

# Vaping: More Than Just a Trend? Examining the Factors That Influence E-Cigarette Use in the Aseer Region

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## ABSTRACT

**Background:** E-cigarette use among teenagers and young adults has significantly increased since its introduction. Identifying the factors associated with e-cigarette use is crucial for developing more effective prevention or cessation interventions.

**Objective:** This study aimed to identify and analyze the factors influencing e-cigarette use among adult smokers in the Aseer region, with a focus on understanding the motivations and behaviors surrounding their use.

**Methods:** We employed an analytical qualitative design to explore the factors influencing e-cigarette use among adult smokers. Participants were e-cigarette users aged 18 years and above, recruited from smoking cessation clinics and other locations where the target population is likely to be found. Data were collected using a questionnaire and individual in-depth interviews. The questionnaire gathered quantitative data on participants' demographic characteristics, behavioral model, and health belief model. In-depth interviews provided qualitative data on participants' experiences, reasons for use, and perceived benefits or risks associated with e-cigarette use.

**Results:** The study included 100 e-cigarette smokers. Participants' ages ranged from 18 to over 40 years, with a mean age of  $26.2 \pm 13.8$  years. A total of 87% were males, and 67% had a university degree. Regarding smoking status, 74% were current smokers, 21% were ex-smokers, and 5% were non-smokers. Half of the participants used smokeless tobacco products. A total of 85% had friends or family members who use e-cigarettes, which was a significant motivator for 41.4% of them. Additionally, 36% saw e-cigarette ads in the media, which motivated 18.3% of them. A total of 96% reported easy access to e-cigarettes, primarily from tobacco shops (82%), online (9%), and gas stations (4%). While 62% felt addicted to e-cigarettes, only 14% planned to continue using them in the future.

**Conclusions:** The study found that the majority of e-cigarette users were middle-aged males with high levels of education and an average level of awareness.

**Keywords:** E-cigarettes, Prevalence, Reasons, Motivators, Knowledge, Attitude, Consequences, Saudi Arabia.

## INTRODUCTION

One of the riskiest habits is smoking. Young adults can start smoking for a variety of reasons. Some want to try it because friends or family members smoke, while others do it because they believe it's a hip thing to do (1, 2). Smoking has been connected to a number of illnesses, including cancers of the mouth, throat, and lungs. It may also raise one's risk of diabetes, heart disease, and stroke(2, 3).

An electronic cigarette is a battery-operated device that emits a vaporized liquid for inhalation(4). These devices are known by many different names, including vaping devices, e-hookahs, vaporizer cigarettes, vape pens, and e-cigarettes(5). There are numerous methods in which they form. Some look like USB drives, for instance, while others seem more like pens (5, 6). While producers of e-cigarettes portray their goods as aids in cutting back on or giving up smoking, the Food and Drug Administration (FDA) categorizes them as tobacco products (7). Chinese pharmacist Hon Lik created the first successful electronic cigarette in Beijing, China in 2003 (8). It has a liquid solution

that usually comprises nicotine, other chemicals (such glycerol or propylene glycol), and flavoring (9-11). It can be difficult to avoid nicotine because it is regarded as a very addictive chemical. It's crucial to note that certain e-cigarettes that advertise themselves as nicotine-free have actually been shown to contain nicotine (12, 13).

E-cigarettes are a very popular tool for people who want to stop smoking. The number of people using them has skyrocketed, especially those trying to give up smoking. The reasons behind the widespread use of e-cigarettes, however, are numerous, intricate, and poorly understood (14). Concerns over e-cigarettes' potential impact on public health, particularly for young adults and non-smokers, have been raised since their inception (15).

Since e-cigarettes are fairly recent, the evidence for long-term health effects is insufficient (16). Hence, the rising trend of e-cigarette use among adolescents and young adults should be considered an important health issue. Policies aimed at reducing tobacco use and efforts to quit

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smoking must consider the variables that affect e-cigarette use. Several aspects have been highlighted by the literature, such as perceived harm, peer influence, and societal norms. It is unclear how significant these traits are in relation to one another and how they interact, necessitating more research (17). Up to authors knowledge, no previous studies in Aseer region and few studies generally assessed motivators behind using e-cigarettes mainly among smokers. The current study aimed to determine and analyze the influencing factors of e-cigarette use among adult smokers to understand the motivations and behavior surrounding their use.

