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E-CIGARETTES, VAPING, AND ORAL HEALTH: ASSESSING KNOWLEDGE AND AWARENESS IN SAUDI ARABIA'S YOUNG ADULT POPULATION – A CROSS-SECTIONAL STUDY

Hisham Abbas Komo[1], Raneem Yahya Moshat*[2], Wafaa Ahmed Alshehri[2], Ahmed Marzouq Alhejaili[3], Wejdan Hussain ALzubaidi[4], Saleh Suliman Almuzaini[5], Ruba Sami Alghamdi[2], Salem Ali Alqahtani[2], Manal Abdullah Alqahtani[6], Khames T. Alzahrani[7]

[1]BDS, SBOMFS, Consultant Oral & Maxillofacial Surgery, King Abdulaziz University, University of Dental Hospital, Jeddah, Saudi Arabia.
[2]Dental student, College of Dentistry, King Khalid University, Abha, Saudi Arabia.
[3]BDS, Ministry of Health, Madinah, Saudi Arabia.
[4]Dental intern, College of Dentistry, King Khalid University, Abha, Saudi Arabia.
[5]Dental Intern, College of Dentistry, Qassim University, Buraydah, Saudi Arabia.
[6]BDS, General Dentist, Jeddah, Saudi Arabia.
[7]BDS, PGD Endo from Stanford University, Saudi Board of Endodontic SR, King Faisal Specialist Hospital & Research Centre, Riyadh, Saudi Arabia.

***Corresponding author**: Raneem Yahya Moshat; **Email**: raneemym1@gmail.com

Abstract

Introduction: This study was designed to find out the level of knowledge and awareness of Saudi Arabian young adults about the risks to their oral health from vaping and e-cigarettes. The prevalence of e-cigarette use has significantly increased worldwide, particularly among younger people. As a result, it is necessary to determine how these individuals perceive the harmful effects of e-cigarettes on oral health, and this study is the first of its kind in Saudi Arabia. **Objectives:** The aim of this study is to assess the level of knowledge and awareness of the oral health risks associated with e-cigarettes and vaping products among young adults in Saudi Arabia. **Methodology:** This cross-sectional study was conducted between July - December 2024 in Saudi Arabia. The inclusion criteria included all Saudi Arabians who agreed to participate in the study and were aged between 16-24 years, were able to answer and respond to the survey in English or Arabic and were both electronic cigarette users and non-users. Exclusion criteria from the study were those who were younger than 16 years and older than 24, unable to understand and respond to the survey, and those who did not agree to participate in the study. The suggested sample size for this study, as computed by the Roasoft sample size calculator, was 385 people with a 95% confidence level and a 5% margin of error, ensuring that the minimum number of respondents needed to be a representative sample of the whole population. **Results:** This cross-sectional study involving 258 young adults in Saudi Arabia assessed knowledge and awareness of e-cigarettes and their effects on oral health. Results indicated that 58.8% of participants recognized the harmful effects of vaping, particularly its association with oral cancer (70% awareness). While a majority expressed high knowledge levels (64.3%), 62.4% still lacked comprehensive understanding of specific risks such as periodontal inflammation. Notably, 84.5% abstained from e-cigarette use, showing a significant trend away from vaping. Gender, smoking status, and willingness to quit exhibited

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significant relationships with awareness levels, highlighting areas for targeted educational initiatives. **Conclusion**: This study provides valuable insights into the knowledge and awareness of oral health risks associated with e-cigarettes and vaping among young adults in Saudi Arabia. While the findings indicate a commendable level of awareness, significant gaps remain that necessitate targeted educational interventions.

Keywords: knowledge, awareness, young adults, oral health, electronic cigarettes, Saudi Arabia.

Introduction:

E-cigarettes are battery-powered electronic devices that heat liquid (E-liquid) and produce an aerosol inhaled by users (termed 'vaping') [1]. The e-cigarette solution in the cartridge is referred to as e-liquid or e-juice and is generally comprised of nicotine, flavor ingredients in propylene glycol, and vegetable glycine [2]. It imitates smoking aside from that there is no burning, and the users breathe in vapor rather than smoke [3]. They come in various forms and with various nicotine concentrations; some of them have reported having zero nicotine [4].

