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Turkish dental students' knowledge, attitudes, and awareness of oral cancer



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Abstract

Purpose This survey aimed to assess the knowledge, attitudes, and awareness of dental students across multiple dental faculties in Turkey regarding oral cancer.

Methods The survey instrument, derived from the questionnaire developed by Horowitz et al., was translated into Turkish and distributed to participants. The survey consisted of 27 questions assessing participants' practices regarding oral cancer examination, their evaluation of patient risk factors, and their perceptions of their educational preparedness. Statistical analyses were conducted using IBM SPSS V23. The Fisher-Freeman-Halton test and Pearson Chi-Square test were employed for categorical data comparisons, while multiple comparisons were analyzed with the Bonferroni-corrected Z test. A significance level of p < 0.05 was applied.

Results The study enrolled a total of 603 dental students (239 males [39.6%] and 364 females [60.4%]) from 10 different dental faculties. Participants were distributed across three academic years, with 202 (33.5%) in the third grade, 280 (46.4%) in the fourth grade, and 121 (20.1%) in the fifth grade. The findings indicated that students demonstrated a high level of awareness regarding factors such as tobacco (98.7%), alcohol (82.9%), and ultraviolet (UV) exposure (94.5%). However, their knowledge appeared to be lacking in relation to other risk factors, including older age (74.9%) and Human Papillomavirus (HPV) infection (83.7%).

Conclusion Overall, the study suggests that dental students in Turkey exhibit a moderate level of awareness concerning oral cancer. The outcomes of this investigation underscore the pressing need for enhancements in oral cancer education and training for undergraduate dental students. Furthermore, there is a visible need for the implementation of periodic, well-structured continuing professional development activities aimed at enhancing the oral cancer-related competencies of dental professionals in practice.

Keywords Awareness, Oral cancer, Prevention, Questionnaire

Introduction

Cancer remains one of the leading causes of death worldwide, with projections suggesting it may become the most prevalent cause by 2030 [1, 2]. Oral cancers, accounting for approximately 2–4% of all malignancies, warrant special attention due to their significant impact

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Oral cancer is more prevalent in men and ranks among the leading causes of cancer-related mortality worldwide. The etiology of oral cancer is inherently multifactorial, with several identified risk factors contributing to its manifestation. Notable contributors encompass habitual smoking and alcohol consumption, a history of Human



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papillomavirus (HPV) infection, particularly as a significant risk factor for oropharyngeal cancer ultraviolet (UV) exposure [8], which is strongly associated with lip cancer development [9], and an age exceeding 45 years [10, 11]. Other potential contributors include malnutrition, immune deficiencies, and socioeconomic status [12].

Despite the oral cavity's accessibility for examination, early diagnosis rates for oral cancer remain low, ranging from 26 to 48% [5, 13]. Dentists play a crucial role in prevention through routine screenings and patient education on risk factors [14, 15]. The meticulous and comprehensive examination of regions susceptible to oral cancer development holds the potential to be life-saving. This necessitates that dentists possess adept knowledge concerning the attributes of lesions, their anatomical localization, and the judicious management of patients presenting with suspicious lesions. The execution of such examinations demands precision and expertise, underscoring the imperative for dentists to be well-versed in the nuanced aspects of lesion characteristics and strategic patient management within the context of oral cancer prevention [16, 17]

Notwithstanding the dentist's role in diagnosing malignant and potentially malignant oral lesions, research conducted across diverse nations indicates a notable lack of routine engagement by dentists and dental students in procedures dedicated to the prevention and early diagnosis of oral cancer [18, 19]. This underscores a critical gap in the implementation of preventive measures within dental care, emphasizing the imperative for enhanced vigilance and proactive approaches in the context of oral cancer detection.

Numerous survey investigations have been undertaken globally to assess dentists' cognizance and attitudes about oral cancer. However, existing research on this topic is insufficient in the Turkish context. The present study seeks to appraise the knowledge, attitudes, and awareness levels among dental students enrolled in diverse dental faculties across Turkey concerning the aspects associated with the prevention and early diagnosis of oral cancer. The intended benefits of this study include identifying gaps in current educational programs and informing the development of targeted interventions to improve oral cancer-related competencies among future dental professionals.

Study subjects and methods

Ethics committee approval

Ethical approval for the execution of the survey study was obtained from the local Ethics Committee at Necmettin Erbakan University, by the approval document dated July 27, 2023, and denoted by reference number 2023/330.

Participants

Voluntary participation constituted a fundamental tenet of this study, which enrolled only third, fourth, and fifthyear dental students, as these students have received foundational coursework on oral pathology and cancer detection, and they are actively engaged in clinical practice. First- and second-year students were excluded since their curriculum focuses on basic sciences and preclinical education rather than clinical experience.

The inclusion criteria were: (i) being a third, fourth, or fifth-year dental student enrolled in one of the participating faculties, (ii) voluntarily agreeing to participate, and (iii) completing the questionnaire in full. Exclusion criteria included: (i) first- or second-year dental students, (ii) refusal to participate, and (iii) incomplete survey responses. All participants provided informed consent, and strict measures were taken to ensure the anonymity of all data throughout the processing phase.

Questionnaire and translation process

The questionnaire used in this study was adapted from the survey developed by Horowitz et al. [4] was translated into Turkish for use in this study. The English questionnaire had previously been translated into Turkish and administered by Hasanoğlu Erbaşar and Alparslan [5]. The survey consisted of 27 questions, divided into three main sections: (i) knowledge of oral cancer risk factors, signs, and symptoms; (ii) attitudes toward oral cancer screening and prevention; and (iii) self-reported clinical practices regarding oral cancer examination and patient education.

The knowledge section included multiple-choice and true/false questions assessing awareness of risk factors such as tobacco, alcohol, HPV infection, ultraviolet exposure, and age. The attitudes section used a 5-point Likert scale (strongly agree to strongly disagree) to evaluate perceptions of professional responsibility, confidence in performing oral cancer examinations, and the perceived need for further education. The clinical practices section assessed the frequency of performing extraoral and intraoral examinations, inquiring about patients' risk factors, and counseling them on prevention strategies.

To ensure clarity and cultural relevance, the translated questionnaire underwent a pilot test with a small group of dental students (n = 20). Feedback was incorporated to refine question wording and improve comprehensibility before the final survey distribution.

Validity and reliability assessment

Validity and reliability analyses were conducted to assess the quality of the adapted questionnaire. Content validity was evaluated by a panel of three experts in oral health, who reviewed the questionnaire for relevance, clarity, and completeness. The content validity index (CVI) was calculated, with an overall CVI score of 0.89, indicating strong content validity. For reliability assessment, internal consistency was measured using Cronbach's alpha coefficient, yielding an overall reliability score of 0.83, demonstrating good internal consistency. Test–retest reliability was assessed by administering the questionnaire twice to a subset of 30 students with a two-week interval, resulting in an intraclass correlation coefficient (ICC) of 0.87, confirming the stability of responses over time.

Participant recruitment and survey administration

Detailed information on how the study participants were approached to distribute the questionnaire is provided as follows: The questions were delivered to participants via Google Forms, and the completion time for the form was approximately three minutes.

Statistical analysis

The study's sample size was determined by employing power analysis using G-Power (version 3.1.9.2; Heinrich-Heine-Universitat Dusseldorf, Dusseldorf, Germany). To attain a statistical power of 0.80, maintain a significance level of 0.05, and accommodate an effect size of 0.3, a sample size of 75 participants would be necessary. Data were analyzed in IBM SPSS V23. Fisher Freeman Halton test and Pearson Chi-Square test were used to compare categorical data, and multiple comparisons were examined with the Bonferroni Corrected Z test. Analysis results were presented as frequency (percentage) for categorical variables, mean \pm standard deviation, and median (minimum – maximum) for quantitative variables. A significance level of p < 0.05 was deemed indicative of statistical significance in the analyses.

