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Awareness and Knowledge Level of Oral Cancer Among Patients Visiting The Dentist

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ABSTRACT

Aim: Oral cancers are a significant global health concern. The aim of this study is to investigate the level of awareness and knowledge about oral cancers, their risk factors, and early signs among patients attending dental examinations. This research aims to determine the current level of awareness about oral cancers and to identify gaps in knowledge in this area.

Material and Methods: This cross-sectional survey was conducted among patients aged 18 and above attending the Department of Oral and Maxillofacial Radiology. The survey included a total of 750 participants and covered demographic information, smoking and alcohol habits, awareness of oral cancers, knowledge of early symptoms of oral cancer, and awareness of associated risk factors.

Results: The participants consist of 63.7% females and 36.3% males. The smoking rate is 31.2%, and alcohol consumption is 14.4%. 53.4% of participants lack awareness of oral cancer; among those aware, 21.6% cite media sources and 4.4% cite dentists as their information sources. Despite smoking (70.4%) and alcohol consumption (56.7%) being well-known risk factors, awareness regarding sun exposure (22.7%) and aging (41.2%) is lower. Moreover, knowledge about early symptoms of oral cancer such as non-healing ulcers (40.3%), red sores (31.1%), white plaques (24%), and persistent swellings (31.5%) is also low.

Conclusion: This study shows that awareness about oral cancers is low among patients visiting dentists. Consistent with our findings, media usage in this context can be an effective way to increase awareness, while regular dental check-ups can also play a role in enhancing awareness.

Diş Hekimine Başvuran Hastalarda Ağız Kanserine Yönelik Farkındalık ve Bilgi Düzeyi

Makale Bilgisi

Makale Geçmişi

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Risk faktörleri,
Erken belirtiler.

ÖZET

Amaç: Ağız kanserleri önemli bir küresel sağlık sorunudur. Bu çalışmanın amacı, diş muayenesi için başvuran hastaların oral kanserler, risk faktörleri ve erken belirtiler hakkındaki farkındalık ve bilgi düzeylerini araştırmaktır. Bu araştırma, ağız kanserleri konusunda mevcut farkındalık seviyesini belirleyerek bu konudaki bilgi açığını ortaya koymayı hedeflemektedir.

Gereç ve Yöntemler: Bu kesitsel anket, Ağız Diş ve Çene Radyolojisi Anabilim Dalı'na başvuran 18 yaş ve üzeri hastalar arasında uygulanmıştır. Toplamda 750 katılımcının yer aldığı anket; demografik bilgileri, sigara içme ve alkol alışkanlıklarını, ağız kanserlerinin farkındalığını, ağız kanserinin erken belirtileri hakkındaki bilgiyi ve ilişkili risk faktörlerine yönelik farkındalığı kapsamaktadır.

Bulgular: Katılımcıların %63,7'si kadın, %36,3'si erkektir. Sigara kullanım oranı %31,2, alkol kullanımı ise %14,4 olarak tespit edilmiştir. Katılımcıların %53,4'ünde oral kanser farkındalığı bulunmamaktadır; farkındalığı olanların %21,6'sı medya kaynaklarını, %4,4'ü ise diş hekimlerini bilgi kaynağı olarak belirtmiştir. Sigara içme (%70,4) ve alkol tüketimi (%56,7), iyi bilinen risk faktörleri olmasına rağmen, güneş ışığına maruz kalma (%22,7) ve yaşlılık (%41,2) hakkındaki farkındalık daha düşüktür. Ayrıca, ağız kanserinin erken belirtileri olan iyileşmeyen ülserler (%40,3), kırmızı yaralar (%31,1), beyaz plaklar (%24), uzun süre devam eden şişlikler (%31,5) konusunda da bilgi düzeyi düşüktür.

Sonuç: Bu çalışma, diş hekimlerine başvuran hastalarda oral kanserlerle ilgili farkındalığın düşük olduğunu göstermektedir. Bulgularımız doğrultusunda, medya kullanımı farkındalık artırmada etkili bir yöntem olabilir; ayrıca düzenli diş hekimi kontrolleri de bu farkındalığı artırmada önemli bir rol oynayabilir.

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INTRODUCTION

Cancer is a leading global cause of death, significantly affecting life expectancy. In 2019, the World Health Organization (WHO) reported cancer as the primary or secondary cause of death before age 70 in 112 of 183 countries.[1,2] Oral cancers, affecting the mouth's structures, pose a major global health concern.[3] In 2020 alone, approximately 377.713 new cases and 177.757 deaths were recorded worldwide, impacting areas such as the lips, tongue, gums, and palate.[2]

Numerous risk factors for oral cavity cancers have been identified in the literature. Among these, tobacco and alcohol use are considered the most significant risk factors.[4-9] In addition to these, viral infections -especially Human Papilloma Virus (HPV)-, immunosuppression, advanced age, ultraviolet radiation, a family history of cancer, poor oral hygiene, candidiasis, chemical carcinogens, chronic mucosal irritation, and nutritional disorders are among other possible risk factors.[7,10-12]

The clinical appearance of early oral cancer lesions is variable. Lesions that do not heal within two weeks after the causative agent's removal may present as red or white-red ulcerated lesions, spontaneous bleeding, or swelling.[10,13,14] Initially, they may be flat or raised, with symptoms like chewing difficulty, limited tongue movement, pain, or swelling developing over time.[11]

Early diagnosis in oral cancers is crucial for the patient's prognosis, survival time, and quality of life. However, these cancers are often asymptomatic in the early stages, making them difficult to detect. As a result, patients typically seek diagnosis and treatment in advanced stages. Therefore, it is of great importance for both patients and clinicians to be knowledgeable about early symptoms and risk factors.[10,11]

This study aims to investigate the level of awareness and knowledge about oral cancers, their risk factors, and early signs among patients attending dental examinations. By understanding the current level of awareness and knowledge, the goal is to emphasize the importance of educating the public about oral cancer and to develop strategies to increase this awareness. Additionally, this study aims to assess the role of dentists in raising awareness and to enhance the effectiveness of educational and informational efforts in this area.