The vaping device has gained broad acceptance since its launch in 2003, predominantly among young adults (18–25 years of age) [5]. Moreover, in the past few years, there has been an enormous increase in the use and knowledge regarding electronic nicotine delivery methods, also referred to as vaping devices or electronic cigarette devices. This is particularly true for younger individuals [6]. In the United States, middle and high school students have been using electronic cigarettes (e-cigarettes) more commonly than traditional cigarettes since 2014 [7]. Vape pipes, vapor pens, e-hookahs, electronic nicotine delivery systems (ENDS), and many other names are used to refer to e-cigarettes, which come in a wide range of designs. "Vaping" is a common term. These devices have been widely advertised, usually as a less harmful choice than traditional cigarettes [8].

While numerous studies were conducted to evaluate the perceived risk of people to the harmful effects of e-cigarettes on general health, only a small number of studies were conducted to evaluate their perceptions of the harmful effects on oral health [9,10]. In published research conducted in 2023 on Aotearoa to investigate how young adults perceived e-cigarette smoking and oral risk, it was found that their perception of the detrimental effect of e-cigarettes on oral health was generally low [11]. In addition, according to a study conducted in Saudi Arabia to assess the awareness of the effects of both shisha and e-cigarette smoking on oral health, 41.5% of smokers were not aware of the harmful effects of smoking on oral health [12]. Moreover, in published research in 2024, focusing on university student proficiency, attitudes, and practices regarding e-cigarettes, it was found that 36.14% of respondents' beliefs that e-cigarettes do not cause any injurious effects on oral health indicate a lack of knowledge among them [13]. Particularly that multiple studies have discovered that e-cigarettes have oral consequences such as dental caries, teeth wear, mouth irritation, dry mouth, oral cancer, periodontal diseases, and peri-implant diseases [14,15].

The use of electronic cigarettes and vaping has risen globally, including in Saudi Arabia, particularly among younger populations. Although some studies suggest that electronic cigarette use can be detrimental to general and oral health, there is a scarcity in the existing literature on young adults' perceptions of these effects on oral health, and they suffer from small sample sizes. This study focuses on the knowledge and awareness of young adults regarding e-cigarettes and oral health risks, and it is the first of its sort in Saudi Arabia.

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Objectives: The aim of this study is to assess the level of knowledge and awareness of the oral health risks associated with e-cigarettes and vaping products among young adults in Saudi Arabia.

Methodology:

Study design and Setting:

This cross-sectional study was conducted between July to December 2024 in Saudi Arabia. The study's population consisted of young adults, both males and females, ranging in age from 16 to 24 years.

Sample size:

The suggested sample size for this study, as computed by the Roasoft sample size calculator, was 385 people with a 95% confidence level and a 5% margin of error, ensuring that the minimum number of respondents needed to be a representative sample of the whole population.

Inclusion and Exclusion Criteria:

The inclusion criteria included all Saudi Arabians who agreed to participate in the study and were aged between 16-24 years, were able to answer and respond to the survey in English or Arabic and were both electronic cigarette users and non-users. Exclusion criteria from the study were those who were younger than 16 years and older than 24, unable to understand and respond to the survey, and those who did not agree to participate in the study.

Method for data collection, instrument and score system:

Data collection was done in the form of participants' answers to the survey questions. The self-administered online questionnaire used in the study was the result of extensive literature research from multiple studies of similar kind [11,12], and consists of four parts. In the first part, it consists of demographic data such as gender, age, residential area, educational qualification, and income. In part two, it is intended to assess the participant's attitude toward smoking e-cigarettes or vaping, whether they are smokers or not, and if yes, what is the reason behind it and whether they have an intention to stop or quit smoking. In parts three and four, participants' knowledge and awareness of the effect of smoking on oral health was assessed, including whether smoking e-cigarettes or vaping could contribute to oral cancer, dry mouth, bad breath, dental caries, tooth wear, stains on teeth, inflammation of the gums and tissues supporting the teeth, and its consequences. They also be questioned about being aware that smoking causes a white-coated tongue.

Scoring system:

A total of thirteen statements were used to evaluate participants' level of knowledge and awareness, with seven statements to assess the knowledge level and an overall score of 21 points and six statements to assess the awareness level with an overall score of 18. The answers were scored utilizing a three-point scale to reflect varying degrees of perspectives; a score of "1" was provided for "I don’t know and I'm not aware" a score of "2" was given to answers with "probably" and a score of "3" points was given to answers with "definitely." According to Bloom's cut-off points, the participant divided into three

ISSN:1624-1940
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groups based on their scores: 80%–100% consider high level, 60%–79% consider moderate level, and less than 59% consider low level. knowledge score was divided as follows: 17-21 points consider high level of knowledge, 13-16 points consider moderate level, and less than 13 consider low level, as well as awareness level, which divided as follows: 14-18 points consider high level of awareness, 10-13 points consider moderate level, and less than 10 consider low level.

