Awareness about Oral Cancer among Dental and Medical Practitioners in Riyadh, Saudi Arabia: A Cross-Sectional Study

Bahija Basheer*, Abdalrhman Alrajhi, Ahmed Alsuawari, Fahad Alotaibi, Hussam Almalki, Faisal Alghanim, Ahmad Jaddoh, Abdulelah Alotaibi, Waleed Albaradie, Nawaf Alotaibi, Khalid Alfozan and Nwaf Alawad

College of Dentistry, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA

*Corresponding e-mail: Basheerb@ksau-hs.edu.sa

ABSTRACT

Objective: *To assess knowledge, practices, and opinion related to oral cancer among medical and dental practitioners in Riyadh, Saudi Arabia.* ***Methods:*** *A total of 550 Self-administered questioners were at various private and government hospitals/polyclinics in and around Riyadh. A convenient sampling technique was used to recruit the participants for the study, as it was challenging to obtain the updated lists of practitioners from all government and private medical and dental facilities. Dental practitioners, including general and speciaslist dentists and medical practitioners, including general and specialist medical practitioners, who are generally not involved in the examination of the oral cavity, were excluded from the study.* ***Results:*** *Among the 550 participants who met the inclusion criteria, 68.9% were males, while the other 31.1% were females. The mean knowledge score related to oral cancer was 9.5 for medical, and 9.7 for dental practitioners, however, the difference was not statistically significant (p=0.392). ANOVA test was applied to evaluate the differences in the mean scores between medical specialists, dental specialists, general medical practitioners (medical GP), and general dentists (dental GP). The mean score for all sub-groups was less than 15; among them, dental specialists had the highest mean score (10.2), followed by medical GP (9.9), dental GP (9.4), and medical specialist (9.2). Nevertheless, the difference between them was not statistically significant (p>0.05).* ***Conclusion:*** *This research highlights the need to increase knowledge and awareness about oral cancer among practitioners.*

Keywords: Dental professionals, Medical professionals, Oral cancer

INTRODUCTION

Globally, cancer is the second most common cause of death, with about one in every six deaths attributable to cancer [1]. Oral cancer (OC) is the world's 11th most common malignancy. In Saudi Arabia, OC is the third most common after lymphoma and leukemia [2], as it represents a significant public health concern. Moreover, oropharyngeal cancers are known to be amenable to early detection, as they primarily occur at sites that are accessible and visible during a non-invasive examination [1]. However, only 30% of Oro-pharyngeal cancers are identified at an early stage, mainly due to late presentation, delayed diagnosis, lack of knowledge, and lack of a clear referral pathway between medical practitioners and dentists. Internationally, multiple studies have been conducted to assess the level of knowledge related to oral cancer screening and prevention among medical and dental undergraduate students [3-7]. A survey conducted by Shrestha, et al., [4] showed the need for increased awareness about OC among medical and dental students. In Saudi Arabia, very few studies have been reported to assess the level of knowledge related to OC among undergraduate medical and dental students [8,9]. Jaber, et al., conducted a study to measure the perception of OC screening and prevention among healthcare practitioners [2]. The survey was conducted in six different settings in Saudi Arabia, mainly in Jeddah and Dammam [2]. Nevertheless, no known studies to date were done to evaluate differences in knowledge and practices related to OC among medical and dental practitioners in the Riyadh region. Hence, the current study aims to assess knowledge, practices, and opinion about OC among medical and dental practitioners in Riyadh, Saudi Arabia. The results of this study will help us identify the gaps and thereby determine the need for the development of professional educational programs and training in OC screening and prevention.

Literature Review

Despite advances in early diagnosis, treatment over the last few years, there has been an increase in the overall incidence of cancers [2]. No significant improvement has been reported in the five-year survival rates for oral pharyngeal cancer [3,4]. While 25% of all OC patients have no apparent risk factors [5], Alcohol and tobacco use are the main factors responsible for OC. Additionally, Human Papilloma Virus (HPV), Human immunodeficiency virus (HIV), poor oral hygiene, ill-fitting appliances causing injury to the oral mucosa, and family history all seem to play a role. OC is the third most common cancer after lymphoma and leukemia in Saudi Arabia, and it represents a significant public health concern [6]. The main risk factors specific to the population of Saudi Arabia are the use of smokeless tobacco, such as Shammah and Qat, which are significantly associated with carcinogenesis, especially in the southern region of Jizan [10-15]. Not all patients with oral cancer experience pain as part of the disease progression [16], which represents a challenge in early detection. Hence, when OC is detected and treated at an early stage, mortality, morbidity, and disfigurement can be significantly reduced [17,18]. Early detection is the single most critical intervention of influencing survival [2,19-22]. The American Cancer Society recommends a cancer-related check-up annually for all individuals aged 40 and older, and every three years for those between 20 and 39 [2]. Some reviews assessing the effectiveness of oral cancer screening have demonstrated that conventional oral examination is a feasible and satisfactory option for screening in dental clinics [1]. All in all, OC is manageable as it primarily occurs at sites that are accessible and visible during a non-invasive examination which facilitates early detection [1].

