

Use and beliefs about e-cigarette among college students in Jordan

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Abstract

Aims: The use of electronic cigarettes (e-cigs) is growing between young adults who are under impression that they are harmless and help quitting conventional tobacco smoking. However, studies on the use and beliefs about e-cigs among young adults in Jordan are limited. The aims of this study were to evaluate e-cigs use, awareness and beliefs among college students in Jordan.

Methods: This study was a cross-sectional study conducted in Jordan in 2017. Questionnaires were distributed randomly to college students in Hashemite University. Participants' demographic data, their current and previous smoking habits and their awareness and beliefs about e-cigs were documented.

Results: In this study, 2.2% of the participants were current users of e-cigs and 6.2% were former users and 75.5% knew what e-cigarettes were. Regarding the participants beliefs about e-cigarettes, 33% believed that e-cigs do not cause addiction, 32.3% thought that they help quitting smoking and 62.5% thought that they are not as harmful as conventional tobacco smoking.

Conclusion: Although the awareness of e-cigs was high, college students' knowledge about their addiction potential and harmful health effects was inaccurate. This necessitates programs to alert young adults about the hazards of e-cigs use, which could help in reducing the spread of this new nicotine delivery system.

Keywords: E-cigarettes, beliefs, Jordan, College students.

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Introduction

Electronic-cigarettes (E-cigs) or electronic nicotine delivery systems were introduced into the international market a decade ago as an alternative to conventional tobacco smoking, and advertised as a safer alternative to tobacco. E-cigs were designed to deliver aerosolized nicotine into the lung without burning tobacco.

E-cig liquids (e-liquids) contain nicotine in a glycerol/propylene glycol vehicle with flavorings, which are vaporized and inhaled using a battery-powered device.¹⁻²

Since there is no burning of tobacco, E-cigs manufacturers' claim that their products are relatively safe compared with tobacco, and help in quitting tobacco smoking. However, there is

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increasing evidence on the harmful effect of E-cigs on health either from nicotine itself or from the different additives and flavorings in the e-liquid used to deliver nicotine in E-cigs.³⁻⁴ In addition, studies have shown that using E-cigs did not help in quitting smoking,⁵ and there is lack of data concerning the safety and efficacy of E-cigs as a smoking cessation therapy.⁶

E-cigs use is rapidly growing between adolescent and young adults worldwide.⁷⁻⁸ Many of E-cigs users are under the impression that E-cigs do not lead to nicotine addiction and they help in quitting tobacco smoking. However, it has been shown that early exposure to nicotine enhances sensitivity to the rewarding effects of nicotine in adulthood⁹ which implies that using E-cigs may actually increase the chance of tobacco addiction rather than helping in quitting tobacco smoking.

This study emphasizes on E-cigs use and beliefs between college students in Jordan which has not been studied before, although E-cigs market is rapidly growing. Understanding the beliefs of young adults about E-cigs help in formulating public strategies to increase the awareness about the harmful effect of E-cigs between this group.

Methods

This cross-sectional study was conducted in June 2017 at Hashemite University (HU) in the Hashemite Kingdom of Jordan. In this study, we used simple random sampling method to select a total of 320 enrolled students from different specialties at HU. Each student was asked to fill a validated questionnaire delivered by hand. The first question asked the students about their willingness to participate and insured that there was no any consequences of accepting or declining to participate. The response rate was 100%. The

questionnaire was written in Arabic language, the mother language for most HU students, to decrease the chance of misunderstanding the questions.

Based on literature review on knowledge, attitude and practice of E-cigs in several countries, the questionnaire in this study was constructed on its first draft. Then, the draft was discussed among experts from HU as part of the ethical approval process and all comments were addressed in the final version of the questionnaire.

