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Across Sectional Survey of Adult E-Cigarette Uses in Iraqi Students with An Emphasis of The Influence on General Health Changes

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Abstract

Objectives: E-cigarettes are battery-powered devices that deliver nicotine or non-nicotine aerosols. Use of e-cigarettes is on the rise in Iraq, especially among students, yet the impact on health is not well documented. This study assessed the e-cigarette use influenced on health among a sample of Iraqi students.

Methods: Iraqi students a cross-sectional survey investigated how e-cigarette use effect on general health through the assessment of smoking history and demographic data from Iraqi adult e-cigarette users as well as responses regarding knowledge, perceptions, and behaviors related to cigarette and e-cigarette use and self-reported health changes and to assess awareness regarding the health risks of cigarette and e-cigarette use.by utilizing a structured questionnaire distributed among university students. Statistical analyses were planned to compare health-related outcomes between users, facilitating a robust evaluation of potential differences.

Results: This study was carried out during the period (October 2024-April 2025). There were 615 students in the study; all of them were 18 years old or older. The majority of the participants, 299 (48.9%), were in the age group 21-23 years old, and more than half of the participants were female, 348 (56.6%). all participants were 73.1%, suggesting a moderately high level of general awareness. Conclusion: This study shows that using e-cigarettes affects the health of Iraqi students. These results provide a basis for further longitudinal and interventional studies, essential for formulating culturally appropriate public health initiatives for Iraq's diverse population.

Keywords

Electronic Cigarettes; Students; Surveys and Questionnaires; Health Status; Smoking Prevention; Iraq.

HIGHLIGHTS

- Electronic cigarettes are battery-powered devices that vaporize a liquid comprising propylene glycol, glycerol, flavorings, and other substances, often containing nicotine in various concentrations
- Their use is gaining popularity worldwide and is becoming commonplace throughout the Arab world. Locally, the prevalence of waterpipe tobacco smoking appears to be rising, although cigarette consumption is declining.
- Among Iraqi students who smoke qalyan, or waterpipes, traditional tobacco use may be on the decline, which is different from the trend in the region where tobacco use is rising.
- The Iraqi university setting is among the limited venues where youth can obtain e-cigarettes, often mirroring the cultural perception that snuff is favored over cigarettes in social contexts.
- The present cross-sectional survey aims to examine the extent to which e-cigarette use affects users' health

INTRODUCTION

Tobacco smoking constitutes a substantial public health challenge in Iraq, with cigarettes remaining the dominant mode of use but an increasing preference for alternative forms such as waterpipe and e-cigarettes. E-cigarettes, which are also called e-cigs, e-vapour products, or electronic nicotine delivery systems, have become very popular in Iraq and around the world [1]. They are small, battery-powered devices that you hold in your hand and use to heat up a liquid

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solution that contains a mix of propylene glycol, vegetable glycerin, additives (usually nicotine), and flavorings [2]. Concerns have been raised regarding the safety of e-cigarettes, although the knowledge base regarding their effects remains limited. Some evidence suggests potential health benefits relative to tobacco cigarettes, including assistance in smoking cessation efforts; however, other findings indicate unfavorable health impacts on the respiratory and cardiovascular systems [3,4].

E-cigarettes (EC) deliver aerosolized nicotine, flavorings and other additives, and their use is increasing worldwide. In Iraq, EC use is controversial [1,5]. Some users in Iraq point to perceptions of safety, reduced cigarettes consumption, and anticipated health benefits, while other studies report early onset of symptoms and exacerbations of pre-existing conditions. Among Iraqi adult sole EC users, many report improved appetite, reduced sputum and coughing, and improved breathing and general wellbeing. The extent to which perceived health changes among dual users varies from that of sole EC users in Iraq remains unclear.[6]

E-cigarette (EC) use is increasing worldwide, including Iraq, but evidence comparing health changes between sole and dual EC users is limited. An e-cigarette is an electronic nicotine delivery system that heats a solution containing nicotine, flavorings, and other ingredients to produce inhaled vapor, without tobacco combustion [1,7]. Many users report dual use of e-cigarettes and regular cigarettes, leading to higher nicotine intake. Global trends indicate that EC use especially among youth and young adults in many countries exceeds US levels, and participants generally perceive ECs as less harmful than cigarettes. A substantial proportion of EC users have developed some level of dependence on ECs. [2,3,8]

Dual use of e-cigarettes and combustible cigarettes reportedly poses greater risks to cardiopulmonary health than do cigarette-only habits among adult smokers. E-cigarettes are available in a variety of forms and frequently deliver nicotine solutions that contain fewer, but not necessarily safe, chemicals relative to combustible products [9,10]. Widespread use can, therefore, produce unintended consequences that arise from underregulating and misinformation. The relative effect on health of sole use versus dual use remains unknown, and the extent to which patterns of transition can forecast these outcomes is difficult to establish. Documenting conditions through which temporary substitution improves tobacco-related health parameters may help guide the development of cessation pathways and risk-reduction strategies in underserved populations. [11,12]

Health studies have reported many beneficial effects of e-cigarettes among sole users as compared with dual users. Dual use was associated with poorer health and greater breathing difficulty. Dual users did not smoke fewer cigarettes, possibly due to insufficient nicotine satisfaction [6, 13]. E-cigarettes deliver lower plasma nicotine levels than cigarettes, and dual users have greater exposure to toxicants from both products. While some e-cigarette users never smoked cigarettes, others who can be considered potential quitters may have used e-cigarettes to quit. However, dual use was not associated with reduced tobacco exposure and might increase health risks due to additional toxicants and nicotine [14,15].

