

Knowledge and Awareness with regard to Oral Cancer and Its Risk Factors among Medical and Dental Students at Majmaah University

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ABSTRACT

BACKGROUND

The incidence of human papillomavirus (HPV) related oral cancer is increasing globally. This study was carried out with an aim to assess the knowledge and awareness of oral cancer and its risk factors among medical and dental students in Saudi Arabia.

METHODS

This cross-sectional study was conducted in Majmaah University, Saudi Arabia, between April and May 2020. A questionnaire was distributed among 343 male and female dental and medical students, who were selected by simple random sampling. Questionnaire was distributed to determine their awareness and knowledge about oral cancer and its risk factors. Their responses were analysed using SPSS version 22 software.

RESULTS

Three hundred and forty-three completed questionnaires were available for analysis. Seventy percent of the respondents were males, 47 % were dental students, and 53 % were medical students. Most (84 %) of respondents agreed strongly that smoking is a risk factor for oral cancer; 70 % agreed strongly that chewing powdered tobacco products like gutka was another risk factor. However, only 25 % of students were aware that HPV could cause oral cancer. Overall, 53 % of students had moderate knowledge, 12 % had good knowledge, 29 % had poor knowledge, and 6 % had no knowledge that HPV was a risk factor. Gender had no effect on depth of knowledge. However, medical students were more knowledgeable about HPV related oral cancer than were dental students.

CONCLUSIONS

Dental and medical students at Majmaah University were not sufficiently informed about oral cancer or the relationship between HPV and oral cancer. Awareness courses and modification of the curriculum to include the risk factors for oral cancer, particularly the relationship between HPV and oral cancer, are recommended.

KEY WORDS

Oral Cancer, Risk Factors, Human Papillomavirus, Awareness, Medical Students, Dental Students, Saudi Arabia

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BACKGROUND

Oral cancers are usually classified as head and neck cancers and include tumours of the oral cavity, oropharynx, nasopharynx, larynx, hypopharynx and lips.¹ Oral cancer is a major health concern and the sixth leading cause of cancer related deaths worldwide.² It also accounts for around 10 % of all malignant neoplasms.³ Furthermore, oral cancers are a growing problem worldwide, with an expected incidence of about 448,000 cases and 228,000 deaths in 2018¹ and about 389,000 new cases per annum.⁴ The incidence of oral cancer and its mortality rates are higher in underdeveloped countries than in the developed countries,⁵ of South-East Asia, where oral cancers account for up to 50 % of all malignant tumours.⁵ Most studies have shown that treatment for oral cancer is most likely to be started at an advanced stage.³ In the Middle East, the prevalence of oral cancer has been reported to be 1.8 – 2.13 / 100,000,⁶ and the incidence varies from 0.5 / 100,000 in Syria,⁷ to 10 / 100,000 in the southern areas of Saudi Arabia,⁸ with wide variation across the different regions in the country. A systematic review reported that the prevalence of oral cancers in Saudi Arabia ranged from 21.6 % to 68.6 %.⁹

There are many risk factors for oral cancer, including use of tobacco, excessive alcohol consumption, chewing betel quid, and various combinations of these habits.¹⁰ Other etiologic factors include ultraviolet exposure (lip cancer), chewing of areca nut, and human papillomavirus (HPV) infection.¹¹ An infectious aetiology is associated with at least 20 % of cancers worldwide, and viruses are responsible for around 15 % of all human cancers.¹² In one study, HPV was identified in up to 75 % of oropharyngeal tumour biopsies.¹¹ In another study, approximately 4.5 % of all oropharyngeal cancers were attributed to HPV, with an estimated 630,000 new cases diagnosed each year.¹³

HPV is a well-known sexually transmitted infection. Approximately 6 million persons are diagnosed to have HPV infection each year, and about 9.0 % – 13.0 % of the world's population has already been infected.¹² In a study performed in Saudi Arabia, HPV-DNA was detected in 9.8 % of 417 women.¹⁴ HPV has been associated with various types of human malignancies, including cervical, vulvar, vaginal, penile, anal and head and neck cancers.¹⁵

HPV related oropharyngeal cancers are closely linked to smoking and alcohol consumption.¹⁰ Some reports have shown that the risk of oral cancer is up to 15 times higher in smokers than in non-smokers.¹⁶ Although, consumption of alcohol is very low in Saudi Arabia, smoking is very common in men.

