



Case Report

E - CIGARETTE: KNOWLEDGE, ATTITUDE AND PRACTICE AMONG THE STUDENTS AND STAFF OF
KING SAUD BIN ABDULAZIZ UNIVERSITY FOR HEALTH SCIENCES, SAUDI ARABIA

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ABSTRACT

Background: E-cigarettes designed to vaporize a liquid solution of propylene glycol and/or vegetable glycerin in which nicotine or other aromas may be dissolved is a pharmacologically active biomolecule that is known to cause addiction. Despite the country's efforts to combat use, electronic cigarettes are still gaining popularity in the community, especially among college students, which makes it necessary to conduct studies to assess the prevalence of this phenomenon in the Saudi community, and to assess the awareness, attitude and practice towards the dangers of those devices, particularly after the latest health concerns raised by the CDC. The present study was conducted to assess the awareness, knowledge and practice of e-cigarettes among the teaching and non-teaching members of King Saud Bin AbdulAziz University for health sciences across the three regions of Saudi Arabia i.e. Al Ahsa, Riyadh and Jeddah.

Material and Methods: It was a cross sectional study. All the students, teaching and non-teaching staff of KSAU-HS across the three campuses Al Ahsa, Jeddah and Riyadh were the inclusion criteria of the study. The calculated sample size was found to be 377. Stratified random sampling technique was used to select participants. The data were collected using a self-administered pretested and validated questionnaire which was distributed online through Google Form. The data were entered and analyzed by using the SPSS, version 21. Descriptive statistics were presented using counts, proportions (%), mean \pm standard deviation whenever appropriate. The comparison of the knowledge, attitude towards e-cigarettes between demographic characteristics was performed by using chi square test. A p-value cut off point of 0.05 at 95% CI was used to determine statistical significance.

Results: A total of 377 subjects participated in this study. The mean age of the participants was 28.81 years \pm 9.28 Std. Dev. More than 60% (N=229) of the participants were male. The mean knowledge score on e-cigarette smoking among the participants who were aware of e-cigarettes was 2.87 \pm 0.93 Std. Dev. Two thirds of them (75.1%) had poor knowledge about the content, use, health hazards, addiction and means of regular smoking cessation of e-cigarettes. Good knowledge about e-cigarette was significantly more among the male than the female (P=0.001), urban participants than the rural ones (P=0.002) and among the e-cigarettes user (P=0.000). The mean attitude score of the participants was 3.25 \pm 0.90 Std. Dev. Out of the total participants who were aware of e-cigarettes, majority of them (56.2%) had poor attitude towards e-cigarette smoking. The positive attitude towards e-cigarette was maximum among those who were conventional smoker (P=0.018). More than fifty one percent had tried e-cigarettes or vaping device. Thirty three percent of the participants considered it a good way to quit or cut down on smoking, 30.6% considered it cheaper than the traditional while 30.1% considered it less harmful than the traditional cigarettes and 20.2% used it by their own desire. Twelve percent used e-cigarettes because they thought that it can be used in places where smoking is prohibited and only 7.1% used it with the aim of quitting smoking.

Conclusion: The present study has shown a poor knowledge of e-cigarette among the students and faculty members of KSAU-HS across the three campuses. Majority of participants in this study also had poor attitude towards e-cigarette. As far as practice towards e-cigarette smoking is concerned majority of them practiced smoking e-cigarette and considered it as a good way to quit or cut down on smoking. It is recommended to conduct an educational and counseling programme to increase more awareness towards e-cigarette smoking, its harm of use specially to enhance their positive attitude towards e-cigarette smoking.