MATERIALS AND METHODS

The current study employed a cross-sectional study design, which was conducted to assess knowledge, practices, and opinion related to oral cancer among medical and dental practitioners in Riyadh, Saudi Arabia. The present study was conducted at various private and government hospitals/polyclinics in and around Riyadh, which included either dental and medical facilities or both. The data collection was scheduled between September and October 2018. The data was collected using a self-administrated structured questionnaire adapted from a previous study by Jaber, et al., [2] and was then modified to meet the objectives of the current study. Based on the previous literature review, the sample size was estimated to be 550. A convenient sampling technique was used to recruit the participants for the study, as it was challenging to obtain the updated lists of practitioners from all government and private medical and dental facilities. Dental practitioners, including general and specialist dental practitioners and medical practitioners, including general and specialist medical practitioners viz., general physicians, family physicians, internal medicine specialists, ENT specialists, were included in the study. However, medical and dental practitioners in administrative positions, who are generally not involved in the examination of the oral cavity, were excluded from the study. All participants were approached personally in their workplace and were briefed about the study objectives. Informed consent was obtained from all willing participants and they were ensured about the protection of their privacy and confidentiality. The questionnaire consisted mainly of four sections. The first section had 11 items, which recorded the demographic details and background information about the study participants, including age, gender, nationality, year of graduation, current professional status, years of experience, current workplace and work sector. The second section was related to assessing the participants' knowledge of oral cancer. It included 13 items to collect information related to OC risk factors, six items related to the clinical presentation of oral cancer, and one item related to the recognition of common sites of occurrence for OC. The third section assessed participants' practices related to oral cancer screening and prevention. Which included five items viz., recording of detailed medical history, conducting comprehensive OC screening for all patients, frequency of screening for patients suspected of high risk, frequency of referring a patient suspected to be at high risk, and the preferred health care professional (HCP) for referring a patient suspected to be at high risk of OC. The fourth section had four items to assess participants' opinions regarding their OC training. First, if they were confident enough to perform an examination for OC. Next, the level of training acquired by him/her to educate patients about the preventive measures of OC, whether allied medical personnel were adequately trained to perform oral cancer examination, and whether the practitioner is interested in receiving more training on oral cancer screening and prevention measures in the future, in the form of continuing education courses. In order to ensure the understandability of the questionnaire by the study population, a pilot study was conducted on 20 participants. Any difficulties or problem associated with any question was identified and then modified accordingly. Data was entered and analyzed using IBM SPSS (Statistical Package for the Social Sciences) software (version 22). The descriptive data

were analyzed using (Frequency distribution, Mean, Median, and Standard Deviation). The difference in the means between the groups was analyzed by the Independent Samples T-test, and the Chi- square test was used to assess the significance of associations between the categorical variables. Significance level (p-value) is set at <0.05.

RESULTS

Among the 550 participants who met the inclusion criteria, 68.9% were males, while the other 31.1% were females. 55.3% of the respondents were Saudi nationals, while 44.7% of the respondents were non-Saudi. 52% of the male respondents were from the dental field, while 48% of them were from the medical field. On the other hand, 64.3% of the females were from the dental field, whereas 35.7% were from the medical field. 45.3% of the respondents were from the government work sector, while the remaining 54.7% were from the private work sector. Regarding the years of experience, it was observed that 21% of the participants were having five years or less than five years of experience, while 33.3% had 6-10 years, 27.5% had 11-15 years, and 17.8% had more than 15 years of experience respectively. 3.4% of the general dental practitioners (dental GP), 75.9% of dental specialists, 43.4% of the general medical practitioners (medical GP), and 38.5% of medical specialists reported having had formal training on OC during their undergraduate study period. Regarding additional training on OC after graduation, 24.1% of dental GPs, 53.7% of the dental specialists, 20.4% of the medical GPs, and 23.1% of medical specialists had received additional training after graduation. There was a statistically significant association between the field of profession and formal training on OC both during undergraduate study and after graduation (p<0.05). However, there was no statistically significant association observed between the field of profession and time elapsed since last training (p>0.05). Concerning risk factors, most of the participants disagree about obesity. In contrast, the majority are not sure about the use of denture, 48.2% of participants agree about betel quid chewing, 37.6% of them are not sure, and 14.2% disagree. About the consumption of soft drinks, statistics show that 20.9% of participants agree, 34.9% are not sure, and 44% disagree. In contrast, for the consumption of Alcohol, 51.1% of the participants agree, and 30.2% are not sure, and 18.7% disagree. The majority of the participants disagree that the consumption of hot food and beverages is a risk factor for OC. In contrast, the majority of them agree on actinic radiation exposure being a risk factor for OC. 28.9% of participants agree, 39.6% are not sure, and 31.5% disagree about poor oral hygiene. However, the majority disagree on the lower consumption of fruits and vegetables being a risk factor. 34% of participants agree, 35.1% are not sure, and 30.9% of them disagree regarding older age, on the other hand, most of them agree that HPV is a risk factor of OC. Most of dental and medical practitioners agreed that the Non-healing ulcer is a clinical presentation of OC. In addition, 65% of participants chose red and white patches as a clinical presentation. 31.5% of participants chose Xerostomia, whereas 44.7% did not. Most of the participants (60.5%) agreed on the enlarged lymph nodes in the neck. Whereas 30.5% of the participant agreed about petechial- ecchymosis, 42% were not sure, 36.2% agreed that difficulty in chewing was considered a clinical presentation. Still, 38.5% were not sure, and the rest disagreed. Furthermore, the mean knowledge score related to OC was 9.5 for medical, and 9.7 for dental practitioners, however, the difference was not statistically significant (p>0.05). ANOVA test was done to evaluate the differences in the mean scores between medical specialists, dental specialists, medical GPs, and dental GPs. The mean score for all sub-groups was less than 15, and among them, dental specialists had got the highest mean score (10.2), followed by medical GP (9.9), dental GP (9.4), and medical specialist (9.2). However, the difference between them was not statistically significant (p>0.05). Among the participants, 15% and 48.5% of the dental professionals scored high and medium knowledge scores, respectively, compared to 9.5% and 55.6% of the medical professionals. Moreover, the difference in the scores between dental and medical participants was not significant statistically (p>0.05). Besides, among the sub- groups of participants, 15.1% of dental GPs, 15% of medical GPs, 14.8% of dental specialists, and 4.6% of medical specialists got a high knowledge score. On the other hand, the majority of the population (51.6%) got a medium score, and 36.8 % had a low score. The difference in scores between the subgroups of participants was significant (p<0.05). With regard to training on OC, the majority mentioned having had training in their undergraduate studies (63.1%). However, results were similar, with a statistically insignificant difference between the groups (p>0.05), in which 13.8% of those that had training achieved a high knowledge compared to 10.3% who did not. Even though the difference rises slightly when we base our comparison on training after graduation, a high knowledge score was attained by 16.4% of those with training, and 11% of those with no training. Additionally, 35.8% of both groups scored low knowledge. In terms of working experience, no significance was depicted (p>0.05). Nevertheless, the highest score was attained by practitioners with an experience of more than 15 years and those with less than five years (16%). On the contrary,