Furthermore, there is a large community of expatriates in Saudi Arabia, especially people from South-East Asia, where social chewing of areca nut is common. These factors are likely to result in an increased incidence of oral cancers in Saudi Arabia in the coming years.¹⁰

The high mortality rate associated with oral cancer can be explained by the late presentation in a large proportion of patients.¹⁷ Oral cancer has among the lowest 5-year survival rates of all cancers.¹⁸ Although the oral cavity is easily accessed for clinical examination, lack of awareness on the part of both patients and health care professionals leads to failure of early detection of precancerous and early cancerous oral lesions.¹⁹ The most effective way to improve the survival rate in patients with oral cancer is early detection, one study showed that

patients with an early diagnosis of oral cancer had a higher survival rate than those who were diagnosed with the disease in its advanced stages.²⁰ Therefore, increased awareness among the public and health care providers is key to improving the survival rate in patients with oral cancer.

The aim of this study was to assess the level of knowledge about oral cancer and its risk factors among dental and medical students at Majmaah University in Saudi Arabia. To our knowledge, this study is the first to address this topic and we anticipate that its findings will be useful at both the national and regional levels.

METHODS

This cross-sectional study was carried out on medical and dental students studying in Majmaah University from April 2020 to May 2020 after approval by the ethics committee at King Fahad Medical City. The study population was students studying in level 3 - 5 at university colleges of medicine and dentistry. Assuming the knowledge prevalence as of 50 % and $q (1 - p)$ as 50 % and confidence value of 95 % and error of 5 %, the study sample was calculated to be 385 based on the formula $N = z^2 pq / e^2$. Prior consent was taken before administering the questionnaire. Questionnaire was distributed by simple random sampling among students. About 23 students didn't give consent for participation and 19 students filled the questionnaire incompletely, were excluded from the study making the final sample size of 343. The questionnaire devised has section on information on demographic variables, including gender, age, academic level (undergraduate, intern, graduate, and postgraduate), and specialty. The other section of questionnaire contained 19 questions, each of which had five possible responses ("strongly agree", "somewhat agree", "somewhat disagree", "strongly disagree", and "I don't know").

Statistical Analysis

Data entry and analysis was done using SPSS version 23. Frequencies and percentages were calculated. Chi-square test was used to test the significant difference in proportions and percentages between the groups. $P < 0.05$ was considered to be statistically significant.

RESULTS

Among 343 students, 239 (70 %) of respondents were males and 104 (30.3 %) were females. 160 (47 %) were dental students, and 183 (53 %) were medical students. About 180 (52.5 %) of respondents were in their fourth year of study, 157 (45.8 %) were in their fifth year, and 6 (1.7 %) were in their third year. The proportions of respondents in each year of study was distributed evenly between the medical and dental colleges (Table 1).

Most respondents, 288 (84 %) agreed strongly that smoking is a risk factor for oral cancer; about 205 (71 %) of these students were males, 152 (52.8 %) were medical students, and 148 (51.4 %) were in their fourth year of study. There was a significant relationship between awareness of

smoking as a risk factor and gender, specialisation (medical or dental), and year of study (all $P < 0.05$; Table 3).

About 238 (70 %) of respondents agreed strongly that chewing powdered tobacco products like gutka was also a risk factor for oral cancer; 162 (68 %) of these respondents were males, 124 (52 %) were dental students, and 126 (52.9 %) were in their fourth year. Overall, gender and specialisation were significantly associated with the respondents' awareness of chewing powdered tobacco products as a risk factor (both $P < 0.05$; Table 3).