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INTRODUCTION

Electronic cigarettes, also known as electronic nicotine delivery systems (ENDS) are battery-operated devices designed to vaporize a liquid solution of propylene glycol and/or vegetable glycerin in which nicotine or other aromas may be dissolved.^[1] The first e-cigarette was invented by

Herbert A Gilbert in 1963, but the commercial design was patented by Hon Lik of China.^[1,2] E-cigarettes entered the US market in 2007, and were promoted as safer alternative to conventional cigarettes for current smokers, as they vaporize a heated fluid instead of burning tobacco, nonetheless they gained tremendous popularity among the youth.^[3] Nicotine, which is the main constituent in e-cigarettes is a

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pharmacologically active biomolecule that is known to cause addiction, and affect brain functions.^[4] It is also known to have harmful consequences on the growing fetus if exposed to it during pregnancy.^[5,6] In addition to nicotine, propylene glycol, and glycerin, e-cigarette liquids and aerosols contain other chemical constituents that may have adverse health effects, like polycyclic aromatic hydrocarbons, nitrosamines, volatile organic chemicals, and inorganic chemicals such as toxic heavy metals.^[7,8] Endotoxins and flavoring compounds such as diacetyl and 2,3-pentanedione were also detected.^[9] Moreover, e-cigarette is sometimes used to deliver a variety of recreational drugs, like tetrahydrocannabinol (THC)-based oils.^[10]

Adverse effects of e-cigarettes vapor and liquid were studied on primary airways epithelial cells and tumor cell lines. Results show reduced viability of cells, increased production of inflammatory mediators, increased oxidative stress, and even increased susceptibility to viral infections like rhinovirus.^[11]

Recently, the CDC announced the outbreak of a serious lung injury associated with the use of e-cigarettes. As of September 24, 2019, the number of cases reached 805 in the United States only, with 12 deaths confirmed (CDC, 2019).^[12] Cases were reported from various states, including Illinois, Wisconsin, Utah as well as North Carolina.^[13-15]

Electronic cigarettes are also becoming popular in Saudi Arabia, especially among college students. For example, a study conducted across universities in Jeddah revealed that the majority of students who practiced smoking were actually using electronic cigarettes, less than half of those were using electronic cigarettes as tools for smoke cessation.^[16] Another study was conducted among medical students in Qassim university.^[17] The aim of the study was to assess the knowledge, perception and prevalence towards e-cigarettes. Results confirmed that 10% of medical students used e-cigarettes, but they lacked necessary knowledge about the devices.^[17] The Saudi anti-smoking law became effective in 2016 that bans all forms of tobacco use in public areas (including e-cigarettes). Despite the country's efforts to combat use, electronic cigarettes are still gaining popularity in the community, especially among college students, which makes it necessary to conduct more studies to assess the prevalence of this phenomenon in the Saudi community, and to assess the awareness, attitude and practice towards the dangers of those devices, particularly after the latest health concerns raised by the CDC.^[16-18] Similar study has been conducted recently on the male nursing students of King Saud Bin Abdul Aziz University of health sciences but this study did not include the female students. However the present study will include all the students (male and female) and faculty staffs which will help us in comparative study.^[19] The present study aims at investigating the awareness, knowledge and practice of e-cigarettes among the teaching and non-teaching members of King Saud Bin AbdulAziz university for health sciences across the three regions of Saudi Arabia i.e. Al Ahsa, Riyadh and Jeddah.

MATERIALS AND METHODS

It was a quantitative cross sectional study. All the students, teaching and non-teaching staff of KSAU-HS across the three campuses AlAhsa, Jeddah and Riyadh were the inclusion criteria of the study irrespective of their nationality, gender

age or ailments. Participants other than the students and employees of KSAU-HS across the three campuses AlAhsa, Jeddah and Riyadh were not included in the study. The sample size was derived by computing the minimum sample size required for accuracy in estimating proportions by considering the standard normal deviation set at 95% confidence level (1.96), percentage picking a choice or response (50% = 0.5) and the confidence interval (0.05 = ±5). The formula $n = z^2 \frac{p(1-p)}{c^2}$ was applied where z = standard normal deviation set at 95% confidence level, p = percentage picking a choice or response = confidence interval. The calculated sample size was found to be 377. To achieve the required sample size, stratified random sampling technique was used to select participants from King Saud Bin Abdulaziz University for Health Science across the three campuses AlAhsa, Jeddah and Riyadh.