Cross-sectional analyses drew upon data from a large country-wide survey of Iraqi adults aged 18 or over collected through a partnership with the Iraqi High Commission for Human Rights and the University of Baghdad. The present study focused upon sole EC users (i.e. those who have never smoked or previously smoked only cigarettes but quit) and non-McKeganey N, Patton A, Barnard G. E-cigarettes and Older Adults who Smoke: A Missed Opportunity to Further Reduce Harm? [20]

MEASUREMENTS/INSTRUMENTS

Participants included adults who used e-cigarettes or both e-cigarettes and conventional cigarettes in Iraq. We used a self-administered questionnaire to collect data from 615 students, all of them were 18 years old or older from more than 12 medical and non-medical universities in Baghdad. A sampling

approach was designed to obtain a representative sample of these groups. Data collection Tools for gathering data acquired information as a Structured Questionnaire that was broken up into parts:

- **Demographics:** age, gender, level of education, faculty, and university
- **Behavioral Data:** When people start smoking, using e-cigarettes, and using hookahs
- **Perceptions and Beliefs:** Safety, addictiveness, health risks, secondhand smoking, and attitudes toward quitting
- **Social Influence:** Friends who smoke, support for a ban on public smoking

These variables are divided into Independent Variables [Gender, Age group, Academic stage, Faculty and University] and Dependent Variables [E-cigarette use (Yes/No), Hookah use, Smoking initiation stage, Perceptions of safety, addictiveness, health risks, Quit attempts and intentions, Beliefs about secondhand smoke and disease risk and social circle influence].

The results were gathered using a standardized questionnaire administered to university students. We planned to utilize statistical studies to compare health-related outcomes between users, which would make it easier to find any differences. The questionnaire was developed subsequent to a review of the literature on similar studies [12,13,14]. Three clinical pharmacy specialists examined the survey to ascertain the clarity of the questions for authenticity. Thirteen people then took the questionnaire to see if it was clear, well-designed, and easy to read. The results led to changes in the questionnaire. We utilized the Cronbach alpha test to see how consistent the questionnaire was inside ($\alpha = 0.78$). The answers led to changes. As a result, it was straightforward to understand and answer the survey. The investigators also gave the people who collected the data feedback and changes every day. We checked the data we collected carefully on a regular basis to make sure it was complete, accurate, and easy to understand. To make sure they were accurate, the questionnaires were randomly chosen and then checked again by a pharmacist. Also, the people who took part in the study were told exactly why they were being asked questions, which made the atmosphere better.

Identification of Awareness-Related Items:

To measure awareness, we selected items that specifically assessed participants' knowledge of the health risks and addictive potential of tobacco and e-cigarettes. Four core items were identified:

- Smoking electronic cigarettes can cause diseases.
- Is smoking E-cigarettes harmful for your health?
- Do you think the smoke from other people's cigarettes is harmful to you?
- Do you think that electronic cigarette is addictive?

Responses were recorded in categorical form (Yes/No, with "Not sure" excluded from awareness scoring).

Data Cleaning and Standardization:

Responses were cleaned and standardized by converting textual answers into binary outcomes. Specifically:

- "Yes" was coded as evidence of awareness.
- "No" was coded as lack of awareness.

Responses such as "Not sure" or missing values were treated as non-applicable and excluded from denominator calculations for awareness scoring.
was computed as:

- Awareness Score = Number of "Yes" responses\Total valid (Yes/No) responses∗ 100
- Overall Awareness Index: The mean of individual awareness scores across the entire sample was calculated to represent the population-level awareness index.

Awareness Calculation

Let the set of awareness-related questions be denoted as

$$\{q1, q2, q3, q4\} = Q$$

where each qj corresponds to one of the following items:

- Smoking electronic cigarettes can cause diseases.

- Is smoking E-cigarettes harmful for your health?

- Do you think the smoke from other people's cigarettes is harmful to you?
- Do you think that electronic cigarette is addictive?

Step 1: Item-specific awareness:
For each question qj , the awareness proportion is defined as

$$A(qj) = Yj/(Yj + Nj) \times 100$$

where:

$Yj = number\ of\ "Yes"\ responses\ to\ question\ qj$

$Nj = number\ of\ "No"\ responses\ to\ question\ qj$

Step 2: Individual awareness score:
For each participant iii, the awareness score is calculated as

$$S_i = \frac{\sum_j^{mi} = 1 Y_{ij}}{M_i}$$

where:

$Y_{ij} = 1\ if\ participant\ i\ answered\ "Yes"\ to\ question\ qj, otherwise\ 0.$

$M_{i=number\ of\ valid\ responses\ \left(\frac{Yes}{No}\right) provided\ by\ participant\ i}$

Step 3: Overall Awareness Index:
The overall index is the mean of individual scores:

Overall Awareness Index$= \frac{1}{n}\sum_{i=1}^{n} Si \times 100$

where n is the total number of participants with at least one valid response.

Step 4: Subgroup analysis:
For a given subgroup g (e.g., gender, age group, academic major, academic stage), the subgroup awareness index is:

$$Awareness\ Index(g) = \frac{1}{n}\sum_{i\epsilon g}^{n} Si \times 100$$

where $_g$n_is the number of participants in subgroup g.

Sample Size Determination and Sampling Procedure

The sample size was calculated using the Raosoft® online software calculator. The result was derived from the requirement establish a 98% confidence interval, and maintain a 5% margin of error. The survey portal was closed upon reaching the required number of responses. It was considered that a sample size of 615 participants would be suitable.

DATA ENTRY AND ANALYSIS

The collected data was cleared, categorized, and analyzed using Statistical Package for Social Sciences (SPSS) version 26, and the results were presented in tables and figures as necessary. With a significance level p of 0.05, the chi-square test was used to look for any association between outcome variables and independent variables.