38% among the other two groups, practitioners with experience of 6-10 and 11-15 years, had low knowledge scores. Among the different intraoral sites, the majority of the participants (38%) considered tongue as the most common site of occurrence of OC, among whom 62.4% were dental, and 37.6% were medical. 20.3% of the total participants (56.5% dental and 43.4% medical) considered floor of the mouth, whereas 18.2% chose buccal mucosa (54.5%: dental, 45.5%: medical) as the most common site. Following that in order were gingiva (14.3%), palate (6.5%), and labia mucosa (2.7%). Results in this question depict better overall knowledge among dental practitioners with a statistically significant association between the variables (p<0.05). In terms of practices, most participants (80.5%) expressed that they often took a detailed medical history; in contrast, 7.5% of participants hardly ever took a medical history. 39.3% of the participants expressed that they routinely conducted comprehensive oral cancer screening, against 28.8% of the participants who expressed to have never conducted a comprehensive oral examination. Most of the participants (43.1%) often do screening for high-risk patients; however, only 23.9% hardly ever do it. The majority (47.6%) refer the patient at a high risk of developing oral cancer to a specialist, but 23.5% do not, regarding referral of OC patient to health care professionals. Statistics depict that most dentists would refer to an oral medicine specialist (53.3% of dental GPs and 48.1% of dental specialist), while for medical practitioners, most of them would refer to an oral & maxillofacial surgeon (52.2% of medical GPs and 52.3% of medical specialists). With regards to opinion and beliefs of the participants on factors related to training of on OC, dental specialists were the most confident of performing oral examination (59.3%) followed by medical specialists (41.5%), while only (27.7%) of medical GPs feel confident to do so. Better confidence has been expressed to provide education to patients on preventive measures of oral cancer by dentists (42.7% of dental GPs and 59.3% of dental specialists) compared to medical practitioners (31% of medical GPs and 34.6% of medical specialists). Finally, the majority of the participants (83.6%) showed interest in receiving additional training on OC (Tables 1-10).

Table 1 Presents demographic and background characteristics of the medical and dental practitioners

Variable	Category	Total		Professional Field							
				Dental GPs		Dental Specialists		Medical GPs		Medical Specialists	
		N	%	N	%	N	%	N	%	N	%
Gender	Male	379	68.9%	122	32.2%	75	19.8%	82	21.6%	100	26.4%
	Female	171	31.1%	77	45.0%	33	19.3%	31	18.1%	30	17.5%
Nationality	Saudi	304	55.3%	129	42.4%	59	19.4%	63	20.7%	53	17.4%
	Non-Saudi	246	44.7%	70	28.5%	49	19.9%	50	20.3%	77	31.3%
Work Sector	Government	249	45.3%	64	25.7%	44	17.7%	74	29.7%	67	26.9%
	Private	301	54.7%	135	44.9%	64	21.3%	39	13.0%	63	20.9%
Years of experience	Less than 5 years	118	21.0%	56	47.5%	11	9.3%	34	28.8%	17	14.4%
	6-10 years	183	33.3%	79	43.2%	34	18.6%	35	19.1%	35	19.1%
	11-15 years	151	27.5%	49	32.5%	37	24.5%	29	19.2%	36	23.8%
	More than 15 years	98	17.8%	15	15.3%	26	26.5%	15	15.3%	42	42.9%

Table 2 Presents association between professional field and training on oral cancer

Variable	Category	Total		Professional Field								Chi-square	p-value
		N	%	Dental GP		Dental Specialist		Medical GP		Medical Specialist			
				N	%	N	%	N	%	N	%		
Training on OC during undergraduate studies	Yes	347	69.4%	166	83.4%	82	75.9%	49	43.4%	50	38.5%	95.699	0.000
	No	203	30.6%	33	16.6%	26	24.1%	64	56.6%	80	61.5%		
Additional training on OC after graduation	Yes	159	31.8%	48	24.1%	58	53.7%	23	20.4%	30	23.1%	40.703	0.000
	No	391	68.2%	151	75.9%	50	46.3%	90	79.6%	100	76.9%		