The data were collected using a self-administered bilingual questionnaire Arabic /English (A modified validated questionnaire) which was distributed online through Google Form. Consent from the participants was taken online. The questionnaire comprised of four sections. The **first section** of the questionnaire included information on demographics characteristics such as - age, gender, specialty, socioeconomic status and marital status, the **second part** consisted of set of 5 questions regarding assessment of knowledge about e-cigarette while the **third section** contained the 5 questions related to attitude towards e-cigarette usage and the **fourth section** regarding the participants practice towards e-cigarette usage. However a pilot study on 10 subjects was done before starting the study to validate the reliability of the questionnaire. The pilot survey was administered giving more emphasis on internal consistency reliability and the construct validity. A reliability test (Cronbach's alpha) was utilized to measure the internal consistency of the items. The item analysis with Cronbach's alpha was carried out via SPSS for the same respondents in the pilot study to identify problematic items.

There were 5 questions each on knowledge and attitude sections. Correct answer was awarded with 1 score while incorrect with zero score. In the both sections score ranged from 0 to 5, the higher the score the higher the knowledge and positive attitude. By using the mean as a cutoff point, the level of knowledge and attitude were measured. The participants were classified as having poor knowledge and good knowledge on the score range of 0 to 5 points. A good knowledge score range was between 3 to 5 points while lower than 3 was considered as poor knowledge. Similarly the participants were classified as having negative attitude and positive attitude the score range of 0 to 5 points. A positive attitude was between 3-5 points while lower than 3 were considered as negative attitude. For the convenience of interpretation neutral answer was considered as disagree. The data were entered and analyzed by using the SPSS, version 21. Descriptive statistics were presented using counts, proportions (%), mean ± standard deviation whenever appropriate. The comparison of the knowledge, attitude towards e cigarettes between demographic characteristics was performed by using chi square test. A p-value cut off point of 0.05 at 95% CI was used to determine statistical significance. Permission was obtained from the research committee of UPPPA-F, University Research Board and the Dean of COSHP prior to the start of study.

RESULTS

A total of 377 subjects participated in this study making the response rate of 100%. The mean age of the participants was

28.81 years \pm 9.28 Std. Dev. (Range 17-63 years). More than 60% (N=229) of the participants were male. The vast majority of the participants (80.2%) were Saudi. Majority of the participants (64.4%) were unmarried while more than thirty three percent (33.2%) were married and 2.4% (N=9) were separated. More than eighty one percent of the participants (81.2%, N=306) were from urban background. Majority of the participants were from Riyadh campus (N=207, 54.9%) followed by Al Ahsa campus (N=75, 19.9%) and Jeddah campus (N=94, 24.9%). The students (50.4%) and the faculty members (49.6%) were almost equally distributed. As far as the status of smoking is concerned, more than sixty eight percent of the participants (68.3%) were nonsmoker while twenty percent (N=77) were using e-cigarette, almost six percent (N=21) were smoker with conventional cigarettes and 7.7 % (N=29) were using both methods of smoking. More than eighty eight percent (N=333) of the participants heard about the e-cigarettes. When asked about the source of information of e-cigarettes, 61.90 % (N=208) of the participants mentioned family and friends while 26.78 % (N=90) mentioned TV and internet and 9.52 % (N=32) of the participants answered print media as the main source of information. Less than 1 % (0.89%) of the participants mentioned journal as the main source of information. The details of the socio demographic characteristics are shown in table 1.

