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Original Article

Prevalence and Perceptions toward Electronic Cigarettes (Vaping) Use among Medical Students: A New Public Health Challenge in Kurdistan Region, Iraq

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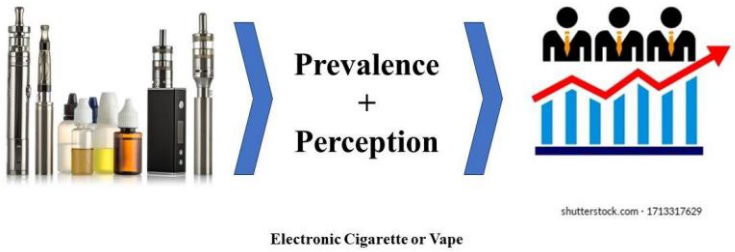
ABSTRACT

Introduction: Using of electronic cigarettes is on the increase all over the world, in particular, among young people. Vaping regularly resulted in health complications with substantial proof. The study was to evaluate university students' prevalence and perceptions in terms of E-cigarettes.
Materials and methods: An online cross-sectional survey was utilized to conduct the research from June 4th, 2023 to November 15th, 2023 at Hawler Medical University, Kurdistan Region in Erbil, Iraq. The questionnaire was filled up by 629 students. The features, prevalence, and perception of the participants were assessed using descriptive statistics. The chi-square test was used with the statistical significance fixed at $p < 0.05$.
Result: The prevalence of electronic cigarettes was 99 (15.7%) The majority of the participants 277 (44%) age group (20-21) years old, in more than half of the participants were female 382 (60.7%), the academic year of the participant were 211 (33.5%) of them first year and 156 (24.8%) of them from the College of Medicine at Hawler Medical University. Approximately one-third (74.6%) of the samples demonstrated fair alertness regarding the damaging effects of smoking hookah, while only 6.4% exhibited marvelous alertness.
Conclusion: The usage of extraordinary prevalence of E-cigarettes was identified. It leads to an upturn of attractiveness and habit of E-cigarettes among students of college. The study recommends that the relevant governmental offices take the findings into consideration. Systematic activities should be performed to stop prevalence of E-cigarettes usage and to rise the peoples' knowledge regarding nicotine products.

GRAPHICALABSTRACT



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Introduction

Electronic cigarettes (E-cigarettes) are tools warming up a watery solution and produce a mist that people inhale. The solution usually contains glycerol and propylene glycol, and may also have nicotine and flavors [1]. Many young adults, including medical students, have been using e-cigarettes more frequently in recent years. The usage of E-cigarettes/vaping among medical students becomes a bigger problem for communal health in the region.

E-cigarettes have quickly become widely available in the market, even though there are still many uncertainties surrounding their safety, effectiveness in reducing harm and helping people quit smoking, and overall impact on public. The landscape of E-cigarette products is evolving rapidly, and the data from research on older products may not apply to the evaluation of newer products that have the potential to be safer and more efficient as nicotine delivery systems. Furthermore, marketing strategies and other external factors can differ by country, leading to variations in patterns of usage and potential impacts on public health. The inherent risks and advantages of these products must be considered within the ongoing presence of traditional cigarettes and other tobacco items, as well as the common practice of using e-cigarettes and conventional cigarettes simultaneously among both adults.

It is important to assess e-cigarette toxicant exposure and individual risk, as well as the health effects, of e-cigarettes as they are actually used to ensure safety and to develop an evidence-based regulatory scheme that protects the entire population- children and adults, smokers and nonsmokers- in the context of how the tobacco industry is marketing and promoting these products. Health claims and claims of efficacy for quitting smoking are unsupported by the scientific evidence to date. To minimize the potential negative impacts on prevention and cessation and the undermining of existing tobacco control measures, E-cigarette use should be prohibited where tobacco cigarette use is prohibited and the products should be subject to the same marketing restrictions as tobacco cigarettes. The first documented reference to an electronic cigarette (E-cigarette) is dated back to 1930, but a patent was obtained for the first non-tobacco, smokeless cigarette device in the USA by Herbert A. Gilbert in 1965. However, it is not commercialized till 1980s on a limited scale while Hon Lik, a pharmacist, invented the first-generation E-cigarettes in 2003. The nicotine liquid was diluted and vaporized using a piezoelectric element in a propylene glycol solution. E-cigarette progressively has entered the USA and European market in 2006 then the infection passed to all other countries [2]. The vaping business has industrialized gradually since its start, producing goods that are more appealing and efficient through innovation, and E-cigarettes come in a wide range of styles, forms, and dimensions [3]. Some E-cigarettes have a visual resemblance to traditional cigarettes, while others may take the form of fountain pens or miniature flashlights. There are also those designed to resemble cigars or pipes. Some are non-rechargeable single-use disposables, while others feature prefilled cartridges or refillable cartridges (modular systems) which users can replenish with E-liquids or E-juices [4].