Time elapsed since last training	Within the last 12 months	21	16.1%	9	18.8%	7	12.1%	3	13.0%	2	6.7%	9.147	0.166
	1-5 years	106	81.5%	31	64.6%	38	65.5%	19	82.6%	18	60.0%		
	More than 5 years	3	2.0%	8	16.7%	13	22.4%	1	4.3%	10	33.3%		

Table 3 Presents participants' knowledge about risk factors for OC

Variable	Category	Total		Professional Field								Chi-square	p-value
		N	%	Dental GP		Dental Specialist		Medical GP		Medical Specialist			
				N	%	N	%	N	%	N	%		
Tobacco smoking	Agree	535	97.3%	194	97.5%	106	98.1%	111	98.2%	124	95.4%	5.173	0.522
	Not sure	10	1.8%	3	1.5%	2	1.9%	2	1.8%	3	2.3%		
	Disagree	5	0.9%	2	1.0%	0	0%	0	0%	3	2.3%		
Tobacco chewing	Agree	475	86.4%	166	83.4%	94	87.0%	104	92.0%	111	85.4%	6.436	0.376
	Not sure	52	9.5%	25	12.6%	8	7.4%	6	5.3%	13	10.0%		
	Disagree	23	4.2%	8	4.0%	6	5.6%	3	2.7%	6	4.6%		
Obesity	Agree	75	13.6%	22	11.1%	13	12.0%	8	7.1%	32	24.6%	22.507	0.001
	Not sure	205	37.3%	77	38.7%	36	33.3%	42	37.2%	50	38.5%		
	Disagree	270	49.1%	100	50.3%	59	54.6%	63	55.8%	48	36.9%		
Use of dentures	Agree	124	22.5%	43	21.6%	31	28.7%	16	14.2%	34	26.2%	17.676	0.007
	Not sure	235	42.7%	77	38.7%	37	34.3%	56	49.6%	65	50.0%		
	Disagree	191	34.7%	79	39.7%	40	37.0%	41	36.3%	31	23.8%		
Betel quid chewing	Agree	265	48.2%	86	43.2%	47	43.5%	62	54.9%	70	53.8%	13.512	0.036
	Not sure	207	37.6%	80	40.2%	39	36.1%	44	38.9%	44	33.8%		
	Disagree	78	14.2%	33	16.6%	22	20.4%	7	6.2%	16	12.3%		
Consumption of soft drinks	Agree	115	20.9%	32	16.1%	26	24.1%	24	21.2%	33	25.4%	10.827	0.288
	Not sure	192	34.9%	70	35.2%	33	30.6%	45	39.8%	44	33.3%		
	Disagree	243	44.0%	97	48.7%	49	45.4%	44	38.9%	53	40.8%		
Consumption of alcohol	Agree	281	51.1%	87	43.7%	66	61.1%	60	53.1%	68	52.3%	10.694	0.098
	Not sure	166	30.2%	72	36.2%	24	22.2%	35	31.0%	35	26.9%		
	Disagree	103	18.7%	40	20.1%	18	16.7%	18	15.9%	27	20.8%		
Consumption of hot food and beverages	Agree	139	25.3%	36	18.1%	33	30.6%	25	22.1%	45	34.6%	14.01	0.03
	Not sure	186	33.8%	74	37.2%	35	32.4%	41	36.3%	36	27.7%		
	Disagree	225	40.9%	89	44.7%	40	37.0%	47	41.6%	49	37.7%		
Actinic radiation exposure	Agree	330	60.0%	93	46.7%	69	63.9%	73	64.6%	95	73.1%	31.288	0.000
	Not sure	152	27.6%	70	35.2%	24	22.2%	34	30.1%	24	18.5%		
	Disagree	68	12.4%	36	18.1%	15	13.9%	6	5.3%	11	8.5%		
Poor oral hygiene	Agree	159	28.9%	41	20.6%	36	33.3%	27	23.9%	55	42.3%	25.026	0.000
	Not sure	218	39.6%	82	41.2%	37	34.3%	49	43.4%	50	38.5%		
	Disagree	173	31.5%	76	38.2%	35	32.4%	37	32.7%	25	19.2%		
Lower consumption of fruits and vegetables	Agree	106	19.3%	32	16.1%	18	16.7%	23	20.4%	33	25.4%	9.962	0.126
	Not sure	182	33.1%	67	33.7%	30	27.8%	37	32.7%	48	36.9%		
	Disagree	262	47.6%	100	50.3%	60	55.6%	53	46.9%	49	37.7%		
Older age	Agree	187	34.0%	51	25.6%	40	37.0%	40	35.4%	56	43.1%	15.332	0.018
	Not sure	193	35.1%	84	42.2%	30	27.8%	42	37.2%	37	28.5%		
	Disagree	170	30.9%	64	32.2%	38	35.2%	31	27.4%	37	28.5%		
HPV	Agree	312	56.7%	86	43.2%	78	72.2%	72	63.7%	76	58.5%	38.189	0.000
	Not sure	179	32.5%	77	38.7%	20	18.5%	36	31.9%	46	35.4%		
	Disagree	59	10.7%	36	18.1%	10	9.3%	5	4.4%	8	6.2%		

Table 4 Summarizes knowledge of medical and dental professionals about the clinical presentations of OC

