutilization of comprehensive oral cancer screening in practice. The dental hygiene appointment is naturally predisposed to oral cancer screenings as a part of routine dental hygiene care. So, it is important to understand what dental hygienists know and believe about OC and their practices in assessing risk factors and performing intra-oral and extra-oral examinations[18].

It has been reported that dentists and dental hygienists can play a crucial role in the early detection and prevention of oral and pharyngeal cancer[19]. Previous studies have evaluated whether or not dentists have the skills necessary to assist patients in cancer prevention[20, 21] but little knowledge is available about dental hygienists. Information on this topic is strongly needed to assess if they are prepared for determining whether patients are at risk of developing oral cancer, as well as for providing a comprehensive oral cancer examination Therefore, the purpose of this study was to assess knowledge, attitude and practices (KAP) among dental hygienists regarding oral cancer in Libya.

II. Materials And Methods

This cross-sectional study was conducted by the department of Dental hygienist, faculty of Libyan Ministry of Technical and Vocational Education Collage of Medical Technology, Benghazi- Libya between February 2024 and July 2024. A random sample of 100 dental hygienists working in private and public clinic agreed to participate in this study. Electronic questionnaire was used to collect data from participants by a link to participate in the online questionnaire via Google Forms, which was set with mandatory responses. The time to complete the questionnaire was estimated to be approximately 15 minutes. Before proceeding to the questionnaire, each participant was invited to read a standard consent statement and gave their verbal consent to participate. Also, participation was voluntary, and all data were collected anonymously. The questionnaire was developed by adapting items from published surveys on this topic and by elaborating on items specifically designed for DHs[22, 23]. The questionnaire consisted of four sections: 1) Personal characteristics; 2) knowledge with 5 subdomains; 3) attitude toward OC examination; and 4) clinical practice regarding OC. In particular, the knowledge-related items consisted of 11 statements about risk factors, 7about non-risk factors, 6 regarding OPMDs, 6 related to common sites of development, and 12about clinical presentation. The outcomes of questions about knowledge were dichotomous (wrong/correct). Fifteen statements investigated attitude items among participants. Of these, 14 statements had dichotomous outcomes (yes/no), and only one item had an ordinal outcome based on a 4-point Liker's scale. To regard practice items, 2 statements were associated with physical examination, 8 with history taking, and 1 with referral to a specialist. The outcomes of questions about the practice were dichotomous (yes/no).

This study included a statistical analysis section in order to explore the respondents' understanding of the knowledge, Attitude, and Practice of oral cancer among dental hygienist. A basic descriptive analysis was made, and frequency distributions and relative frequencies (percentages) were calculated. T-test for independent samples, and one-way analysis of variance Anova test are applied to investigate if there are any statistically significant differences in the effect of gender and the graduation year on the respondents' answers regarding the knowledge, the attitudes as well as on the practice. Statistical software (IBM SPSS Statistics v.21, IBM Inc.) was used for calculation. For all tests, p-values <0.05 were accepted as statistically significant.

III. Results

100 person DHs included in the mailing list of the survey. On the basis of the graduation year, the participants were divided into 2 groups: group 1 (2015–2020), group 2 (2021–2024). Table 1 showed the demographic characteristic of the participants. From the Table (3), it seems that, the highest number of participants of this study is in the Age group [20-25] where it reached to 49 participants with percentage of 49%, followed it the age group [26-31] with percentage of 40%, followed by the last age group of [32-36] with percentage of 11%. Also, from table (3), we can see that, the proportion of Female participants in this study is 60%, and the percentage of Male participants is 40% with male to female ratio (M: F = 0.66). According to graduation year, we can see that, the highest number of participants was in the category of [2021-2024] with 66%, and the participants of the other category [2015-2020] with 34%.

Table (1) Characteristics of the study population

	N	%
Gender		
Male	**40**	**40%**
Female	**60**	**60%**
Age		
20-25	**49**	**49%**
26-31	**40**	**40%**
32-36	**11**	**11%**
Graduation year		
2015-2020	**34**	**34%**
2021-2024	**66**	**66%**

Knowledge of risk factors

Respondents' knowledge about OC risk factors is presented in Figure 1 Most of the DHs recognized smoking and alcohol as risk factors (86% and 83% respectively). However, considerable variability in knowledge levels was noticed among participants regarding other risk factors, including diet (71%), past positive OC history (70%), oral HPV infection (64%) and immunosuppressant (65%). Whereas only 47%, 57%, 57% and 65% identified sun exposure, elderly, betel quid chewing and oral mycosis as a risk factor.