In contrast, only 84 (25 %) of respondents knew that HPV could cause oral cancer; 66 (78.60 %) were males, 58 (50 %) were medical students, and 43 (51.2 %) were in their fourth year. Gender, specialisation, and year of study were significantly associated with the respondents' knowledge about this risk factor (all $P < 0.05$; Table 3). Moreover, 56 (16.3 %) of respondents agreed strongly that chronic mechanical irritation was a risk factor for oral cancer; 32 (57.10 %) of these respondents were males, 23 (50 %) were medical students, and 38 (67.9 %) were in their fourth year. Gender, specialisation, and year of study were all significantly associated with the respondents' awareness of chronic mechanical irritation as a risk factor (Table 3).

Fifty-three percent of respondents had moderate knowledge about oral cancer, 12 % had good knowledge, 29 % had poor knowledge, and 6 % had no knowledge at all (Figure 1). There was no significant relationship between gender and knowledge about oral cancer; 272 (79.50 %) of the respondents with good knowledge were males, 102 (29.7 %) of those with moderate knowledge were females, 217 (63.4 %) of those with poor knowledge were males, and 82 (23.8 %) of those with no knowledge were females (Table 2). In contrast, there was a significant relationship between specialisation and knowledge about oral cancer; 70 (20.5 %) of respondents who had good knowledge were dental students, 181 (52.7 %) of those with moderate knowledge were medical students, 203 (59.4 %) of those with poor knowledge were dental students, and 203 (71.4 %) of those with no knowledge were medical students.

Year of study also had a significant effect on knowledge about oral cancer. In total, 167 (48.7 %) of students with good knowledge were in their fourth year, 158 (46.20 %) were in their fifth year; half of those with moderate knowledge were in their fourth year and 4 (1.1 %) were in their third year. Most 220 (64.4 %) of the students with poor knowledge were in their fourth year and 117 (33.7 %) in their fifth year. No student in their third year was aware of oral cancer whereas 262 (76.2 %) of those in their fifth year knew about the disease.

The level of respondents' knowledge about HPV as a risk factor for oral cancer is summarised in Table 4. We found that

58 (16.9 %) of respondents agreed strongly with the untrue statement that all types of HPV can cause oral cancer and 87 (25.4 %) somewhat agreed. We also found that 87 (25.4 %) of respondents agreed strongly that some types of HPV cause cervical cancer and 94 (27.4 %) somewhat agreed. In response to the untrue statement that HPV causes herpes and cold sores, 73 (20 %) of respondents strongly agreed, 96 (29 %) somewhat agreed, 44 (12 %) somewhat disagreed, 72 (20 %) strongly disagreed, and 62 (19 %) were unsure. When asked if HPV could cause acquired immune deficiency syndrome, 80 (23 %) strongly agreed, 54 (16 %) somewhat agreed, 70 (20 %) somewhat disagreed, 76 (22 %) strongly disagreed, and 63 (18 %) were unsure. When asked if HPV is a sexually transmitted virus, most respondents agreed [155 (45 %) strongly, 92 (27 %) somewhat], 35 (10 %) strongly or somewhat disagreed, and 29 (9 %) were unsure. Most respondents agreed that HPV can be spread by deep kissing [163 (48 %) strongly, 94 (27 %) somewhat] and contaminated instruments [137 (40 %) strongly, 101 (30 %) somewhat]. The distribution of answers according to demographic characteristics is shown in Table 4.

Many respondents were confident that they had enough knowledge to diagnose oral cancer (20 % strongly agreed, 26 % somewhat agreed). Confidence was highest in male respondents, dental students, and those in their earlier years of study. However, most of the respondents reported that they had never encountered a case of oral cancer and did not know anybody with the disease (36.4 % strongly disagree, 39.7 % I don't know). Table 5 shows the distribution of answers according to demographic characteristics.