Variable	Category	Total		Professional Field								Chi-square e	p-value
				Dental GP		Dental Specialist		Medical GP		Medical Specialist			
		N	%	N	%	N	%	N	%	N	%		
Non- heal-ing ulcer	Agree	453	82.4%	170	85.4%	92	85.2%	89	78.8%	102	78.5%	15.075	0.02
	Not sure	80	14.5%	22	11.1%	10	9.3%	24	21.2%	24	18.5%		
	Disagree	17	3.1%	7	3.5%	6	5.6%	0	0%	4	3.1%		
Red and White patch	Agree	361	65.0%	138	69.3%	76	70.4%	73	64.6%	74	56.9%	16.138	0.013
	Not sure	149	27.1%	44	22.1%	21	19.4%	36	31.9%	48	36.9%		
	Disagree	40	7.3%	17	8.5%	11	10.2%	4	3.5%	8	6.2%		
Xerstomi a	Agree	173	31.5%	54	27.1%	47	43.5%	31	27.4%	41	31.5%	21.859	0.001
	Not sure	246	44.7%	90	45.2%	31	28.7%	64	56.6%	61	46.9%		
	Disagree	131	23.8%	55	27.6%	30	27.8%	18	15.9%	28	21.5%		
Enlarged lymhnod e/s in the neck	Agree	333	60.5%	104	52.3%	67	62.0%	68	60.2%	94	72.3%	19.925	0.003
	Not sure	164	29.8%	67	33.7%	28	25.9%	39	34.5%	30	23.1%		
	Disagree	53	9.6%	28	14.1%	13	12.0%	6	5.3%	6	4.6%		
Petechia-ecchymo sis	Agree	168	30.5%	58	29.6%	40	37.0%	23	20.4%	46	35.4%	12.801	0.046
	Not sure	231	42.0%	86	43.2%	36	33.3%	52	46.0%	57	43.8%		
	Disagree	151	27.5%	54	27.1%	32	29.6%	38	33.6%	27	20.8%		
Difficult y in chewing	Agree	199	36.2%	47	23.6%	47	43.5%	36	31.9%	69	53.1%	43.434	0.000
	Not sure	212	38.5%	88	44.2%	30	27.8%	51	45.1%	43	33.1%		
	Disagree	139	26.0%	64	32.2%	31	28.7%	26	23.0%	18	13.8%		

Table 5 Shows the mean scores of knowledge related to OC among the participants

Profession	N	Mean Knowledge Score (SD)	p-value
Medical (Combined GP and Specialists)	243	9.53 (± 3.05)	0.392
Dental (Combined GP and Specialists)	307	9.76 (± 3.37)	
Dental GP	199	9.49 (± 3.48)	0.53
Dental Specialist	108	10.27 (± 3.11)	
Medical GP	113	9.90 (± 3.28)	
Medical Specialist	130	9.20 (± 2.80)	

Table 6 Presents the association between knowledge related to OC and different variables

Variables	Total		Mean Knowledge Score (out of 19)						Chi-square	p-value
			High (≥ 14)		Medium (10-13)		Low (≤ 9)			
			12.50%		51.60%		35.80%			
	N	%	N	%	N	%	N	%		
Professional Field										
Dental professionals	307	55.8%	46	15.0%	149	48.5%	112	36.5%	4.673	0.097
Medical professionals	243	44.2%	23	9.5%	135	55.6%	85	35.0%		

								Chi-square	p-value
Professional Field									
Dental GP	199	36.2%	30	15.1%	91	45.7%	78	39.2%		
Dental Specialist	108	19.6%	16	14.8%	58	53.7%	34	31.5%	12.695	0.048
Medical GP	113	20.5%	17	15.0%	59	52.2%	37	32.7%		
Medical Specialist	130	23.6%	6	4.6%	76	58.5%	48	36.9%		
Training on OC during Undergraduate Studies									
Yes	347	63.1%	48	13.8%	175	50.4%	124	35.7%	1.508	0.471
No	203	36.9%	21	10.3%	109	53.7%	73	36.0%		
Training on OC after Graduation									
Yes	159	28.9%	26	16.4%	76	47.8%	57	35.8%	3.221	0.2
No	391	71.1%	43	11.0%	208	53.2%	140	35.8%		
Working Experience									
less than 5	118	21.5%	19	16.1%	60	50.8%	39	33.1%		
6-10 years	183	33.3%	22	12.0%	92	50.3%	69	37.7%	6.289	0.392
Nov-15	151	27.5%	12	7.9%	81	53.6%	58	38.4%		
more than 15	98	17.8%	16	16.3%	51	52.0%	31	31.6%		

Table 7 Presents participants' knowledge about most and least common sites for oral cancer

	Total		Professional Field							
			Dental GPs		Dental Specialists		Medical GPs		Medical Specialists	
Most Common Site	N	%	N	%	N	%	N	%	N	%
Gingiva	80	14.3%	22	11.1%	7	6.5%	16	14.2%	35	26.9%
Tongue	210	38.0%	79	39.7%	52	48.1%	42	37.2%	37	29.5%
Buccal Mucosa	101	18.2%	30	15.1%	25	23.1%	20	17.7%	26	20.0%
Palate	36	6.5%	13	6.5%	12	11.1%	4	3.5%	8	6.2%
Labial mucosa	16	2.7%	2	1.0%	5	4.6%	5	4.4%	4	3.1%
Floor of the mouth	112	20.3%	52	26.1%	12	11.1%	28	24.8%	21	16.2%