MATERIAL AND METHODS

This study was submitted to the Bezmialem Vakif University Non-Interventional Clinical Research Ethics Committee. It has been approved ethically with the approval number 2023/263 on 23.08.2023 for the study numbered 16 and dated 23.08.2023 (E-54022451-050.05.04-121165). This study was performed in line with the principles of the Declaration of Helsinki. Informed consent was obtained from all individual participants included in the study.

This study is a descriptive cross-sectional research conducted using a questionnaire, involving face-to-face interviews with patients who applied for routine examination to the Department of Oral and Maxillofacial Radiology at Bezmialem Vakif University between August 24, 2023, and November 24, 2023. A total of 750 voluntary patients without mental disabilities, randomly selected and aged 18 and above, were included in the study, with 478 (63.7%) being female and 272 (36.3%) being male. The identity information of the participating patients was kept confidential without being disclosed. No prior information about oral cancers was provided to the participants in the study.

To determine the sample size, a pilot study involving 30 patients was conducted. The required sample size was calculated to be at

least 317 patients, and a total of 750 individuals were included in the study. For determining the internal consistency reliability of the questionnaire, the Kuder Richardson 20 formula (KR-20) was used, and the coefficient was found to be 0.85, indicating high internal reliability (KR-20 > 0.70).

A literature review was conducted, and surveys from previous studies [3,14,15] were evaluated to create the questionnaire. The questionnaire includes 26 questions, addressing participants' demographic information (age, gender, educational status) with 3 questions, lifestyle and habits (smoking, alcohol use, and frequency of smokeless tobacco use) with 6 questions, medical history (the participant and their first-degree relatives) with 2 questions, cancer history (the participant and their relatives (first, second, and third-degree)) with 2 questions, awareness of oral cancer information (knowledge about oral cancer; source of information, if any; preventable or treatable; contagious) with 5 questions, knowledge about risk factors for oral cancers (smoking, alcohol use, sunlight exposure, advanced age) with 4 questions, and knowledge about early signs of oral cancer (non-healing ulcers, red sores, white plaques, persistent swelling) with 4 questions.

Statistical Analyses

All statistical analyses were performed using statistical software (IBM SPSS Statistics, v26.0; IBM Corp, Armonk, NY, USA). Descriptive statistics, including the number and percentage values of the data, were provided. Fisher's exact test was applied to assess the relationship between variables and levels of knowledge and awareness. The significance level was set at 0.05 ($p<0.05$). Based on the results of Fisher's exact test, an adjusted Bonferroni test was applied to determine in which groups the significant differences occurred in the multinomial chi-square tables. In tables examining the relationship between awareness, risk factors, early signs, and age groups, the adjusted p-value was considered to be 0.004. Similarly, in tables investigating the relationship between awareness, risk factors, early signs, and educational status, the adjusted p-value was set at 0.003. All statistical analyses were conducted using IBM SPSS Statistics software (v26.0; IBM Corp, Armonk, NY, USA). Descriptive statistics, including frequencies and percentages, were provided. Fisher's exact test was used to evaluate the relationship between variables and levels of knowledge and awareness. The significance level was set at 0.05 ($p<0.05$). Following the results of Fisher's exact test, an adjusted Bonferroni correction was applied to identify the groups where significant differences occurred in the multinomial chi-square tables. In tables exploring the relationship between awareness, risk factors, early signs, and age groups, the adjusted p-value threshold was set at 0.004. Similarly, in tables investigating the relationship between awareness, risk factors, early signs, and educational status, the adjusted p-value was set at 0.003.

RESULTS

All patients invited to the survey agreed to participate. The participation rate for the survey was 100%. A total of 750 surveys were collected and analyzed over a 3-month period, with participants aged between 18 and over 60 years, and an average age of approximately 36. Of the participants, 63.7% (n=478) were female, and 36.3% (n=272) were male. The demographic data of the participants are summarized in Table 1. Among the participants, 55.9% (n=419) had never smoked, while 12.1% (n=91) of participants reported smoking at least one pack of cigarettes per day. Regarding alcohol consumption habits, 77.2% (n=579) of participants had never consumed alcohol, and among the 14.4% (n=108) who reported alcohol use, 7.6% (n=57) consumed alcohol every day. The data related to the participants' lifestyles and habits, as well as information on cancer history, are summarized in Table 1.

46.5% (n=349) of the participants answered 'yes' to the question 'Have you ever heard of oral cancer?', while 41.7% (n=313) stated that they had not heard of it, and 11.7% (n=88) stated they were unaware of this topic. In response to the question 'From whom/where did you hear about oral cancer?', 21.6% (n=162) of the participants mentioned hearing it from the media, only 4.4% (n=33) from a dentist, and 2.1% (n=16) from a doctor. Regarding the question 'Can oral cancer be prevented?', 46.5% (n=349) of the participants answered 'yes', while 51.1% (n=383) indicated that they did not know. In response to the question 'Can oral cancer be treated?', 53.5% (n=401) of the participants answered 'yes', while 43.7% (n=328) expressed that they did not know. When asked if oral cancer is contagious, 50.8% (n=381) of the participants stated that they did not have information on this, while 36.8% (n=276) answered 'no'. The data related to awareness of oral cancer are provided in Table 1.

70.4% (n=528) of the participants answered 'yes' to the question 'Does smoking increase the likelihood of oral cancer?', while 2.4% stated they were unaware of a link between smoking and oral cancer, and 27.2% (n=204) stated they were unaware of this topic. Regarding the question 'Does alcohol use increase the likelihood of oral cancer?', 56.7% (n=425) of the participants answered 'yes', while 38.5% (n=289) indicated that they lacked knowledge about this. For the question 'Does exposure to sunlight increase the likelihood of oral cancer?', 60.1% (n=451) of the participants stated that they lacked knowledge about this, while 22.7% (n=170) answered 'yes'. For the question 'Does advanced age increase the likelihood of oral cancer?', 50.4% (n=378) of the participants stated that they did not have any information on this, while 41.2% (n=309) answered 'yes'. The data on the knowledge level regarding risk factors for oral cancer are provided in Table 1.