Results

A total of 603 dental students participated in this study, with 239 males (39.6%) and 364 females (60.4%). The mean age of participants was 21.96 years. Among the students, 202 (33.5%) were in their third year, 280 (46.4%) in their fourth year, and 121 (20.1%) in their fifth year. Selçuk University had the highest number of participants, comprising 13.4% of the total sample (Table 1).

The participants were queried on their assessment of various patient anamnesis elements during the survey. A comprehensive breakdown of their responses is presented in Table 1. Noteworthy findings from Table 1 indicate that 98.7% of participants perceive tobacco use as a significant risk factor, while 68.5% associate low fruit and vegetable consumption with heightened risk. Betel chewing, ultraviolet exposure, family history of cancer, viral infections (e.g., HPV), alcohol use, previous oral cancer lesions, advanced age, obesity, hot foods/drinks, spicy foods, poor oral hygiene, and inappropriate prostheses were also acknowledged as potential risk factors by varying proportions of participants.

Concerning self-perceived competence, 56.4% of participants (combining "disagree" and "strongly disagree") stated that they do not feel adequately trained to examine oral cancer patients. Similarly, 39.8% reported insufficient training in palpating neck lymph nodes, while 70.8% felt unprepared for tobacco cessation education, and 75.6% lacked confidence in providing alcohol cessation counseling.

Among the participants, 59.3% reported inquiring about patients' past alcohol use, while 82.4% asked about current alcohol consumption. Additionally, 61.1% documented both the type and amount of alcohol intake. Regarding tobacco use, 78.1% of participants questioned patients about their past usage, and 96.5% inquired about current tobacco consumption. Furthermore, 80.7% asked about the type and amount of tobacco products used. A total of 95.5% of participants reported questioning patients about their personal history of cancer, whereas 77.6% considered it important to ask about family history of cancer. Lastly, 90.9% of students emphasized the necessity of continuing education on oral cancer.

Significant differences were observed between academic grades in several key areas (Table 2). For example, responses to Q3 (p = 0.001) showed that third, fourth, and fifth-year students differed significantly in their knowledge about betel chewing as a risk factor (Fig. 1). Similarly, Q10 (p < 0.001) indicated that fifth-year students were less likely to consider obesity a risk factor compared to other grades. Regarding clinical confidence, responses to Q15 (p < 0.001) showed that third-year students were significantly less confident in conducting oral cancer examinations than their senior counterparts. In addition, Q16 (p < 0.001) revealed that third-year students demonstrated the lowest confidence in palpating lymph nodes (Fig. 2). In terms of awareness and educational preparedness, fifth-year students showed significantly higher uncertainty in their responses to Q14 (p = 0.028) and Q26 (p < 0.001), with "I don't know" being a common answer (Fig. 3). Moreover, Q19 (p = 0.002) and Q21 (p < 0.001) showed that third-year students had significantly lower awareness of certain risk factors compared to other grades. The remaining statistically significant differences across grade levels are presented in Table 2.

Statistically significant differences were found between the faculties for questions Q3 (p=0.048), Q7 (p=0.008), Q10 (p=0.013), Q13 (p=0.022) (Fig. 4), Q15 (p<0.001), Q16 (p<0.001), Q17 (p=0.004) (Fig. 5), Q20 (p=0.001), Q21 (p=0.001), and Q24 (p=0.045) (Fig. 6). There is no

Table 1 Descriptive statistics

	Frequency	%
Gender		
Male	239	39.6
Female	364	60.4
The faculty they are studying at		
Altınbaş University, Faculty of Dentistry (Altınbaş)	65	10.8
Ahmet Keleşoğlu University, Faculty of Dentistry (Ahmet Keleşoğlu)	68	11.3
Kırıkkale University, Faculty of Dentistry (Kırıkkale)	34	5.6
Kocaeli University, Faculty of Dentistry (Kocaeli)	57	9.5
Lokman Hekim University, Faculty of Dentistry (Lokman Hekim)	75	12.4
Necmettin Erbakan University, Faculty of Dentistry (NEU)	65	10.8
Selçuk University, Faculty of Dentistry (Selçuk)	81	13.4
Süleyman Demirel University, Faculty of Dentistry (Süleyman Demirel)	67	11.1
Tokat University, Faculty of Dentistry (Tokat)	80	13.3
Bursa Uludağ University, Faculty of Dentistry (Uludağ)	11	1.8
The period in which they are studying		
Grade 3	202	33.5
Grade 4	280	46.4
Grade 5	121	20.1
Q1. Do you consider tobacco use as a risk factor?		
l don't know	1	0.2
Yes	594	98.7
No	7	1.2
Q2. Do you consider low fruit and vegetable consumption as a risk factor?		
l don't know	72	11.9
Yes	413	68.5
No	118	19.6
Q3. Do you consider betel chewing as a risk factor?		
l don't know	236	39.2
Yes	342	56.8
No	24	4
Q4. Do you consider ultraviolet exposure as a risk factor?		
l don't know	16	2.7
Yes	568	94.5
No	17	2.8
Q5. Do you consider the presence of cancer in the family as a risk factor?		
l don't know	23	3.8
Yes	567	94
No	13	2.2
Q6. Do you consider viral infection (e.g. HPV) as a risk factor?		
l don't know	58	9.6
Yes	505	83.7
No	40	6.6
Q/. Do you consider alcohol use as a risk factor?		_
l don't know	42	/
Yes	499	82.9
NO	61	10.1
Q8. Do you consider previous oral cancer lesion as a risk factor?	10	2
I don't know	18	3
Yes	580	96.3

Table 1 (continued)

No40.7Q9. Do you consider older age as a risk factor?559.1I don't know559.1Yes45174.9			,.
Q9. Do you consider older age as a risk factor?559.1I don't know559.1Yes45174.9	10	4	0.7
l don't know 55 9.1 Yes 451 74.9	Do you consider older age as a risk factor?		
Yes 451 74.9	don't know	55	9.1
	es	451	74.9
No 96 15.9	10	96	15.9
Q10. Do you consider obesity as a risk factor?). Do you consider obesity as a risk factor?		
l don't know 83 13.8	don't know	83	13.8
Yes 380 63	es	380	63
No 140 23.2	10	140	23.2
Q11. Do you consider hot foods and drinks as a risk factor?	I. Do you consider hot foods and drinks as a risk factor?		
l don't know 89 14.8	don't know	89	14.8
Yes 294 48.8	es	294	48.8
No 220 36.5	10	220	36.5
Q12. Do you consider spicy foods a risk factor?	Do you consider spicy foods a risk factor?		
I don't know 103 17.1	don't know	103	17.1
Yes 247 41	es	247	41
No 252 41.9	10	252	41.9
Q13. Do you consider poor oral hygiene a risk factor?	3. Do you consider poor oral hygiene a risk factor?		
l don't know 19 3.2	don't know	19	3.2
Yes 541 89.7	es	541	89.7
No 43 7.1	10	43	7.1
Q14. Do you consider ill-fitting dentures as a risk factor?	I. Do you consider ill-fitting dentures as a risk factor?		
I don't know 45 7.5	in't know	45	7.5
Yes 509 84.6	es	509	84.6
No 48 8	10	48	8
Q15. I am adequately trained to examine oral cancer patients	 I am adequately trained to examine oral cancer patients 		
I don't know 121 20.1	don't know	121	20.1
l'absolutely agree 15 2.5	absolutely agree	15	2.5
l agree 127 21.1	agree	2/	21.1
l dont agrée 201 43.5	don't agree	201	43.3
I strongly disagree 79 13.1	strongly disagree	/9	13.1
don't know 61 10.1	den't know	61	10.1
	abrolutoly agree	40	0.1
Lagroo 253 42		49 253	0.1
I don't agree 180 31.3	don't agree	180	42
Listronaly disagree 51 85	strongly disagree	51	85
017 Lam adequately trained to provide tobacco cessation education	7 Lam adequately trained to provide tobacco cessation ed	lucation	0.5
I don't know 63 104	don't know	63	10.4
Labsolutely agree 20 3.3	absolutely agree	20	33
lagree 93 154	agree	93	15.4
I don't agree 309 51.2	don't agree	309	51.2
l strongly disagree 118 19.6	strongly disagree	118	19.6
Q18. I am adequately trained to provide alcohol cessation education	3. I am adequately trained to provide alcohol cessation edu	ucation	
I don't know 64 10.6	don't know	64	10.6
l absolutely agree 16 2.7	absolutely agree	16	2.7
lagree 67 11.1	agree	67	11.1
I don't agree 323 53.7	don't agree	323	53.7
l strongly disagree 132 21.9	strongly disagree	132	21.9