## METHODS

A community-based analytical qualitative study was conducted in Aseer region, southern of Saudi Arabia targeting all e-cigarette users attending 19 Aseer smoking cessation clinics and the places where the target populations are likely to be found like parks, coffees and tobacco stores in the Aseer region. Participants were selected based on their status as users of e-cigarettes, and they will be invited to participate in the study through the physicians in the clinics and Researchers team in the other places directly and asked them if they would be interested in participating in. Adult smokers aged 18 years and above who are users of e-cigarettes at smoking cessation clinics and the places were included. Smokers below 18 years of age, non-e-cigarette users, and those who not living in Aseer region were excluded. For participant selection, a purposive sampling technique was used to ensure the inclusion of a diverse range of e-cigarette users within the target population. Participants will be selected based on criteria such as age, e-cigarette use. This approach enabled the study to capture a wide range of perspectives and experiences related to the influencing factors of e-cigarette use among adult smokers in smoking cessation clinics in the Aseer region. Data were collected using a mixed-methods approach, combining both quantitative and qualitative data collection methods. The primary data collection methods included a questionnaire and individual in-depth interviews. This allowed for a comprehensive exploration of the influencing factors of e-cigarette use among users in smoking cessation clinics. Firstly, a structured questionnaire developed to collect quantitative data on participants' demographic characteristics, behavioral model, health belief model, and influencing factors. The questionnaire was designed based on the research objectives and relevant literature, ensuring the inclusion of key variables and indicators. Second method included individual In-depth Interviews where a semi-structured individual interview will be conducted to gather qualitative data on participants' experiences, motivations, and barriers related to e-cigarette use. A topic guide was developed to facilitate the interviews, covering areas such as reasons for initiation, perceived benefits/risks, social influences, and interactions with smoking cessation clinics.

This study was conducted in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. Ethical approval for this study was granted by the Aseer Institutional Review Board at the Directorate of Health Affairs in the Aseer Region, under the approval number REC-6-11-2023. All participants provided informed consent prior to their inclusion in the study.

## STATISTICAL ANALYSIS

After data were extracted, it was revised, coded, and fed to statistical software IBM SPSS version 22(SPSS, Inc. Chicago, IL). All statistical analysis was done using two-tailed tests. P value less than 0.05 was statistically significant. Descriptive analysis based on frequency and percent distribution was done for all variables including participants' socio-demographic data, smoking history, frequency and pattern

of e-cigarettes smoking, motivators of smoking. Also, participants attitudes and perception towards e-cigarette smoking were collected categorized and coded for frequency distribution analysis. Reasons of e-cigarettes smoking, participants knowledge were also coded and graphed based on answered categories frequency. All relations were done to assess significance based on the Pearson Chi-square test and Mont Carlo exact test for small frequency distributions.

## RESULTS

A total of 100 e-cigarettes smokers were included. Participants ages ranged from 18 to more than 40 years with a mean age of  $26.2 \pm 13.8$  years old. A total of 87 (87%) were males, 67 (67%) had a university degree of education, 32 (32%) were students, 23 (23%) work at the governmental sector, and 21 (21%) work at private sector / trading. A total of 41 (41%) had monthly income less than 4000 SR, 43 (43%) had monthly income 4000-10000 SR, and 14 (14%) had 11000 to 20000 SR. As for marital status, 73 (73%) were single, 24 (24%) are married. Considering smoking, 74 (74%) were current smokers, 21 (21%) were ex-smokers and 5 (5%) were non-smokers. A total of 50 (50%) used smokeless tobacco products (Table 1).

**Table 1.** Socio-demographic characteristics of study participants, Aseer region (n=100)

Socio-demographics	No	%
<b>Age in years</b>		
18-25	53	53.0%
26-33	35	35.0%
34-40	10	10.0%
> 40	2	2.0%
<b>Gender</b>		
Male	87	87.0%
Female	13	13.0%
<b>Educational level</b>		
Secondary / below	28	28.0%
University degree	67	67.0%
Post-graduate	5	5.0%
<b>Employment</b>		
Not working	8	8.0%
Student	32	32.0%
Governmental	23	23.0%
Military sector	16	16.0%
Others	21	21.0%
<b>Monthly income</b>		
< 4000 SR	41	41.0%
4000-10000 SR	43	43.0%
11000-20000 SR	14	14.0%
> 20000 SR	2	2.0%
<b>Marital status</b>		
Single	73	73.0%
Married	24	24.0%
Divorced / widow	3	3.0%
<b>Smoking</b>		
Current smoker	74	74.0%
Ex-smoker	21	21.0%
Non-smoker	5	5.0%
<b>Have you used smokeless tobacco products (shamma, etc.)?</b>		
Yes	50	50.0%
No	50	50.0%