53.6% (n=402) of the participants stated that they did not have any information about whether ‘Are non-healing ulcers a sign of oral cancer?', while 40.3% (n=302) answered 'yes'. For the question 'Are red sores in the mouth a sign of oral cancer?', 62.1% (n=466) of the participants declared that they did not have any information on this, while 31.1% (n=233) answered 'yes'. Regarding the question 'Are white plaques in the mouth a sign of oral cancer?', 63.9% (n=479) of the participants stated that they did not have any information on this, while 24% (n=180) answered 'yes'. For the question 'Are persistent swellings a sign of oral cancer?', 62.5% (n=469) of the participants declared that they did not have any information on this, while 31.5% (n=236) answered 'yes'. The data on the knowledge level regarding the early signs of oral cancer are provided in Table 1.

The level of oral cancer awareness was statistically higher among females compared to males, except for the question 'Can oral cancer be prevented?' (p=0.000; p=0.261; p=0.021; p=0.007) (Table 2). A statistically significant relationship was observed between age groups and their responses to oral cancer awareness questions, except for the question 'Is oral cancer contagious?' (p=0.010; p=0.002; p=0.003; p=0.262). To determine which groups contributed to these differences, a post-hoc test with Bonferroni correction was conducted. The statistical difference arises primarily because the '18-29' age group demonstrated a significantly higher level of awareness about oral cancer across all questions—except ‘Is oral cancer contagious?’—compared to other groups. For the question 'Have you heard of oral cancer?', the '30-44' age group, and for the question 'Can oral cancer be prevented?', the '45-59' age group had a statistically lower level of oral cancer awareness compared to other groups (p<0.004) (Table 2).

Table 1: Demographic information, lifestyle and habits, awareness of oral cancer, risk factors, and early signs information of study participants

			Frequency (n)	Percent (%)
DEMOGRAPHIC VARIABLES	**Gender**	Female	478	63.7
		Male	272	36.3
	Age Group	18-29	319	42.5
		30-44	211	28.2
		45-59	186	24.8
		60-	34	4.5
	Education Level	Primary school	192	25.6
		High school	199	26.5
		University	318	42.4
		Master's degree	32	4.3
		Doctorate	9	1.2
LIFESTYLE AND HABITS	**Smoking Habit - Tobacco Use Habit**	I have never smoked	419	55.9
		I used to smoke	97	12.9
		I currently smoke	234	31.2
	Frequency of Smoking	1-2 per day	35	4.7
		5 per day	35	4.7
		10 per day	67	8.9
		1 pack per day	91	12.1
		2 packs or more	6	0.8
	Alcohol Use Habit	I have never used	579	77.2
		I used to use	63	8.4
		I currently use	108	14.4
	Frequency of Alcohol Use	Rarely	2	0.3
		Once a month	10	1.3
		Once a week	17	2.3
		2-3 times a week	22	2.9
		Every day	57	7.6
	Smokeless Tobacco Use Habit	I have never used	745	99.3
		I used to use	5	0.7
		I currently use	0	0
HISTORY OF CANCER	**Have You Had Cancer?**	Yes	13	1.7
		No	737	98.3
	Does Your Family Have A History Of Cancer?	Yes, I. degree	121	16.1
		Yes, II. degree	108	14.4
		Yes, III. degree	54	7.2
		No	467	62.3
ORAL CANCER AWARENESS INFORMATION	**Have You Ever Heard About Oral Cancer?**	Yes	349	46.5
		No	313	41.7
		Do not know	88	11.7
	Source of Information Regarding Oral Cancer	Dentist	33	4.4
		Doctor	16	2.1
		Media	162	21.6
		Friends-family	83	11.1
		Other	55	7.3
	Can Oral Cancer Be Prevented?	Yes	349	46.5
		No	18	2.4
		Do not know	383	51.1
	Can Oral Cancer Be Treated?	Yes	401	53.5
		No	21	2.8
		Do not know	328	43.7
	Is Oral Cancer Contagious?	Yes	93	12.4
		No	276	36.8
		Do not know	381	50.8

KNOWLEDGE LEVEL ABOUT THE RISK FACTORS OF ORAL CANCER	Do you think smoking is a risk factor for oral cancer?	Yes	528	70.4
		No	18	2.4
		Do not know	204	27.2
	Do you think alcohol is a risk factor for oral cancer?	Yes	425	56.7
		No	36	4.8
		Do not know	289	38.5
	Do you think sunlight exposure is a risk factor for oral cancer?	Yes	170	22.7
		No	129	17.2
		Do not know	451	60.1
	Do you think advanced age is a risk factor for oral cancer?	Yes	309	41.2
		No	63	8.4
		Do not know	378	50.4
KNOWLEDGE LEVEL ABOUT EARLY SIGNS OF ORAL CANCER	Do you think non-healing ulcers are a sign of oral cancer?	Yes	302	40.3
		No	46	6.1
		Do not know	402	53.6
	Do you think red sores are a sign of oral cancer?	Yes	233	31.1
		No	51	6.8
		Do not know	466	62.1
	Do you think white plaques are a sign of oral cancer?	Yes	180	24
		No	91	12.1
		Do not know	479	63.9
	Do you think persistent swellings are a sign of oral cancer?	Yes	236	31.5
		No	45	6
		Do not know	469	62.5