General characteristics of the patients were assessed with descriptive statistics (simple frequencies and percentages) for categorical variables and descriptive statistics for continuous variables. Associations between the demographic characteristics of patients and correct understanding of dosage regimen were analyzed by Chi-square test.

Ethical Considerations and consent to participate

This study received approval from the institutional research ethics committee at Al-Nahrain University- College of pharmacy, Baghdad, Iraq (approval registration number: nah.coh.pha.H9). Before data collection commenced, informed consent was obtained from all survey participants to ensure voluntary participation and confidentiality of responses. Participants were given 10 to 15 minutes to read the consent form carefully before signing it. Participants were informed that the disclosed information would be used exclusively for research purposes and treated with strict confidentiality. Escalating awareness of ethical conduct in healthcare research highlights the importance of safeguarding research objectives and protecting research subjects.

RESULT

The demographic data presented in [Table 1] shows that most of the people who took part (48.6%) are between the ages of 21 and 23, while

a smaller group (14.80%) is 24 or older. The gender breakdown shows that 43.4% of the people that took part are male and 56.6% are female. Most of the people who took part are still in college, and only 13.2% have graduated. 44.2% of the people that took part are studying pharmacy.

Table 1: *Socio-demographic characteristics of the participants*

Socio-demographic characteristics		N=615	
		No.	%
Age	18-20	225	36.6
	21-23	299	48.6
	≥ 24	91	14.8
Gender	Female	348	56.6
	Male	267	43.4
Academic stage	First stage	73	11.9
	Second stage	143	23.3
	Third stage	80	13
	Fourth stage	66	10.7
	Fifth stage	164	26.7
	Sixth stage	8	1.3
	Graduated	81	13.2
Faculty	Dentistry	38	6.2
	Medical engineering	29	4.7
	Medical laboratory techniques	21	3.4
	Medicine	210	34.1
	Nursing	5	0.8
	Other non-medical professions (engineering, law, etc)	34	5.5
	Pharmacy	272	44.2
	Radiologic technology	6	1.0
Participating universities	University of technology	1	0.2
	Al-Iraqia university	41	6.7
	Al-Israa university	11	1.8
	Al-Mustafa university	33	5.4
	Al-Baian university	5	0.8
	Al-Mustanseria university	34	5.5
	Al-Nahrain university	185	30.1
	Al-Turath university	40	6.5
	Ashur university	8	1.3
	Baghdad university	89	14.5
	Dijlah university	2	0.3
	Others	166	27.0
Type of study	Private	167	27.2
	Public	448	72.8

The dataset in [Table 2] provides information about the smoking habits of 615 people, including their use of electronic cigarettes, hookah smoking, and when they started smoking in college. A summary of what the results mean A large majority have never used e-cigarettes, which shows that they are not very popular. About 5% of people who smoke electronic cigarettes do so

every day. Most of the people who took part in the study had never smoked before, but almost 1 in 5 started smoking in college. The initial stage of college (8.0%) had the greatest initiation rate, which could be because of unfamiliar social situations, stress, or peer pressure. Using a hookah is even less prevalent than using an e-cigarette. The regular use rate (8.8%) is a little higher than the daily use rate (8.8%). This could be because people prefer hookah in groups because of cultural or societal reasons. In this sample, smoking is not very frequent, yet there is a noticeable minority who does it regularly or occasionally. It looks like college is a big time for people to start smoking, especially in the beginning. People use hookahs and e-cigarettes more for fun or on occasion than all the time.

Table 2: *Distribution of study participants based on demographic data on smoking habits*

	Frequency	N=615	
		No.	%
How often do you currently use an electronic cigarette?	Never	432	70.2
	Only smoke at certain occasions	54	8.8
	Once per week	59	9.6
	Several days per week	39	6.3
	Every day	31	5.0
At any collage stage you start smoking?	Never	418	68.0
	Before collage	78	12.7
	First stage	49	8.0
	Second stage	17	2.8
	Third stage	25	4.1
	Fourth stage	14	2.3
	Fifth stage	9	1.5
	6th stage	5	0.8
Do you smoke hookah	Never	538	87.5
	Only smoke at certain occasions	23	3.7
	Regularly now	54	8.8

The statistics in [Table 3] shows that 183 of the 615 individuals (29.8%) use e-cigarettes, while 432 (70.2%) do not. Statistically significant: Males are far more likely than females to use e-cigarettes. $P < 0.0001$, $\chi^2 = 148.81$. The highest number of people who use e-cigarettes is between the ages of 21 and 23. Statistical significance: $P < 0.0001$, $\chi^2 = 18.096$. Graduates exhibit a greater prevalence of e-cigarette using. Statistical trend: $P = 0.062$, $\chi^2 = 11.984$ (significance on the edge). The sample is mostly made up of Pharmacy and Medicine students, however Pharmacy students use e-cigarettes more often. Statistical significance: $P < 0.006$, $\chi^2 = 19.856$. Statistical significance shows that Al-Nahrain University has the most e-cigarette users. $P < 0.035$, $\chi^2 = 20.809$.