**Table 2.** E-cigarette smoking pattern, practice and motivators among study participants

<b>E-cigarette smoking pattern, practice and motivators</b>	<b>No</b>	<b>%</b>	
Duration of e-cigarette smoking	1-2 years	24	24.0%
	3-5 years	34	34.0%
	6-10 years	25	25.0%
	> 10 years	17	17.0%
Age at first use of e-cigarettes	<20	37	37%
	20-29	49	49%
	30+	14	14%
Do any of your friends or family members use e-cigarettes?	Yes	85	85.0%
	No	15	15.0%
Did their use of e-cigarettes motivate your use of them? (n=85)	Strongly disagree	32	32.3%
	Disagree	12	12.1%
	Neutral	14	14.1%
	Agree	27	27.3%
	Strongly agree	14	14.1%
Do you see e-cigarette ads in the media?	Yes	36	36.0%
	No	64	64.0%
If yes, did the ads stimulate your use of e-cigarettes? (n=36)	Strongly disagree	39	41.9%
	Disagree	18	19.4%
	Neutral	19	20.4%
	Agree	11	11.8%
	Strongly agree	6	6.5%
Is it easy for you to get electronic cigarettes?	Yes	96	96.0%
	No	4	4.0%
Where to buy electronic cigarettes?	Tobacco shops	82	82.0%
	Online	9	9.0%
	Gas stations	4	4.0%
	Others	5	5.0%
Do you feel addicted to electronic cigarettes?	Yes	62	62.0%
	No	38	38.0%
Do you plan to continue using e-cigarettes in the future?	Yes	14	14.0%
	No	86	86.0%
If no, why? (n=86)	Its health hazards	46	53.5%
	To keep my health	18	20.9%
	Family refusal	7	8.1%
	Need to quit smoking	8	9.3%
	Others	7	8.1%
How much nicotine do you use in e-cigarettes?	3 mg	8	8.0%
	5 mg	10	10.0%
	30 mg	14	14.0%
	50 mg	68	68.0%
Do you use e-cigarettes in public places?	Yes	66	66.0%
	No	34	34.0%
Do you use e-cigarettes around other people?	Yes	82	82.0%
	No	18	18.0%
Is it easy for you to quit using e-cigarettes?	Yes	58	58.0%
	No	42	42.0%
Do you have the support you need to quit e-cigarettes?	Yes	67	67.0%
	No	33	33.0%
Have you tried to quit using e-cigarettes before?	Yes	73	73.0%
	No	27	27.0%
If yes, how many times?	1 time	14	21.9%
	2-3 times	32	50.0%
	4 /more times	18	28.1%

Table 2. E-cigarette smoking pattern, practice and motivators among study participants. As for motivators, 85% had friends or family members use e-cigarettes, which was high motivators for 41.4% of them. Also, 36% see e-cigarette ads in the media, which motivated 18.3% of them. Exactly 96% reported easiness to have e-cigarettes, mainly from Tobacco shops (82%), online (9%), gas station (4%), and others sites. A total of 62% feel addicted to electronic cigarettes but only 14% plan to continue using e-cigarettes in the future. The main reported reasons for not continuing were its health hazards (53.3%), to keep their health (20.9%), family refusal (8.1%), and Need to quit smoking (9.3%). As for the smoking practices, about 34 (34%) smoked e-cigarettes for 3-5 years, 25 (25%) for 6-10 years and 17 (17%) for more than 10 years while 24 (24%) smoked for 1-2 years. A total of 68 (68%) smoked 50 mg daily, 82% use e-cigarettes around other people, 66% use e-cigarettes in public places, 58% told it is easy for you to quit using e-cigarettes, 67% have the support you need to quit e-cigarettes. A total of 73 (73%) tried to quit using e-cigarettes which was for 2-3 times among 32 (50%), only 1 time among 14 (21.9%) and for more than 4 times among 18 (28.1%).

Figure 1. Reason of using e-cigarettes among study participants, Aseer region, Saudi Arabia. The most reported reasons included to quit smoking (23%), simulation and leisure (17%), alternative to traditional cigarettes (15%), lack of smell (14%), allowed to use anywhere (10%), and to relieves stress (7%).