Table 2: Relationship between demographic data and awareness of oral cancer

Oral Cancer Awareness Informations' Questions	Demographic Variables		Oral Cancer Awareness Information Questions' Responses			p-value
			Yes (%)	No (%)	Do not know (%)	
Have you ever heard about oral cancer?	Gender	Female	53.35	37.45	9.20	0.000*
		Male	34.56	49.26	16.18	
	Age Group	18-29	53.29	36.05	10.66	0.010*
		30-44	36.0	51.2	12.8	
		45-59	45.7	41.4	12.9	
		60-	52.94	38.24	8.82	
	Education	Primary school	37.5	50.0	12.5	0.001*
		High school	40.2	45.7	14.1	
		University	55.0	34.6	10.4	
		Master's degree	50.0	46.9	3.1	
		Doctorate	66.7	11.1	22.2	
Can oral cancer be prevented?	Gender	Female	48.74	2.51	48.75	0.261
		Male	42.65	2.20	55.15	
	Age Group	18-29	54.5	1.6	43.9	0.002*
		30-44	45.0	1.9	53.1	
		45-59	35.5	4.3	60.2	
		60-	41.2	2.9	55.9	
	Education	Primary school	30.7	5.2	64.1	0.000*
		High school	45.2	1.5	53.3	
		University	55.3	1.6	43.1	
		Master's degree	56.25	0	43.75	
		Doctorate	66.7	0	33.3	
Can oral cancer be treated?	Gender	Female	56.9	3.1	40.0	0.021*
		Male	47.4	2.2	50.4	
	Age Group	18-29	61.4	1.6	37	0.003*
		30-44	46.92	2.84	50.24	
		45-59	46.8	4.3	48.9	
		60-	55.9	5.9	38.2	
	Education	Primary school	44.8	5.2	50	0.022*
		High school	50.3	1.5	48.2	
		University	60.4	2.5	37.1	
		Master's degree	59.4	0	40.6	
		Doctorate	44.4	0	55.6	

Is oral cancer contagious?	**Gender**	Female	13.6	40	46.4	0.007*
		Male	10.30	31.25	58.45	
	Age Group	18-29	15.05	37.93	47.02	0.262
		30-44	8.5	34.6	56.9	
		45-59	11.8	37.1	51.1	
		60-	14.7	38.2	47.1	
	Education	Primary school	14.1	25	60.9	0.010*
		High school	12.6	37.7	49.7	
		University	11.64	42.14	46.22	
		Master's degree	9.4	40.6	50	
		Doctorate	11.1	66.7	22.2	

Pearson Chi-Square *$p<0.05$

Table 3: Relationship between demographic data and risk factors of oral cancer

Knowledge Level About The Risk Factors Of Oral Cancer's Questions	**Demographic Variables**		**Knowledge Level About The Risk Factors Of Oral Cancer Questions' Responses**			**p-value**
			Yes (%)	**No (%)**	**Do not know (%)**	
Do you think that smoking is a risk factor for oral cancer?	**Gender**	Female	74.1	2.5	23.4	0.009*
		Male	64	2.2	33.8	
	Age Group	18-29	75.2	1.6	23.2	0.002*
		30-44	66.8	0.5	32.7	
		45-59	66.13	4.84	29.03	
		60-	70.6	8.8	20.6	
	Education	Primary school	64.6	3.6	31.8	0.332
		High school	67.3	2.5	30.2	
		University	75.16	1.89	22.95	
		Master's degree	75.0	0	25	
		Doctorate	77.8	0	22.2	
Do you think that alcohol is a risk factor for oral cancer?	**Gender**	Female	60.3	5	34.7	0.017*
		Male	50.4	4.4	45.2	
	Age Group	18-29	59.9	4.7	35.4	0.384
		30-44	55	3.8	41.2	
		45-59	52.15	5.38	42.47	
		60-	61.8	8.8	29.4	
	Education	Primary school	51.6	5.2	43.2	0.409
		High school	53.8	4.5	41.7	
		University	61.3	4.4	34.3	
		Master's degree	59.37	6.25	34.38	
		Doctorate	55.6	11.1	33.3	
Do you think that sunlight exposure is a risk factor for oral cancer?	**Gender**	Female	25.7	18	56.3	0.010*
		Male	17.3	15.8	66.9	
	Age Group	18-29	25.1	18.2	56.7	0.069
		30-44	17.1	17.5	65.4	
		45-59	23.7	13.4	62.9	
		60-	29.4	26.5	44.1	
	Education	Primary school	21.4	16.1	62.5	0.087
		High school	15.6	20.1	64.3	
		University	26.4	17	56.6	
		Master's degree	31.25	9.38	59.37	
		Doctorate	44.45	11.10	44.45	
Do you think that advanced age is a risk factor for oral cancer?	**Gender**	Female	41.8	10.3	47.9	0.026*
		Male	40.1	5.1	54.8	
	Age Group	18-29	45.45	6.27	48.28	0.030*
		30-44	35.5	9	55.5	
		45-59	37.1	11.3	51.6	
		60-	58.8	8.8	32.4	
	Education	Primary school	38.5	11.5	50	0.308
		High school	37.2	7	55.8	
		University	45.6	7.9	46.5	
		Master's degree	37.5	3.1	59.4	
		Doctorate	44.45	11.10	44.45	

Pearson Chi-Square *$p<0.05$

There is a statistically significant relationship between education level and responses to oral cancer awareness questions (p=0.001; p=0.000; p=0.022; p=0.010). A post-hoc test with Bonferroni corrected was performed to identify the groups contributing to this difference. The statistical difference arises because participants in the 'university' education group demonstrated a higher level of oral cancer awareness (p<0.003) (Table 2).

Females' knowledge level about oral cancer risk factors is statistically higher compared to males (p=0.009;p=0.017; p=0.010; p=0.026) (p<0.05) (Table 3). A statistically significant relationship exists between age groups and the response to whether smoking is a risk factor for oral cancer. (p=0.002). A Bonferroni-adjusted post-hoc test was conducted to determine which groups contributed to this difference. The statistical difference is primarily due to the '18-29' age group demonstrating a higher level of knowledge about smoking being a risk factor for oral cancer compared to other groups. (p<0.004) (Table 3).

The knowledge level regarding alcohol consumption as a risk factor for oral cancer is statistically insignificant among age groups (p=0.384; p>0.05) (Table 3). Similarly, knowledge about sun exposure as a risk factor for oral cancer is also statistically insignificant among age groups. (p=0.069; p>0.05) (Table 3).