Table 3: *The relationship between college students in Baghdad who smoke e-cigarettes and their social and demographic characteristics in 2025*

Variable	E-cigarette use n=183 No. (%)	Non-E-cigarette use n=432 No. (%)	Total n= 615 No. (%)
Gender			
Male	148(80.9)	119(27.5)	267 (43.4)
Female	35(19.1)	313(72.5)	348(56.6)
***P <0.0001 d,f= 1 χ2=148.81**			

Age (year)			
18-20	52(28.4)	173(40)	225(36.6)
21-23	88(48.1)	211(48)	299(48.6)
≥ 24	43(11.1)	48(11.1)	91(14.8)
***P <0.0001 d,f= 2 χ2=18.096**			
Academic stage			
First stage	24(13.1)	49(11.3)	73(11.9)
Second stage	30(26.2)	113(26.2)	143(23.3)
Third stage	24(13)	56(13)	80(13)
Fourth stage	22(12)	44(10.2)	66(10.7)
Fifth stage	47(25.7)	117(27.1)	164(26.7)
Sixth stage	2(1.1)	6(1.4)	8(1.3)
Graduated	34(18.6)	47(10.9)	81(13.2)
P <0.062 d,f= 6 χ2=11.984			
Faculty			
Dentistry	14(2.3)	24(3.9)	38(6.2)
Medical engineering	9(1.5)	20(3.3)	29(4.7)
Medical laboratory techniques	6(1)	15(2.4)	21(3.4)
Medicine	52(8.5)	158(25.7)	210(34.1)
Nursing	5(0.8)	0(0)	5(0.8)
Other non-medical professions (engineering, law, etc.)	15(2.4)	19(3.1)	34(5.5)
Pharmacy	79(12.8)	193(31.4)	272(44.2)
Radiologic technology	3(0.5)	3(0.5)	6(1)
***P <0.006 d,f= 7 χ2=19.856**			
Participating universities			
University of technology	1(0.2)	0(0)	1(0.2)
Al-Iraqia university	8(1.3)	33(5.4)	41()6.7
Al-Israa university	6(1)	5(0.8)	11(1.8)
Al-Mustafa university	10(1.6)	23(3.7)	33(5.4)
Al-Baian university	2(0.3)	3(0.5)	5(0.8)
Al-Mustanseriya university	5(0.8)	29(4.7)	34(5.5)
Al-Nahrain university	44(7.2)	141(22.9)	185(30.1)
Al-Turath university	12(2)	28(4.6)	40(6.5)
Ashur university	3(0.5)	5(0.8)	8(1.3)
Baghdad university	31(5)	58(9.4)	89(14.5)
Dijlah university	0(0)	2(0.3)	2(0.3)
Others	61(9.9)	105(17.1)	166(27)
***P <0.035 d,f= 11 χ2=20.809**			
***Significant difference between percentages using Pearson-χ2-test at 0.05 level.**			

The data shown in [Table 4] demonstrate how people use and think about e-cigarettes. Safety as it seems 67% of people think e-cigarettes are safe. There is no significant difference between users and non-users (P = 0.939, χ^2 = 0.006). 17.7% of people think e-cigarettes are addictive. Users are far more likely to say "yes" (15.6%) than people who don't utilize it (2.1%). Very important: P < 0.0001, χ^2 = 451.027, Health Harm 87.5% think that e-cigarettes are bad for your health. Users are less likely to agree (23.7%) than non-users (63.7%) (P < 0.0001, χ^2 = 16.859). Secondhand

Smoke- 91.7% think that smoke from other people is bad for you. Groups are very different from each other. $P < 0.005$, $\chi^2 = 7.965$, and Disease Risk 38.2% think that e-cigarettes can get you sick. Users are less likely to agree (15%) than those who don't utilize it (23.7%). $P < 0.0001$, $\chi^2 = 14.711$. The other element is Cessation Behavior and Intentions, which include 20% of people tried to quit smoking in the past year. People who used e-cigarettes were substantially more likely to have tried. $P < 0.0001$, $\chi^2 = 487.42$, Want to Quit Now 16.6% want to give up. Once more, users demonstrate stronger purpose. $P < 0.0001$, $\chi^2 = 453.467$. E-Cigarettes as a Way to Quit 58.2% think that e-cigarettes help people quit smoking. Users are more likely to agree. $P < 0.001$, $\chi^2 = 11.838$ also changing from regular smoking 47.5% say they stopped using traditional techniques (like hookah) after switching to e-cigarettes. There is a big gap between users and non-users. $P < 0.0001$, $\chi^2 = 253.322$. the last axis Social Influence and Beliefs that include the use of the Inner Circle 58.2% of people know someone who uses e-cigarettes. - This is more likely to be reported by users. $P < 0.0001$, $\chi^2 = 88.054$, also Long-Term Safety Belief 27.6% think it's safe to keep smoking after one to two years. People who use it are more likely to agree. $P < 0.0001$, $\chi^2 = 66.710$ Although, Support for a ban on smoking in public 61.6% agree that smoking should be banned in public. There is no significant difference between groups ($P = 0.386$, $\chi^2 = 0.7500$). Even though they don't all agree, most people who took part in the survey support limits on smoking in public places and know that secondhand smoke is bad for you.

Table 4: *The relationship between e-cigarette uses and knowledge among Baghdad medical college students on their use in 2025.*

Variable	E-cigarette use n=183 No. (%)	Non-E-cigarette use n=432 No. (%)	Total n= 615 No. (%)
Electronic cigarette is safe?			
Yes	123(20)	289(47)	412(67)
No	60(9.8)	143(23.3)	203(33)
P <0.939 d,f= 1 χ2=0.006			
Do you think that electronic cigarette is addictive?			
Yes	96(15.6)	13(2.1)	109(17.7)
No	68(11.1)	5(0.8)	73(11.9)
Not sure	19(3.1)	414(67.3)	433(70.4)
***P <0.0001 d,f= 2 χ2=451.027**			
In the previous year, have you attempted to cease smoking cigarettes?			
Yes	115(18.7)	8(1.3)	123(20)
No	50(8.1)	2(0.3)	52(8.5)
Not sure	18(2.9)	422(68.6)	440(71.5)
***P <0.0001 d,f= 2 χ2=487.42**			
Do you wish to cease smoking cigarettes at this moment?			
Yes	93(15.1)	9(1.5)	102(16.6)
No	68(11.1)	5(0.8)	73(11.9)
Not sure	22(3.6)	418(68)	440(71.5)
***P <0.0001 d,f= 2 χ2=453.467**			
Is smoking E-cigarettes harmful for your health?			
Yes	149(23.7)	392(63.7)	538(87.5)
No	8(1.3)	15(2.4)	23(3.7)
Not sure	29(4.7)	25(4.1)	44(8.8)
***P <0.0001 d,f= 2 χ2=16.859**			