So many brands of E-cigarette have been produced in the world. However, they share similar parts which are a battery, a reservoir comprising the liquid and a vaporization chamber with warming element the e liquid contains a solvent (propylene glycol or vegetable glycerin), flavorings (tobacco, mint, fruit, and bubblegum), and often, nicotine in various doses typically ranging from 3-50 mg/ ml [5]. The frequency with which medical students use e-cigarettes varies across different studies.

An investigation carried out at Saudi Arabia's Qassim University found that approximately 10% of medical Students admitted to using E-cigarettes [6]. Another study in Jeddah, Saudi Arabia, involving three different universities reported that 27.7% of participants smoked electronic cigarettes [7]. In contrast, an investigation carried out at the University of Minnesota explored that 14.7% of medical students had ever tried e-cigarettes [8]. In France, the popularity of E-cigarette ever use among college students was available to be

23.0%, which is consistent with rates in Poland, the USA, and Romania. The occurrence of existing E-cigarette use among college students in France was 5.7% lower than in the USA [9]. A current epidemic of lung harm interrelates to vaping products or E-cigarettes. More than 2600 cases and 60 losses have been registered so far in the USA and other parts of the world [10, 11]. E-cigarettes that contain cannabis have been linked to lung harm in almost 80% of documented cases involving vaping products or e-cigarettes, while products containing nicotine and cannabinoids have been utilized in about 58% of reported cases, only nicotine has been used in 13% of cases [12, 13].

In the United States, E-cigarette usage has become a domestic epidemic among high/middle schools pupils, with prevalence rates of 27.5% and 10.5%, respectively [14]. Among college students in the US, opinions about how harmful and addicting E-cigarettes were found to be lower paralleled to conventional cigarettes. This insight of lower harm and addictiveness was also observed among high-class and dual users of E-cigarettes [15].

Materials and Methods

The purpose of this cross-sectional study is to dictate undergraduate students at Hawler Medical University regarding the prevalence and attitudes of E-cigarette usage as well as the health hazards that go along with it. The students were updated with the purpose of the research and guaranteed that their response was only used for the study. The involvement was optional. The duration of the study was from June 4th 2023 to November 15th 2023. The questionnaire was designed as a google form and handed out to the contributors by means of a text message. The questionnaire embraced three different parts. Sociodemographic characteristics covered the first part. Part two stood for smoking status and part three represented the perception towards health-related risks of E-cigarettes use. Only the undergraduates at Hawler Medical University encountered the inclusion necessities. The data were analyzed via SPSS V.27.0. The frequency and percentages were determined in descriptive analysis. Moreover, the relations between variables were tested through chi-square test, and the statistical significance was installed at $p < 0.05$.

Table 1: Socio-demographic characteristics of the participants

Socio-demographic characteristics		n=629	
		No.	%
Age group	= > 26	11	1.7
	18- 19	250	39.7
	20-21	277	44.0
	22-23	75	11.9
	24-25	16	2.5
Gender	Female	382	60.7
	Male	247	39.3
Academic Year	The 1st Year	211	33.5
	The 2nd Year	205	32.6
	The 3rd Year	113	18.0
	The 4th Year	64	10.2
	The 5th Year	24	3.8
	The 6th Year	12	1.9
College or Faculty	Dentistry	138	21.9
	Health sciences	133	21.1%
	Medicine	156	24.8%
	Nursing	103	16.4%
	Pharmacy	99	15.7%

Table 2: Study sample distribution by general information of smoking habits

Types of smoking	Frequency	n=629	
		No.	%
Have you ever used an electronic cigarette (Vape)?	Never	475	75.5
	Occasionally but not regularly	55	8.7
	Regularly now	99	15.7
Do you smoke cigarette?	Never	562	89.3
	Occasionally but not regularly	27	4.3
	Regularly now	40	6.4
Do you smoke hookah?	Never	559	88.9
	Occasionally but not regularly	31	4.9
	Regularly now	39	6.2

Results and Discussion

The majority of the participant 277 (44%) age group (20-21) years old, in which more than half of the participant are female 382 (60.7%), regarding the academic year of the participant were 211 (33.5%) of them first year and 156 (24.8%) of them from college of medicine at Hawler Medical University (Table 1).