The questionnaire was self-reported by the participants. It was divided into two parts; the first part comprises the sociodemographic data which include gender, age and student's specialty. The second part comprised 10 questions related to (1) participants' smoking habit, which included asking questions about current smokers (participants who smoked cigarettes at the moment of the study), former smokers (participants who have smoked cigarettes in the past), current vapers (participants who smoked E-cigs at the time of the study) and former vapers (participants who have smoked E-cigs in the past) and (2) participants knowledge and beliefs about E-cigs which included their awareness of the presence of this smoking technique (have you ever heard about E-cigs) and their beliefs about the addiction potential of E-cigs (Do you believe that E-cigs cause addiction), their beliefs about the use of E-cigs as smoking cessation aid (Do you believe that E-cigs help quitting smoking, do you believe that E-cigs are better than nicotine gums for quitting smoking) and the participants beliefs about the harmful consequences of using E-cigs (Do you think that E-cigs cause any health problems, Do you think that E-cigs are as harmful as tobacco smoking).

Data were analyzed using statistical package for social science (SPSS) version 20. The descriptive analysis for continuous variables was done using mean and standard deviation (SD), and for qualitative variables using the percentage. Wherever there was a missing data, the valid percentages were calculated after the missing values were ignored. Bivariate analyses were done using Pearson Chi-square test. A P-value of less than 0.05 was considered statistically significant.

This study was approved by the IRB board at HU. Informed consents were obtained from all individual participants included in the study. They were assured that the study was for research purposes only and any data they provided would be kept confidential.

Results

Of the 320 participants in this study, the average age was 20.43 year-old (SD 1.69). There were proportionally more females in our sample, which is similar to the overall undergraduate population in Jordan.¹⁰ Regarding students' fields of study, about 57% of the participants were from literacy and humanitarian specialty, and the rest from either engineering or other scientific specialties. Descriptive data analysis for the participants' sociodemographic data is shown in Table 1.

Current and previous conventional and electronic smoking habits were analyzed. 8.8% of participants were current smokers; while 3.4% were previous smokers (current smokers' answers to the question related to previous smoking habit were excluded). Regarding e-smoking habit, 2.2% of the participants were current E-cigs users (current vapers), while 6.2% were previous E-cigs users (previous vapers), results are presented in Table 2. Conventional smoking and e-smoking habits were analyzed between participants' different

specialties as this variable may affect students' knowledge about E-cigs. As shown in Table 3, students from engineering specialty were significantly higher current smokers (20.1%), previous smokers (15.8%) and previous vapers (29.9%) than students from other specialties.

One of the aims of this study was to explore the knowledge and beliefs of college students about E-cigs. Table 4 summarizes participants' answers about specific questions related to E-cigs. High percentage (74.7%) were aware and have heard about E-cigs although E-cigs were banned in Jordan at the time of the study.¹¹ About one-third of participants believed that E-cigs do not cause addiction (33.0%) and almost a similar percentage (32.3%) believed that E-cigs help quitting conventional tobacco smoking. When participants were asked about their beliefs regarding the effectiveness of E-cigs as smoking cessation aid compared to nicotine gums, an FDA-approved method for smoking cessation,¹² less than one third (27.5%) of participants believed that E-cigs were better than nicotine gums for quitting smoking. Regarding participants' beliefs about the harmful effect of E-cigs, 74.3% of the participants believed that E-cigs cause health problems, but only 37.7% believed that they were as toxic as regular tobacco smoking.

Participants' awareness and beliefs about E-cigs were related to their field of study; there is no significant difference in students' beliefs about E-cigs, their addiction risk or their harmful effect among different specialties. The only significant difference was related to the effectiveness of E-cigs as smoking cessation aid. The data is shown in Table 5.

Discussion

This study showed the beliefs and use of college students of E-cigs. College students

represent a major sector of young adults in Jordan and at the time of the study, E-cigs were banned in Jordan.¹¹ When participants in this study were asked about their beliefs regarding addiction potential from E-cigs, one-third of them believed that E-cigs addiction risk is less than conventional tobacco. E-cigs provides a dose of inhaled nicotine; scientific studies have shown that early exposure to nicotine, not only causes addiction but also increases the chance for nicotine addiction^{9,13} because early exposure to nicotine during adolescence enhances sensitivity to the rewarding effect of nicotine in the brain. This necessitates the need for increasing the awareness about potential addiction liability of E-cigs to prevent its spread between young adults.