Do you support the prohibition of cigarette smoking in public areas?			
Yes	108(17.6)	271(44.1)	379(61.6)
No	75(12.2)	161(26.2)	236(38.4)
P <0.386 d,f= 1 χ2=0.750			
After a year or two of smoking, do you believe it's safe to continue?			
Yes	92(15)	78(12.7)	170(27.6)
No	91(14.8)	354(57.6)	445(72.4)
***P <0.0001 d,f= 1 χ2=66.710**			
Do you think the smoke from other people's cigarettes is harmful to you?			
Yes	159(25.9)	405(70.2)	564(91.7)
No	24(3.9)	27(57.6)	51(8.3)
***P <0.005 d,f= 1 χ2=7.965**			
Does anyone in your inner circle use electronic cigarettes?			
Yes	159(25.9)	199(32.4)	358(58.2)
No	24(3.9)	233(37.9)	257(41.8)
***P <0.0001 d,f= 1 χ2=88.054**			
Using an electronic cigarette to smoke can lead to diseases?			
Yes	92(15)	146(23.7)	377(38.2)
No	24(3.9)	233(37.9)	257(61.3)
***P <0.0001 d,f= 1 χ2=14.711**			
One of the most efficient ways to quit cigarette smoking is to use an electronic cigarette?			
Yes	92(15)	146(23.7)	377(58.2)
No	87(14.1)	142(23.1)	229(37.2)
***P <0.0001 d,f= 1 χ2=11.838**			
Ceasing the use of conventional smoking methods, such as hookah, after transitioning to electronic cigarettes?			
Yes	177(28.8)	115(18.7)	292(47.5)
No	6(1)	317(51.5)	323(52.5)
***P <0.0001 d,f= 1 χ2=253.322**			
***Significant difference between percentages using Pearson-χ2-test at 0.05 level.**			

Item-specific awareness

A total of 615 valid responses were included in the analysis. The overall Awareness Index of the study population was 73.1%, indicating that, on average, participants correctly identified nearly three out of four awareness-related items. Awareness levels varied considerably across the four key questions (Figure 1). Only 38.7% of respondents recognized that electronic cigarette use can cause diseases. In contrast, 95.9% acknowledged that conventional cigarette smoking is harmful to health. Similarly, 91.7% agreed that secondhand smoke from others is harmful. Awareness regarding the addictive potential of e-cigarettes was 59.9% among 182 valid respondents.

These findings demonstrate a disparity in awareness: while most participants were knowledgeable about the risks of conventional smoking and secondhand exposure, substantially fewer recognized the health risks and addictive nature of e-cigarettes.

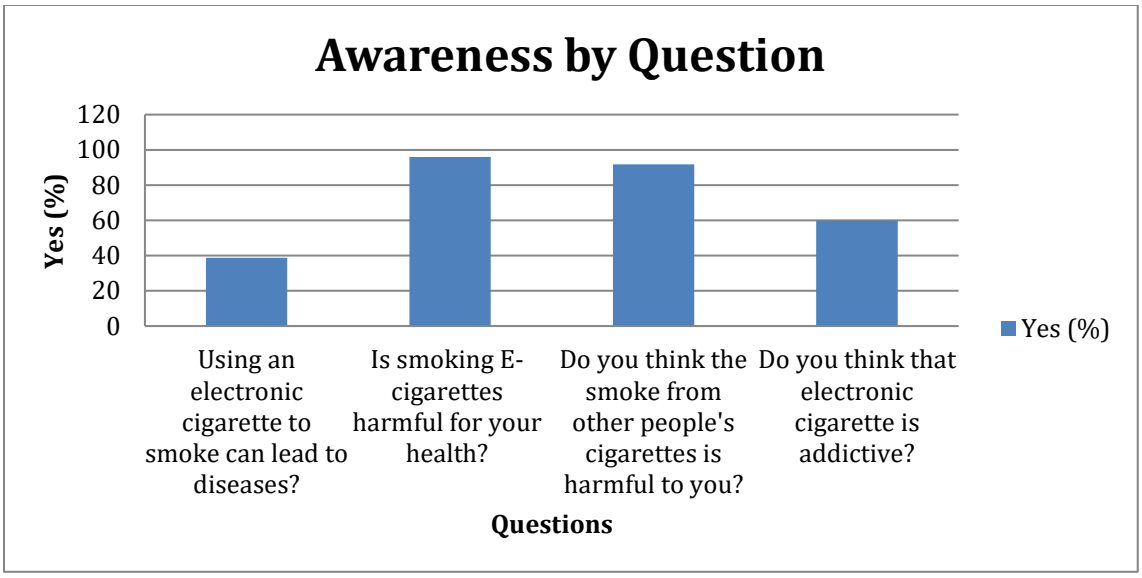

Figure 1. *Evaluation of the studied sample awareness about electronic cigarette smoking.*

Overall awareness: The mean Awareness Index across (Figure 2). all participants were 73.1%, suggesting a moderately high level of general awareness, but with critical gaps in knowledge related to electronic cigarettes.