Table 1 Showing the demographic characteristics of the participants

Variables	Number	Percentage
Age		
28.81 years \pm 9.28 Std. dev. (Range 17-63)		
Gender		
Male	229	60
Female	148	40
Nationality		
Saudi	302	80.2
Non saudi	75	19.8
Background		
Rural	71	18.8
Urban	306	81.2
Marital status		
Unmarried	142	33.2
Married	125	64.4
Divorced	9	2.4
Campus		
Riyadh Campus	207	55.1
Jeddah Campus	94	25.0
Al Ahsa campus	75	19.9
Position		
Student	190	50.4
Faculty member	187	49.6
Educational qualification		
Status of smoking		
Non smoker	250	66.5
E-cigarettes smoker	77	20.5
Conventional cigarettes smoker	29	7.7
Both conventional and e-cigarettes smoker	22	5.6
Did you hear about e-cigarettes?		
Yes	333	88.3
No	44	11.7
If yes		
Then what was the source of information?		
Family and friends	205	54.3
TV and internet	90	23.9
Print media	31	8.2
Journal	3	0.8

Responses on the knowledge questionnaires

Almost seventy four percent of the participants (N=246) correctly answered that e- cigarettes contain nicotine. More than ten percent of the participants (N=35) did not know the

answer. When asked as how would they compare the health and safety of e-cigar to tobacco cigar, more than thirty two percent (N=121) of the participants claimed no real difference between them and 46.2% (N=174) of the participants were of the view that e-cigarettes are safer and less harmful to use than tobacco. However almost eleven percent of the participants (N=41) were of the opinion that e-cigarettes are more harmful and unsafe to use than tobacco cigarettes. More than half of the participants (56%) agreed with the statement that e-cigarettes cause addiction same like normal cigarettes while 28.6% did not know about this and more than fifteen percent (15.4%) of the participants disagreed with this statement. Similarly more than fifty three percent (N=202) of the participants answered that e-cigarettes are safer to smoke than regular cigarette while twenty five percent of them (N=94) did not agree with this and 21.5% did not know about this. With reference to the statement that e-cigarettes are a helpful aid for smoking cessation, almost fifty percent (N=186) of the participants answered ‘yes’ while 28.9% of the participants answered ‘No’. The details of the responses on the knowledge questionnaires are shown in table 2.

Table 2 Showing the details of the responses on the knowledge questionnaires

Knowledge questions	Number	Percentage
Does the e-cigarettes contain nicotine (N=333)		
Yes	246	73.87
No	52	15.62
I don't know	35	10.51
How would you compare the health and safety of e- cigar to tobacco cigar, please tick the appropriate answer (N=333)		
1. There is no real difference between them.	121	36.34
2. E-cigarettes are safer and less harmful to use than tobacco cigarettes	174	52.25
3. E-cigarettes are more harmful and unsafe to use than tobacco cigarettes	38	11.41
Does the e-cigarette cause addiction same as normal cigarette?		
Yes	211	56.0
No	58	15.4
I don't know	108	28.6
E-cigarettes are safer to smoke than regular cigarette	202	53.5
Yes	94	24.9
No	81	21.5
I don't know		
E-cigarettes are a helpful aid for smoking cessation		
Yes	186	49.3
No	109	28.9
I don't know	82	21.8

Responses on the attitude questions

More than seventy six percent (N=287) of the participants either strongly agreed or agreed with the statement that e-cigarette use is a public health concern while the rest did not agree with this statement. Regarding the statement that e-cigarette may be a gateway to conventional use, three fourth of the participants (74.5%) agreed or strongly agreed with this statement. More than seventy eight percent of the participants (78.5%) either strongly agreed or agreed with the statement that e-cigarette should be regulated like other tobacco products while the rest disagreed. On the attitude of recommending e-cigarettes to quit or cut down the use of regular cigarettes, a vast majority of the participants (82.2%) either agreed or strongly agreed. With reference to the statement that e-cigarette is good because it does not cause side effects, almost eighty two percent (N=272) of the participants agreed. The

detail on the responses on the attitude questions is shown in table 3.