Table 1 (continued)

	Frequency	%
Q19. Do you question patients' past alcohol use?		
Yes	357	59.3
No	245	40.7
Q20. Do you question patients' current alcohol use?		
Yes	496	82.4
No	106	17.6
Q21. Do you question the type and amount of alcohol consumption?		
Yes	367	61.1
No	234	38.9
Q22. Do you question patients about their past tobacco use?		
Yes	468	78.1
No	131	21.9
Q23. Do you question patients about their current tobacco use?		
Yes	581	96.5
No	21	3.5
Q24. Do you question the type and amount of tobacco consumption?		
Yes	485	80.7
No	116	19.3
Q25. Do you question patients about their cancer history?		
Yes	575	95.5
No	27	4.5
Q26. Do you question patients' family history of cancer?		
Yes	467	77.6
No	135	22.4
Q27. The need for continuing education about oral cancer		
Is necessary	548	90.9
It is not necessary	55	9.1
	Mean ± Std.D	Median (Min–Max)
Age	21.96 ± 1.56	22 (19—34)

statistically significant difference between the faculties and the other questions (Table 3).

In this survey study, participants' interests in continuing education in oral cancer were also evaluated. While 90.9% of all participants stated that they were interested in the continuing education program in the future, 9.1% stated that they were not interested in these trainings.

Discussion

Oral cancer is a preventable malignancy, and early diagnosis significantly impacts prognosis and treatment outcomes. Despite advancements in diagnostic and therapeutic approaches, oral cancer continues to have one of the lowest five-year survival rates, with early diagnosis rates ranging from 26 to 48% [5, 13, 20]. Dentists play a critical role in early detection through regular screenings and patient education. Awareness studies among dental students and practitioners have been conducted world-wide [5, 21, 22], yet research focusing specifically on Turkish dental students remains limited.

The primary risk factors associated with oral cancer predominantly involve tobacco and alcohol use [4]. In a prior investigation conducted by Hasanoğlu Erbaşar and Alparslan [5], participants were queried about "current tobacco use of patients," "past tobacco use of patients," "current alcohol use of patients," and "past alcohol use of patients" at rates of 97.6%, 92%, 83.3%, and 71.2%, respectively.

In the present study, the corresponding inquiry rates were observed to be slightly lower, specifically 96.5%, 78.1%, 82.4%, and 59.3%, respectively. Moreover, Hasanoğlu Erbaşar and Alparslan [5] reported that 92.6% of participants inquired about "patients' family history

Table 2 Comparison of answers according to periods

	The period in w	hich they are studying		Test statistics	p
	Grade 3	Grade 4	Grade 5		
Q1. Do you consider tobacco	use as a risk factor?				
l don't know	0 (0)	0 (0)	1 (0.8)	4.5	0.270*
Yes	198 (98.5)	276 (98.6)	120 (99.2)		
No	3 (1.5)	4 (1.4)	0 (0)		
Q2. Do you consider low fruit	and vegetable consumption	on as a risk factor?			
l don't know	27 (13.4)	34 (12.1)	11 (9.1)	8.004	0.091**
Yes	143 (70.8)	194 (69.3)	76 (62.8)		
No	32 (15.8)	52 (18.6)	34 (28.1)		
03. Do vou consider betel ch	ewing as a risk factor?				
l don't know	111 (55) ^a	103 (36.9) ^b	22 (18.2) ^c	46.304	< 0.001*
Yes	85 (42 1) ^a	166 (59 5) ^b	91 (75 2) ^c		
No	6 (3)	10 (3.6)	8 (6 6)		
04 Do you consider ultraviol	et exposure as a risk factor?	10 (0.0)	0 (0.0)		
I don't know	9 (4 5)	4 (1 4)	3 (2 5)	4612	0.317*
Yes	187 (92.6)	265 (95 3)	116 (95 9)	1.012	0.517
No	6 (3)	Q (3 2)	2 (1 7)		
05 Do you consider the pres	onco of cancor in the family	(3.2)	2 (1.7)		
L dop't know	10 (5)		2 (2 5)	1 115	0 952*
	10 (3)	264 (04 2)	3 (2.3) 115 (05)	1.445	0.000
tes	100 (95.1)	204 (94.5)	115 (95)		
	4 (Z)	0 (2.1)	5 (2.5)		
Q6. Do you consider viral line	2CUON (e.g. HPV) as a risk rac	24 (9 ()	7 (5 0)	14 250	0.007**
T don't know	27 (13.4)	24 (8.0)	7 (5.8)	14.258	0.007**
ies	102 (80.2)	244 (87.1)	99 (81.8)		
	13 (6.4)	12 (4.3)	15 (12.4) ^a		
Q7. Do you consider alcohol	use as a risk factor?			5.440	0.0.1788
l don't know	10 (5)	24 (8.6)	8 (6.7)	5.418	0.24/**
Yes	1// (8/.6)	225 (80.4)	97 (80.8)		
No	15 (7.4)	31 (11.1)	15 (12.5)		
Q8. Do you consider previous	s oral cancer lesion as a risk	factor?			
l don't know	7 (3.5)	6 (2.1)	5 (4.2)	3.697	0.410*
Yes	195 (96.5)	271 (96.8)	114 (95)		
No	0 (0)	3 (1.1)	1 (0.8)		
Q9. Do you consider older ag	e as a risk factor?				
l don't know	21 (10.4)	30 (10.7)	4 (3.3)	6.355	0.174**
Yes	150 (74.6)	205 (73.2)	96 (79.3)		
No	30 (14.9)	45 (16.1)	21 (17.4)		
Q10. Do you consider obesity	y as a risk factor?				
l don't know	34 (16.8)	37 (13.2)	12 (9.9)	29.301	< 0.001**
Yes	133 (65.8) ^a	188 (67.1) ^a	59 (48.8) ^b		
No	35 (17.3) ^a	55 (19.6) ^a	50 (41.3) ^b		
Q11. Do you consider hot for	ods and drinks as a risk facto	r?			
l don't know	26 (12.9)	44 (15.7)	19 (15.7)	1.859	0.762**
Yes	102 (50.5)	130 (46.4)	62 (51.2)		
No	74 (36.6)	106 (37.9)	40 (33.1)		
Q12. Do you consider spicy for	oods a risk factor?				
l don't know	35 (17.3)	51 (18.3)	17 (14)	6.922	0.140**
Yes	73 (36.1)	113 (40.5)	61 (50.4)		
No	94 (46.5)	115 (41.2)	43 (35.5)		

Table 2 (continued)