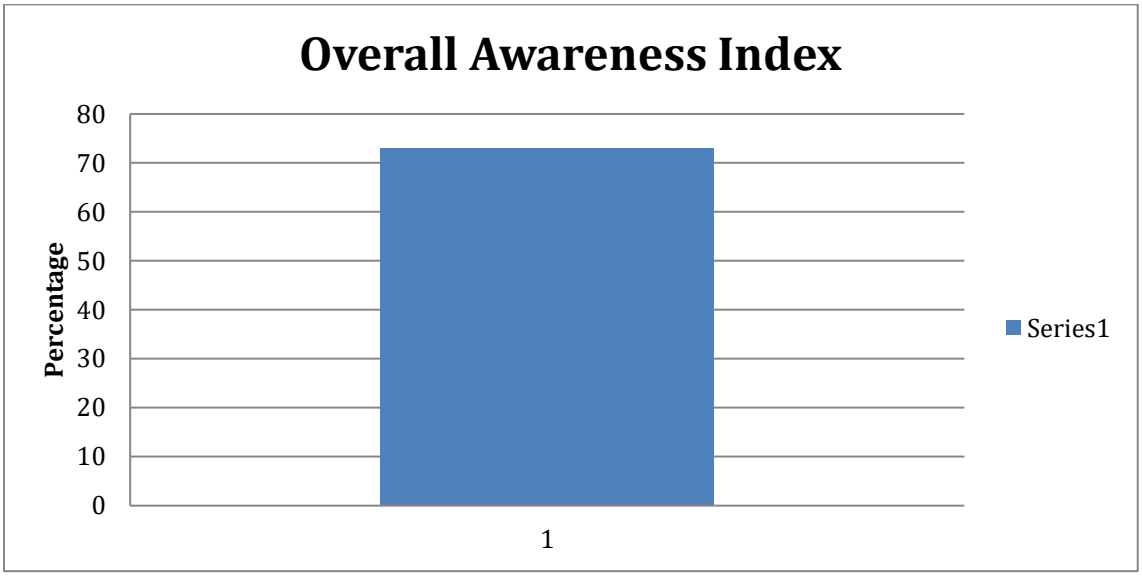

Figure 2. *Overall Awareness Index.*

Subgroup comparisons: Stratified analysis by sex and age (Figure 3) revealed only modest variations. Female respondents showed slightly higher awareness scores compared to males, while younger age groups (18–20 years) demonstrated comparable or lower awareness than older peers (21–23 years) as seen in (Figure 4).