Table 2 indicates that 99 (15.7%) of the study sample were regularly use e-cigarette (vape) smokers, while only 55 (8.7%) of them smoked occasionally, more than half 475 (75.5%) of them were non-E-cigarette smoking. Concerning smoking conventional cigarette, 40 (6.4%) of the study sample were regularly smokers, while only 27 (4.3%) of them smoked occasionally, more than three quarter 562 (89.3%) of them were never smoked cigarette smoking. Concerning smoking hookah, Table 2 shows that 39(6.2%) of the study sample were regularly smokers, while only 31 (4.9%) of them smoked occasionally but not regularly, more than three quarter 559 (88.9%) of them were never hookah smoking.

As can been seen in Tables 3 and 4, participants' awareness was poor (19.1%) with regard to harmful of smoking hookah. One-third (74.6%) had a fair understanding of the hazards associated with hookah smoking showing the overall awareness of the participants about harmful of smoking hookah was poor (19.1%). About one-third (74.6%) of them were had fair awareness about the harmful of smoking hookah. Merely 6.4% possessed marvelous awareness.

To the best empathy, this is the foundational work examining the prevalence of vaping among students enrolled in medical universities in the Kurdistan Region. The vaping is going to a public health challenge because the number of users increase rapidly furthermore the use of E-cigarette should take consideration among population and especially among health professional and more specifically among medical student. The prevalence of college students use E-cigarettes is different across different countries. The study investigated the prevalence of electronic cigarette usage by Students in medical universities. Ever-use of e-cigarettes was 15.7% in the current study. The findings of this study was highly compared with a study conducted at Umm AlQura University, Makkah, Saudi Arabia, declared that 31% of respondents are currently smoking e-cigarettes [16]. A study conducted in medical schools at University of Minnesota discovered that a prevalence of 14.7% [8]. Further investigation indicated that 9.5% of Jordanian university medical students acknowledged using e-cigarettes. The sample was a nationwide cross-sectional one that involved 1819 medical students from five medical colleges in Jordan. Many research works, from meta-analyses to longitudinal and cross-sectional studies, have consistently supported the idea that young individuals who use E-cigarettes are more likely to later smoke traditional cigarettes [17,18]. Findings of this study indicated that the majority of the research sample for age group was between 20-21 years old, they were female, first year medical student and from college of medicine respectively.

Table 3: Study sample distribution by their E-cigarettes awareness

E-cigarette awareness		n=629	
		No.	%
Smoking e-cigarettes is less dangerous than conventional cigarette smoking.	No	295	46.9
	Not sure	207	32.9
	Yes	127	20.2
Smoking e-cigarettes is less addictive than conventional cigarette smoking.	No	296	47.1
	Not sure	187	29.7
	Yes	146	23.2
Is vaping a cancer risk?	No	30	4.8
	Not sure	126	20.0
	Yes	473	75.2
E-cigarettes are safe to use as long as they do not contain nicotine.	No	363	57.7
	Not sure	205	32.6
	Yes	61	9.7
E-cigarettes can be used to take drugs such as cannabis or marijuana.	No	48	7.6
	Not sure	192	30.5
	Yes	389	61.8
E-cigarettes do not hurt the lungs.	No	496	78.9
	Not sure	80	12.7
	Yes	53	8.4
E-cigarette liquid is non-toxic.	No	445	70.7
	Not sure	153	24.3
	Yes	31	4.9
Flavoured E-cigarettes encourage to take up vaping.	No	18	2.9
	Not sure	61	9.7
	Yes	550	87.4
E-cigarette use (vaping) should be restricted in public places like regular cigarettes.	No	49	7.8
	Not sure	24	3.8
	Yes	556	88.4
The sale, supply, and use of all types of e-cigarettes should be banned.	No	62	9.9
	Not sure	51	8.1
	Yes	516	82.0
E-cigarettes should have health warnings like regular cigarettes.	No	11	1.7
	Not sure	31	4.9
	Yes	587	93.3

Table 4: Overall responses about E-cigarette awareness (vaping)

Levels of Awareness	No.	%	M	SD
Poor	120	19.1%	1.87	0.488
Fair	469	74.6%		
Good	40	6.4%		
Total	629	100%		

Poor=1-3, Fair= 4-6, and Good=7-9.