Table 3 Showing responses on attitude questions

Questions on Attitude	S.A	A	N	D	S.D
E-cigarette use is a Public health concern	125(37.54)	118(35.44)	0	70(21.02)	20(6.0)
E-cigarette may be a gateway to conventional use	109(32.73)	128(38.44)	0	70(21.02)	26(7.81)
E-cigarette should be regulated like other tobacco products	163(48.95)	89(26.73)	0	47(14.11)	34(10.21)
Would you recommend e-cigarettes as a good way to quit or cut down on use?	192(57.66)	82(24.62)	0	59(17.72)	0
E-cigarette is good because it does not cause side effects	160(48.05)	112(33.63)	5(1.50)	54(16.22)	2(0.60)

Abbreviation : SA- Strongly Agree , A- Agree , N- Neutral , D- Disagree , SD – strongly disagree

Responses on the practice questions

As far as the practice of e-cigarettes smoking is concerned, more than fifty one percent (51.5%) accepted that they have tried e-cigarettes or vaping device. Thirty three percent of the participants (N=126) were of the opinion that they will recommend e-cigarettes as a good way to quit or cut down on smoking while 15.6% (N=59) did not recommend this as a good way of quitting smoking. When asked about the reasons behind using e- cigarettes 30.6 % (N=56) of the participants mentioned that e-cigarettes are cheaper than the traditional followed by 30.1% (N=55) who considered it less harmful than the traditional cigarettes and 20.2 % (N=37) of the participants used it by their own desire. Twelve percent (N=22) of the participants used e-cigarettes because they thought that it can be used in places where smoking is prohibited and only 7.1 % (N=13) used it with the aim of quitting smoking. The details of the response on practice towards e-cigarette are shown in table 4.

Table 4 Showing the response on the practice questions on e-cigarette smoking

Questions on practice	Number	%
Have you ever tried an e-cigarette or vaping device		
Yes	183	48.54
No	194	51.46
How long have you used an e-cigar? (N=183)		
Less than 6 months	51	27.87
Between 6 to 12 months	31	16.94
Between 1 to 2 years	43	23.50
>2 years	58	31.69
How often do you use e cigarette or vape?		
Daily	133	72.68
Weekly	31	16.94
Monthly	19	10.38
What attracts you to the idea of smoking an e-cigarette?(N=183)		
Cheaper than smoking cigarettes		
own desire	56	30.60
Considered less harmful to your health than cigarettes	35	19.13
cigarettes	55	30.05
Aim to quit smoking	15	8.20
Can use e-cigarettes in places where smoking is prohibited	22	12.02

Knowledge score

The mean knowledge score on e-cigarette smoking among the participants who were aware of e-cigarettes was 2.87 ±0.93 Std. Dev. (Range : 1-5). Two thirds of them (75.1%, N= 250) had poor knowledge about the content ,use, health hazards ,addiction and means of regular smoking cessation of e-cigarettes. Good knowledge about e-cigarette was significantly more among the male than the female (31.25% vs. 14.4%, P=0.001). The prevalence of good knowledge on e-cigarette was higher among the Saudi participant than the non-Saudi participant but it was statistically significant (25.81% vs. 14.81%, P=0.150).

Similarly the good knowledge about e-cigarette was apparently more among the Jeddah campus participants (27.05)% followed by Al Ahsa Campus(25.0%) and Riyadh campus (23.37%) but it was not statistically significant (P=0.318). The good knowledge of e-cigarettes was also more among the unmarried (27.85%) than the separated (25%) and married participants (18.86%) but it was also not statistically significant.(P=0.210). The good knowledge of e-cigarettes was significantly more among urban participants than the rural ones (26.59% vs. 18.18%, P=002). As compared to faculty members the good knowledge of e-cigarettes among students was more than the faculty members but it was also not significant (26.58% vs. 23.15%, P=0.73). As expected, the good knowledge of e-cigarette among e-cigarettes smoker was significantly higher than those who were nonsmoker, both e-cigarette and conventional smoker and those who were conventional smoker (43.05 vs. 18.22% vs. 37.93 vs. 11.76%, P=0.000). The details of the knowledge score and its association with socio demographic variables is shown in table 5.