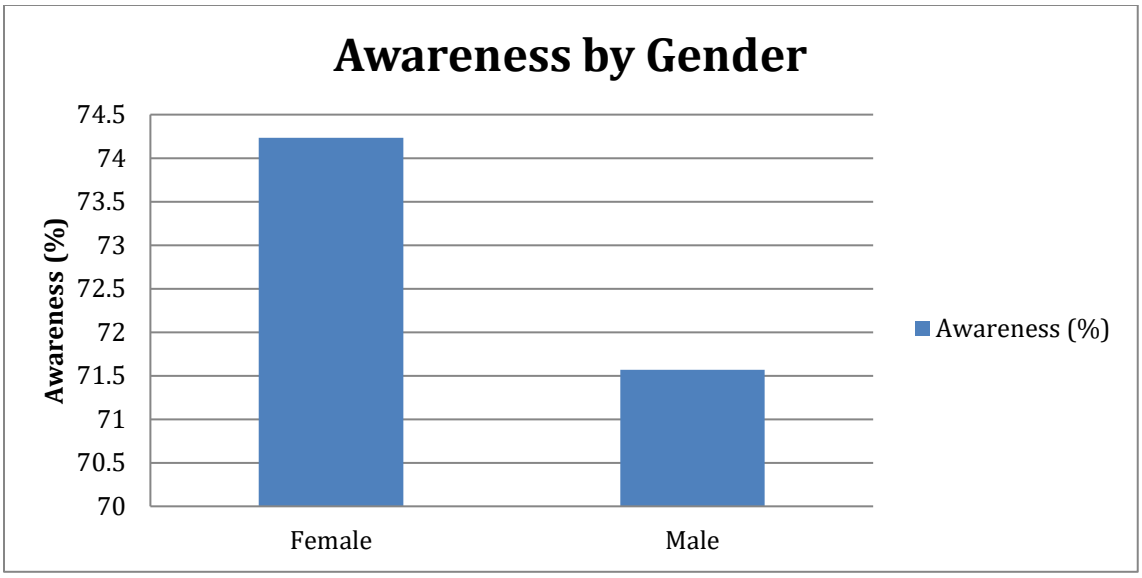

Figure 3. *Awareness By Gender.*

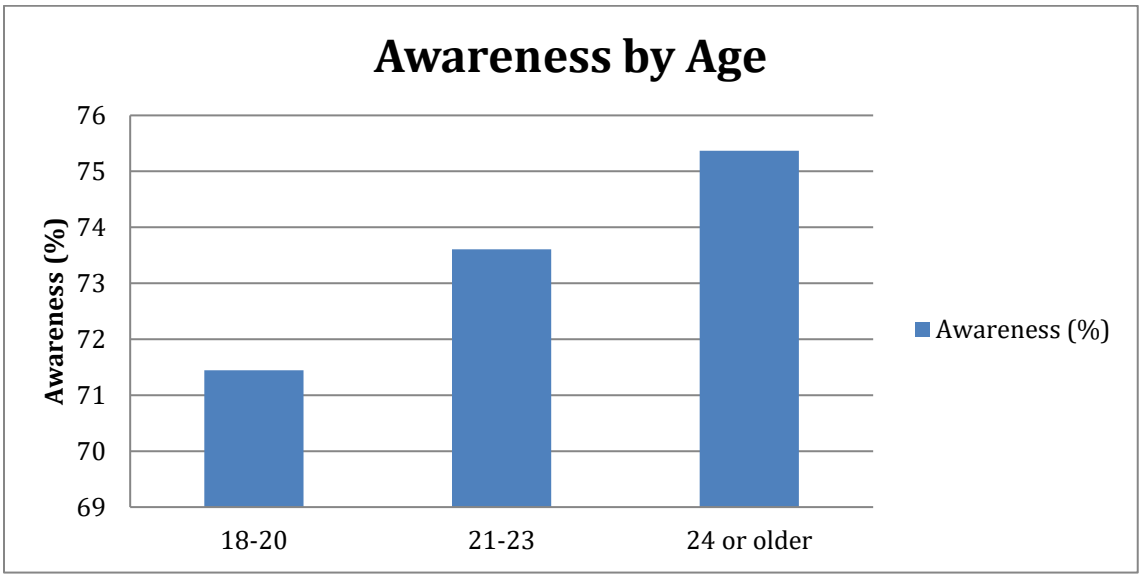

Figure 4. *Awareness by Age.*

Awareness was also examined by academic major and academic stage (Figure 5), (Figure 6)., where students enrolled in health-related disciplines (e.g., Medicine, Pharmacy) tended to report higher awareness compared to non-health majors**.**

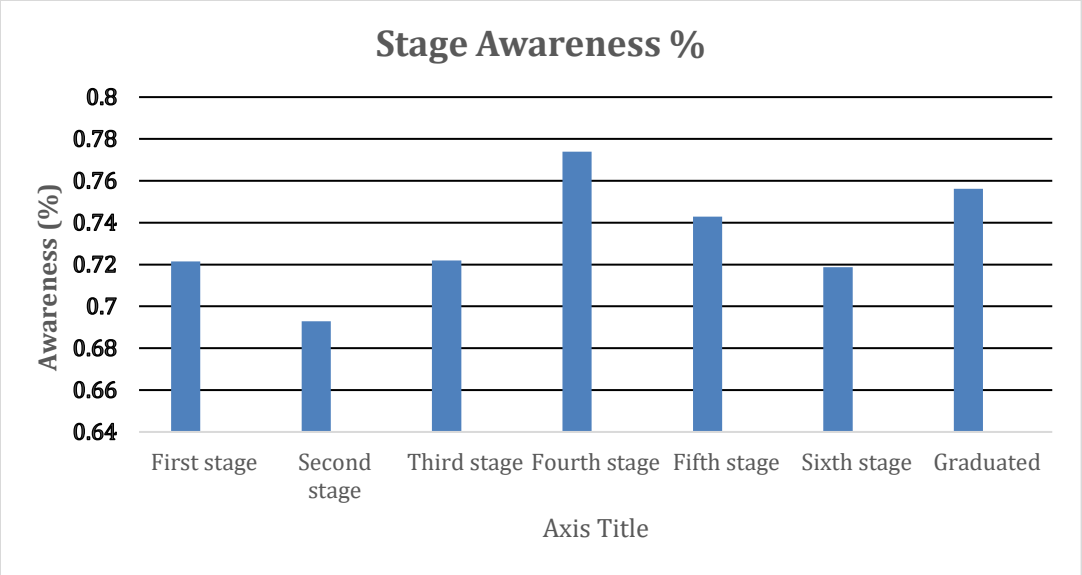

Figure 5. *The Stage Awareness.*

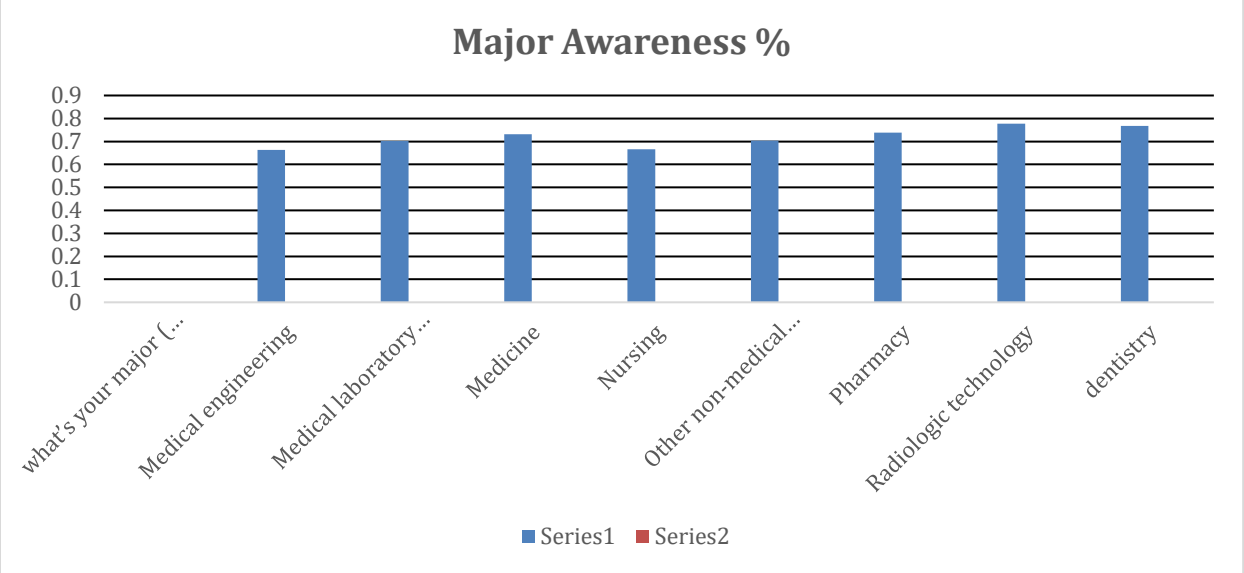

Figure 6: *The Major Awareness.*

DISCUSSION

The use of e-cigarettes is currently rising among young individuals in Iraq due to the proliferation of the fallacy that e-cigarettes are safer than conventional tobacco cigarettes [15]. Recent studies have indicated that e-cigarettes pose comparable risks to tobacco smoking [16]. Because of this, it's crucial to know what e-cigarettes are like in Iraq**.** The present study revealed a relatively low prevalence of e-cigarette (29.8%) use among adult Iraqi students, with less than half classified as current users; the majority were intermittent rather than daily smokers, and health warnings received did not significantly influence smoking cessation, and this actually very similar to what Sallam M. *et, al.* study said [17] and Abdurahman & Jader (2019) [18]. This result is notably higher than the global average of 10.2% for current vaping use among school and college students, as reported in a recent meta-analysis encompassing 146 studies across 53 countries [19].