	The period in w	hich they are studying		Test statistics	р
	Grade 3	Grade 4	Grade 5		
Q13. Do you consider poor oral	hygiene a risk factor?				
l don't know	7 (3.5)	9 (3.2)	3 (2.5)	7.816	0.092*
Yes	185 (91.6)	254 (90.7)	102 (84.3)		
No	10 (5)	17 (6.1)	16 (13.2)		
Q14. Do you consider ill-fitting c	dentures as a risk factor?				
l don't know	17 (8.4) ^a	26 (9.3) ^a	2 (1.7) ^b	10.862	0.028**
Yes	172 (85.1)	233 (83.5)	104 (86)		
No	13 (6.4)	20 (7.2)	15 (12.4)		
Q15. I am adequately trained to	examine oral cancer pati	ents			
l don't know	45 (22.3) ^a	64 (22.9) ^a	12 (9.9) ^b	98.938	< 0.001*
l absolutely agree	2 (1)	9 (3.2)	4 (3.3)		
lagree	10 (5) ^a	62 (22.1) ^b	55 (45.5) ^c		
l don't agree	99 (49)	117 (41.8)	45 (37 2)		
l strongly disagree	46 (22 8) ^a	28 (10) ^b	5 (4 1) ^b		
016 Lam adequately trained to	nalpate the lymph Node	s in the neck	5 (1.1)		
I don't know	3/ (16.8) ^a	20 (7 1) ^b	7 (5 8) ^b	116/120	~0.001**
Labsolutely agree	4 (2) ^a	20 (7.1) 32 (11 A) ^b	13 (10 7) ^b	110.129	0.001
	+ (2) 26 (17 0) ^a	150 (52 6) ^b	67 (55 4) ^b		
l dop't agree	06 (17.5) ^a	62 (22 1)b	07 (55.4) 21 (55.6) ^b		
l utrongly disagrap	90 (47.5)	02 (22.1) 16 (E 7) ^b	2 (2 5)b		
1 strongly disagree	JZ (13.0)	IO (S.7)	5 (2.5)		
			10 (0.2)	0 406	0.202*
Labsolutoly agree	25 (12.4)	20 (10)	10 (0.5)	0.400	0.595
	S (1.5)	14 (5)	5 (2.5)		
l agree	29 (14.4)	41 (14.6)	23 (19)		
l don't agree	103 (51)	140 (50)	66 (54.5)		
I strongly disagree	42 (20.8)	57 (20.4)	19 (15.7)		
Q18.1 am adequately trained to	provide alcohol cessation	n education			
l don't know	24 (11.9)	29 (10.4)	11 (9.1)	5.348	0./22*
l absolutely agree	3 (1.5)	11 (3.9)	2 (1./)		
lagree	21 (10.4)	29 (10.4)	17 (14)		
l don't agree	109 (54)	146 (52.3)	68 (56.2)		
l strongly disagree	45 (22.3)	64 (22.9)	23 (19)		
Q19. Do you question patients' p	past alcohol use?				
Yes	139 (69.2) ^a	155 (55.4) ^b	63 (52.1) ^b	12.514	0.002**
No	62 (30.8)	125 (44.6)	58 (47.9)		
Q20. Do you question patients' or rent alcohol use?	Cur-				
Yes	176 (87.6) ^a	221 (78.9) ^b	99 (81.8) ^{ab}	6.046	0.049**
No	25 (12.4)	59 (21.1)	22 (18.2)		
Q21. Do you question the type a	and amount of alcohol co	onsumption?			
Yes	149 (74.1) ^a	158 (56.6) ^b	60 (49.6) ^b	23.441	< 0.001**
No	52 (25.9)	121 (43.4)	61 (50.4)		
Q22. Do you question patients a	about their past tobacco	use?			
Yes	164 (82.4)	217 (77.5)	87 (72.5)	4.427	0.109**
No	35 (17.6)	63 (22.5)	33 (27.5)		
Q23. Do you question patients a	about their current tobac	co use?			
Yes	195 (97)	266 (95)	120 (99.2)	4.465	0.102*
No	6 (3)	14 (5)	1 (0.8)		

Table 2 (continued)

	The period in w	hich they are studying		Test statistics	р
	Grade 3	Grade 4	Grade 5		
Q24. Do you question the typ	pe and amount of tobacco c	onsumption?			
Yes	166 (82.6)	222 (79.6)	97 (80.2)	0.711	0.701**
No	35 (17.4)	57 (20.4)	24 (19.8)		
Q25. Do you question patien	ts about their cancer history	?			
Yes	191 (95)	269 (96.1)	115 (95)	0.378	0.828**
No	10 (5)	11 (3.9)	6 (5)		
Q26. Do you question patien	ts' family history of cancer?				
Yes	171 (85.1) ^a	218 (77.9) ^a	78 (64.5) ^b	18.47	< 0.001**
No	30 (14.9)	62 (22.1)	43 (35.5)		
Q27. The need for continuing	g education about oral cance	er			
ls necessary	185 (92.5)	251 (90)	108 (90)	1.019	0.601**
It is not necessary	15 (7.5)	28 (10)	12 (10)		

* Fisher Freeman Halton test

**Pearson Chi square test

^{a-c} There is no difference between groups with the same letter



Fig. 1 The distribution of questions Q3, Q6, Q10, Q14 that were found to be significant according to grades is shown with a 100% stacked column chart

of cancer." In the present study, however, this aspect was questioned by 77.6% of participants, reflecting a marginally lower rate. These variations in percentages between studies may denote differences in emphasis, awareness levels, or educational exposure among the surveyed dental professionals. Such nuanced distinctions underscore the ongoing need for comprehensive understanding and awareness within the context of oral cancer risk assessment in dental practice.

The findings of this study resonate with the results of Sujir et al. [23], who reported that dental students exhibited high knowledge levels but lower confidence in clinical competencies related to oral cancer detection. While participants recognized key risk factors such as tobacco



Fig. 2 The distribution of Q15, Q16 questions obtained as significant according to grades is shown with a 100% stacked column chart



Fig. 3 The distribution of questions Q19, Q20, Q21, Q26, which were found to be significant according to grades, is shown with a 100% stacked column chart

and alcohol, they expressed uncertainty about their practical skills, such as palpating lymph nodes. This highlights the need for integrating more hands-on training into dental curricula. Similarly, Antoranz et al. [24] found that although students valued oral cancer screening, only a small percentage felt confident in diagnosing cases independently. Similarly, our study revealed that only 21.1% of students







Fig. 5 The distribution of Q15, Q16, Q17 questions obtained as significant according to universities is shown with a 100% stacked column chart

felt adequately trained to perform oral cancer examinations, reinforcing the need for practical training in clinical settings. Within the confines of this study, 21.1% of participants stated that they were trained enough to conduct an oral cancer examination, while 42% indicated proficiency in palpating patients' neck lymph nodes. For contextual



Fig. 6 The distribution of Q20, Q21, Q24 questions obtained meaningfully according to universities is shown with a 100% stacked column chart

comparison, the study undertaken by Hasanoğlu Erbaşar and Alparslan [5] reported higher rates at 52.3% and 76.8%, respectively, for these particular competencies. These discrepancies may underscore variances in educational exposure, training protocols, or individual perceptions among the surveyed dental professionals regarding their readiness to undertake specific clinical examinations relevant to oral cancer assessment.

In the examination of risk factors associated with oral cancer, the present study identified a noteworthy awareness rate of 98.7% among dental students concerning tobacco products and cigarette use. This heightened awareness suggests the potential impact of effective antitobacco policies implemented in recent years. A comprehensive review of the literature reveals that awareness scores exceeding 90% have been consistently documented in analogous studies [5, 12, 25].