Table 5 Showing the details of the knowledge score and its association with demographic characteristics

Knowledge score	Poor knowledge	Good knowledge	P value
Mean knowledge 2.87 ± .93			
Std. dev. (Range : 1-5).			
Gender			
Male	143(68.75)	65(31.25)	0.001
Female	107(85.6)	18(14.4)	
Nationality			
Saudi	227(74.19)	79(25.81)	0.150
Non saudi	23(85.19)	4(14.81)	
Background			
Rural	54(81.82)	12(18.18)	0.002
Urban	196(73.41)	71(26.59)	
Marital status			
Unmarried	158(72.15)	61(27.85)	0.210
Married	86(81.14)	20(18.86)	
Divorced	6(75.0)	2(25.0)	
Campus			
Riyadh Campus	141(76.63)	43(23.37)	0.318
Jeddah Campus	62(72.95)	23(27.05)	
Al Ahsa campus	48(73.84)	17(26.16)	
Position			
Student	127(73.42)	46 (26.58)	
Faculty member	1239(76.85)	37 (23.15)	
Status of smoking			
Non smoker			
E-cigarettes smoker	175(81.78)	39(18.22)	0.000
Conventional cigarettes smoker	41(56.95)	31(43.05)	
Both conventional and e-cigarettes smoker	18(62.07)	11(37.93)	
Both conventional and e-cigarettes smoker	15(88.24)	2(11.76)	

Attitude score

The mean attitude score of the participants was 3.25±0.90 Std.Dev. (Range 0-5). Out of the total participants who were aware of e-cigarettes, majority of them (56.2%) had poor

attitude towards e-cigarette smoking. There was no significant difference in the attitude score demographically except those with different smoking habit. The positive attitude towards e-cigarette was maximum among those who were conventional smoker (61.11) than those who were e-cigarette smoker (56%), Nonsmoker(37.10) and those who were smoking both e-cigarette and conventional cigarettes(37.93%) , $P=0.018$. The details of the attitude score and its association with the demographic characteristics is shown in table 6.

Table 6 Showing the attitude score and its association with different demographic characteristics.

Attitude score	Negative Attitude No.(%)	Positive attitude No.(%)	P value
The mean attitude score = 3.25±0.90 Std.Dev. (Range 0-5)	187(56.2)	146(43.8)	
Gender			
Male	119(56.67)	91(43.33)	0.447
Female	68(54.92)	55(45.08)	
Nationality			
Saudi	171(56.63)	131(43.38)	0.363
Non saudi	16(51.61)	15(48.39)	
Background			
Rural	36(56.25)	28(43.75)	0.550
Urban	151(56.13)	118(43.87)	
Marital status			
Unmarried	123(56.68)	94(43.32)	0.324
Married	62(57.41)	46(42.59)	
Divorced	2(28.57)	5(71.43)	
Campus			
Riyadh Campus	112(60.54)	73(39.46)	0.215
Jeddah Campus	46(53.49)	40(46.51)	
Al Ahsa campus	29(48.33)	32(51.67)	
Position			
Student	94(55.29)	76(44.71)	0.416
Faculty member	93(57.06)	70(42.94)	
Status of smoking			
Non smoker	129(61.14)	82(38.86)	0.018
e-cigarettes smoker	33(44.0)	42(56.0)	
Conventional cigarettes smoker	18(62.07)	11(37.93)	
Both conventional and e-cigarettes smoker	6(35.29)	11(64.71)	

DISCUSSION

Two thirds of the participants in our study had poor knowledge about the content, use, health hazards, addiction and means of regular smoking cessation of e-cigarettes. Poor knowledge about e-cigarettes have also been reported in Chinese study conducted on college students where only 42.6% of the students knew that e-cigarettes contain nicotine and fewer than one third of the students identified e-cigarettes as tobacco product.^[20] In a Croatian study only 9.8% of the study subjects reported fair knowledge about e-cigarettes.^[21] A deficient knowledge about e-cigarettes was also reported in a Thailand study where the average score was 5.9 ± 2.1 from a total score of 12.^[22] This study also indicated that 85.5% of the participants knew that nicotine was the cause of e-cigarettes addiction. In the present study also 56% of the participants agreed that e-cigarette cause addiction similar to normal cigarette since it contains nicotine. Almost fifty percent of the participants in the present study affirmed that e-cigarette could be helpful aid for smoking cessation. In a similar Saudi study on university hospital staffs the researchers have found that 31.1% of its participants suggested e-cigarette as helpful aid for smoking cessation.^[23] In a Lebanese study 63.3% of the participant with mean age of 30.3 years had lower level of e-cigarette. Sixty five percent of the participants in this study falsely thought that it is harmless and not addictive.^[24] In one Saudi study conducted on college students Abdulwahab A *et al*