Pilot test:

Twenty people were given the questionnaire and asked to complete it. This was done to assess the study's feasibility and the questionnaire's ease of use. The pilot study's data were not included in the study's final analysis.

Analyzes and entry method:

Data were collected and entered on the computer using a "Microsoft Office Excel Software" program. For statistical analysis, data was then transferred to the Statistical Package of Social Science Software (SPSS) program, version 20.

Results:

Table (1) displays various demographic parameters of the participants with a total number of (258). They have a mean age of 21.3 years with a majority (45.0%) of subjects being 21 to 23 years of age. The apparently overwhelming excess of females, with 74.4 percent, may represent more a reflection of broader structuring changes in the society or the research focus. Participants are geographically mostly Southern (51.9%) which may portray differences in responses or accessibility to education and employment opportunities. Beyond the number of years at each stage of child and adult development, educational attainment is quite notable given that an incredible 64.3 percent of respondents have graduated with a bachelor's degree, suggesting a large investment in educational capital among young adults in this cohort. But the economic data suggests it's a concerning trend: 67.8 percent of respondents, for example, say they get paid monthly for less than SAR 3,000.

Table (1): Sociodemographic characteristics of participants (n=258).

Parameter		***No.***	***Percent (%)***
Age (Mean:21.3, STD:2.4)	20 or less	86	33.3
	21 to 23	116	45.0
	24 years old	56	21.7
Gender	Female	192	74.4
	Male	66	25.6
Residential region	Southern region	134	51.9
	Central region	42	16.3
	Eastern region	14	5.4
	Western region	68	26.4
Educational level	Middle school	2	.8
	High school	85	32.9

ISSN:1624-1940
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	Bachelor's degree	166	64.3
	Postgraduate degree	5	1.9
Monthly income	Less than 3000 SAR	175	67.8
	3000 to 8000 SAR	39	15.1
	8001 to 12000 SAR	18	7.0
	More than 12000 SAR	26	10.1

As shown in figure 1, The data presented here is of individuals who used an electronic cigarette for the reasons presented. To our knowledge, the proportion of never smoking e-cigarettes among this sample is substantially higher, 83.3% or 215 respondents, which is very indicative of a trend away from use of e-cigarettes in this population. Of the 43, whom do smoke, 22, or 8.5 percent of the overall sample say stress reduction is their principal reason for use. In addition, 8 respondents (about 3.1 per cent) admitted that friends and community can be a motivator, 5 respondents (1.9 per cent) mentioned curiosity and 5 respondents (1.9 per cent) pleasure. These results strongly suggest that while e-cigarette uptake is limited, adoption reasons are mainly driven by psychological and social factors.

Figure (1): Illustrates the reasons for smoking electronic cigarettes among participants.