Conversely, when assessing the alcohol-related risk factor in the survey, the awareness rate dropped to 82.9%. Comparable studies have reported a range of data, falling between 67 and 91%, indicating a broader variability in the awareness of alcohol-related risk factors among dental professionals [12, 21, 25, 26].

Upon inquiry into the harmful effects of UV rays, a notable awareness rate of 94.5% emerged in the survey. This finding aligns with similar results reported in other studies. However, Carter and Ogden's study reported a strikingly lower awareness level, as low as 10%, among

dentists regarding the carcinogenic effects of UV rays. These variations underscore the nuanced landscape of awareness levels within the dental profession, emphasizing the need for targeted educational interventions and the dissemination of current evidence on risk factors for oral cancer [27, 28].

The opinion that viral infections such as HPV are risk factors for oral cancer was found to be 83.7% in this study, and this result is consistent with the results of other studies in the literature [12, 29]. In the study conducted by Murariu et al. [19], fourth- and fifth-year students, as well as recent graduates, indicated their perception of Human Papillomavirus (HPV) as a risk factor at rates of 28.5%, 36.5%, and 70.2%, respectively. In contrast, the present study observed that third, fourth, and fifth-grade students reported considering HPV as a risk factor at rates of 80.2%, 87.1%, and 81.8%, respectively, suggesting that these differences might reflect variations in educational curricula.

The findings of this study further align with broader research on oral cancer awareness. For instance, Anirudh et al. [30] emphasized the need for comprehensive education on diverse risk factors, including HPV, which are often underrepresented in dental curricula. Similarly, Kazeminejad et al. [31] highlighted the importance of reinforcing dental school curricula with discussions on HPV-related oral cancers, underscoring the critical role of dental practitioners in patient education and early

Table 3	Compariso	n of answers according t	o faculties									
	The faculty	they are studying at									Test	ъ*
	Altınbaş	Ahmet Keleşoğlu	Kırıkkale	Kocaeli	Lokman Hekim	NEU	Selçuk	Süleyman Demirel	Tokat	Uludağ	statistics	
Q1. Do you	consider tobac	co use as a risk factor?										
l don't know	1 (1.5)	0) (0)	(0) 0	0 (0)	0 (0)	0 (0)	0) 0	(0) 0	(0) 0	(0) 0	15.453	0.993
Yes	63 (96.9)	67 (100)	34 (100)	56 (98.2)	74 (98.7)	64 (98.5)	80 (98.8)	66 (98.5)	79 (98.8)	11 (100)		
No	1 (1.5)	0 (0)	(0) 0	1 (1.8)	1 (1.3)	1 (1.5)	1 (1.2)	1 (1.5)	1 (1.3)	(0) 0		
Q2. Do you	consider low fi	ruit and vegetable consumption	as a risk factor? מ									
l don't know	5 (7.7)	13 (19.1)	4 (11.8)	7 (12.3)	11 (14.7)	8 (12.3)	4 (4.9)	7 (10.4)	13 (16.3)	(0) 0	26.635	0.075
Yes	47 (72.3)	41 (60.3)	28 (82.4)	33 (57.9)	51 (68)	40 (61.5)	67 (82.7)	45 (67.2)	52 (65)	9 (81.8)		
No	13 (20)	14 (20.6)	2 (5.9)	17 (29.8)	13 (17.3)	17 (26.2)	10 (12.3)	15 (22.4)	15 (18.8)	2 (18.2)		
Q3. Do you	consider betel	chewing as a risk factor?										
l don't know	31 (47.7)	30 (44.8)	14 (41.2)	21 (36.8)	38 (50.7)	22 (33.8)	21 (25.9)	18 (26.9)	38 (47.5)	3 (27.3)	27.544	0.048
Yes	32 (49.2)	36 (53.7)	20 (58.8)	32 (56.1)	35 (46.7)	42 (64.6)	55 (67.9)	44 (65.7)	38 (47.5)	8 (72.7)		
No	2 (3.1)	1 (1.5)	0 (0)	4 (7)	2 (2.7)	1 (1.5)	5 (6.2)	5 (7.5)	4 (5)	(0) 0		
Q4. Do you	consider ultrav	violet exposure as a risk factor?										
l don't know	4 (6.2)	0 (0)	(0) 0	2 (3.6)	2 (2.7)	2 (3.1)	0 (0)	1 (1.5)	5 (6.3)	(0) 0	14.629	0.578
Yes	58 (89.2)	67 (98.5)	32 (94.1)	52 (92.9)	70 (94.6)	61 (93.8)	79 (97.5)	65 (97)	73 (91.3)	11 (100)		
No	3 (4.6)	1 (1.5)	2 (5.9)	2 (3.6)	2 (2.7)	2 (3.1)	2 (2.5)	1 (1.5)	2 (2.5)	0 (0)		
Q5. Do you	consider the p.	resence of cancer in the family ¿	as a risk factor?									
l don't know	5 (7.7)	6 (8.8)	2 (5.9)	(0) 0	3 (4)	1 (1.5)	2 (2.5)	(0) 0	3 (3.8)	1 (9.1)	20.81	0.140
Yes	58 (89.2)	60 (88.2)	32 (94.1)	56 (98.2)	69 (92)	61 (93.8)	79 (97.5)	66 (98.5)	76 (95)	10 (90.9)		
No	2 (3.1)	2 (2.9)	(0) 0	1 (1.8)	3 (4)	3 (4.6)	(0) 0	1 (1.5)	1 (1.3)	(0) 0		
Q6. Do you	consider viral i.	nfection (e.g. HPV) as a risk fact.	or?									
l don't know	8 (12.3)	5 (7.4)	3 (8.8)	8 (14)	6 (8)	8 (12.3)	3 (3.7)	9 (13.4)	8 (10)	(0) 0	20.214	0.281
Yes	52 (80)	61 (89.7)	29 (85.3)	46 (80.7)	68 (90.7)	50 (76.9)	73 (90.1)	50 (74.6)	66 (82.5)	10 (90.9)		
No	5 (7.7)	2 (2.9)	2 (5.9)	3 (5.3)	1 (1.3)	7 (10.8)	5 (6.2)	8 (11.9)	6 (7.5)	1 (9.1)		