There is a statistically significant relationship between age groups and the response to whether advanced age is a risk factor for oral cancer (p=0.030). A Bonferroni-corrected post-hoc test was conducted to identify which groups contributed to this difference. The statistical difference is due to the '60-' age group having a higher level of knowledge about advanced age being a risk factor for oral cancer compared to other groups (p<0.004) (Table 3).

The knowledge level about oral cancer risk factors is statistically insignificant across different education level groups (p=0.332; p=0.409; p=0.087; p=0.308) (p>0.05) (Table 3).

Females demonstrate a statistically significant knowledge level about the early symptoms of oral cancer compared to males. (p=0.023; p=0.039; p=0.020; p=0.003) (p<0.05) (Table 4). Additionally, a statistically significant relationship exists between age groups and responses to the question about whether non-healing ulcers are an early symptom of oral cancer. (p<0.001). However, no statistically significant relationship was found between age groups and knowledge of other early symptoms of oral cancer. (p=0.717; p=0.346; p=0.637) (Table 4).

There is also a statistically significant relationship between education levels and responses to questions about non-healing ulcers and red sores being early symptoms of oral cancer (p=0.048; p=0.029) (p<0.05) (Table 4). However, knowledge about white plaques and persistent swellings as early symptoms of oral cancer remains statistically insignificant across education level groups (p=0.351; p=0.721) (p>0.05) (Table 4).

No statistically significant relationship was found between individuals with or without the habit of smoking and their level of oral cancer awareness. Similarly, among individuals with varying smoking frequencies, no statistically significant relationship was observed regarding oral cancer awareness. (p=0.206; p=0.602; p=0.620; p=0.529) (p>0.05) (Table 5). A statistically significant relationship was identified between individuals with and without the habit of alcohol consumption and the awareness question 'Have you heard of oral cancer?' (p=0.001; p<0.05) However, no statistically significant relationship was observed with the awareness question 'Can oral cancer be prevented?' (p=0.809; p>0.05). Among alcohol consumers, no statistically significant relationship was found between

different alcohol consumption frequencies and oral cancer awareness levels. (p=0.372; p=0.558) (p>0.05) (Table 5). Regarding smoking as a risk factor for oral cancer, no statistically significant relationship was found between those with and without the habit of smoking. Similarly, among smokers with different smoking frequencies, no statistically significant relationship was observed regarding smoking as a risk factor. There was no statistically significant relationship between those with and without the habit of alcohol consumption concerning whether alcohol use is a risk factor. Likewise, no statistically significant relationship was observed among alcohol consumers with varying alcohol consumption frequencies concerning alcohol use as a risk factor. (p=0.749; p=0.190; p=0.537; p=0.163) (p>0.05) (Table 5).

Table 4: Relationship between demographic data and early symptoms of oral cancer

Knowledge Level About Early Signs of Oral Cancer's Questions	Demographic Variables		Knowledge Level About Early Signs of Oral Cancer Questions' Responses			p-value
			Yes (%)	No (%)	Do not know (%)	
Do you think that non-healing ulcers are a sign of oral cancer?	Gender	Female	43.9	5.9	50.2	0.023*
		Male	33.8	6.6	59.6	
	Age Group	18-29	43.26	1.88	54.86	0.000*
		30-44	36.97	6.16	56.87	
		45-59	37.1	11.3	51.6	
		60-	50	17.6	32.4	
	Education	Primary school	35.9	12	52.1	0.048*
		High school	39.2	5	55.8	
		University	43.1	4.1	52.8	
		Master's degree	46.9	0	53.1	
		Doctorate	33.3	0	66.7	
Do you think that red sores are a sign of oral cancer?	Gender	Female	34.1	7.1	58.8	0.039*
		Male	25.7	6.3	68	
	Age Group	18-29	32.6	5.6	61.8	0.717
		30-44	28.4	8.1	63.5	
		45-59	31.18	6.45	62.37	
		60-	32.36	11.76	55.88	
	Education	Primary school	30.2	10.9	58.9	0.029*
		High school	32.7	2	65.3	
		University	30.5	8.2	61.3	
		Master's degree	31.25	0	68.75	
		Doctorate	33.3	0	66.7	
Do you think that white plaques are a sign of oral cancer?	Gender	Female	25.9	13.8	60.3	0.020*
		Male	20.6	9.2	70.2	
	Age Group	18-29	25.1	11	63.9	0.346
		30-44	20.85	13.27	65.88	
		45-59	25.3	10.8	64	
		60-	26.5	23.5	50	
	Education	Primary school	24.48	14.06	61.46	0.351
		High school	21.6	14.1	64.3	
		University	24.5	11.3	64.2	
		Master's degree	28.1	0	71.9	
		Doctorate	33.3	0	66.7	
Do you think that persistent swellings are a sign of oral cancer?	Gender	Female	35.56	6.28	58.16	0.003*
		Male	24.3	5.5	70.2	
	Age Group	18-29	31.3	4.4	64.3	0.637
		30-44	31.2	6.2	62.6	
		45-59	31.18	8.07	60.75	
		60-	35.3	8.8	55.9	
	Education	Primary school	31.8	8.3	59.9	0.721
		High school	27.14	6.03	66.83	
		University	33.65	5.03	61.32	
		Master's degree	34.38	3.12	62.50	
		Doctorate	33.3	0	66.7	

Pearson Chi-Square **p<0.05*

Table 5: Relationship between lifestyle and habits with oral cancer awareness and risk factor findings