Figure 2. Participants knowledge and awareness about e-cigarettes, Aseer region, Saudi Arabia. A total of 82% think that electronic cigarettes are more acceptable than traditional cigarettes, 76% think the sale of e-cigarettes should be regulated, 27% think e-cigarettes are a healthy alternative to smoking, and only 21% think e-cigarettes are safe.

Table 3. Participants attitude and perception towards e-cigarettes, Aseer region, Saudi Arabia. Exact of 80% agreed that the lack of smell in e-cigarettes motivate their use, 67% think that the availability of electronic cigarettes and the spread of stores that sell them encourage their use, 62% agreed that different shapes and sizes of e-cigarette devices encourage their use, 61% agreed that Workplace and school smoking policies affect e-cigarette use, 58% agreed that different

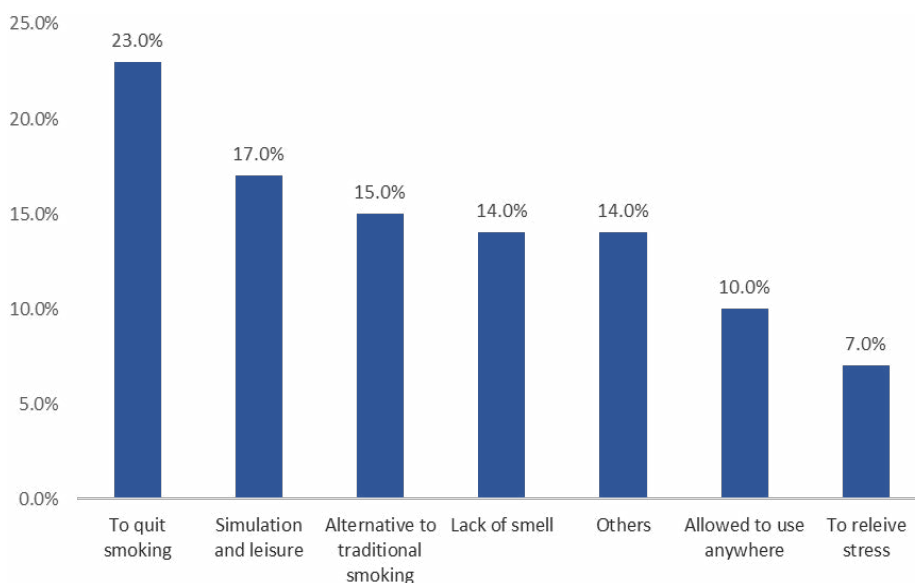


Figure 1. Reason of using e-cigarettes among study participants, Aseer region, Saudi Arabia

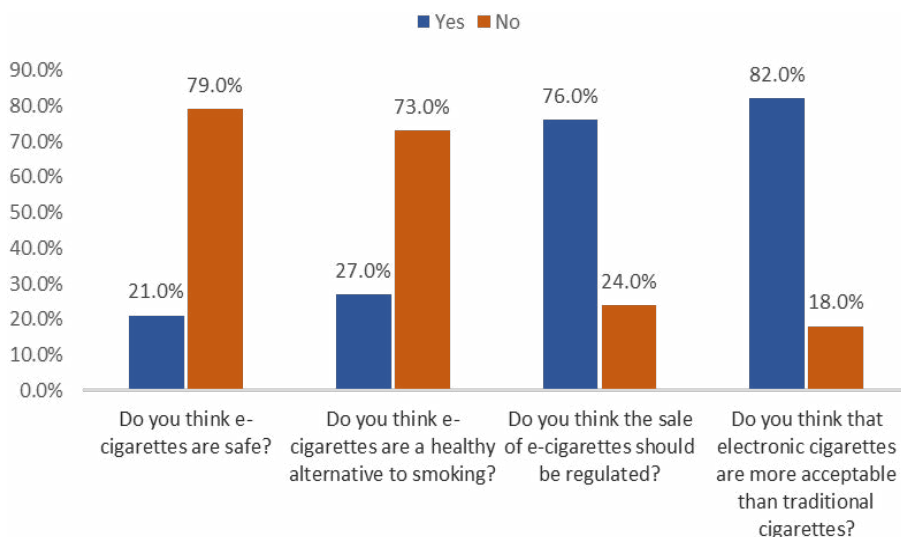


Figure 2. Participants knowledge and awareness about e-cigarettes, Aseer region, Saudi Arabia