I

	The faculty t	hey are studying at										Test	p*
	Altınbaş	Ahmet Keleşoğlu	Kırıkkale	Kocaeli	Lokman Hekim	NEU	Š	elçuk	Süleyman Demirel	Tokat	Uludağ	statistics	
	-	-											
U/. Do you . I don't	consider alconc	ol use as a risk factor? די אין	5 (1 1 7)	F (8 8)	10 (13 3)	1(63)1	2 (۲ د	2 (A E)	7 (8 0)	(0) 0	33 101	
know	(0) 0	(+./) C	(7.41) C	(Q.Q) C	(5.51) 01	4 (0.2)) n	(/.c)	(C.+) C	/ (0.4)	(n) n	33.IUI	0.008
Yes	59 (90.8) ^{abcd}	59 (86.8) ^{abcd}	27 (79.4) ^{abc}	d 42 (73.7) ^c	d 55 (73.3) ^{bd}	54 (83.1) ^{at}	76 (9:	3.8) ^a	53 (79.1) ^{abcd}	63 (79.7) ^{abcd}	11 (100) ^{abcd}		
No	6 (9.2)	4 (5.9)	2 (5.9)	10 (17.5)	10 (13.3)	7 (10.8)	2 ((2.5)	11 (16.4)	9 (11.4)	(0) 0		
Q8. Do you	consider previo	us oral cancer lesion as	a risk factor?										
l don't know	3 (4.6)	1 (1.5)	2 (5.9)	1 (1.8)	4 (5.4)	0 (0)	3 ((3.7)	1 (1.5)	2 (2.5)	1 (9.1)	15.094	0.520
Yes	62 (95.4)	67 (98.5)	32 (94.1)	56 (98.2)	69 (93.2)	65 (100)	76	3.8)	56 (98.5)	77 (96.3)	10 (90.9)		
No	(0) 0	0 (0)	0 (0)	0) 0	1 (1.4)	0 (0)	2 ((2.5) ((O) C	1 (1.3)	(0) 0		
Q9. Do you	consider older a	ige as a risk factor?											
l don't know	5 (7.7)	8 (11.8)	4 (11.8)	7 (12.3)	5 (6.7)	5 (7.8)	4((4.9)	7 (10.4)	7 (8.8)	3 (27.3)	12.368	0.824
Yes	44 (67.7)	51 (75)	26 (76.5)	42 (73.7)	57 (76)	49 (76.6)	64	, (67) 4	49 (73.1)	62 (77.5)	7 (63.6)		
No	16 (24.6)	9 (13.2)	4 (11.8)	8 (14)	13 (17.3)	10 (15.6)	13	(16)	11 (16.4)	11 (13.8)	1 (9.1)		
Q10. Do you	I consider obesi	ity as a risk factor?											
l don't know	5 (7.7)	9 (13.2)	2 (5.9)	8 (14)	14 (18.7)	14 (21.5)	4 ((4.9)	10 (14.9)	16 (20)	1 (9.1)	33.223	0.013
Yes	43 (66.2) ^{ab}	44 (64.7) ^{ab}	24 (70.6) ^{ab}	31 (54.4) ^a	b 43 (57.3) ^{ab}	28 (43.1) ^b	61 (7)	5.3) ^a	46 (68.7) ^{ab}	52 (65) ^{ab}	8 (72.7) ^{ab}		
No	17 (26.2)	15 (22.1)	8 (23.5)	18 (31.6)	18 (24)	23 (35.4)	16 (19	9.8)	11 (16.4)	12 (15)	2 (18.2)		
Q11. Do you	ı consider hot fı	oods and drinks as a rish	k factor?										
l don't know	8 (12.3)	12 (17.6)	6 (17.6)	3 (5.3)	10 (13.3)	9 (13.8)	13	; (16)	8 (11.9)	17 (21.3)	3 (27.3)	17.002	0.521
Yes	35 (53.8)	34 (50)	17 (50)	26 (45.6)	34 (45.3)	35 (53.8)	39	8.1)	31 (46.3)	40 (50)	3 (27.3)		
No	22 (33.8)	22 (32.4)	11 (32.4)	28 (49.1)	31 (41.3)	21 (32.3)	29	5.8)	28 (41.8)	23 (28.7)	5 (45.5)		
Q12. Do you	ı consider spicy	foods a risk factor?											
l don't know	9 (13.8)	12 (17.6) 3 (8	3.8)	(15.8)	16 (21.3)	10 (15.4)	11 (13.8)		10 (14.9)	19 (23.8)	4 (36.4)	13.175	0.782
Yes	26 (40)	28 (41.2) 15 ((44.1) 2	1 (36.8)	28 (37.3)	32 (49.2)	37 (46.3)		28 (41.8)	30 (37.5)	2 (18.2)		
No	30 (46.2)	28 (41.2) 16 ((47.1) 2	7 (47.4)	31 (41.3)	23 (35.4)	32 (40)		29 (43.3)	31 (38.8)	5 (45.5)		

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Table 3 (continued)

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Table 3	(continued	(
	The faculty	they are studying	gat								Test	p*
	Altınbaş	Ahmet Keleşoğ	ğlu Kır	rikkale Kocaeli	i Lokman Hekim	NEU	S	elçuk Süleyman Demirel	Tokat	Uludağ	statistics	
Q13. Do you	1 consider poo	r oral hygiene a ris	k factor?									
l don't know	(0) 0	2 (2.9)	0 (0)	3 (5.3)	2 (2.7)	2 (3.1)	2 (2.5)	2 (3)	6 (7.5)	0 (0)	28.61	0.022
Yes	54 (83.1)	65 (95.6)	31 (91.2)	46 (80.7)	72 (96)	58 (89.2)	74 (91.4)	60 (89.6)	71 (88.8)	10 (90.9)		
No	11 (16.9) ^a	1 (1.5) ^{ab}	3 (8.8) ^{ab}	8 (14) ^{ab}	1 (1.3) ^b	5 (7.7) ^{ab}	5 (6.2) ^{ab}	5 (7.5) ^{ab}	3 (3.8) ^{ab}	1 (9.1) ^{ab}		
Q14. Do you	1 consider ill-fit	ting dentures as a	risk factor?									
l don't know	2 (3.1)	7 (10.3)	2 (6.1)	6 (10.5)	4 (5.3)	5 (7.7)	7 (8.6)	6 (9)	5 (6.3)	1 (9.1)	12.121	0.829
Yes	53 (81.5)	57 (83.8)	27 (81.8)	49 (86)	65 (86.7)	56 (86.2)	67 (82.7)	56 (83.6)	70 (87.5)	9 (81.8)		
No	10 (15.4)	4 (5.9)	4 (12.1)	2 (3.5)	6 (8)	4 (6.2)	7 (8.6)	5 (7.5)	5 (6.3)	1 (9.1)		
Q15. I am ao	lequately train	ed to examine ora	l cancer patients									
l don't know	16 (24.6)	11 (16.2)	4 (11.8)	18 (31.6)	22 (29.3)	6 (9.2)	18 (22.2)	12 (17.9)	12 (15)	2 (18.2)	66.819	< 0.001
	1 (1.5)	0 (0)	2 (5.9)	2 (3.5)	2 (2.7)	3 (4.6)	3 (3.7)	1 (1.5)	1 (1.3)	0 (0)		
absolutely agree												
l agree	5 (7.7)	17 (25)	8 (23.5)	14 (24.6)	22 (29.3)	19 (29.2)	20 (24.7)	10 (14.9)	9 (11.3)	3 (27.3)		
l don't agree	37 (56.9) ^a	30 (44.1) ^{ab}	15 (44.1) ^{ab}	21 (36.8) ^{ab}	21 (28) ^b	30 (46.2) ^{ab}	30 (37) ^{ab}	36 (53.7) ^{ab}	39 (48.8) ^{ab}	2 (18.2) ^{ab}		
l strongly disagree	6 (9.2) ^{ab}	10 (14.7) ^{ab}	5 (14.7) ^{ab}	2 (3.5) ^b	8 (10.7) ^{ab}	7 (10.8) ^{ab}	10 (12.3) ^{ab}	8 (11.9) ^{ab}	19 (23.8) ^{ab}	4 (36.4) ^a		
Q16. I am ao	lequately train	ed to palpate the l	lymph Nodes in th	ie neck								
l don't know	11 (16.9)	7 (10.3)	1 (2.9)	5 (8.8)	9 (12)	3 (4.6)	8 (9.9)	4 (6)	10 (12.5)	3 (27.3)	89.915	< 0.001
l absolutely agree	2 (3.1) ^{ab}	6 (8.8) ^{ab}	4 (11.8) ^{ab}	12 (21.1) ^b	10 (13.3) ^{ab}	3 (4.6) ^{ab}	5 (6.2) ^{ab}	4 (6) ^{ab}	2 (2.5) ^a	1 (9.1) ^{ab}		
l agree	12 (18.5) ^a	25 (36.8) ^{abc}	17 (50) ^{bc}	28 (49.1) ^{bc}	33 (44) ^{abc}	: 29 (44.6) ^{abc}	49 (60.5) ^c	32 (47.8) ^{bc}	24 (30) ^{ab}	4 (36.4) ^{abc}		
l don't agree	34 (52.3) ^a	24 (35.3) ^{ab}	9 (26.5) ^{ab}	11 (19.3) ^b	14 (18.7) ^b	° 25 (38.5) ^{ab}	16 (19.8) ^b	24 (35.8) ^{ab}	31 (38.8) ^{ab}	1 (9.1) ^{ab}		
l strongly disagree	6 (9.2)	6 (8.8)	3 (8.8)	1 (1.8)	9 (12)	5 (7.7)	3 (3.7)	3 (4.5)	13 (16.3)	2 (18.2)		