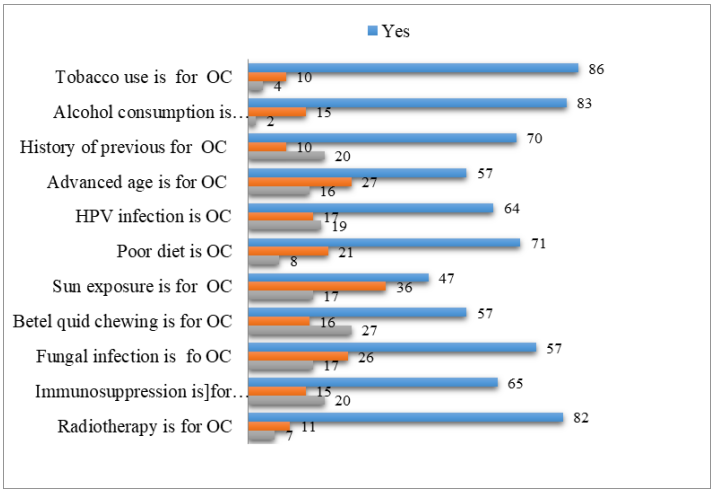

Fig 1: Knowledge of dental hygienists about risk factors for oral cancer

Knowledge of non-risk factors

Respondents' the knowledge of non-risk factors is shown in the figure 2. Just over half of the respondents correctly indicated that family history, poor oral hygiene, and poor fitting prosthesis are not risk factors for OC onset (57%; 55%; and 51%, respectively). Only a few DHs knew that obesity (47%) and hot food (47%) are not-risk factors.

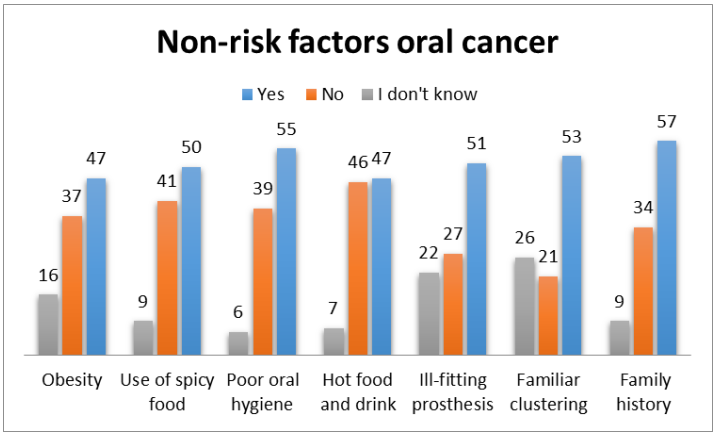

Fig 2: Knowledge of dental hygienists about non-risk factors for oral cancer

Knowledge of OPMDs

The majority of respondents (80% & 77% respectively) correctly identified leukoplakia and erythroplakia as OPMDs. Chronic hyperplastic candidiasis and actinic cheilitis have been recognized as OPMDs by 67% &65 respectively. The values relative to the other OPMDs are indicated in Figure 3 below.

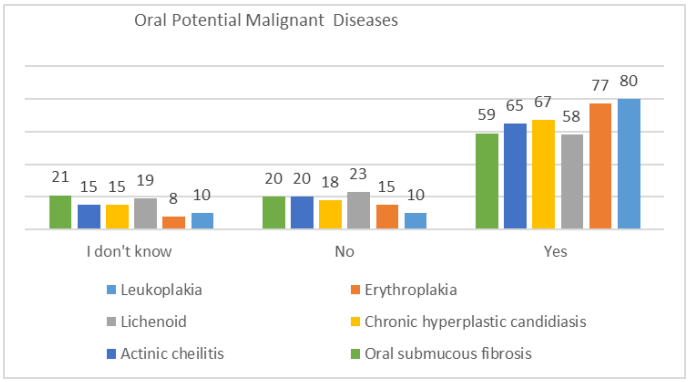

Fig3: Knowledge of DHs about OPMDs.

Knowledge about common site of development

A large part of DHs indicated the floor of the mouth and the tongue as common sites of development (84% and 78% respectively). Following buccal mucosa, lips and gum the percentages of which are shown in Figure 4 below.