**Table 3.** Participants attitude and perception towards e-cigarettes, Aseer region, Saudi Arabia

Attitude	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	No	%	No	%	No	%	No	%	No	%
E-cigarettes are a useful tool for quitting smoking?	35	35.0%	20	20.0%	25	25.0%	13	13.0%	7	7.0%
Using e-cigarettes increases a person's social value?	62	62.0%	26	26.0%	4	4.0%	4	4.0%	4	4.0%
Using e-cigarettes has become fashionable and attracts the attention of others?	18	18.0%	11	11.0%	23	23.0%	27	27.0%	21	21.0%
Adding different flavors encourage the use of electronic cigarettes?	21	21.0%	10	10.0%	21	21.0%	33	33.0%	15	15.0%
Different concentrations of nicotine in e-cigarettes stimulate their use?	16	16.0%	4	4.0%	22	22.0%	32	32.0%	26	26.0%
The price of electronic cigarettes encourage use?	13	13.0%	25	25.0%	21	21.0%	24	24.0%	17	17.0%
The availability of electronic cigarettes and the spread of stores that sell them encourage their use?	9	9.0%	10	10.0%	14	14.0%	35	35.0%	32	32.0%
Workplace and school smoking policies affect e-cigarette use?	10	10.0%	11	11.0%	18	18.0%	38	38.0%	23	23.0%
The abundance of advertising for electronic cigarettes encourage their use?	14	14.0%	22	22.0%	23	23.0%	30	30.0%	11	11.0%
The different shapes and sizes of e-cigarette devices encourage their use?	11	11.0%	11	11.0%	16	16.0%	41	41.0%	21	21.0%
The lack of smell in e-cigarettes motivate their use?	8	8.0%	5	5.0%	7	7.0%	25	25.0%	55	55.0%

**Table 4.** Participants perception towards e-cigarettes and their experience and consequences

Perception	No	%
E-cigarettes are cheaper than traditional cigarettes?		
<i>Yes</i>	60	60.0%
<i>No</i>	40	40.0%
Prefer smoking e-cigarettes in places where traditional cigarettes are prohibited		
<i>Yes</i>	65	65.0%
<i>No</i>	35	35.0%
Think that electronic cigarettes are more acceptable than traditional cigarettes?		
<i>Yes</i>	86	86.0%
<i>No</i>	14	14.0%
How do you see your experience with electronic cigarettes?		
<i>Poor</i>	68	68.0%
<i>Neutral</i>	12	12.0%
<i>Good</i>	20	20.0%
Consequences		
<i>Health problems mainly respiratory</i>	48	48.0%
<i>Affected physical fitness</i>	15	15.0%
<i>Habituation and addiction</i>	12	12.0%
<i>None</i>	25	25.0%
Have you been diagnosed with any of the following diseases?		
<i>Depression</i>	17	17.0%
<i>Stress</i>	7	7.0%
<i>Anxiety</i>	6	6.0%
<i>None</i>	70	70.0%