The findings enhance understanding of this fast-growing trend within this age group in Iraq, extending the insights of previous investigations.

The sample included 615 students from different local universities and departments. Most (48.6%) were with a majority aged 21-23. Female respondents predominated, and over half (56.6%) were undergraduates. This conclusion corroborates results from different countries that elucidated the significance of college as a pivotal phase in the development of smoking behavior. Also agree with the study's findings revealed that the predominant demographic of the research sample consisted of individuals aged 20 to 21 years, who were female, first-year medical students, and affiliated with the college of medicine [12,20, 21].

Approximately 29.8% of adult students currently used e-cigarettes, with 5 % of this population engaging in daily use. The chief motivations for vaping were enjoyment and involvement in social gatherings. Current users often believed that e-cigarettes posed a substantially lower risk than traditional cigarettes or to be entirely harmless and that smoking data did not support associations between e-cigarette use and increased mortality or morbidity. In total, 87.5% of the cross-sectional sample recognized e-cigarette use as risks for general health. Despite widespread exposure to various information sources, only a minority understood the potential harmful effects of e-cigarettes, with social media, the predominant medium of information, typically dominated by e-cigarette advertising and promotional content [21, 22].

About 8.8% of students smoke hookah regularly and this finding disagree with Abdurahman and Jader (2019) [19] conducted a study that found 23.5% of students were smokers, with a higher prevalence in males (41.9%) compared to females (6.8%). Salim Younus *et, al*. (2023) [23] also talked about how many students' smokes. They found that 33.1% of them smoke, and most of them smoke hookah (47.2%), followed by cigarettes (39.2%) and vaping (13.6%).

Furthermore, Mousawi's (2014) [24] study found that about half of the smokers who were interviewed started smoking before they turned 18. This is similar to what the current study found, which said that a higher percentage (12.7%) of students start smoking before they go to college. This is because tobacco products are cheap, there aren't enough rules about selling them to young people, and they are being advertised.

These statistics demonstrate the imperative for stringent restrictions to govern global smoking rates among young, a point further underscored by Jafari et al. (2021) [25].

Moreover, this study was found out how many people wanted to quit cigarette smoking through the use an electronic cigarette; more than 58.2% of those who answered "yes" they were interested in quitting within the following months. This is in line with earlier studies that showed that younger vapers are more likely to want to quit and actually try to quit than older vapers [26].

The results of the current study indicated a reasonable level of knowledge regarding e-cigarettes among medical students. A total of 615 contributors, representing 73.1%, % of the sample, who have overall Awareness Index Only 38.7% of respondents recognized that electronic cigarette use can cause diseases. In contrast, 95.9% acknowledged that conventional cigarette smoking is harmful to health. Similarly, 91.7% agreed that secondhand smoke from others is harmful. Awareness regarding the addictive potential of e-cigarettes was 59.9% among 182 valid respondents. The knowledge level in this study exceeds that documented at Hangzhou University in China, where around 58% of students were certain that E-cigarettes contained nicotine, while more than 68% of students did not identify E-cigarettes as tobacco products [27]. The results of this study demonstrate the heterogeneity in the general knowledge of medical students. Medical students seem to be more aware of the health risks and addictive qualities of e-cigarettes. Most students know that e-cigarettes can't be used in public or closed spaces, but they might be using them (or seeing someone else use them) in these areas, or they might not know that e-cigarettes are illegal in Brazil [28]. Interestingly, the low level of knowledge about e-cigarettes seems to be common among health colleges students reflected by reports of Habib et al. and Guckert et al., where 69.4% of medical students

and 81.6% of dental students believed e-cigarettes were less harmful compared to conventional cigarettes, respectively [28, 29]. The current study demonstrates a relationship between awareness of e-cigarettes and their current consumption, applicable to both e-cigarettes and conventional cigarettes. It shows a trend where smokers are less aware of how harmful and addictive e-cigarettes are. A study in Thailand found similar results: those who didn't know as much about the bad consequences of e-cigarettes were more likely to use them [30].

These findings indicate significant gaps in knowledge among students regarding the risks posed by e-cigarette use. Cultural taboos, for instance, discourage Iraqi women from smoking, yet permit e-cigarette use; advertising of traditional cigarettes is prohibited, whereas e-cigarettes remain largely unregulated; and many people erroneously perceive electronic cigarettes as harmless smoking aids. The predominance of online sources and absence of formal educational programs contribute to superficial understanding and underestimation of potential health hazards.

CONCLUSION

This study sheds lights into the consequences and patterns of adult Iraqi students who used e-cigarette. A significant current users experienced percentage had a wide range of health disturbances that disrupted their wellbeing. Students displayed awareness about the risks associated with e-cigarette use in addition to the changes on adverse health effect. Furthermore, consumption of was prevalent within the student community, reinforcing the need for public health initiatives that address both the immediate health impacts and the informational requirements of this demographic. Policymakers would do well to consider these findings in the formulation of regulations and educational interventions aimed at safeguarding the young adult's health in academic settings. The government and other relevant authorities should pay attention to the findings of this study and previous research, as they show a worrying trend toward the widespread use of e-cigarettes and a lack of knowledge about these nicotine products.

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Availability of Data

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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