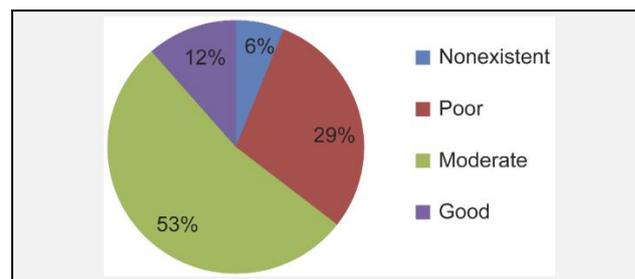


Figure 1. Level of Knowledge about Oral Cancer among Dental and Medical Students

		n	%
Gender	Male	239	69.7
	Female	104	30.3
Specialization	Dentistry	160	46.6
	Medicine	183	53.4
Year of study	Third	6	1.7
	Fourth	180	52.5
	Fifth	157	45.8
	Total	343	100.0

Table 1. Demographic Distribution of Respondents According to Specialization, Gender and Year of Study

		Level of Knowledge %				P-Value
		Non-Existent	Poor	Moderate	Good	
Gender	Male	261 (76.2 %)	217 (63.4 %)	241 (70.3 %)	272 (79.5 %)	0.247
	Female	82 (23.8 %)	126 (36.6 %)	102 (29.7 %)	71 (20.5 %)	
	Total	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	
Specialization	Dental	98 (28.6 %)	203 (59.4 %)	162 (47.3 %)	70 (20.5 %)	0.001*
	Medical	203 (71.4 %)	140 (40.6 %)	181 (52.7 %)	273 (79.5 %)	
	Total	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	
Year of study	Third	0 (0.0 %)	6 (2.0 %)	4 (1.1 %)	18 (5.1 %)	0.007*
	Fourth	81 (23.8 %)	220 (64.4 %)	171 (50.0 %)	167 (48.7 %)	
	Fifth	262 (76.2 %)	117 (33.7 %)	168 (48.9 %)	158 (46.2 %)	
	Total	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	

Table 2. Respondents' Level of Knowledge According to Gender, Specialization and Year of Study