Table 8 Summarizes participants' practices related to OC

Variable	Category	Total		Professional Field								Chi-square	p-value
		N	%	Dental GP		Dental Specialist		Medical GP		Medical Specialist			
				N	%	N	%	N	%	N	%		
How often do you take detailed medical history?	Often	443	80.5%	146	37.4%	93	86.1%	96	85.0%	108	83.1%		
	Sometimes	66	12.0%	34	17.1%	11	10.2%	8	7.1%	13	10.0%	12.66	0.49
	Hardly ever	41	7.5%	19	9.5%	4	3.7%	9	8.0%	9	6.9%		
How frequently do you complete a comprehensive oral cancer screening?	Often	216	39.3%	73	36.7%	57	52.8%	39	34.5%	47	36.2%		
	Sometimes	175	31.8%	70	35.2%	35	32.4%	28	24.8%	42	32.3%	22.03	0.001
	Hardly ever	159	28.9%	56	28.1%	16	14.8%	46	40.7%	41	31.5%		

		Total N	Total %	Dental GP N	%	Dental Spec N	%	Medical GP N	%	Medical Spec N	%	Chi-square	P value
How frequently do you do screening for patient who's suspected to be high risk for OC	Often	237	43.1%	85	42.7%	59	54.6%	41	36.3%	52	40.0%		
	Sometimes	182	33.1%	57	28.6%	37	34.3%	38	33.6%	50	38.5%	18.64	0.005
	Hardly ever	131	23.8%	57	28.6%	12	11.1%	34	30.1%	28	21.5%		
How frequently do you refer a patient at high risk of developing oral cancer to a specialist	Often	262	47.6%	79	39.7%	73	67.6%	52	46.0%	58	44.6%		
	Sometimes	159	28.9%	71	35.7%	24	22.2%	25	22.1%	39	30.0%	30.483	0.000
	Hardly ever	129	23.5%	49	24.6%	11	10.2%	36	31.9%	33	25.4%		

Table 9 Presents participants' practices related to the referral of suspected cases of OC

Variable	Category	Total N	Total %	Dental GPs N	%	Dental Specialists N	%	Medical GPs N	%	Medical Specialists N	%	Chi-square	P value
Referral to health care professionals	General Dentist	48	8.7%	19	9.5%	11	10.2%	9	8.0%	9	6.9%		
	Oral and Maxillo-facial surgeon	230	41.8%	64	32.2%	39	36.1%	59	52.2%	68	52.3%		
	Oral Medicine specialist	219	39.8%	106	53.3%	52	48.1%	35	31.0%	26	20.0%		
	Plastic surgeon	14	2.5%	3	1.5%	2	1.9%	1	0.9%	8	6.2%	67.175	0.000
	ENT Specialist	29	5.3%	3	1.5%	3	2.8%	7	6.2%	16	12.3%		
	Others	10	1.8%	4	2.0%	1	0.9%	2	1.8%	3	2.3%		

Table 10 Summarizes participants' opinion about training on OC

Variable	Category	Total N	Total %	Dental GP N	%	Dental Specialist N	%	Medical GP N	%	Medical Specialist N	%	Chi-square	p-value
I am adequately trained to perform oral cancer examination	Agree	226	41.1%	77	38.7%	64	59.3%	31	27.4%	54	41.5%		
	Not sure	182	33.1%	81	40.7%	29	26.9%	34	30.1%	38	29.2%	40.52	0.000
	Disagree	142	25.8%	41	20.6%	15	13.9	48	42.5%	38	29.2%		
I am adequately trained to provide education to patients on preventive measures for Oral Cancer	Agree	229	41.6%	85	42.7%	64	59.3%	35	31.0%	45	34.6%		
	Not sure	200	36.4%	78	39.2%	33	30.6%	43	38.1%	46	35.4%	30.453	0.000
	Disagree	121	22.0%	36	18.1%	11	10.2%	35	31.0%	39	30.0%		
Dentists, dental assistants, physicians, and nurse practitioners are adequately trained to perform oral cancer examination	Agree	206	37.5%	61	30.7%	51	47.2%	41	36.3%	53	40.8%		
	Not sure	200	36.4%	80	40.2%	38	35.2%	35	31.0%	47	36.2%	13.431	0.037
	Disagree	144	26.2%	58	29.1%	19	17.6%	37	32.7%	30	23.1%		
Interest in receiving additional training on OC	Yes	460	83.6%	175	87.9%	91	84.3%	98	86.7%	96	73.8%		
	No	90	16.4%	24	12.1%	17	15.7%	15	13.3%	34	26.2%	12.616	0.006

DISCUSSION

The study was designed to assess knowledge about risk factors and clinical presentation with a 19 items survey. In comparison, Jaber, et al., [2] conducted a study evaluating knowledge about risk factors composed of 13 items. In both studies, participants were put into categories showing the difference in the knowledge level. In this study: high ($\geq$ 14) medium (10-13) and low knowledge ($\leq$ 9). On the other hand, Jaber, et al., [2] categorized participants into

high (>13) medium (11-13) and low knowledge (≤ 11). Results in this study show 12.5% with high knowledge, 51.6% with moderate, and 35.8% with low knowledge level. On the contrary, Jaber, et al., [2] suggested 0.9% high, 20% moderate, and 79.1% low knowledge. The difference between the two studies can be attributed to sampling size, and time of conduction (before 2009). Statistics depict better confidence to provide patient education and preventive measures against oral cancer by dentists (42.7% of dental GPs and 59.3% of dental specialists), Compared to medical practitioners (31% of medical GPs and 34.6% of medical specialists). This might lead to a lack of community awareness and educational training related to OC's prevention. Most participants (83.6%) were interested in receiving additional training on OC, similar to the study done by Jaber, et al. [2], (81.3%) of participants showed interest in OC continuous education, which might be related to health care professionals acknowledging their lack of knowledge about OC and additionally confirms their willingness to improve.