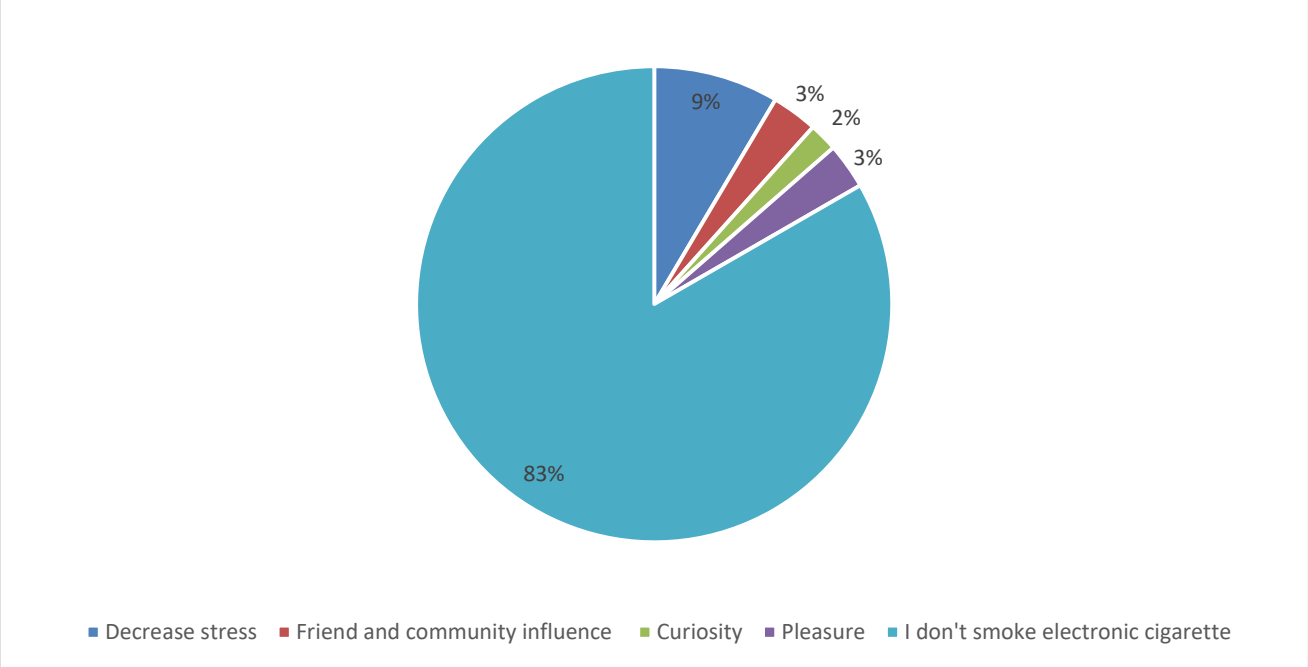

Table 2 presents the data regarding attitudes to e-cigarettes and vaping in a sample of 258 people. Among other things, it's noteworthy that a very sizable majority, 84.5 percent, indicated they do not use electronic cigarette smoking or vaping showing a wide aversion or abstention from these practices amongst this group of people. Out of the 15.5% that vape, the main motivators are stress relief (8.5%), followed by friends and community (6.5%), curiosity (3.5%), and personal pleasure (2.5%) each less. Additionally, age of initiation into vaping is a concerning trend, albeit modest, characterized by adolescents younger than 18 years aged most as initiators. A good news story for prevention efforts was that most were willing to quit, with 14.7 per cent confirming they wished to do so.

ISSN:1624-1940
http://magellanes.com/

Table (2): Parameters related to attitude about e-cigarettes, vaping, and oral health (n=258).

Parameter		**No.**	**Percent (%)**
Do you smoke electronic cigarettes or vape?	No	218	84.5
	Yes	40	15.5
If yes, why do you smoke electronic cigarette?	Decrease stress	22	8.5
	Friend and community influence	8	3.1
	Curiosity	5	1.9
	Pleasure	8	3.1
	I don't smoke electronic cigarette	215	83.3
How old were you when you first start vaping?	<14 years old	4	1.6
	14–15 years old	4	1.6
	16–17 years old	13	5.0
	>18 years old	22	8.5
	I don’t smoke electronic cigarette	215	83.3
Do you like to quit/stop smoking electronic cigarette habit?	Yes	38	14.7
	No	4	1.6
	I don't smoke electronic cigarette	216	83.7

As shown in figure (2), The data presented suggest that overall, the total sample of 258 participants were aware of the harmful effects of smoking electronic cigarettes and vaping on oral health. More specifically, we used 152 respondents, about 58.8% of the respondents, who were aware of the risks that these practices pose. Meanwhile, 76 or about 29.5 percent served as a degree of uncertainty, meaning they "probably" know that they are harmful, leaving an area for increased outreach educational. On the contrary, a smaller segment, 30 participants (11.6%) failed to have been aware of it.

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Figure (2): Illustrates knowing the bad effects of smoking e-cigarettes among participants.