*Statistically significant at $P \leq 0.05$

		Gender %		Specialization %		Year of Study %			Total N (%)
		Male	Female	Dental	Medical	Third	Fourth	Fifth	
Smoking	Strongly agree	205 (71.20 %)	83 (28.8 %)	136(47.2 %)	152 (52.8 %)	6 (2.1 %)	148 (51.4 %)	134 (46.5 %)	288 (83.97 %)
	Somewhat agree	6 (31.60 %)	13 (68.40 %)	14 (73.7 %)	5 (26.3 %)	0 (0.0 %)	17 (89.5 %)	2 (10.5 %)	19 (5.54 %)
	Somewhat disagree	6 (75.0 %)	2 (25.0 %)	4 (50.0 %)	4 (50.0 %)	0 (0.0 %)	4 (50.0 %)	4 (50.0 %)	8 (2.33 %)
	Strongly disagree	2 (100.0 %)	0 (0.0 %)	2 (100.0 %)	0 (0.0 %)	0 (0.0 %)	100.0	0 (0.0 %)	2 (0.58 %)
	I don't know	27 (76.9 %)	6 (23.1 %)	4 (15.4 %)	22 (84.6 %)	0 (0.0 %)	17 (34.6 %)	9 (65.4 %)	26 (7.58 %)
	P-value	0.005*		0.001*		0.031*			343 (100 %)
Chewing powdered tobacco products like gutkha	Strongly agree	162 (68.1 %)	76 (31.9 %)	124 (52.1 %)	114 (47.9 %)	4 (1.7 %)	126 (52.9 %)	108 (45.4 %)	238 (69.3 %)
	Somewhat agree	33 (60.0 %)	22 (40.0 %)	30 (54.5 %)	25 (45.5 %)	2 (3.6 %)	30 (54.5 %)	23 (41.8 %)	55 (16.0 %)
	Somewhat disagree	2 (100.0 %)	0 (0.0 %)	2 (100.0 %)	0 (0.0 %)	0 (0.0 %)	2 (100.0 %)	0 (0.0 %)	2 (0.5 %)
	Strongly disagree	0 (0.0 %)	2 (100.0 %)	0 (0.0 %)	2 (100.0 %)	0 (0.0 %)	2 (100.0 %)	0 (0.0 %)	2 (0.5 %)
	I don't know	42 (91.3 %)	4 (8.7 %)	4 (8.7 %)	42 (91.3 %)	0 (0.0 %)	20 (43.5 %)	26 (56.5 %)	46 (13.4 %)
	P-value	0.001*		0.000*		0.466			100.00
Virus	Strongly agree	66(78.6 %)	18 (21.4 %)	26 (31.0 %)	58 (69.0 %)	4 (4.8 %)	43 (51.2 %)	37 (44.0 %)	84 (24.4 %)
	Somewhat agree	89 (72.4 %)	34 (27.6 %)	75 (60.2 %)	48 (39.8 %)	0 (0.0 %)	55 (44.7 %)	68 (55.3 %)	123 (35.8 %)
	Somewhat disagree	32 (61.5 %)	20 (38.5 %)	36 (69.2 %)	16 (30.8 %)	0 (0.0 %)	30 (57.7 %)	22 (42.3 %)	52 (15.1 %)
	Strongly disagree	11 (42.3 %)	15 (57.7 %)	12 (46.2 %)	14 (53.8 %)	0 (0.0 %)	18 (69.2 %)	8 (30.8 %)	26 (7.5 %)
	I don't know	41 (70.7 %)	17 (29.3 %)	12 (20.7 %)	46 (79.3 %)	2 (3.4 %)	34 (58.6 %)	22 (37.9 %)	58 (16.9 %)
	P-value	0.006*		0.000*		0.030*			100.00
Chronic mechanical irritation	Strongly agree	32 (57.1 %)	24 (42.9 %)	23 (50.0 %)	23 (50.0 %)	0 (0.0 %)	38 (67.9 %)	18 (32.1 %)	56 (16.3 %)
	Somewhat agree	72 (73.5 %)	26 (26.5 %)	50 (51.0 %)	48 (49.0 %)	4 (4.1 %)	31 (31.6 %)	63 (64.3 %)	98 (28.5 %)
	Somewhat disagree	53 (79.1 %)	14 (20.9 %)	40 (59.7 %)	27 (40.3 %)	0 (0.0 %)	39 (58.2 %)	28 (41.8 %)	67 (19.5 %)
	Strongly disagree	22 (47.8 %)	24 (52.2 %)	22 (47.8 %)	24 (52.2 %)	0 (0.0 %)	34 (73.9 %)	12 (26.1 %)	46 (13.4 %)
	I don't know	60 (78.9 %)	16 (21.1 %)	20 (26.3 %)	56 (73.7 %)	2 (2.6 %)	38 (50.0 %)	36 (47.4 %)	76 (22.1 %)
	P-value	0.000*		0.001*		0.000*			100.00

Table 3. Respondents' Answers to Questions about Risk Factors for Oral Cancer According to Specialization, Gender and Year of Study