Risk Factors

In a study conducted by Shrestha, et al., [4] most commonly identified risk factors were tobacco smoking and tobacco chewing 97.3% and 86.4% consequently which was similar to a study carried out by Carter and Ogden [23]. Significantly, most of the medical and dental practitioners identified tobacco smoking as a risk factor for oral cancer, which was consistent with the study done by Carter and Ogden [23]. 51.1% of participants in our study chose the consumption of alcohol as a risk factor. However, only 14.6% in Shrestha, et al. [4], identified Alcohol as a risk factor. Besides, 48.2% of participants in this survey identified Betel quid as a risk factor. On the contrary, Shrestha, et al., identified only 39.1% of participants [4]. In this study, 60% considered radiation as a risk factor, compared to 16% of participants by Shrestha, et al. [4].

Clinical Presentation

Participants in this survey were asked about their knowledge about clinical presentation. 85% of dental and 89% of medical practitioners chose ulcers. Red & white patches were considered by 88% of dental professionals and 60% of medical. Furthermore, 55% of dental and 66% of medical identified enlarged lymph nodes. On the other

hand, Shrestha, et al., [4] study depicts that ulcers were chosen by 69.9% dental and 51.4% by medical. Red and white patches were considered in 47% of dental professionals and 66% of medical. Finally, enlarged lymph nodes were chosen by 15.3% of dental and 23.4% medical practitioners.

Practices

Shrestha, et al., [4] mentioned in their study that the majority of dental and medical selected oral medicine for referral (57.2 %) and oral surgery (45.81 %), followed ENT and general dentist (20.9 %). On the other hand, this study shows 41.8% would refer to an oral surgeon (significantly more dental), and 39.8% to oral medicine (more dental than medical) followed by general dentist (8.7%), ENT (5.3%), plastic surgeon (3.5%) and 1.8% to other specialties. The differences between these two studies can be advocated for the difference in population. This survey was conducted on dental and medical practitioners, whereas Shrestha, et al., [4] conducted their study on dental and medical students. Another difference was the sample size, 550 collected in Riyadh compared to 143 collected in BP institute in Nepal. Moreover, the difference in sample distribution intended for dental and medical centers and clinics in Riyadh. In contrast, Shrestha, et al., [4] study objected to only the BP Koirala Institute of Health Sciences in Nepal.

Importance of Results and their Implication

An intervention is needed to improve the early detection of oral cancer due to it is high mortality and morbidity rates associated. However, evaluating the knowledge, practices, and opinions of dental and medical practitioners about OC is, therefore, a key step towards improving long-term survival. Evaluating knowledge, practices, and opinions of dental and medical practitioners about OC can immensely help in the prevention and early detection of oral cancer. The implementation of preventive measures such as dental counseling and social educational programs will help to reduce the future morbidity/mortality rate that can be connected to delayed detection. In Saudi Arabia, 25% of the general adult population and 25% of university students were smokers, which is one of the world's highest smoking rates [24]. Saudi Arabia has a large community of emigrants, especially people of Southeast Asian origin, where social habits are common such as; areca nut chewing and smokeless tobacco [24].

Limitations

Limitations of this study can be attributed to variation in the following factors: sampling technique, years of experience, nationalities, place of graduation, workplace, working sector, training before and after graduation, and the use of a Likert scale. The sampling technique used was convenient sampling, which does not necessarily cover an area representative of the population. Hence, it is not thorough and is biased to health care centers that are far away. There was no restriction to variation of age, which may show an extreme difference in years of experience. Additionally, undergraduate studies may vary and cause a notable difference. Finally, nationality and place of graduation can explain a gap in knowledge about OC, such as education level and curriculum. Next, the consideration of the risk factor of OC was only based on the Likert scale (agree, not sure, or disagree). The Likert scale does not interpret the likelihood of arising actual risk factors (mild, moderate, and high), and protective factors. In addition, having a neutral option to choose may mask the statistical importance since the human nature tends to select the middle choice and drift to the neutral option, which may help in altering the statistical outcome.

Professional Status

It was one of the inclusion criteria having a particular professional status such as dental GP, Dental specialists, medical GP, ENT, and medical specialists. Dental practitioners and dental specialists are more likely to examine the oral cavity. General medical practitioners are more likely to emphasize more on the general systematic diagnosis. The workplace and working sector were used in the questionnaire to differentiate between HCPs working in governmental and private hospitals and non-hospital settings. Governmental sectors alone can vary significantly in line of work, the same as private sectors, or even hospital or non-hospital settings. The governmental sector alone is too wide to determine. Training before and after undergraduate studies: The inquiry of attending courses related to OC in undergraduate study or after graduation does not show the title of the course or the included information provided by the course.

CONCLUSION

Oral cancer is still considered one of the most common malignant diseases. Proper knowledge about OC risk factors and clinical presentation is a significant necessity for HCPs to aid in prevention and early detection. This survey shows that more than one-third of HCPs scored a low level of knowledge about OC risk factors and clinical presentation which highlights the need to increase knowledge and awareness about OC among practitioners. This study further depicts that most HCPs recognize these deficiencies and are interested in receiving additional training on oral cancer. All in all, Health care providers should exert more efforts to receive further information and education regarding OC to master the knowledge and skill and thus be prepared to serve their patients effectively.

DECLARATIONS

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

[1] Mariño, Rodrigo, et al. "Oral cancer screening practices of oral health professionals in Australia." *BMC Oral Health,* Vol. 17, No. 1, 2017, p. 151.