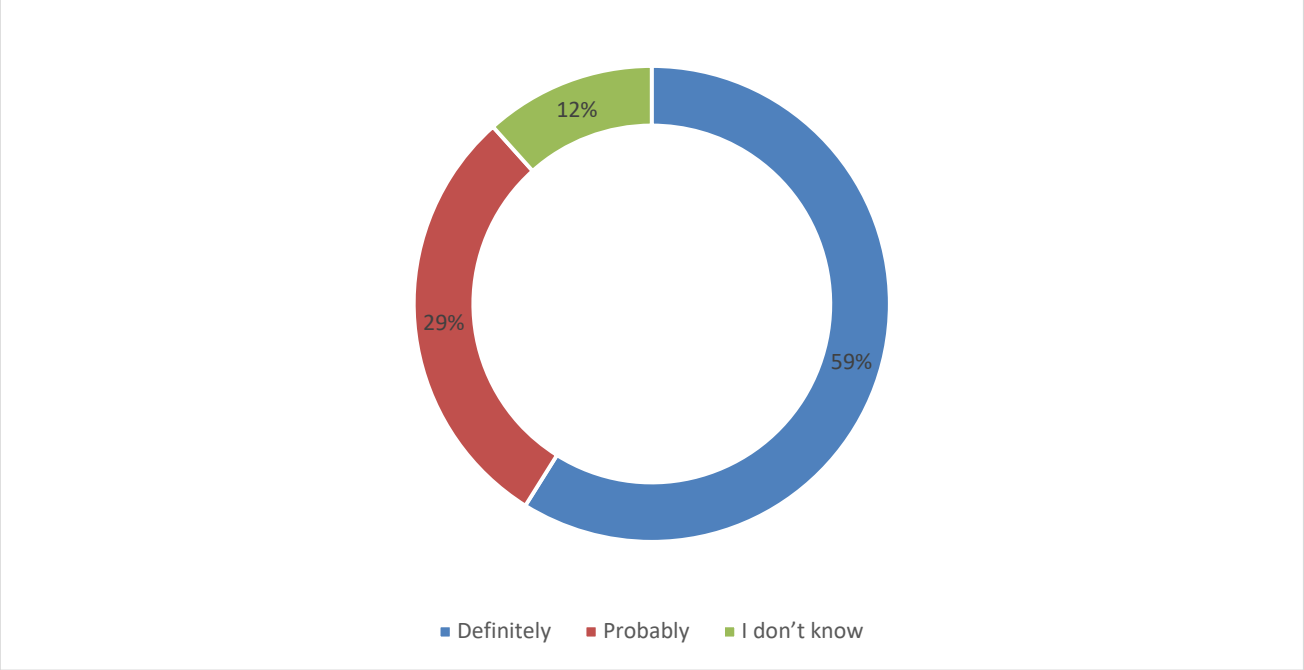

Table (3) shows that about 58.9 percent of respondents affirmatively acknowledge that these practices are harmful for oral health, and around 70 percent are informed about the higher oral cancer risk incurred by them. Some parts are noteworthy though, with 11.6-24.8 percent uncertainty regarding specific health risks like disease transmission with shared devices or inflammation of the gum. While this vagueness may leave ambiguous who is actually responsible for causing bad breath, a commendable 72.5% of participants do understand that vaping is bad for your-oral-hygiene.

Table (3): participants' knowledge about e-cigarettes, vaping, and oral health (n=258).

Parameter		***No.***	***Percent (%)***
Do you know the bad effects of smoking electronic cigarettes and vaping on oral health?	Definitely	152	58.9
	Probably	76	29.5
	I don't know	30	11.6
Do you know that smoking electronic cigarettes or vaping increase the risk of oral cancer?	Definitely	179	69.4
	Probably	45	17.4
	I don't know	34	13.2
Do you know that sharing smoking devices causes infectious diseases such as tuberculosis (TB), herpes ulcers, and hepatitis C?	Definitely	164	63.6
	Probably	40	15.5
	I don't know	54	20.9
Do you know that smoking electronic cigarettes or vaping causes inflammation and bleeding of the gums?	Definitely	154	59.7
	Probably	49	19.0
	I don't know	55	21.3
Do you know that smoking electronic cigarettes or vaping increases the risk of receding gums?	Definitely	143	55.4
	Probably	51	19.8

ISSN:1624-1940
http://magellanes.com/

	I don't know	64	24.8
Does smoking electronic cigarettes and vaping contribute to dry mouth?	Definitely	138	53.5
	Probably	60	23.3
	I don't know	60	23.3
Does smoking electronic cigarettes or vaping cause bad breath in the mouth?	Definitely	187	72.5
	Probably	36	14.0
	I don't know	35	13.6

Table 4 presents the data about what participants know about what it is doing to the oral health of themselves and other people who use e-cigarettes and who earnings that it has the same status as smoking regular cigarettes. Notably, a very large majority — 62.8 percent — agree that there is a connection between the use of electronic cigarettes and dental decay, a degree of awareness of the harmful downstream consequences of this kind of behaviour that is remarkable. Further, a mind-boggling 76.7% said that e cigarettes and vaping can end in tooth and gum staining, indicating how much concern there exists over aesthetics and related health problems. But awareness dwindles when we think of periodontal inflammation risks, with just 55.4 percent understanding its involvement in tooth mobility and loss.