*Statistically significant at P ≤ 0.05

		Gender %		Specialization %		Year of Study %			Total
		Male	Female	Dental	Medical	Third	Fourth	Fifth	
Can all types of HPV cause oral cancer?	Strongly agree	63 (18.4 %)	46 (13.5 %)	60 (17.5 %)	56 (16.4 %)	0 (0.0 %)	5 (15.0 %)	68 (19.7 %)	58 (16.9 %)
	Somewhat agree	79 (23.0 %)	106 (30.8 %)	116 (33.8 %)	62 (18.0 %)	114 (33.3 %)	92 (26.7 %)	81 (23.6 %)	87 (25.4 %)
	Somewhat disagree	67 (19.7 %)	59 (17.3 %)	68 (20.0 %)	62 (18.0 %)	0	72 (21.1 %)	59 (17.2 %)	65 (19.0 %)
	Strongly disagree	89 (25.9 %)	40 (11.5 %)	43 (12.5 %)	101 (29.5 %)	114 (33.3 %)	76 (22.2 %)	70 (20.4 %)	74 (21.6 %)
	I don't know	45 (13.0 %)	92 (26.9 %)	56 (16.2 %)	62 (18.0 %)	114 (33.3 %)	52 (15.0 %)	65 (19.1 %)	59 (17.2 %)
		343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)
Can some types of HPV cause cervical cancer?	Strongly agree	108 (31.4 %)	39 (11.5 %)	73 (21.2 %)	99 (29.0 %)	228 (66.7 %)	80 (23.3 %)	90 (26.1 %)	87 (25.4 %)
	Somewhat agree	87 (25.5 %)	109 (31.7 %)	120 (35.0 %)	71 (20.8 %)	0 (0.0 %)	95 (27.8 %)	96 (28.0 %)	94 (27.4 %)
	Somewhat disagree	40 (11.7 %)	73 (21.2 %)	47 (13.8 %)	52 (15.3 %)	115 (33.3 %)	44 (12.8 %)	54 (15.9 %)	50 (14.6 %)
	Strongly disagree	63 (18.4 %)	20 (5.8 %)	26 (7.5 %)	72 (20.8 %)	0 (0.0 %)	46 (13.3 %)	57 (16.6 %)	50 (14.6 %)
	I don't know	45 (13.0 %)	102 (29.8 %)	77 (22.5 %)	49 (14.2 %)	0 (0.0 %)	78 (22.8 %)	46 (13.4 %)	62 (18.1 %)
		343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)
Can HPV cause herpes and cold sores?	Strongly agree	75 (21.8 %)	53(15.4 %)	47 (13.8 %)	86 (25.1 %)	114 (33.3 %)	72 (20.6 %)	63 (18.5 %)	68 (19.8 %)
	Somewhat agree	92 (26.8 %)	119(34.6 %)	146 (42.5 %)	60 (17.5 %)	0 (0.0 %)	96 (27.8 %)	109 (31.8 %)	100 (29.2 %)
	Somewhat disagree	43 (12.6 %)	33 (9.6 %)	38 (11.2 %)	41 (12.0 %)	0 (0.0 %)	28 (8.3 %)	55 (15.9 %)	40 (11.7 %)
	Strongly disagree	92 (26.8 %)	19 (5.8 %)	26 (7.5 %)	109 (31.7 %)	0 (0.0 %)	67 (20.0 %)	74 (21.7 %)	70 (20.4 %)
	I don't know	41 (12.1 %)	119 (34.6 %)	86 (25.0 %)	47 (13.7 %)	229 (66.7%)	80 (23.3 %)	42 (12.1 %)	65 (19.0 %)
		343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)
Can HPV cause AIDS?	Strongly agree	59 (17.2 %)	128 (37.5 %)	90 (26.2 %)	71 (20.8 %)	114 (33.3 %)	92 (26.7 %)	66 (19.1 %)	80 (23.3 %)
	Somewhat agree	52 (15.1 %)	60 (17.3 %)	85 (25.0 %)	26 (7.7 %)	0 (0.0 %)	61 (17.8 %)	48 (14.0 %)	54 (15.7 %)
	Somewhat disagree	92 (26.8 %)	20 (5.8 %)	60 (17.5 %)	79 (23.0 %)	114 (33.3 %)	61 (17.8 %)	79 (22.9 %)	70 (20.4 %)
	Strongly disagree	95 (27.6 %)	33 (9.6 %)	34 (10.0 %)	112 (32.8 %)	0 (0.0 %)	70 (20.6 %)	85 (24.8 %)	76 (22.2 %)
	I don't know	45 (13.4 %)	102 (29.8 %)	74 (21.2 %)	54 (15.8 %)	114 (33.3 %)	59 (17.2 %)	66 (19.1 %)	63 (18.4 %)
		343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)
Is HPV a sexually transmitted disease?	Strongly agree	155 (45.2 %)	155 (45.2 %)	141 (41.2 %)	167 (48.6 %)	114 (33.3 %)	141 (41.1 %)	173 (50.3 %)	155 (45.2 %)
	Somewhat agree	89 (25.9 %)	99 (28.8 %)	103 (30 %)	82 (24.0 %)	229(66.7 %)	88 (25.6 %)	92 (26.8 %)	92 (26.8 %)
	Somewhat disagree	39 (11.3 %)	26 (7.7 %)	47 (13.8 %)	24 (7.1 %)	0 (0.0 %)	36 (10.6 %)	35 (10.2 %)	35 (10.2 %)
	Strongly disagree	36 (10.5 %)	14 (3.80 %)	9 (2.5 %)	47 (13.7 %)	0 (0.0 %)	44 (12.8 %)	13 (3.8 %)	29 (8.5 %)
	I don't know	24 (7.1 %)	49 (14.4 %)	43 (12.5 %)	22 (6.6 %)	0 (0.0 %)	34 (10.0 %)	30 (8.9 %)	32 (9.3 %)
		343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)
Can HPV be spread by deep kissing?	Strongly agree	161 (46.9 %)	168 (49.0 %)	102 (32 %)	208 (60.7 %)	229 (66.7 %)	156(45.6 %)	168 (49.0 %)	163 (47.5 %)
	Somewhat agree	91 (26.4 %)	102 (29.8 %)	110 (35.0 %)	71 (20.8 %)	114 (33.3 %)	99 (28.9 %)	87 (25.5 %)	94 (27.4 %)
	Somewhat disagree	39 (11.3 %)	13 (3.8 %)	47 (13.8 %)	17 (4.9 %)	0 (0.0 %)	24 (7.2 %)	40 (11.5 %)	31 (9.0 %)
	Strongly disagree	16 (4.6 %)	33 (9.6 %)	26 (7.5 %)	17 (4.9 %)	0 (0.0 %)	19 (5.6 %)	24 (7.0 %)	21 (6.1 %)
	I don't know	36 (10.9 %)	27 (7.7 %)	38 (11.2 %)	30 (8.75)	0 (0.0 %)	45 (12.8 %)	24 (7.0 %)	34 (9.9 %)
		343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)
Can HPV be spread by contaminated instruments?	Strongly agree	136 (39.7 %)	138 (40.4 %)	124 (36.2 %)	148 (43.2 %)	229 (66.7 %)	127 (37.2 %)	144 (42.0 %)	137 (39.9 %)
	Somewhat agree	104 (30.1 %)	99 (28.8 %)	124 (36.2 %)	82 (24.0 %)	114 (33.3 %)	107 (31.1 %)	46 (28.0 %)	101 (29.7 %)
	Somewhat disagree	49 (14.2 %)	31 (8.7 %)	34 (10.0 %)	51 (14.8 %)	27 (7.9 %)	38 (11.1 %)	50 (14.6 %)	43 (12.5 %)
	Strongly disagree	27 (7.9 %)	22 (6.7 %)	17 (5.0 %)	34 (9.8 %)	27 (7.9 %)	31 (8.9 %)	23 (6.4 %)	26 (7.6 %)
	I don't know	27 (7.9 %)	53 (15.4 %)	44 (12.5 %)	28 (8.2 %)	27 (7.9 %)	40 (11.7 %)	30 (8.9 %)	36 (10.2 %)
		343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)	343 (100 %)