	The faculty t	hev are studving	nat										Tect	*2
	Altınbaş	Ahmet Keleşo	ğlu	Kırıkkale	Kocaeli	Lokman Hekim	NEU		Selçuk Süley Demi	'man Irel	Tokat	Uludağ	statistics	L
O17, Lam ad	equately traine	d to provide tob	acco cessation e	Aucation										
l don't know	10 (15.4)	3 (4.4)	3 (8.8)	4 (7)		17 (22.7)	3 (4.6)	7 (8.6)	5 (7.5)	0	10 (12.5)	1 (9.1)	59.68	0.004
l absolutely agree	3 (4.6)	(0) 0	3 (8.8)	2 (3.5)		2 (2.7)	5 (7.7)	3 (3.7)	1 (1.5)		1 (1.3)	(0) 0		
l agree	11 (16.9) ^{ab}	12 (17.6) ^{ab}	4 (11.8) ^{ab}	15 (26.3	3) ^b	15 (20) ^{ab}	3 (4.6) ^a	14 (17.3) ^{ab}	10 (17	4.9) ^{ab}	9 (11.3) ^{ab}	0 (0) ^{ab}		
l don't agree	25 (38.5)	36 (52.9)	20 (58.8)	29 (50.5	(6	29 (38.7)	35 (53.8)	46 (56.8)	40 (55	(2)	44 (55)	5 (45.5)		
l strongly disagree	16 (24.6)	17 (25)	4 (11.8)	7 (12.3)	<u> </u>	12 (16)	19 (29.2)	11 (13.6)	11 (16	5.4)	16 (20)	5 (45.5)		
Q18. I am ad	lequately traine	d to provide alco	hol cessation e	ducation										
l don't know	8 (12.3)	6 (8.8)	1 (3)	7 (12.3)	_	16 (21.3)	2 (3.1)	7 (8.6)	6 (9)		10 (12.5)	1 (9.1)	44.868	0.098
l absolutely agree	3 (4.6)	(0) 0	2 (6.1)	2 (3.5)		2 (2.7)	4 (6.2)	2 (2.5)	0) 0		1 (1.3)	(0) 0		
l agree	9 (13.8)	7 (10.3)	5 (15.2)	5 (8.8)		11 (14.7)	4 (6.2)	11 (13.6)	8 (11.9	(6	7 (8.8)	0 (0)		
l don't agree	29 (44.6)	35 (51.5)	18 (54.5)	36 (63.2	2)	34 (45.3)	34 (52.3)	46 (56.8)	42 (62	2.7)	44 (55)	5 (45.5)		
I strongly disagree	16 (24.6)	20 (29.4)	7 (21.2)	7 (12.3)	~	12 (16)	21 (32.3)	15 (18.5)	11 (16	5.4)	18 (22.5)	5 (45.5)		
Q19. Do you	ı question patie	ints' past alcohol u	use?											
Yes	48 (73.8)	40 (58.8)	17 (50)	29 (50.5	(6	47 (62.7)	30 (46.2)	53 (65.4)	39 (28	3.2)	46 (58.2)	8 (72.7)	15.749	0.078
No	17 (26.2)	28 (41.2)	17 (50)	28 (49.1	1)	28 (37.3)	35 (53.8)	28 (34.6)	28 (41	(8)	33 (41.8)	3 (27.3)		
Q20. Do you	ı question patie	ints' current alcoh	iol use?											
Yes	63 (96.9) ^a	51 (75) ^b	25 (73.5) ^b	44 (77.2	2) ^b	66 (88) ^{ab}	49 (75.4) ^b	73 (90.1) ^{ab}	53 (79	9.1) ^{ab}	62 (78.5) ^{ab}	10 (90.9) ^{ab}	26.698	0.001
No	2 (3.1)	17 (25)	9 (26.5)	13 (22.6	8)	9 (12)	16 (24.6)	8 (9.9)	14 (20	(6:0	17 (21.5)	1 (9.1)		
Q21. Type ar	nd amount of a	Icohol consumpt	ion?											
Yes	46 (70.8) ^{abcd}	38 (55.9) ^{abcd}	18 (54.5) ^{abcd}	32 (56.1	1) ^{abcd}	49 (65.3) ^{abcd}	29 (44.6) ^{cd}	58 (71.6) ^{ab}	32 (47	^{bd} (8.7	59 (74.7) ^a	6 (54.5) ^{abcd}	27.664	0.001
No	19 (29.2)	30 (44.1)	15 (45.5)	25 (43.5	6)	26 (34.7)	36 (55.4)	23 (28.4)	35 (52	2.2)	20 (25.3)	5 (45.5)		

Table 3 (continued)

	The faculty th	ופא are studying at									Test	p*
	Altınbaş	Ahmet Keleşoğlu	Kırıkka	ile Kocaeli	Lokman Hekim	NEU	Selçuk S D	üleyman emirel	Tokat	Uludağ	statistics	
Q22. Do you	question patier	ots about their past to	obacco use?									
Yes	52 (81.3)	51 (75)	30 (88.2)	39 (68.4)	63 (84)	47 (72.3)	60 (74.1)	51 (77.3)	66 (84.6)	9 (81.8)	11.354	0.249
No	12 (18.8)	17 (25)	4 (11.8)	18 (31.6)	12 (16)	18 (27.7)	21 (25.9)	15 (22.7)	12 (15.4)	2 (18.2)		
Q23. Do you	question patier	nts about their currer	nt tobacco use?									
Yes	63 (96.9)	62 (91.2)	33 (97.1)	55 (96.5)	75 (100)	65 (100)	78 (96.3)	64 (95.5)	76 (96.2)	10 (90.9)	12.184	0.123
No No	2 (3.1)	6 (8.8)	1 (2.9)	2 (3.5)	0 (0)	0 (0)	3 (3.7)	3 (4.5)	3 (3.8)	1 (9.1)		
U24. UO you	duestion me ty	יף אחמ אחטטוון טו ונכ	лрассо сопзигирия	300								
Yes	48 (73.8)	47 (69.1)	27 (79.4)	45 (78.9)	68 (90.7)	55 (85.9)	66 (81.5)	51 (76.1)	69 (87.3)	9 (81.8)	17.136	0.045
No	17 (26.2)	21 (30.9)	7 (20.6)	12 (21.1)	7 (9.3)	9 (14.1)	15 (18.5)	16 (23.9)	10 (12.7)	2 (18.2)		
Q25. Do you	question patier	nts about their cance	er history?									
Yes	61 (93.8)	63 (92.6)	32 (94.1)	57 (100)	73 (97.3)	61 (93.8)	80 (98.8)	65 (97)	73 (92.4)	10 (90.9)	11.295	0.193
No	4 (6.2)	5 (7.4)	2 (5.9)	0 (0)	2 (2.7)	4 (6.2)	1 (1.2)	2 (3)	6 (7.6)	1 (9.1)		
Q26. Do you	question patier	nts' family history of c	cancer?									
Yes	52 (80)	50 (73.5)	28 (82.4)	46 (80.7)	61 (81.3)	42 (64.6)	68 (84)	52 (77.6)	59 (74.7)	9 (81.8)	10.192	0.331
No	13 (20)	18 (26.5)	6 (17.6)	11 (19.3)	14 (18.7)	23 (35.4)	13 (16)	15 (22.4)	20 (25.3)	2 (18.2)		
Q27. The nee	ed for continuin	g education about o	rral cancer									
ls neces- sary	59 (90.8)	63 (92.6)	30 (88.2)	52 (92.9)	70 (93.3)	59 (92.2)	73 (90.1)	58 (86.6)	69 (88.5)	11 (100)	4.024	0.912
lt is not nec-	6 (9.2)	5 (7.4)	4 (11.8)	4 (7.1)	5 (6.7)	5 (7.8)	8 (9.9)	9 (13.4)	9 (11.5)	(0) 0		
essary												

Table 3 (continued)

* Fisher Freeman Halton test

 $^{\rm a-d}$ There is no difference between groups with the same letter

detection. The findings from this study, which revealed gaps in knowledge concerning risk factors such as older age and HPV, resonate with these recommendations, advocating for a more robust educational framework to better prepare future dentists.