Table (4): participants' awareness about e-cigarettes, vaping, and oral health (n=258).

Parameter		***No.***	***Percent (%)***
Are you aware that smoking electronic cigarettes or vaping causes teeth to decay?	Definitely	162	62.8
	Probably	48	18.6
	I don't know	48	18.6
Are you aware that smoking electronic cigarettes or vaping causes stains on teeth and gums?	Definitely	198	76.7
	Probably	31	12.0
	I don't know	29	11.2
Are you aware that smoking electronic cigarettes or vaping contributes to increasing the chance of inflammation of the tissue supporting the teeth, making them susceptible to movement and subsequent loss?	Definitely	143	55.4
	Probably	51	19.8
	I don't know	64	24.8
Are you aware that smoking electronic cigarettes or vaping causes inflammation and bleeding in the gums?	Definitely	159	61.6
	Probably	53	20.5
	I don't know	46	17.8
Are you aware that smoking electronic cigarettes or vaping causes a white-coated tongue?	Definitely	119	46.1
	Probably	51	19.8
	I don't know	88	34.1
Are you aware that smoking electronic cigarettes or vaping contributes to tooth wear and that the teeth become more sensitive to hot and cold food and beverages?	Definitely	155	60.1
	Probably	52	20.2
	I don't know	51	19.8

Table 5 shows that the data presented does provide a nice layover of what the surveyed population knows when it comes to e-cigarettes, vaping, and oral health. It is worth noting that a large number of respondents (64.3%), a majority of whom, responded that they have a high level of knowledge; this may

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suggest that awareness campaigns or the educational initiatives which surround the disease caused by vaping on the oral health of individuals. On the other hand, 20.2% and 15.5% of those who have moderate and low knowledge levels indicate where efforts should be concentrated.

Table (5): Shows knowledge about e-cigarettes, vaping, and oral health score results.

	Frequency	**Percent**
High knowledge level	166	64.3
Moderate knowledge	52	20.2
Low knowledge level	40	15.5
Total	258	100.0

As shown in Table 6, the data shows a big variance of awareness of e-cigarettes, vaping, and its implications on oral health among the surveyed population. Nearly half of respondents, or 62.4 percent, have high awareness of the possible oral health consequences from these smoking alternatives. On the other hand, moderate awareness of 25.2 percent and low awareness of 12,4 percent mean that there is still a large section of the population that could be benefited by targeted educational initiatives.

Table (6): Shows awareness about e-cigarettes, vaping, and oral health score results.

	Frequency	**Percent**
High awareness level	161	62.4
Moderate awareness	65	25.2
Low awareness level	32	12.4
Total	258	100.0

Table (7) shows that knowledge about e-cigarettes, vaping, and oral health has statistically significant relation to gender (P value=0.026), state of smoking e-cigarettes or vaping (P value=0.016), well to stop smoking (P value=0.005). It also shows statistically insignificant relation to age, residential region, educational level, and monthly income.

Table (7): Relation between knowledge about e-cigarettes, vaping, and oral health and sociodemographic characteristics.

Parameters		***Knowledge level***		***Total (N=258)***	***P value****
		High knowledge level	**Moderate or low knowledge**		
Gender	Female	131	61	192	0.026
		78.9%	66.3%	74.4%	
	Male	35	31	66	
		21.1%	33.7%	25.6%	
Age	20 or less	54	32	86	0.645
		32.5%	34.8%	33.3%	
	21 to 23	73	43	116	