**Table 5.** Factors associated with participants' duration of using e-cigarettes

Factors	Duration of e-cigarette smoking								p-value
	1-2 years		3-5 years		6-10 years		> 10 years		
	No	%	No	%	No	%	No	%	
<b>Age in years</b>									
18-25	16	30.2%	21	39.6%	13	24.5%	3	5.7%	.017*^
26-33	5	14.3%	11	31.4%	10	28.6%	9	25.7%	
34-40	3	30.0%	2	20.0%	2	20.0%	3	30.0%	
> 40	0	0.0%	0	0.0%	0	0.0%	2	100.0%	
<b>Gender</b>									
Male	21	24.1%	30	34.5%	22	25.3%	14	16.1%	.941
Female	3	23.1%	4	30.8%	3	23.1%	3	23.1%	
<b>Educational level</b>									
Secondary / below	14	50.0%	8	28.6%	4	14.3%	2	7.1%	.007*^
University graduate	10	14.9%	25	37.3%	19	28.4%	13	19.4%	
Post-graduate	0	0.0%	1	20.0%	2	40.0%	2	40.0%	
<b>Employment</b>									
Not working	4	50.0%	2	25.0%	1	12.5%	1	12.5%	.306^
Student	9	28.1%	14	43.8%	7	21.9%	2	6.3%	
Governmental	3	13.0%	5	21.7%	8	34.8%	7	30.4%	
Military sector	4	25.0%	7	43.8%	3	18.8%	2	12.5%	
Others	4	19.0%	6	28.6%	6	28.6%	5	23.8%	
<b>Monthly income</b>									
< 4000 SR	12	29.3%	16	39.0%	10	24.4%	3	7.3%	.105^
4000-10000 SR	10	23.3%	13	30.2%	13	30.2%	7	16.3%	
11000-20000 SR	2	14.3%	5	35.7%	1	7.1%	6	42.9%	
> 20000 SR	0	0.0%	0	0.0%	1	50.0%	1	50.0%	
<b>Marital status</b>									
Single	17	23.3%	28	38.4%	19	26.0%	9	12.3%	.418^
Married	6	25.0%	5	20.8%	6	25.0%	7	29.2%	
Divorced / widow	1	33.3%	1	33.3%	0	0.0%	1	33.3%	
<b>Smoking</b>									
Current smoker	14	18.9%	29	39.2%	16	21.6%	15	20.3%	.191^
Ex-smoker	8	38.1%	4	19.0%	7	33.3%	2	9.5%	
Non-smoker	2	40.0%	1	20.0%	2	40.0%	0	0.0%	
<b>Have you used smokeless tobacco products</b>									
Yes	9	18.0%	14	28.0%	16	32.0%	11	22.0%	.112
No	15	30.0%	20	40.0%	9	18.0%	6	12.0%	

P: Pearson X<sup>2</sup> test

^: Exact probability test

\* P < 0.05 (significant)

concentrations of nicotine in e-cigarettes stimulate their use, 48% agreed that adding different flavors encourage the use of electronic cigarettes, and also agreed that Using e-cigarettes has become fashionable and attracts the attention of others. Only 20% think that E-cigarettes are a useful tool for quitting smoking and 8% agreed that using e-cigarettes increases a person's social value.

Table 4. Participants perception towards e-cigarettes and their experience and consequences. Exact of 60% told that e-cigarettes are cheaper than traditional cigarettes, 65% prefer smoking e-cigarettes in places where traditional cigarettes are prohibited, and 86% Think that electronic cigarettes are more acceptable than traditional cigarettes. A total of 68% told that their experience with e-cigarettes was poor where 48% had health problems mainly respiratory, 15% had affected physical fitness, and 12% reported for Habituation and addiction. Also, 17% had depression, 7% had stress and 6% had anxiety.

Table 5. Factors associated with participants' duration of using e-cigarettes. All participants aged more than 40 years used e-cigarette for more than 10 years versus 5.7% of young aged participants (P=.017). Also, 40% of those with PG degree used for more than 10 years compared to 7.1% of those with low education (P=.007). None of the other factors were associated with duration of e-cigarettes use.

Table 6. Reasons and motivators of e-cigarettes use among study participants, Aseer region, Saudi Arabia. The most reported reasons for e-cigarette smoking among males included to quit smoking (24.1%), Alternative to traditional smoking (17.2%), and Lack of smell (16.1%) while among females were Simulation and leisure (23.1%), and to relieve stress (23.1%) (P=.034). Also, 55.2% of male users have you used smokeless tobacco products versus 15.4% of females (P=.007). Exact of 17.6 of male users affected by their friends versus 23.1% of females (P=.034). Other motivators were insignificantly higher males than females.