Table 4. Respondents' Level of Knowledge about the Relationship between Human Papillomavirus and Oral Cancer According to Specialization, Gender, and Year of Study

HPV: human papillomavirus

		Gender %		Specialization %		Year of study %			Total %
		Male	Female	Dental	Medical	Third	Fourth	Fifth	
I have sufficient knowledge to diagnose oral cancer	Strongly agree	23.80	11.50	27.50	13.70	66.70	19.40	19.10	20.10
	Somewhat agree	20.90	38.50	26.20	26.20	0.00	26.10	27.40	26.20
	Somewhat disagree	23.80	22.10	18.80	27.30	33.30	21.70	24.80	23.30
	Strongly disagree	20.50	7.70	10.00	22.40	0.00	20.00	13.40	16.60
	I don't know	10.90	20.20	17.50	10.40	0.00	12.80	15.30	13.70
I have examined a case of oral cancer or know a person with oral cancer	Strongly agree	10.50	13.50	15.00	8.20	0.00	13.90	8.90	11.40
	Somewhat agree	3.30	5.80	6.20	2.20	0.00	2.20	6.40	4.10
	Somewhat disagree	7.90	9.60	12.50	4.90	0.00	4.40	13.40	8.50
	Strongly disagree	33.50	43.30	35.00	37.70	66.70	40.60	30.60	36.40
	I don't know	44.80	27.90	31.20	47.00	33.30	38.90	40.8	39.70