Oral Cancer Awareness Informations' Questions	Lifestyle and Habits' Questions	Lifestyle and Habits Questions' Responses	Oral Cancer Awareness Information Questions' Responses			p-value
			Yes (%)	No (%)	Do not know (%)	
HAVE YOU EVER HEARD ABOUT ORAL CANCER?	Do you have a smoking habit?	I have never smoked	47.3	43.4	9.3	0.206
		I used to smoke	45.4	41.2	13.4	
		I currently smoke	45.7	38.9	15.4	
	What is the frequency of your smoking?	1-2 per day	52.9	32.4	14.7	0.620
		5 per day	47.1	29.4	23.5	
		10 per day	44.8	41.8	13.4	
		1 pack per day	43.95	42.86	13.19	
		2 packs or more	50	16.7	33.3	
	Do you have a habit of consuming alcohol?	I have never used	47.15	43.35	9.50	0.001*
		I used to use	34.9	47.6	17.5	
		I currently use	50	29.6	20.4	
	What is the frequency of your alcohol consumption?	Rarely	48.3	29.3	22.4	0.372
		Once a month	56.52	39.13	4.35	
		Once a week	41.2	23.5	35.3	
		2-3 times a week	50	20	30	
		Every day	50	50	0	
CAN ORAL CANCER BE PREVENTED?	Do you have a smoking habit?	I have never smoked	47.73	2.63	49.64	0.602
		I used to smoke	39.18	2.06	58.76	
		I currently smoke	47.43	2.14	50.43	
	What is the frequency of your smoking?	1-2 per day	45.95	2.51	51.54	0.529
		5 per day	61.8	0	38.2	
		10 per day	55.9	0	44.1	
		1 pack per day	41.8	4.5	53.7	
		2 packs or more	50	0	50	
	Do you have a habit of consuming alcohol?	I have never used	47	2.6	50.4	0.809
		I used to use	39.7	1.6	58.7	
		I currently use	48.1	1.9	50	
	What is the frequency of your alcohol consumption?	Rarely	48.3	0	51.7	0.558
		Once a month	43.5	4.3	52.2	
		Once a week	47.1	0	52.9	
		2-3 times a week	50	10	40	
		Every day	50	0	50	
DO YOU THINK SMOKING IS A RISK FACTOR FOR ORAL CANCER?	Do you have a smoking habit?	I have never smoked	71.6	2.4	26.0	0.749
		I used to smoke	72.2	1	26.8	
		I currently smoke	67.5	3	29.5	
	What is the frequency of your smoking?	1-2 per day	82.35	5.88	11.77	0.190
		5 per day	61.77	5.88	32.35	
		10 per day	67.2	1.5	31.3	
		1 pack per day	65.9	2.2	31.9	
		2 packs or more	50	0	50	
DO YOU THINK ALCOHOL IS A RISK FACTOR FOR ORAL CANCER?	Do you have a habit of consuming alcohol?	I have never used	58.2	4.5	37.3	0.537
		I used to use	52.38	4.76	42.86	
		I currently use	50.9	65	42.6	
	What is the frequency of your alcohol consumption?	Rarely	60.3	5.2	34.5	0.163
		Once a month	43.5	8.7	47.8	
		Once a week	41.2	0	58.8	
		2-3 times a week	40	10	50	
		Every day	0	50	50	

Pearson Chi-Square **p<0.05*

There was no statistically significant relationship observed between individuals with a history of cancer in their medical history and those without, regarding the level of oral cancer awareness knowledge (p=0.567; p=0.841; p=0.849; p=0.728) (p>0.05) (Table 6).

Similarly, there was no statistically significant relationship observed between individuals with a history of cancer in first, second, and third-degree relatives in their family history and those without, regarding the level of oral cancer awareness knowledge (p=0.117; p=0.397; p=0.574; p=0.493) (p>0.05) (Table 6).

Table 6: Correlation between cancer history and awareness of oral cancer

Cancer History	History Responses	Awareness Question	Awareness Responses			p-value
			Yes (%)	No (%)	Do not know (%)	
HAVE YOU HAD CANCER?	Yes	Have you ever heard about oral cancer?	53.8	46.2	0	0.567
	No		46.4	41.7	11.9	
	Yes	Can oral cancer be prevented?	53.8	0	46.2	0.841
	No		46.4	2.4	51.2	
	Yes	Can oral cancer be treated?	61.5	0	38.5	0.849
	No		53.32	2.85	43.83	
	Yes	Is oral cancer contagious?	7.69	46.16	46.15	0.728
	No		12.5	36.6	50.9	
	Yes, I, degree	Have you ever heard about oral cancer?	52.9	41.3	5.8	0.117
	Yes, II, degree		49.08	37.96	12.96	
	Yes, III, degree		53.7	31.5	14.8	
	No		43.5	43.9	12.6	
DOES YOUR FAMILY HAVE A HISTORY OF CANCER?	Yes, I, degree	Can oral cancer be prevented?	43	0	57	0.397
	Yes, II, degree		47.2	3.7	49.1	
	Yes, III, degree		50	1.9	48.1	
	No		46.9	2.8	50.3	
	Yes, I, degree	Can oral cancer be treated?	50.4	4.1	45.5	0.574
	Yes, II, degree		55.6	4.6	39.8	
	Yes, III, degree		57.4	0	42.6	
	No		53.3	2.4	44.3	
	Yes, I, degree	Is oral cancer contagious?	14.9	33.9	51.2	0.493
	Yes, II, degree		14.8	38	47.2	
	Yes, III, degree		14.82	44.44	40.74	
	No		10.9	36.4	52.7	

Pearson Chi-Square **p<0.05*

DISCUSSION

In cancer, the treatability of lesions through early diagnosis is a crucial factor for survival. In a study conducted by Saadat et al. [16] in the United Kingdom in 2022, an increase in the incidence of oral cancer in the country was attributed to the closure of access to dentists during the Covid-19 pandemic, leading to a negative impact on early diagnosis. In our survey assessing awareness levels of oral cancers, data were obtained from patients visiting our clinic through supervised, face-to-face interviews with physicians. This approach is believed to provide more accurate information compared to surveys conducted through mail, phone calls, and other online methods. Furthermore, with 750 participants included in our survey, exceeding the statistically determined minimum participant count of 317, and a KR-20 value of 0.85, the survey demonstrates high internal consistency reliability. Therefore, it is considered to better reflect the community's views on oral cancer.