[2] Jaber, Louay, Sami Shaban, and Deema Hariri. "Oral cancer prevention and early detection: Knowledge and practice among Saudi Arabian healthcare practitioners." *International Journal of Health Care Quality Assurance,* Vol. 25, No. 1, 2012, pp. 64-74.

[3] Cruz, Gustavo D., et al. "Preventing and detecting oral cancer: Oral health care providers' readiness to provide health behavior counseling and oral cancer examinations." *The Journal of the American Dental Association,* Vol. 136, No. 5, 2005, pp. 594-601.

[4] Shrestha, Ashish, et al. "Awareness of undergraduate dental and medical students towards oral cancer." *Journal of Cancer Education,* Vol. 32, No. 4, 2017, pp. 778-83.

[5] Jayasinghe, R. D., et al. "Level of awareness of oral cancer and oral potentially malignant disorders among medical and dental undergraduates." *Ceylon Medical Journal,* Vol. 61, No. 2, 2016, pp. 77-79.

[6] Sitheeque, Mohaideen, Zulkifli Ahmad, and Rajan Saini. "Awareness of oral cancer and precancer among final year medical and dental students of Universiti Sains Malaysia (USM), Malaysia." *Archives of Orofacial Sciences,* Vol. 9, No. 2, 2014, pp. 53-64.

[7] Carter, Lachlan M., and Graham R. Ogden. "Oral cancer awareness of undergraduate medical and dental students." *BMC Medical Education,* Vol. 7, No. 1, 2007, p. 44.

[8] Kujan, Omar, et al. "Knowledge and attitudes of Saudi dental undergraduates on oral cancer." *Journal of Cancer Education,* Vol. 29, No. 4, 2014, pp. 735-38.

[9] Kujan, Omar, et al. "Assessing oral cancer knowledge among Saudi medical undergraduates." *Journal of Cancer Education,* Vol. 28, No. 4, 2013, pp. 717-21.

[10] Salem, Gamil, Ruth Juhl, and Torben Schiødt. "Oral malignant and premalignant changes in 'Shammah'- users from the Gizan region, Saudi Arabia." *Acta Odontologica Scandinavica,* Vol. 42, No. 1, 1984, pp. 41- 45.

[11] Ibrahim, E. M., et al. "Oral cancer in Saudi Arabia: The role of Alqat and Alshammah." *Cancer Detection and Prevention,* Vol. 9, No. 3-4, 1986, pp. 215-18.

[12] Allard, William F., Edward B. DeVol, and Ofelia B. Te. "Smokeless tobacco (shamma) and oral cancer in Saudi Arabia." *Community Dentistry and Oral Epidemiology,* Vol. 27, No. 6, 1999, pp. 398-405.

[13] El-Husseiny, G., et al. "Squamous cell carcinoma of the oral tongue: An analysis of prognostic factors." *British Journal of Oral and Maxillofacial Surgery,* Vol. 38, No. 3, 2000, pp. 193-99.

[14] Zhang, X., et al. "Shammah-induced oral leukoplakia-like lesions." *Oral Oncology,* Vol. 37, No. 7, 2001, pp. 609-12.

[15] Alsanosy, Rashad Mohammed. "Smokeless tobacco (shammah) in Saudi Arabia: A review of its pattern of use, prevalence, and potential role in oral cancer." *Asian Pacific Journal of Cancer Prevention,* Vol. 15, No. 16, 2014, pp. 6477-83.

[16] Al-Ghamdi, Saeed A., et al. "Head and neck cancer in a referral center in Asir region." *Annals of Saudi Medicine,* Vol. 14, No. 5, 1994, pp. 383-86.

[17] Mashberg, Arthur, and Alan M. Samit. "Early detection, diagnosis, and management of oral and oropharyngeal cancer." *CA: A Cancer Journal for Clinicians,* Vol. 39, No. 2, 1989, pp. 67-88.

[18] Pisani, Paola, et al. "Estimates of the worldwide mortality from 25 cancers in 1990." *International Journal of Cancer,* Vol. 83, No. 1, 1999, pp. 18-29.

[19] Silverman Jr, S. O. L. "Demographics and occurrence of oral and pharyngeal cancers: The outcomes, the trends, the challenge." *The Journal of the American Dental Association,* Vol. 132, No. 1, 2001, pp. 7S-11S.

[20] Horowitz, Alice M., and Michael C. Alfano. "Performing a death-defying act." *The Journal of the American Dental Association,* Vol. 132, No. 1, 2001, pp. 5S-6S.

[21] Sciubba, James J. "Oral cancer and its detection: History-taking and the diagnostic phase of management." *The Journal of the American Dental Association,* Vol. 132, No. 1, 2001, pp. 12S-18S.

[22] Alfano, Michael C., and Alice M. Horowitz. "Professional and community efforts to prevent morbidity and mortality from oral cancer." *The Journal of the American Dental Association,* Vol. 132, No. 1, 2001, pp. 24S-29S.

[23] Carter, Lachlan M., and Graham R. Ogden. "Oral cancer awareness of undergraduate medical and dental students." *BMC Medical Education,* Vol. 7, No. 1, 2007, p. 44.

[24] Al-Haqwi, Ali I., Hani Tamim, and Ali Asery. "Knowledge, attitude and practice of tobacco smoking by medical students in Riyadh, Saudi Arabia." *Annals of Thoracic Medicine,* Vol. 5, No. 3, 2010, pp. 145-48.