Table 5. Respondents' Experience in the Diagnosis of Oral Cancer According to Specialization, Gender, and Year of Study

DISCUSSION

The aim of this questionnaire survey was to assess the level of knowledge of medical and dental students at Majmaah University about oral cancer and its risk factors. This research is important because HPV is likely to become the most common risk factor for oral cancer in the next decade. Furthermore, in Saudi Arabia, there are many risk factors for oral cancer that are more widespread than in other countries, such as smoking and chewing areca nut. Moreover, there is a relationship between HPV and cancerous oral lesions,²¹ which all doctors and dentists should be aware of to ensure that oral cancer can be diagnosed as early as possible

Overall, students in this study had moderate knowledge about oral cancer. However, only a quarter of students knew that HPV can cause oral cancer. Furthermore, only 45 % of all questions related to HPV in this survey were answered correctly, which is consistent with the findings of other researchers. A study by Lewandowski et al. found that 43.4 % of university students were unaware of any relationship between HPV and the risk of oral cancer.²²

We found no significant relationship between student gender and level of knowledge, which can be explained by the educational system in Saudi Arabia being gender-neutral and the religion-based restrictions on extramarital sexual relationships in the country.

We anticipated that dental students would have a higher level of knowledge about oral cancer. However, we found that more questions were answered correctly by medical students than by dental students. A possible reason for this finding is that people tend to visit a doctor rather than a dentist when they have oral symptoms.²³ For example, a study in the UK found that individuals considered to be at increased risk of oral cancer were more likely to consult their general practitioner than a dentist.²⁴ Therefore, medical students may be more aware of causes of oral pathology and the relationship between oral cancer and HPV. Moreover, most students in our study associated HPV more with other sexually transmitted diseases than with oral cancer.

We found that both medical students and dental students in their more advanced years of study had better knowledge about oral cancer and HPV, probably because they had received more training in oral pathology and were more likely to have read about or come into contact with a cases of oral cancer. This finding was in line with that of another study which reported that the mean oral cancer knowledge score increased with every year of academic study.²⁵

Improving the awareness and knowledge of dental and medical students about oral cancer, including its relationship

with HPV, is a key step towards increasing the likelihood of detection of the disease in its earlier stages and decreasing the associated high mortality and morbidity rates. Implementation of preventive measures, such as dental and medical counselling and lifestyle education programs, would help to reduce the morbidity and mortality rates that result from delayed detection. Medical and dental students' awareness and knowledge about oral cancer could be improved by revising the undergraduate curriculum to include more detailed information on risk factors, such as smoking and chewing areca nut, which are widespread in Saudi Arabia. One study in Saudi Arabia reported that 25 % of the general adult population and 25 % of university students were smokers; these rates are among the highest in the world.¹⁷ Saudi Arabia also has a large community of immigrants, particularly from South-East Asia, where areca nut chewing and smokeless tobacco consumption rates are high.¹⁷

This study has some limitations. This is a cross-sectional study conducted in one medical college; therefore findings may not generalize to medical and dental students at other institutions. Moreover, there was a low response rate from the third year students, compared to the response rate from students in the other levels. In general, this study had a relatively small sample size, again suggesting caution when generalizing the results. Given these limitations, further longitudinal studies with larger sample sizes must be carried out in medical colleges throughout Saudi Arabia to conclude more valid outcomes.

CONCLUSIONS

The findings of this study indicate that dental and medical students at Majmaah University have insufficient knowledge about oral cancer and its risk factors, particularly its relationship with HPV infection. This lack of knowledge is more apparent in dental students but had no association with gender. Improving the awareness and knowledge of dental and medical students about oral cancer, including its relationship with HPV, is a key step towards earlier detection of oral cancer and decreasing the mortality and morbidity rates associated with this disease. Preventive measures, such as dental and medical counselling and lifestyle programs, would help to decrease the high morbidity and mortality rates that result from delayed detection.

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