In the current study, individuals who claimed to have heard of oral cancer constituted 46.5% of the participants. A literature review revealed varying percentages in studies conducted worldwide, including 73.8% in Australia,[17] 58.2% in Nepal,[18] 30.7% in Iran,[19] 72% in Spain,[20] 52.9% in China,[15] 81.3% in Brazil,[21] 53.2% in Indonesia,[22] 65.4% in a joint study in Poland and Germany,[23] 68.4% in Italy,[24] 70% in Jordan,[25] and 66% in Singapore.[16] Although the participants in the mentioned studies reported awareness of oral cancer in the specified percentages, it does not necessarily indicate their knowledge of the symptoms, etiologies, and preventive measures for oral cancers. It is a fact in our study that the awareness rate is quite low, and this is believed to be influenced by the low sociocultural and socioeconomic levels in the vicinity of the hospital where our study was conducted.

In our study, when participants were asked about the source from which they heard about oral cancer, the responses revealed that the highest percentage obtained information

from the media (21.6%), while the lowest percentages were reported for doctors (2.1%) and dentists (4.4%). Evaluating this question as an indicator of awareness sources among participants, it is notable that doctors and dentists have a significantly weak impact on patient education, a trend observed in previous studies on the subject. A literature review on the topic was conducted, and in the study by Zachar et al.,[17] the reported sources were TV/Radio (33.1%), cigarette packages (35.7%), newspapers/magazines (15.2%), friends/ acquaintances (21.2%), dentist (20.7%), doctor (7.2%), and internet (14%). In the study by Wimardhani et al.,[22] the percentages were health warnings (43.3%), print media (6.2%), TV/radio (17.8%), internet (9.5%), dentist (18.9%), doctor (8.1%). Gerber et al.'s study [23] reported percentages as TV/radio/newspaper (34.8%), internet (33.7%), doctor (23.7%), friends/acquaintances (19.6%). Rupel et al.'s study [24] indicated percentages as media (44.3%), school (21%), family/friends (34.5%), dentist (13.7%), other (11.8%). Finally, in the study by Jarab et al.,[25] the reported percentages were friends (5.03%), doctor (16.8%), TV (3.6%), newspaper (0.11%), radio (0.22%), health pamphlets (5.79%), internet (29.29%), educational campaigns (5.79%), and social media (20.87%). Although the parameters of these studies do not directly align, it suggests a weak communication between patients and healthcare professionals, emphasizing the need for training for healthcare personnel at all levels to increase awareness about oral cancer in the community.

In our study, when oral cancer awareness, risk factors, and early signs were compared with demographic information, it was observed that, within the gender group, women, within the age groups, participants aged 18-29, and within the education groups, participants with advanced education levels such as university, master's, and doctorate, although not always statistically significantly different, had a better level of knowledge about oral cancers. Similar results were obtained in studies conducted in Australia,[17] Italy,[24] Jordan,[25] and Iran [26] on this subject. The better knowledge level observed in the age group of 18-29 is thought to be due to their more effective use of technology, making access to information easier. Additionally, the fact that oral cancer is more prevalent in men and at an older age [5] contributes to this worrisome indication for gender and age. In general, this low level of awareness is considered to expose older men to a higher risk of delayed diagnosis, leading to increased morbidity and higher mortality rates.

In terms of awareness of risk factors for oral cancers, 70.4% of participants identified smoking, 56.7% identified alcohol consumption, 22.7% identified exposure to sunlight, and 41.2% considered advanced age as a risk factor for oral cancers. In comparison, Zachar et al.'s study [17] reported rates of 96.4% for smoking, 57.1% for alcohol, and 35.8% for advanced age; Rupel et al.'s study [24] reported rates of 94.1% for smoking, 51.4% for alcohol, and 15.4% for exposure to sunlight; Jarab et al.'s study [25] found rates of 92.79% for smoking, 83.28% for alcohol, 20.66% for exposure to sunlight, and 47.98% for advanced age as risk factors. While our study had a higher rate of smoking, the awareness rate of smoking as a risk factor was lower compared to the aforementioned studies. Additionally, no significant difference in awareness of smoking as a risk factor was observed between smokers and non-smokers among our study participants. All these findings suggest a generally low level of awareness in the community regarding the association of smoking with oral cancer, despite the higher prevalence of smoking in our study.

The awareness rates of our participants regarding early signs of oral cancers were as follows: long-lasting non-healing ulcers 40.3%, red sores 31.1%, white plaques 24%, and persistent swellings 31.5%. In comparison, awareness rates in Zachar et al.'s study[17] for the same topic were 90.3% for non-healing ulcers, 44.6% for red sores, and 44.1% for white

plaques. Wimardhani et al.'s study [22] reported awareness rates of 36.3% for non-healing ulcers, 8.7% for red sores, and 6.1% for white plaques. As observed, our study's awareness rates on non-healing ulcers are notably lower than those reported by Zachar et al.,[17] particularly, and higher than those from Wimardhani et al.'s study,[22] especially for red sores and white plaques. This difference is thought to be primarily related to the level of development of the countries. Furthermore, the awareness rate of early signs of oral cancers, as in similar studies, was found to be higher in women, individuals with a university degree, and those aged between 18-29 and above 60. The higher awareness among individuals aged 60 and above is considered to be due to the increased likelihood of oral cancer with age and the higher occurrence of oral cancer in their age group, even if the individual themselves does not have oral cancer.

Despite the large sample size, the limitation of this study lies in its data being restricted to a single university clinic. Future multicenter research across Istanbul and Turkey is recommended to assess oral cancer awareness comprehensively. A broader sample would better highlight regional and urban-rural differences, facilitating the development of targeted campaigns and educational programs to improve public health policies.

CONCLUSION

This study investigates the awareness and knowledge of oral cancers, their risk factors, and early signs among patients in hospital dental clinics. Findings reveal a generally low level of awareness within the community, underscoring the need for public education on oral cancer. While media is effective for information dissemination, regular dental check-ups also play a role in increasing awareness. These findings can guide efforts to enhance oral cancer awareness in the community.