ISSN:1624-1940
http://magellanes.com/

		44.0%	46.7%	45.0%	
	24 years old	39	17	56	
		23.5%	18.5%	21.7%	
Residential region	Southern region	93	41	134	0.371
		56.0%	44.6%	51.9%	
	Central region	25	17	42	
		15.1%	18.5%	16.3%	
	Eastern region	8	6	14	
		4.8%	6.5%	5.4%	
	Western region	40	28	68	
		24.1%	30.4%	26.4%	
Educational level	Middle school	1	1	2	0.710
		0.6%	1.1%	0.8%	
	High school	51	34	85	
		30.7%	37.0%	32.9%	
	Bachelor's degree	111	55	166	
		66.9%	59.8%	64.3%	
	Postgraduate degree	3	2	5	
		1.8%	2.2%	1.9%	
Monthly income	Less than 3000 SAR	117	58	175	0.071
		70.5%	63.0%	67.8%	
	3000 to 8000 SAR	18	21	39	
		10.8%	22.8%	15.1%	
	8001 to 12000 SAR	12	6	18	
		7.2%	6.5%	7.0%	
	More than 12000 SAR	19	7	26	
		11.4%	7.6%	10.1%	
Do you smoke electronic cigarettes or vape?	No	147	71	218	0.016
		88.6%	77.2%	84.5%	
	Yes	19	21	40	
		11.4%	22.8%	15.5%	
Do you like to quit/stop smoking electronic cigarette habit?	No	1	3	4	0.005
		0.6%	3.3%	1.6%	
	Yes	17	21	38	
		10.2%	22.8%	14.7%	
	I don't smoke	148	68	216	
		89.2%	73.9%	83.7%	

P value was considered significant if ≤ 0.05.

Table (8) shows that awareness about e-cigarettes, vaping, and oral health has statistically significant relation to state of smoking e-cigarettes or vaping (P value=0.005), well to stop smoking (P value=0.012). It also shows statistically insignificant relation to age, gender, residential region, educational level, and monthly income.

ISSN:1624-1940
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Table (8): Awareness about e-cigarettes, vaping, and oral health in association with sociodemographic characteristics.

Parameters		***Awareness level***		***Total (N=258)***	***P value****
		High awareness level	**Moderate or low awareness**		
Gender	Female	126	66	192	0.068
		78.3%	68.0%	74.4%	
	Male	35	31	66	
		21.7%	32.0%	25.6%	
Age	20 or less	52	34	86	0.796
		32.3%	35.1%	33.3%	
	21 to 23	75	41	116	
		46.6%	42.3%	45.0%	
	24 years old	34	22	56	
		21.1%	22.7%	21.7%	
Residential region	Southern region	91	43	134	0.258
		56.5%	44.3%	51.9%	
	Central region	25	17	42	
		15.5%	17.5%	16.3%	
	Eastern region	7	7	14	
		4.3%	7.2%	5.4%	
	Western region	38	30	68	
		23.6%	30.9%	26.4%	
Educational level	Middle school	1	1	2	0.704
		0.6%	1.0%	0.8%	
	High school	52	33	85	
		32.3%	34.0%	32.9%	
	Bachelor's degree	106	60	166	
		65.8%	61.9%	64.3%	
	Postgraduate degree	2	3	5	
		1.2%	3.1%	1.9%	
Monthly income	Less than 3000 SAR	108	67	175	0.565
		67.1%	69.1%	67.8%	
	3000 to 8000 SAR	22	17	39	
		13.7%	17.5%	15.1%	
	8001 to 12000 SAR	12	6	18	
		7.5%	6.2%	7.0%	
	More than 12000 SAR	19	7	26	
		11.8%	7.2%	10.1%	
Do you smoke electronic cigarettes or vape?	No	144	74	218	0.005
		89.4%	76.3%	84.5%	
	Yes	17	23	40	

ISSN:1624-1940
http://magellanes.com/

		10.6%	23.7%	15.5%	
Do you like to quit/stop smoking electronic cigarette habit?	No	1	3	4	0.012
		0.6%	3.1%	1.6%	
	Yes	17	21	38	
		10.6%	21.6%	14.7%	
	I don't smoke	143	73	216	
		88.8%	75.3%	83.7%	

P value was considered significant if ≤ 0.05.

Discussion:

Our present study is aimed to evaluate the level of knowledge and awareness about the oral health risks for e-cigarettes and vaping by young adults of Saudi Arabia. Given this growing prevalence of e-cigarette use among younger populations with their counterparts in Saudi Arabia and the global community, this is particularly important investigation. Results from this study reveal important hinges on how young adults see and understand the oral health consequences of vaping, information needed for shaping public policy and educational messages.