E-cigs deliver nicotine to the body by battery-powered device that heat the e-liquid.¹ E-liquids contain diverse nicotine concentrations in different E-cigs products, in addition to other additives and flavorings.¹⁴⁻¹⁵ The amount of nicotine delivered to the body depends on the amount of e-liquid consumed, and the E-cigs user habit of smoking; i.e. number of puffs and the average puff duration.¹⁶ Hence, nicotine could be delivered in a level comparable to conventional tobacco smoking or even higher,¹⁷⁻²¹ and to date, there is insufficient evidence regarding the efficacy of E-cigs as smoking cessation aid.^{6,22} However, E-cigs are frequently advertised as an alternative to cigarettes and/or as a smoking cessation method. This claim was believed by around one third of college students participated in this study which is comparable to what was measured in other countries.^{8,23} Around one-half of this group believed that E-cigs are even better than nicotine gum; an FDA-approved technique that is available as

nonprescription method for quitting smoking since 1996,¹² for quitting smoking. Notably, it was found that young adults who believed that E-cigs were less harmful than conventional cigarettes and they can help in quitting tobacco were more likely reported using them.²⁴ In this study, students' beliefs about E-cigs were not related to their specialties which implies that their knowledge about E-cigs is independent on their college studies and do not rise from formal sources of information. It may rely on other informal sources such as web sources or social networking platforms. This raises the concern of increasing E-cigs use between college students with the pre-assumption that they are better substitute to conventional tobacco.

Moreover, the safety concern of E-cigs is under enormous debate. In one side, some studies showed that they were less harmful than conventional smoking due to the lack of many of the toxic compounds produced from burning tobacco.²⁵ On the other side, researchers believe that E-cigs carry a new risk on health due to the production of certain chemicals from burning the additives and flavorings presented in e-liquid especially on long-term exposure.⁴ To date, there is no clinical studies to demonstrate this hazard, but there are several studies done on different cell lines that showed the toxic effects of e-liquid on human keratinocytes and human lung epithelial cells.²⁶⁻²⁸ Absolutely, E-cigs cannot be considered harmless.

Finally, the prevalence rate of E-cigs use was measured in different countries around the world.^{5,7,29-30} The percentage of E-cigs users presented in this study concur to the reported prevalence rate reported in other studies.²⁹⁻³⁰. However, in this study the sample size is insufficient to reflect the prevalence rate.

Moreover, studies varies regarding the target population, this study was targeted to college students while others were national surveys for all age groups.

Conclusion

E-cigs use was not common between college students in Jordan. However, the awareness was high, and college students' beliefs about E-cigs could affect their decision for trying them. Hence, increasing the perception about the adverse health effects of E-cigs is needed to prevent advertising this new nicotine delivery system as a safer

alternative to tobacco smoking or even as smoking cessation aid and, thus, prevent its spread among young adults.

Limitations

This study is restricted to college students. Expanding the research to include also non-college young adults will help in identifying the best strategies to limit the use and correct the beliefs about E-cigs.

Disclosure

The author declares no conflicts of interest and there has been no sponsorship or funding arrangements relating to this research

Table 1: Sociodemographic profile of the study participants.

Characteristic	Number of respondents (Percentage %)
Gender	
Male	54 (17)
Female	263 (83)
Specialty	
Scientific	109 (35.3)
Literary and humanitarian	176 (57)
Engineering	24 (7.8)

Table 2: Current and previous tobacco smoking and e-smoking habits.

Question	Number of respondents (Percentage %)
Are you a current smoker?	
Yes	28 (8.8)
No	291 (91.2)
Are you a previous smoker?	
Yes	10 (3.4)
No	282 (96.9)
Are you a current E-cigs user?	
Yes	7 (2.2)
No	308 (97.8)
Are you a previous E-cigs user?	
Yes	19 (6.2)
No	289 (93.8)

Table 3: Percentages of current and previous smoking and e-smoking users among participants' specialties.

	Specialty			P-value
	Scientific	Literary and humanitarian	Engineering	
Are you a current smoker?				
Yes (% within specialty)	3 (2.8%)	18 (10.3%)	5 (20.8%)	0.006*
Are you a previous smoker?				
Yes (% within specialty)	2 (1.9%)	4 (2.5%)	3 (15.8%)	0.005*
Are you a current E-cigs user?				
Yes (% within specialty)	0 (0.0%)	6 (3.5%)	1 (4.2%)	0.137
Are you a previous E-cigs user?				
Yes (% within specialty)	4 (3.8%)	10 (5.8%)	7 (29.9%)	0.000*

*P-value is < 0.05

Table 4: Knowledge and beliefs of participants about E-cigs.