Ethical Approval

The study was approved by the Non-Interventional Research Ethics Committee of Bezmialem Vakif University under approval number 2023/263, with reference code E-54022451-050.05.04-121165.

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Conflict of Interest

The authors deny any conflicts of interest related to this study.

Author Contributions

Design: EA, Data collection or access: EA, NK, İS, Analysis and comments: EA, İS, Literature search: EA, NK, İS, Writing: EA, İS.

REFERENCES

1. Jemal A, Siegel R, Xu J, Ward E. Cancer statistics, 2010. CA Cancer J Clin. 2010;60:277-300.
2. Sung H, Ferlay J, Siegel RL, Laversanne M, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2021;71:209-49.
3. Hassona Y, Scully C, Ghosh MA, Khoury Z, et al. Mouth cancer awareness and beliefs among dental patients. Int Dent J. 2015;65:15-21.
4. Lin W-J, Jiang R-S, Wu S-H, Chen F-J, Liu S-A. Smoking, alcohol, and betel quid and oral cancer: a prospective cohort study. J Oncol. 2011;2011:525976.
5. Deveci H, Çankal DAU. Ağız kanserleri ve diş hekimlerinin rolü. Ortadoğu Tıp Dergisi. 2019;11:78-84.
6. Turati F, Garavello W, Tramacere I, Pelucchi C, Galeone C, Bagnardi V, et al. A meta-analysis of alcohol drinking and oral and pharyngeal cancers: results from subgroup analyses. Alcohol Alcohol. 2013;48:107-18.
7. Chi AC, Neville BW, Damm DD, Allen CM. Oral and maxillofacial pathology. St. Louis, Missouri 63043: Elsevier Health Sciences, 2015.

8. Worakhajit P, Fuangtharnthip P, Khovidhunkit S-oP, Chiewwit P, Klongnoi B. The relationship of tobacco, alcohol, and betel quid with the formation of oral potentially malignant disorders: A community-based study from Northeastern Thailand. Int J Environ Res Public Health. 2021;18:8738.
9. Hashibe, Mia. Risk factors for cancer of the mouth: Tobacco, betel quid, and alcohol. In: Textbook of Oral Cancer: Prevention, Diagnosis and Management.. Editors:Saman Warnakulasuriya, John S. Greenspan Cham: Springer International Publishing, 2020. p. 23-30.
10. Del Corso G, Villa A, Tarsitano A, Gohel A. Current trends in oral cancer: A review. Can Cell Microenviron. 2016;3:e1332.
11. Neville BW, Day TA. Oral cancer and precancerous lesions. CA Cancer J Clin. 2002;52:195-215.
12. Hobbs C, Sterne J, Bailey M, Heyderman R, et al. Human papillomavirus and head and neck cancer: a systematic review and meta-analysis. Clin Otolaryngol. 2006;31:259-66.
13. Villa A, Villa C, Abati S. Oral cancer and oral erythroplakia: an update and implication for clinicians. Aust Dent J. 2011;56:253-6.
14. Al-Maweri SA, Tarakji B, Alsalhani AB, Al-Shamiri HM, et al. Oral cancer awareness of the general public in Saudi Arabia. Asian Pac J Cancer Prev. 2015;16:3377-81.
15. Zhou X-H, Huang Y, Yuan C, Zheng S-G, et al. A survey of the awareness and knowledge of oral cancer among residents in Beijing. BMC Oral Health. 2022;22:367.
16. Saadat S, Longridge N, Shaw R, Walker A, McCarthy C. Oral cancer awareness and education within the pharmacy profession. J Oncol Pharm Pract. 2023;29:826-32.
17. Zachar JJ, Huang B, Yates E. Awareness and knowledge of oral cancer amongst adult dental patients attending regional university clinics in New South Wales, Australia: a questionnaire-based study. Int Dent J. 2020;70:93-9.
18. Bajracharya D, Gupta S, Sapkota M, Bhatta S. Oral cancer knowledge and awareness in patients visiting Kantipur Dental College. 2017;15:247-51.
19. Azimi S, Ghorbani Z, Ghasemi E, Tennant M, Kruger E. Disparities in oral cancer awareness: a population survey in Tehran, Iran. J Cancer Educ. 2019;34:535-41.
20. Varela-Centelles P, Estany-Gestal A, Bugarín-González R, Seoane-Romero JM. Oral cancer awareness in Spain: A pilot study. Oral Dis. 2018;24:124-7.
21. do Prado NS, Bonan RF, da Silva Leonel ACL, de Amorim Carvalho EJ, et al. Awareness on oral cancer among patients attending dental school clinics in Brazil. Med Oral Patol Oral Cir Bucal. 2020;25:e89-95.
22. Wimardhani YS, Warnakulasuriya S, Subita GP, Soegyanto AI, et al. Public awareness of oral cancer among adults in Jakarta, Indonesia. J Investig Clin Dent. 2019;10:e12379.
23. Gerber H, Gedrange T, Szymor P, Leszczyszyn A, et al. Oral cancer awareness among patients at 3 university hos-pitals in Poland and Germany: a survey research. Adv Clin Exp Med. 2022;31:607-13.
24. Rupel K, Biasotto M, Gobbo M, Poropat A, et al. Knowledge and awareness of oral cancer: A cross-sectional survey in Trieste, Italy. Frontiers in Oral Health. 2023;4:1056900.
25. Jarab FS, Al-Qerem W, Qarqaz R. Oral Cancer Awareness, Attitudes, and Barriers among Jordanian Adults: A Cross-sectional Study. Oral Health Prev Dent. 2022;20:85-94.
26. Tadbir AA, Ebrahimi H, Pourshahidi S, Zeraatkar M. Evaluation of levels of knowledge about etiology and symptoms of oral cancer in southern Iran. Asian Pac J Cancer Prev. 2013;14:2217-20.