**Table 6.** Reasons and motivators of e-cigarettes use among study participants, Aseer region, Saudi Arabia

Reasons and motivators	Gender				p-value
	Male		Female		
	No	%	No	%	
Reasons of using e-cigarettes					
To quit smoking	21	24.1%	2	15.4%	.034*^
Lack of smell	14	16.1%	0	0.0%	
Alternative to traditional smoking	15	17.2%	0	0.0%	
Simulation and leisure	14	16.1%	3	23.1%	
Allowed to use anywhere	9	10.3%	1	7.7%	
To relieve stress	4	4.6%	3	23.1%	
Others	10	11.5%	4	30.8%	
Have you used smokeless tobacco products (shamma, etc.)?					
Yes	48	55.2%	2	15.4%	.007*
No	39	44.8%	11	84.6%	
Do any of your friends or family members use e-cigarettes?					
Yes	74	85.1%	11	84.6%	.967
No	13	14.9%	2	15.4%	
Did their use of e-cigarettes motivate your use of them?					
Strongly disagree	28	32.6%	4	30.8%	.173^
Disagree	12	14.0%	0	0.0%	
Neutral	10	11.6%	4	30.8%	
Agree	25	29.1%	2	15.4%	
Strongly agree	11	12.8%	3	23.1%	
Do you see e-cigarette ads in the media?					
Yes	32	36.8%	4	30.8%	.674
No	55	63.2%	9	69.2%	
If yes, did the ads stimulate your use of e-cigarettes?					
Strongly disagree	36	45.0%	3	23.1%	.034*^
Disagree	15	18.8%	3	23.1%	
Neutral	15	18.8%	4	30.8%	
Agree	11	13.8%	0	0.0%	
Strongly agree	3	3.8%	3	23.1%	
Is it easy for you to get electronic cigarettes?					
Yes	84	96.6%	12	92.3%	.466^
No	3	3.4%	1	7.7%	
Where to buy electronic cigarettes?					
Tobacco shops	74	85.1%	8	61.5%	.160^
Online	7	8.0%	2	15.4%	
Gas stations	3	3.4%	1	7.7%	
Others	3	3.4%	2	15.4%	
Do you feel addicted to electronic cigarettes?					
Yes	54	62.1%	8	61.5%	.971
No	33	37.9%	5	38.5%	
Do you plan to continue using e-cigarettes in the future?					
Yes	11	12.6%	3	23.1%	.312^
No	76	87.4%	10	76.9%	

P: Pearson X<sup>2</sup> test

^: Exact probability test

\* P < 0.05 (significant)

## DISCUSSION

The current study aimed to identify the factors influencing e-cigarette use and to understand the perceptions and primary reasons adults in the Aseer region use e-cigarettes. The study also sought to develop evidence-based recommendations for the prevention and control of e-cigarette use among the target populations. Despite the availability of a freely accessible Smoking Fact Sheet from the Centers for Disease Control (CDC) aimed at raising adult awareness of the risks associated with smoking, only approximately 70% of adults surveyed were aware of at least one negative effect of nicotine. On average, individuals were aware of nearly three of the six major effects (18). Despite the CDC running the Tips from Former Smokers initiative since 2012, only 75% of young adults surveyed were aware of the services and programs available to assist them in quitting vaping and smoking.

In reference to global prevalence, limited information is available regarding the prevalence of e-cigarette use worldwide. According to a systematic review and meta-analysis, the lifetime prevalence of e-cigarette use and current e-cigarette vaping stands at 11% and 23%, respectively. Women reported lifetime e-cigarette use 16% of the time and current use 8% of the time. Additionally, men reported lifetime and current e-cigarette vaping prevalence at 22% and 12%, respectively (19). In Saudi Arabia, Althobaiti NK et al., 2022 (20), found that 26% of their cohort had tried electronic cigarettes at least once in their lives.

As for reasons for vaping, the current study revealed that most users started vaping in their middle age, consistent with other literature documenting that young adults aged 18-25 are more likely to smoke compared to other age groups (21, 22). The vast majority smoked 50 mg daily, primarily for less than five years. Quitting smoking, simulating peers, enjoyment, and serving as an alternative to traditional cigarettes were the most reported reasons among the study users. Similar findings were reported by Habib E et al. (23) in Saudi Arabia, where the three most common reasons for using electronic cigarettes were to enjoy the variety in flavors, to reduce or quit tobacco cigarettes, and to circumvent the public smoking ban. By providing flavor and inhaling sensations that are closer to smoking a cigarette than those produced by a nicotine inhalator, e-cigarettes are able to replicate the sensation of smoking a traditional cigarette (24). This was consistent with results at Qassim University (25) and the University of Minnesota (26). This suggests that medical students are in dire need of education about vaping patterns in relation to quitting tobacco smoking, given that the FDA has not approved these devices for smoking cessation. A meta-analysis showed that e-cigarettes aid conventional cigarette smokers in quitting smoking compared to a placebo (27). Another study showed a strong association between conventional smoking and e-cigarette use among both adolescents and adults (28). It is worth noting that the sale of all e-cigarette or vaping products has been officially banned in Saudi Arabia since September 2015 (29).