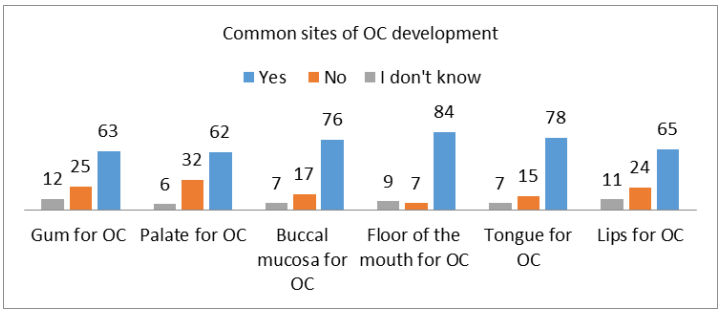

Fig4: Percentage of DH s that indicated each site as one of the most common site of OC development

Knowledge about clinical findings of OC:

Seventy-four percent of respondents knew that OC is asymptomatic at early stage and 74% were aware that squamous cell carcinoma is the most common form. Large number of them was also aware that the diagnosis was more frequently at advanced stage (74%) and small, painless red area (76%). Submandibular lymph nodes, dysphagia, lung metastasis of oral cancer and limitation in tongue mobility have been identified as OC symptoms by a low percentage of DHs (65%, 58%, 61% and 56%, respectively). About 59% knew that ventral border of the tongue most likely to develop oral cancer Figure 5.

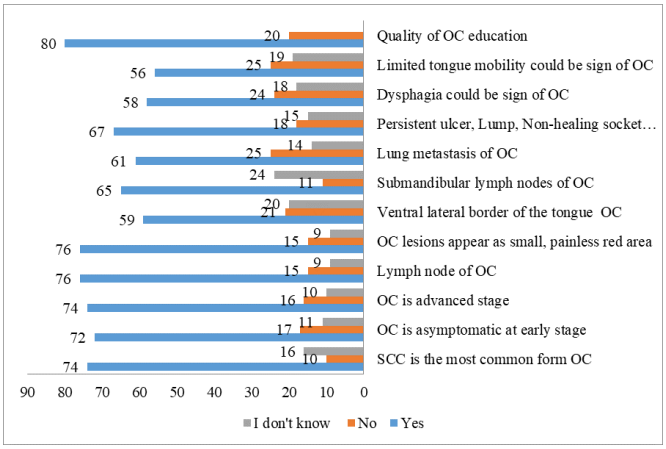

Fig 5: Responses of dental hygienists in relation to clinical findings of OC

There are statistically significant differences in the effect of gender on the respondents' answers regarding the Knowledge where (t = 3.078), and P-value (0.003) <0.05. However, there are no statistically significant differences in the effect of year of graduation on the respondents' answers regarding the Knowledge of oral cancer among oral and hygienist.

Attitude:

Only (78%) respondents considered the received OC education during the university training period to be adequate and 22% considered the received OC education during the university training period to be "insufficient. The totality 81% of DHs believed they needed continuous updates in the future, but despite this, (19%) said they did not perform OC updates. 82% DHs considered it necessary to perform annual OC screening for patients over 40 and 79 % aware that early detection increases the 5-year survival rate. Besides, 82% of the respondents felt that they had an adequate level of training to perform the screening, and 83% recognizing that the figure of the DH qualified to perform it. The majority investigated the patients' knowledge level about risk factors (78%) and they felt that their training was adequate to explain the risks of smoking and alcohol (73%). Only (72%) of DHs said they were confident in recognizing a high-risk lesion based on lesion clinical presentation, and 89% said they were comfortable reporting suspicious lesions to the specialist. The values relative to the other Attitude items are indicated in figure 6.There are statistically significant differences in the effect of gender on the Attitudes whereas (t = 2.488), and P-value (0.015) < 0.05. However, there is no statistically significant difference in the effect of year of graduation on the Attitudes of oral cancer among DHs.

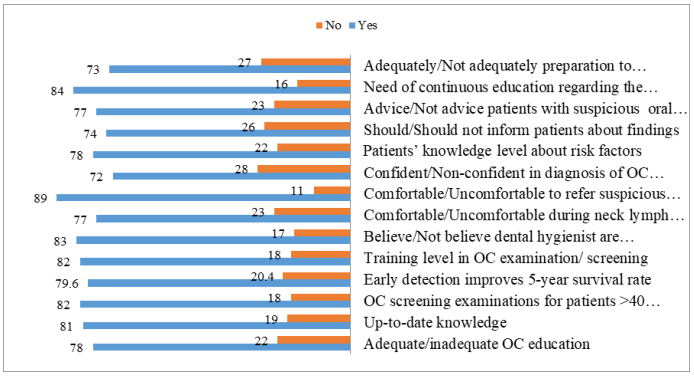

Fig 6: Responses of dental hygienists in relation to Attitude

Practice:

With regard to practice, 88% of DHs stated to perform an extra/intraoral examination and 81% carried out palpation of the lymph nodes. (91%) of them inquired about the type and quality of the tobacco products and 81% of the respondents asked the patient questions about current/ previous tobacco use. Regarding alcohol, DHs (85%) asked questions about its current/previous use and the same percentage inquired about the type and quantity of alcoholic products used. Seventy-nine DHs (79%) investigated personal and family history of cancer, (86%) asked questions about the type of diet, and only (78%) asked questions about sun exposure. Finally, 86 DHs (86%) were used to refer the patient to a specialist in their clinical activity. There are statistically significant differences in the effect of gender on the Practice whereas (t = 2.298), and P-value (0.024) < 0.05. However, there is no statistically significant difference in the effect of year of graduation on the Practice of oral cancer among oral and hygienist.

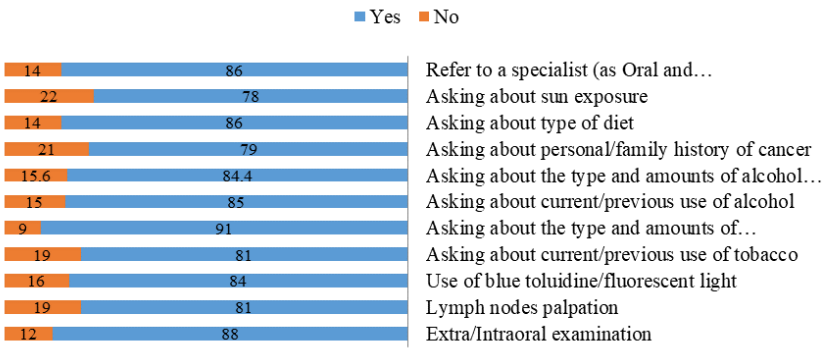

Fig 7: Responses of dental hygienists in relation to clinical practice procedures

IV. Discussion

Early detection is still the most effective tool for increasing a 5-year survival and improving the quality of life of patients affected by OC[24]. Dental hygienists play an important role in the primary and secondary prevention of oral diseases, not only for the ability to detect oral lesions considered to be at highest risk and oral cancer, but also for counseling and educating patients to avoid known risk factors. An appropriate treatment and lower stage of diagnosis have been most often associated with a non-tiered seating examination, which was most likely to occur in a dental setting. Even by detecting a malignant lesion in the early stage and educating their patients about signs and risk factors associated with oral cancer, they can positively influence mortality rates[25]**.** Dental hygienists can be defined as 'prevention specialists' through the services they provide, including screening examinations, preventive treatments, and oral health education; thus, they represent a unique group of oral health care providers [26].

This study included a statistical analysis section in order to explore the respondents' understanding of the knowledge, attitude, and practice of oral cancer among oral hygienists. Therefore, an electronic questionnaire was prepared using Google Forms. The questionnaire was distributed using social media such as WhatsApp, Facebook... etc. Then 100 questionnaires were received, all of them valid, and they were analyzed using the statistical analysis program SPSS, where t- tests for independent samples and one-way analysis of variance (Anova) tests were applied.

Knowledge: Our study focused on the level of knowledge and experience provided by oral health specialists in Libya regarding oral cancer. The findings of the present study identified sufficient knowledge among dental hygienists working in Benghazi. They showed a good level of knowledge about risk factors. Exposure to tobacco carcinogens is considered one of the main risk factors for oral cancer. A retrospective study conducted on 122 Libyan oral squamous cell carcinoma patients proved that nearly 80% of them were tobacco smokers'[27]. 86% of the dental hygienists in this study correctly mentioned tobacco as the most common risk factor, and this percentage indicates a good level of knowledge among dental hygienists in Benghazi, which was greater than those reported in previous studies conducted at the University of Naples of Italy 71.4% level of knowledge about risk factors. When asked about risk factors, the respondents nearly unanimously identified drinking alcohol and smoking as risk factors. This finding aligns with previous research, such as the study conducted in Spain, which established smoking and alcohol consumption as the primary causes of oral cancer. In addition to the OC cases linked to these two main risk factors, an increase in HPV-related OC has been observed in the last decade. This trend emphasizes the need for updates. In this study, the knowledge of HPV as an OC risk factor was 64%. Only a small group of our cohort identified advanced age, oral mycosis, and sun exposure as risk factors. These data, in line with the literature[29, 30]. This trend emphasizes the need for updates.