The findings of this study are compared to previous literature and it is clear that young adults living in Saudi Arabia, while many people are aware of the oral health risks of e-cigarettes, awareness of these risks is also relatively high. For example, 58.9% of participants stated e-cigarette use is harmful to oral health while more than 70% recognized they're at a higher risk for oral cancer due to vaping. Our findings are consistent with studies in other parts of the world, which have shown that young adults know significantly about the health risks of vaping. A study done by Gaiha et al reported young adults living in the United States noticing health warning about e-cigarettes, which had a critical effect on respiratory and oral health issues [16]. Research by [17] also suggests that young adults tend to perceive vaping related to many health risks, including oral health risks — which explains why educational outreach can sufficiently promote awareness.

But the study also found there were knowledge gaps that were critical. 29.5% of participants are uncertain about the risks in vaping, while 55.4% participants do not recognize the periodontal risks from e-cigarette use. It is concerning as it shows that while people are aware of risks of this kind, they do not know enough about what those particular risks might mean to their health. Research by Namwase et al shows that many young adults perceive e-cigarettes as safer than regular cigarettes, and as a result do not realize there are dangers and harms with them [18]. While this finding is consistent with research by Namwase et al, which found that young adults believe e-cigarettes to be less harmful than regular cigarettes, and mistakes this to be misleadingly safer, I believe that in this case, young adults are mistaken that they are safer than regular cigarettes, and Such misconceptions can limit effective public health interventions that will help reduce e-cigarette use among young adults.

Additionally, motivations for using e-cigarettes amongst participants in this study match broader trends found in other studies. The primary reasons for vaping for these young adults as cited in this study included stress relief and social influences, similar to parental report findings by Kale et al. of vaping initiation in young adults for social influence and coping with stress [19]. This is further evidence that working to curtail vaping behavior requires working to address the social and psychological factors which contribute to that behavior in educational campaigns. However, the study also showed that a large proportion of participants (84.5%) abstained from vaping, suggesting that young adults in Saudi Arabia may resist e-cigarette use. This is encouraging and that resistance may be leveraged to further educate young adults about the risks of vaping in targeted public health campaigns.

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But the study also found there were knowledge gaps that were critical. 29.5% of participants are uncertain about the risks in vaping, while 55.4% participants do not recognize the periodontal risks from e-cigarette use. It is concerning as it shows that while people are aware of risks of this kind, they do not know enough about what those particular risks might mean to their health. Research by Namwase et al shows that many young adults perceive e-cigarettes as safer than regular cigarettes, and as a result do not realize there are dangers and harms with them [18].

While this finding is consistent with research by Namwase et al, which found that young adults believe e-cigarettes to be less harmful than regular cigarettes, and mistakes this to be misleadingly safer, I believe that in this case, young adults are mistaken that they are safer than regular cigarettes, and Such misconceptions can limit effective public health interventions that will help reduce e-cigarette use among young adults.

Additionally, motivations for using e-cigarettes amongst participants in this study match broader trends found in other studies. This echoes findings of Kale et al., who reported that young adults typically begin vaping because of peer pressure and the wish to relieve stress [19]. This is further evidence that working to curtail vaping behavior requires working to address the social and psychological factors which contribute to that behavior in educational campaigns. Additionally, the study found that a great majority of them (84.5%) who abstained from vaping showed a resistance to e-cigarette use by Saudi young adults. This is encouraging and that resistance may be leveraged to further educate young adults about the risks of vaping in targeted public health campaigns.

Moreover, the geographical scope of the study, being only in the Southern region, may reduce the generalizability to other parts of Saudi Arabia with different cultural and social dynamics. Variations in educational access, socioeconomic status, and cultural attitudes toward smoking and vaping can greatly affect knowledge and awareness levels. Research by Khouja et al. identified regional differences as an important factor to consider when assessing vaping behaviors and perceptions among young adults [20-22]. Thus, further research should be expanded to involve more varied locations to grasp the full range of attitudes and knowledge about e-cigarettes across Saudi Arabia.

Conclusion:

The current study enlightens knowledge and awareness regarding the oral health risks of e-cigarettes and vaping among Saudi Arabia's young adults. The results reveal an encouraging situation of awareness but with certain serious lacunas, which are highly imperative for effective educational interventions. Motives among the participants to take up vaping echo the larger scenario portrayed by various studies: It shows the necessity to engage the psychosocial aspects of such practices within public health communications. Despite the limitations inherent in the design and composition of this study, its results have great implications for continued education and awareness in reducing the potential health risks related to vaping among young adults.

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Ethical approval

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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Conflict of interests

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

Data and materials availability

All data associated with this study are present in the paper.

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