As for participants' awareness about e-cigarettes, the current study showed that the vast majority of participants believe that electronic cigarettes are more acceptable than traditional cigarettes and also believe the sale of e-cigarettes should be regulated. Only one-fourth believe e-cigarettes are a healthy alternative to smoking, and one-fifth believe e-cigarettes are safe. All indicated an acceptable level of knowledge and awareness about e-cigarettes among participants. Similar findings were reported at King Khalid University in Aseer (30), where nearly half of the students were knowledgeable about e-cigarettes and their effects. More than two-thirds knew about the nicotine content and its psychological effect, while nearly all of them (91.5%) knew that it is harmful. A second study in Riyadh (31) revealed that the average age at which smoking was started was  $16.4 \pm 1.2$  years. There was substantial awareness of the negative effects of e-cigarettes. However, when

comparing e-cigarettes to regular cigarettes, only 22.5% and 48.4% of the students reported that they carry the same risk and contain the same chemicals as regular cigarettes do.

As for the motivators of using e-cigarettes, the current study revealed that having friends or relatives who use e-cigarettes, seeing e-cigarette ads in the media, the ease of obtaining electronic cigarettes, the ability to use e-cigarettes in work and public areas, affordability and availability, thinking that e-cigarettes are safe, and the perception that e-cigarettes are more acceptable than traditional cigarettes all contribute to the increasing utilization rate. These factors, along with the lack of legislation regarding use and lack of awareness about its hazards, stand behind the trending utilization rate. Similar factors were assessed by Han G and Son H (32) in their systematic review. They identified demographics, health-related behaviors, mental health, perception of e-cigarettes, and characteristics of e-cigarettes as the most significant factors. Interpersonal factors were classified into two categories: friend characteristics, including a friend's e-cigarette use or smoking, and family factors such as parental smoking and parental advice. Organizational and community factors included home, school, online community, and retail shop accessibility. Society and policy factors were regulation, media, and residence area. The findings indicate that multi-dimensional factors influence e-cigarette use among adolescents and young adults. Therefore, an approach that considers these factors is required to develop effective interventions for the prevention of e-cigarette use. Another systematic review aimed to identify and synthesize current evidence on the influence of social factors on e-cigarette intentions and use found consistent evidence that exposure to advertising increases the intention to use e-cigarettes (33). In Australia, curiosity was the most commonly reported reason for intended use and use initiation, whereas the taste of e-cigarettes and their appealing flavors were the most frequently reported motivators of current e-cigarette use (34). Also, curiosity, smoking reduction or cessation, social influences (e.g., having friends who use e-cigarettes), and the lower cost of e-cigarettes compared to tobacco cigarettes were also reported motivators by other studies in different regions (35-39). It has been discovered that these motivators differ among age groups. Adults, for instance, frequently report using e-cigarettes to help them quit smoking (40, 41), on the other hand, younger populations typically report using e-cigarettes out of curiosity (37) and for affective reasons (42).

However, this study has several limitations that should be considered when interpreting the findings. Firstly, the study was geographically confined to the Aseer region, which may limit the generalizability of the results. Secondly, the data collected in this study were self-reported, which could introduce recall bias or social desirability bias. Lastly, it is important to note that the sample size of 100 e-cigarette smokers, while not large, was chosen for the depth of data it could provide. Each participant was interviewed in-depth, allowing for a rich, qualitative understanding of the influencing factors of e-cigarette use.

## CONCLUSIONS

In conclusion, the current study revealed that the majority of e-cigarette smokers were middle-aged males with a high level of education. Additionally, more than three-fourths were current smokers, and half of them used smokeless tobacco products. Participants' awareness of hazards was, on average, moderate. Several motivators for using e-cigarettes were reported, such as having a friend who uses them, their availability, ease of access, lack of legislation particularly in public areas and work environments and the belief that they are safer. Restrictions on flavorings and marketing represent potential strategies for addressing the initiation and ongoing recreational use of e-cigarettes. However,



**further investigation is needed to produce relevant data regarding the long-term safety, side effect profile, and precise components used in vape cartridges in order to protect the health of its users.**

**Authorship Contribution:** RMA and IE were responsible for the conceptualization and methodology of the study and secured the necessary resources. IA, AHA, and RMA carried out the data collection. The formal analysis, including the development of the theoretical framework and data analysis, was conducted by RMA, FA, and AA. All authors contributed to the writing of the manuscript and approved the final version for publication.

**Institutional Review Board Statement:** This study received approval from the Aseer Institutional Review Board at the Directorate of Health Affairs in the Aseer Region, under the approval number REC-6-11-2023.

**Data Availability Statement:** De-identified datasets used or generated during the study are available from the corresponding author upon request.

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