Knowledge non-risk factors: Our study shows knowledge of non-risk factors. Just half of the respondents correctly indicated that spicy foods, obesity, and hot food are not risk factors for oral cancer onset (47%, 55%, and 50%). This finding is higher than those reported by Ni Riordain *et al*[31]. A very low percentage of respondents were aware that family history of OC, badly fitting prostheses, and poor oral hygiene are not-risk factors, which could be due to gaps in educational background. DHs can provide patients with accurate information when they are aware of the true risk factors [32].

Knowledge of OPMDs: Leukoplakia and erythroplakia are the best known oral potentially malignancy disorders with a malignant transformation rate that could be at least 50% [33]. The majority of respondents in our study (80, 77%) correctly identified proliferation leukoplakia and erythroplakia as OPMDs, which is higher than those seen in a similar study on DHs conducted in Carolina [34] and in Italy **[32].** There is greater misinformation in relation to other precancerous lesions, such as oral lichenoid lesions, oral submucous fibrous or actionic keratosis, highlighting the need for updating on this topic.

Knowledge about the common site of development: Considerable variability in the knowledge of the common sites of development was noticed. Regarding the floor of the mouth, lips, and tongue as a common site, a large part of DHs indicated the floor of the mouth and tongue as common sites of development (84% and 78%, respectively). A good level of knowledge among DHs has also emerged with regard to the common high-risk sites of cancer development, such as the tongue and floor of the mouth. This finding is agreement with a study conducted in Canada[35].

Knowledge about clinical findings: The findings from our evaluation of clinical practices among dental hygienists (DHs) underscore a critical need for enhanced attention to history-taking and examination processes, particularly in relation to oral cancer screening. With only 79% of DHs reporting proficiency in history-taking, a noted decrease compared to previous studies[32], it is evident that there is potential for improvement in this

fundamental aspect of patient assessment. This gap suggests that enhancing training and support for DHs in history-taking could lead to more comprehensive patient evaluations and improved health outcomes.

Furthermore, while a commendable percentage of DHs inquire about tobacco (91%) and alcohol use (85%), which are significant risk factors for oral diseases, there remains a discrepancy when assessing their confidence in carrying out comprehensive physical examinations. While most DHs demonstrate assurance in performing intraoral and extra oral examinations, their confidence diminishes significantly when it comes to techniques such as lymph node palpation. This finding aligns with previous studies[35, 36,] indicating a potential area for targeted training. Recognizing the importance of early detection, it is imperative that DHs not only understand the procedures involved in screening but also feel competent and confident in executing them.

The role of DHs in the prevention of oral diseases is paramount, particularly in the context of identifying lesions at high risk for malignancy. Despite their education on oral cancer screening, a study indicated that DHs often struggle to apply this knowledge in practice[37]. This paradox of possessing theoretical knowledge but lacking practical application highlights a significant gap that needs addressing in dental training programs.

Barriers to effective practice were also identified in our evaluation. The most frequently cited obstacles included a lack of time to conduct thorough examinations, reliance on dentists to perform oral inspections, and concerns regarding patient compliance[31]**.** These factors illustrate the complexities of clinical practice and highlight the need for systemic changes to better support DHs. To overcome these challenges, it is essential to foster collaborative relationships between dentists and DHs. When functioning synergistically, these professionals can ensure more comprehensive patient assessments and facilitate a stronger preventative healthcare model.

In conclusion, while DHs are pivotal in the early detection and prevention of oral health issues, particularly oral cancer, improvements in training, collaboration, and systemic support are urgently needed. Addressing the current barriers to effective practice could enhance the confidence and competence of DHs, ensuring that they can fully utilize their training to benefit patient care outcomes. Ongoing professional development, along with interpro fessional collaboration, will be essential steps in bridging the gap between knowledge and practical application in clinical settings.

Attitudes: Our study revealed that a significant majority of respondents (78%) perceived the oral cancer (OC) education received during their university training as sufficient, which is notably higher than findings from previous studies conducted by Stefania Leuci and others[30, 35]. This perception of adequacy in education not only underscores the importance of university curricula in preparing dental hygienists (DHs) for their role in cancer prevention but also highlights the need for ongoing education. Almost all participants recognized the necessity of updating their knowledge and skills, indicating a proactive attitude toward professional development and a commitment to improving their competency in oral cancer prevention.