have found an overall knowledge score of 3.9 out of total 7 score. About half of the participants correctly identified e-cigarettes as not less addictive than cigarettes in this study.^[25] In a Chinese study pooled prevalence of awareness, previous use, current use of e-cigarettes and perceived health status of e-cigarettes than regular cigarettes (healthier perception) among adults were 61.2%, 16.8%, 11.1% and 52.6% respectively.^[26] A Pakistani study has shown that 59% of its participants knew of e-cigarettes and males were more likely to know about e-cigarettes (0.00) with 1.86 times more chances to use it in future.^[27] Nearly all students (94.7%) had heard about e-cigarettes in the Italian study while the present study showed that 88.3% of its participant heard about e-cigarettes.^[28]

Good knowledge about e-cigarette was significantly more among the male than the female. The same result was published in another Saudi study^[25] where the male participants had significantly higher knowledge about e cigarette (Mean score 4.41 vs. 3.57, $P<0.001$). In the present study the e-cigarettes user had significantly higher knowledge than those of conventional cigarette user. However in a Jordan study conventional smokers were independently associated with a better knowledge about e cigarettes (OR=1.496, 95 CI %-1.018-2.197, $p=0.040$).^[29]

As far as the attitude towards e-cigarettes is concerned more than sixty percent of the participants in Thailand study^[22] believed that e-cigarettes were less dangerous to human health than the conventional cigarette and 51.7% were against the opinion that smoking e-cigarettes had a negative effect on human health in the long term. Conversely seventy six percent of the participants in the present study either agreed or strongly agreed with the statement that e-cigarette use is a public health concern. In another Saudi study about two-thirds of the participants believed that e-cigarettes could adversely affect health.^[30] Regarding the attitude towards e-cigarette 60.3% of the participants in Thailand study^[22]

A high percentage the participants (51.6%) in the present study had tried e-cigarette. This is in contrast to a Poland study where only 1.9% of the participants were found smoking e-cigarette.^[31] However in another Saudi study conducted on medical student, the researchers have found that almost thirty percent of the participants were using e-cigarettes and one fourth of them used it to quit tobacco smoking while 20.3% of them found it less costly and 18.9% thought its less harmful.^[30] In the present study also thirty three percent of the participants were of the opinion that they used e-cigarettes as a good way to quit or cut down on smoking and one third of them used it because they thought it's cheaper than the conventional cigarettes. In a large study conducted on the students of eastern and central Europe 43.7% of the participants had used e-cigarette and only 1.1% were in a current e-cigarette smoking status^[32]. In an Italian study 30.3% of the participants had ever used e-cigarettes while only 2.1% of them were regular user of e-cigarettes.^[28] The Jordanian study has reported a high prevalence of e-cigarette smoking among study population (11%). In this study 26.5% and 20.5% of the participants used it for the purpose of smoking cessation and they believed it as less harmful than other tobacco product.

CONCLUSION

The present study has shown a poor knowledge of e-cigarette among the students and faculty members of KSAU-HS across

the three campuses Al Ahsa, Jeddah and Riyadh. Majority of participants in this study also had poor attitude towards e-cigarette. As far as practice towards e-cigarette smoking is concerned majority of them practiced smoking e-cigarette and considered it as a good way to quit or cut down on smoking. It is recommended to conduct an educational and counseling programme to increase more awareness towards e-cigarette smoking, its harm of use specially to enhance their positive attitude towards e-cigarette smoking.

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