The existent research displayed that majority of the study participant mentioned that smoking E-cigarette is not less harmful than conventional cigarette and also not less addictive. A survey by the Center for Environmental Health of 97 different E-cig products showed the chemical acetaldehyde to be present. Acetaldehyde is associated with asthma and cancer. In addition,

they found lead, cadmium, nickel, tin, and other heavy metals that are associated with nervous-system and respiratory problems [19]. E-cigarette users who use nicotine-containing products might develop a dependence on them; nonetheless, e-cigarettes are usually thought to be less addictive than traditional cigarettes [20, 21]. Professionals express hesitation concerning the potential addictiveness of E-cigarettes, as they encompass nicotine, a substance known to induce addiction [22]. The rising misconception that E-cigarettes are just as deadly as regular combustible cigarettes, if not more so, exacerbates this worry [23]. In this current study, more than half of the participant thought that the E-cigarette contains chemical substance and highly risk for cancer. This result agree with a study was founded that Particularly in the mid and high ranges of observed values, E-cigarette liquids and aerosols stand out as a notable and remarkably changeable source of metals, contributing to unduly elevated risks of both cancer and non-cancer outcomes [24]. Lead, manganese, arsenic, cadmium, and nickel are small contributors to these dangers, although chromium and nickel are the main culprits, despite the point that E-cigarette vapours are verified to have far fewer carcinogenic toxicants than regular tobacco [25].

Concerning the possibilities of taking drugs such as cannabis or marijuana in E-cigarettes near two third of the participant believed that there's a possibility of using drugs in E-cigarettes. There are difficulties associated with youth E-cigarette usage because some studies show a link between E-cigarette use and the use of other drugs, such as cannabis [26, 27]. The discovery of the existent study shows that most of the participants thought that E-cigarette cause lung injury and decreasing pulmonary function. The finding of the current work agree with a study was conducted in United States of America they found that a vital fraction of hospitalized patients with lung injuries related to vaping products or E-cigarettes have needed to be admitted to the intensive care unit, and up to one-third of them required mechanical ventilation [5].

Table 5: Associations between socio-demographics of electronic cigarette and their awareness

Socio-demographics		Poor		Fair		Good		*P*-value
		NO.	%	NO.	%	NO.	%	
Age	= > 26	2	18.2	8	72.7	1	9.1	0.698
	18- 19	47	18.8	190	76.0	13	5.2	
	20-21	52	18.8	204	73.6	21	7.6	
	22-23	18	24.0	54	72.0	3	4.0	
	24-25	1	6.3	13	81.3	2	12.5	
Gender	Female	83	21.7	282	73.8	17	4.5	0.010
	Male	37	15.0	187	75.7	23	9.3	
Academic year	The 1st Year	33	15.6	161	76.3	17	8.1	0.161
	The 2nd Year	40	19.5	158	77.1	7	3.4	
	The 3rd Year	25	22.1	82	72.6	6	5.3	
	The 4th Year	18	28.1	39	60.9	7	10.9	
	The 5th Year	3	12.5	19	79.2	2	8.3	
	The 6th Year	1	8.3	10	83.3	1	8.3	
College or Faculty	Dentistry	20	14.5	110	79.7	8	5.8	0.028
	Health sciences	34	25.6	90	67.7	9	6.8	
	Medicine	25	16.0	125	80.1	6	3.8	
	Nursing	14	13.6	81	78.6%	8	7.8	
	Pharmacy	27	27.3	63	63.6%	9	9.1	

The outcomes of the existent study specified a moderate stage of knowledge with respect to e-cigarettes among medical students. A total of 473 contributors, constituting 75.2% of the sample, were knowledgeable about the fact that E-cigarettes consist of nicotine, are regarded as tobacco products, and have the potential to cause cancer. The knowledge level observed in this study surpasses that reported at Hangzhou University in China, where approximately 58% of students were certain about E-cigarettes containing nicotine, and over 68% of students failed to recognize E-cigarettes as tobacco products [14]. The findings of the present study illustrate the variability in the overall knowledge of medical students. Medical students appear to possess a heightened awareness of the adverse health effects and addictive properties associated with E-cigarettes. Most students well knowing that E-cigarettes cannot be used in closed or public places may indicate that they are using E-cigarettes (or observing its use) in these places, or that they are unaware that E-cigarettes are prohibited 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 [6, 28]. Moreover, the present study indicates an association between knowledge about e-cigarettes and their existing usage, both for E-cigarettes and traditional cigarettes. It reveals a trend where smokers exhibit less alertness of the damages and addictiveness linked with E-cigarettes. Similar observations were noted in a study conducted in Thailand, in which participants with lower awareness of the detrimental effects of e-cigarettes were more inclined to use them [29].

Conclusion

The present study show that the Hawler Medical University students consume a high prevalence of use e-cigarette, their level of perception regarding E-cigarettes was fair, even though they are medical students. This implies that E-cigarette use is becoming more common and popular among college students. It is recommended that the government and other relevant authorities take note of the present study's findings as well as those from earlier research, since they indicate a concerning trend toward the widespread use of e-cigarettes and a lack of awareness regarding these nicotine products.

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