While there is a consensus among DHs regarding the effectiveness of intraoral visual inspections for early diagnosis of cancers [22, 36], it is concerning that only a few DHs acknowledged older age as a significant risk factor for oral cancer. Nevertheless, an impressive 82% of respondents believed in the importance of conducting annual OC screenings for patients over 40 years of age. This acknowledgment reflects a growing awareness among DHs regarding the critical need for proactive screening, particularly in high-risk populations [32].

Furthermore, 77% of participants affirmed that patients with lesions suspected of being oral cancer should be referred to a specialist, illustrating an understanding of the importance of timely intervention and the role of DHs in facilitating further evaluation and treatment. The improvement in 5-year survival rates associated with early detection reinforces the necessity for DHs to remain vigilant and adequately trained in recognizing potential indicators of oral cancer [32]. Despite this consensus on the value of early diagnosis, a notable disparity was observed in the confidence levels regarding the identification of suspicious lesions. While 89% of our respondents reported confidence in recognizing suspicious mouth lesions, previous research conducted by Nicotera G *et al.* [32] highlighted that only 25.5% of DHs felt similarly confident in identifying high-risk lesions based on clinical presentation. This stark contrast emphasizes the ongoing need for enhanced training and practical experience in lesion identification, as well as the importance of fostering an environment where DHs feel equipped to assess and refer potential cases of oral cancer confidently.

While our study shows promising levels of education and awareness among DHs regarding oral cancer, it also identifies critical areas for improvement, particularly in the recognition of risk factors and the identification of high-risk lesions. By addressing these gaps through targeted educational initiatives and training programs, DHs can bolster their contribution to oral cancer prevention and ultimately enhance patient outcomes.

Practice: The findings regarding the clinical practice of dental hygienists (DHs) highlight several crucial aspects related to history-taking and physical examinations. The reported percentage of 79% for history-taking is noteworthy, yet it falls below the percentages observed in previous studies [32, 37]. This discrepancy signals a potential area for improvement in clinical practices among DHs, particularly in the thoroughness of patient interviews. While a high percentage of DHs inquire about tobacco use (91%) and alcohol consumption (85%), a

more comprehensive approach to history-taking is essential for better patient outcomes, especially in the context of oral cancer screening.

When it comes to physical examinations, DHs express greater confidence in performing intraoral and extraoral assessments, although palpation of lymph nodes appears to be less confidently executed. This aligns with previous research that demonstrates similar results [35, 36]. The confidence levels exhibited by DHs in these examinations are critical as they play a fundamental role in early detection of oral diseases. It is imperative for DHs to not only be familiar with and comfortable performing screening examinations but also to effectively communicate with patients about the associated risk factors and lifestyle habits contributing to an increased risk of oral cancer.

Moreover, DHs are at the forefront of both primary and secondary prevention of oral diseases. They have the capability to identify high-risk oral lesions and play a significant role in oral cancer detection. However, while DHs are believed to possess substantial knowledge regarding oral cancer (OC) screening, the translation of this knowledge into clinical practice remains inadequate[37]. This gap indicates that further training and support are necessary to empower DHs to implement their knowledge effectively during patient care.The barriers preventing DHs from routinely conducting intra- and extraoral examinations merit attention. The most frequently cited challenges include a lack of time, delegating the inspection of the oral mucosa to dentists, and concerns regarding patient compliance [37]. These limitations reflect systemic issues within dental practices that can hinder the delivery of comprehensive care. To enhance patient outcomes, it is crucial for dentists and DHs to collaborate effectively, fostering a synergistic relationship that maximizes the strengths of each professional.

In sum, while DHs are essential in the prevention and early detection of oral diseases, various obstacles still exist. Initiatives aimed at enhancing the confident execution of screening protocols and the effective communication of risk factors is necessary. By addressing these barriers and promoting teamwork within dental practices, DHs can significantly improve the quality of care provided to patients and contribute to better health outcomes, particularly in the domain of oral cancer prevention.

V. Conclusions

This study provides some important information about dental hygienist's knowledge, opinion, and practices regarding oral cancer. The majority of dental hygienists believed they needed continuous updates in the future. This is the first survey that described the knowledge, attitudes, and demographic factors related to dental hygienists' cancer-preventive behaviors in Libya and emphasized the importance of performing these surveys in order to plan educational interventions. More continuing education programs on risk factors and diagnosis of oral cancer should be organized to train DHs. Oral cancer screening should be a routine procedure for the high risk patients at the primary oral health care centers in Libya

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