When comparing students from different academic years, third-year students demonstrated significantly lower confidence in performing oral cancer examinations and palpating lymph nodes, which can be attributed to their limited clinical exposure. In contrast, fifth-year students exhibited greater competence in these areas, suggesting that increased clinical experience positively influences self-confidence in oral cancer diagnosis. Additionally, significant differences were observed between faculties regarding students' awareness of various risk factors, such as alcohol consumption and poor oral hygiene. However, the overall knowledge levels did not show substantial variation across faculties, indicating that despite minor curricular differences, dental education in Turkey follows a relatively consistent structure. Given this observation, the implementation of a standardized national curriculum for oral cancer education could further enhance uniformity in knowledge dissemination and ensure that all dental students receive comprehensive training in oral cancer detection and prevention.

Additionally, a survey conducted among dentists in Northern Cyprus reported that while tobacco and alcohol were widely recognized as primary risk factors, the significance of low fruit and vegetable intake was underappreciated [32]. Similarly, findings from a survey at Ankara University revealed that while students demonstrated fundamental knowledge of oral cancer risk factors, gaps in practical training limited their competencies, particularly in recognizing early-stage lesions and performing critical procedures such as lymph node examination [33]. These insights emphasize the necessity of revising curricula to address both theoretical and practical components and incorporating continuous professional education programs to enhance diagnostic capabilities.

Within the purview of this investigation, a noteworthy 68.5% of respondents consider that low fruit and vegetable consumption serves as a predisposing factor to the development of oral cancers. Comparative analyses with findings from various studies in the literature reveal a spectrum of rates, ranging between 30 and 57%. These variations underscore the diversity in perceptions among dental professionals regarding the potential association between malnutrition and susceptibility to oral cancer, emphasizing the need for further exploration and elucidation within this domain [5, 12, 34, 35].

When the information about whether aging is a predisposing factor for oral cancer was evaluated, the rate in dentistry students was found to be higher compared to studies in the literature. According to the results of the survey, around 75% of those think that aging effects oral cancer. In the literature, it is seen that this rate varies between 48–69% in evaluations regarding aging [12, 34, 35]. This finding highlights a relatively better understanding of this risk factor among the surveyed

students.

Additionally, the study by Chan et al. [36] underscores that a significant proportion of oral cancers are diagnosed at advanced stages, often associated with poor prognosis. This reinforces the necessity for dental students to be equipped with the knowledge to identify early signs of oral cancer and to recognize the importance of timely referrals for improving patient outcomes. Similarly, Bsher et al. [37] emphasizes the role of clinical exposure in enhancing students' awareness and practical skills related to oral cancer management. While progress in education ideally leads to greater competence, persistent gaps in knowledge and skills regarding oral cancer management identified in this study highlight the need for curriculum enhancements that integrate both theoretical knowledge and practical applications.

A principal observation gleaned from this study underscores the inadequacy of participants' knowledge concerning the risk factors associated with oral cancer (OC). While a substantial majority recognized tobacco and alcohol consumption as primary risk factors, a noteworthy proportion exhibited a lack of awareness regarding other contributory factors, such as age and viral influences. This finding aligns with analogous studies conducted in Saudi Arabia [38] and Yemen [39], indicating a consistent pattern of insufficient awareness among dental professionals regarding the multifaceted nature of risk factors associated with OC. This underscores the need for targeted educational initiatives to enhance the comprehensiveness of knowledge within the dental community regarding the diverse etiological elements contributing to oral cancer.

To the best of our knowledge, this study stands as the inaugural multi-center investigation in Turkey delving into the awareness of oral cancer among dental students. Nevertheless, the study is not devoid of limitations. Specifically, it should be noted that the findings may not be entirely representative of the broader student cohorts in the participating faculties, let alone the entirety of dental institutions across Turkey. A critical recommendation for future research endeavors is the inclusion of a more expansive and diverse participant pool, encompassing not only dental students but also graduates, specialists, and general dentists. This methodological refinement would afford a more nuanced and comprehensive exploration of oral cancer awareness within the expansive dental community. By broadening the scope to include various professional categories, subsequent studies may achieve heightened generalizability and applicability, enriching our understanding of knowledge levels of oral cancer across diverse segments of the dental profession.

Strengths and limitations

This study is distinguished by several strengths, including its multi-center design, which provides insights into oral cancer awareness among dental students from different faculties in Turkey. However, despite this broad inclusion, the findings may not be entirely generalizable to all dental students in Turkey, as participation was voluntary, potentially introducing selection bias. Additionally, the use of a standardized questionnaire allows for direct comparisons with other studies conducted globally.

Nevertheless, certain limitations must be acknowledged. The cross-sectional design precludes any causal inferences, and the reliance on self-reported data may introduce response biases. Furthermore, although the study includes students from multiple institutions, it does not account for potential curricular differences among faculties, which could influence knowledge and attitudes. Future research should aim to include a larger and more diverse sample, incorporating longitudinal designs to better understand changes in knowledge and attitudes over time.

Conclusion

This study sought to assess the awareness and knowledge of oral cancer among dental students. Findings revealed that students exhibited a high level of awareness regarding smoking, alcohol consumption, and UV exposure as risk factors for oral cancer. However, it was evident that students lacked sufficient information regarding other aspects of oral cancer awareness. Given the crucial role of early diagnosis in reducing morbidity and mortality rates associated with oral cancer, it is imperative to underscore the significance of training well-educated and adequately equipped dentists. By prioritizing comprehensive education and equipping dental professionals with the necessary knowledge and skills, significant strides can be made in the prevention and early detection of oral cancer.

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This study was presented as a poster at the 2nd International Congress of Oral Cancer on 05-08 October, 2023 with 406 samples.

Authors' contributions

AA conceptualized and designed the study. Data collection and processing were performed by SB, IBY, and AA. AA and IBY conducted the analysis and interpretation. Literature search was carried out by AA, SB, and IBY. AA, SB, and IBY drafted the manuscript, and IBY and AA critically reviewed it. All authors reviewed and approved the final manuscript.

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Data availability

Data is available from the corresponding author upon reasonable request.

Declarations

Ethics Approval and consent to participate

The study received ethical approval from the Research Ethics Committee of the Faculty of Dentistry at Necmettin Erbakan University, and the study conducted in accordance with the Helsinki Declaration of Human Rights guide-lines (Approval Date: July 27, 2023; Approval Number: 2023/330). Participation was voluntary, informed consents were obtained from all participants, and all data were processed anonymously.

Consent for publication

Informed consent was obtained from all participants involved in the study.

Competing interest

The authors declare no competing interests.

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