Question	Number of respondents (Percentage %)
Have you ever heard about E-cigs?	
Yes	241 (75.5%)
No	78 (24.5%)
Do you believe that E-cigs cause addiction?	
Yes	202 (66%)
No	103 (33%)
Do you believe that E-cigs help quitting smoking?	
Yes	98 (32.3%)
No	205 (67.7%)
Do you believe that E-cigs are better than nicotine gums for quitting smoking?	
Yes	80 (27.5%)
No	211 (72.5%)
Do you think that E-cigs cause any health problems?	
Yes	226 (74.3%)
No	78 (25.7%)
Do you think that E-cigs are as harmful as tobacco smoking?	
Yes	115 (37.7%)
No	190 (62.5%)

Table 5: Students beliefs about E-cigs among different specialties.

	Specialty			P-value
	Scientific	Literary and humanitarian	Engineering	
Have you ever heard about E-cigs?				
Yes (% within specialty)	83 (76.1%)	127 (72.6%)	20 (83.3%)	0.476
Do you believe that E-cigs cause addiction?				
Yes (% within specialty)	67 (66.3%)	119 (69.6%)	11 (47.8%)	0.114
Do you believe that E-cigs help quitting smoking?				
Yes (% within specialty)	38 (37.3%)	45 (26.8%)	12 (52.2%)	0.022*
Do you believe that E-cigs are better than nicotine gums for quitting smoking?				
Yes (% within specialty)	34 (35.8%)	37 (22.7%)	7 (31.8%)	0.071
Do you think that E-cigs cause any health problems?				
Yes (% within specialty)	75 (73.5%)	126 (74.6%)	17 (77.3%)	0.933
Do you think that E-cigs are as harmful as tobacco smoking?				
Yes (% within specialty)	35 (34.0%)	70 (41.7%)	5 (21.7%)	0.121

*P-value is < 0.05

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الاستخدام والمعتقدات حول السيجار الإلكتروني بين طلبة الجامعات في الاردن

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الملخص

أهداف الدراسة: استخدام السيجار الإلكتروني في تزايد مستمر بين اليافعين وذلك لظنهم أنه غير ضار ويساعد في الاقلاع عن التدخين. الدراسات عن استخدام ومعتقدات اليافعين في الاردن عن السيجار الإلكتروني قليلة، فكان الهدف من هذه الدراسة هو معرفة مدى استخدام السيجار الإلكتروني بين طلاب الجامعات في الاردن ومدى معرفتهم ومعتقداتهم عنه.

منهجية البحث: تم استخدام منهجية البحث المقطعي لاجراء هذه الدراسة في الأردن في العام 2017، حيث تم توزيع استبيان بشكل عشوائي لطلبة في الجامعة الهاشمية وجمع معلوماتهم الديموغرافية، استخدامهم الحالي و السابق للدخان، ومدى معرفتهم ومعتقداتهم عن السيجار الإلكتروني.

نتائج البحث: أظهرت هذه الدراسة الى أن 2.2% من المشاركين كانوا مستخدمين للسيجار الإلكتروني و 6.2% كانوا قد استخدموه سابقا ولم يستمروا على استخدامه و أن 75.5% يعلمون بوجود هذا النوع من السيجار. بما يخص معتقدات المشاركين في الدراسة عن السيجار الإلكتروني، فإن 33% منهم يعتقدون أن السيجار الإلكتروني لا يسبب الإدمان و 32.3% يعتقدون أنه يساعد في الاقلاع عن التدخين بينما يعتقد 62.5% أنه ليس ضارا كالتدخين التقليدي.

الاستنتاجات: على الرغم من معرفة طلبة الجامعة عن السيجار الإلكتروني، إلا أن معتقداتهم عن احتمالية الإدمان وآثاره الضارة غير دقيقة. نشر الوعي بين اليافعين عن مزار استخدام السيجار الإلكتروني قد يساعد بعدم انتشاره بينهم.

الكلمات الدالة: السيجار الإلكتروني، معتقدات، الاردن، طلبة الجامعات.