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Original Research Article

Factors associated with knowledge, attitude and practice of e-cigarette among adult population in KOSPEN areas of Kuching district, Sarawak, Malaysia

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ABSTRACT

Background: Smoking electronic cigarette is a current world phenomenon, however, the vaping community had ignorant about its health effects. Considering this view, this study was conducted to determine the level of knowledge and attitude toward e-cigarette and factors associated with it.
Methods: This cross-sectional study was conducted among adults in the KOSPEN locality in Kuching district. Six out of the 64 KOSPEN localities had been chosen randomly as study locations. Systematic random sampling with replacement method was used to select the respondent. A total of 354 adults were interviewed by face to face interview using adapted and validated questionnaire. The data entry and analysis were done by IBM SPSS Version 22.0. A $p<0.05$ was considered as statistically significant.
Results: Data revealed that 66% of the respondents admitted that they heard about e-cigarette. Among them 54.3% of the respondent had good knowledge about e-cigarette. However, more than half (52.8%) do not support the use of e-cigarette. Bi-variate analysis revealed that male gender and attitude towards supporting e-cigarette was significantly associated with practice of e-cigarette ($p<0.05$). However, for the conventional practice of smoking, age, gender, marital status, level of education and occupation found to be significantly associated with practice of conventional smoking.
Conclusions: Though the study did not depict the national scenarios of e-smoking and conventional cigarette smoking as well, but the factors identified in this study appeared to be policy options for the programme managers, health administration, and health educators designing the preventive programmes against e-smoking and conventional smoking.

Keywords: Attitude, Conventional smoking, e-Cigarette, Knowledge, Practice, Sarawak

INTRODUCTION

E-cigarette has been marketed since 2003 and it has evolved with the advancement of technology, from the first design mimic the conventional cigarette to the machinery types cigarette.[1] Basically, it consists of a battery as a power supply, a flow sensor, heating chamber (aerosol chamber/coil chamber) and solution called e-liquid.[2] The mechanism of this devices is simple, where the user just needs to puff and then the flow will activate the e-cigarette. Subsequently the coil chamber will heat the solution to produce a vapour.[2] The speciality of e-cigarette is their e-liquid. The e-liquid not only contain nicotine, propylene glycol or glycerol but also has of flavouring agents such as mint, fruits and tobacco itself.[3] Besides that, there are potential substances or material

have been found by United State Food and Drugs Administration (FDA) such as nitrosamines and diethylene glycol inside the e-liquid and the cartridge. Based on the analysis FDA has regulated e-cigarette under the Federal Food Drugs and Cosmetic Act.[4] With the safety of e-cigarette still in doubt, the use of E-cigarette among smokers and non-smokers are increasing in trend. In United States of America (USA), ever-used e-cigarette prevalence among current smoker has been increasing from 9.8% in 2010 to 21.2% in 2011.[5] Meanwhile among non-smoker the prevalence of ever use e-cigarette has increased to 4% in three years.[6] Otherwise in Malaysia, there is an increment of ever used e-cigarette to 18.2% from year 2011 to year 2014.[7,8]

Even though, e-cigarette has become more popular among Malaysian, there is limited data about e-cigarette in Malaysia. Therefore, this study would focus on the prevalence of e-cigarette use among Malaysian and also to assess their knowledge, attitude, practice and factors associated with it among adult population in Kuching district, Sarawak, Malaysia.

METHODS

A cross sectional study was conducted with the aim of determining the factors associated with knowledge, attitude and practice of electronic cigarette among adult population in Kuching districts. The study population for this study was adult population in KOSPEN localities in Kuching district. The KOSPEN program is an initiative that has been triggered by the Ministry of Health (MOH) Malaysia in 2013 to address the problem of the increasing burden of NCDs (Non-Communicable Diseases, NCDs) in the country. There are 64 "Komuniti Sihat, Perkasa Negara" (KOSPEN) community in Kuching district. Ten percent of the KOSPEN locality (six localities) have been selected randomly. From each of these six localities, 59 adult respondents have been selected systematically using a sampling frame provided by local community leader. The sample size of 354 respondents was calculated using a confident interval of 95%, anticipated participant proportion 26% based on Elkalmi et al and further inflated due to non-response of 20%.[9]

Inclusion criteria for this study were age 18 years and above irrespective gender and race, Malaysian citizen and respondents willing to participate in this study.

A face-to-face interview was conducted using structured questionnaire. After obtaining the list of names, the respondent has been selected systematically with replacement method. Once the respondent has been selected, the researcher visited respondent's house. The respondent would be asked regarding willingness to participate in the study. If the respondent were not at home during that time, the researcher would return later. If the respondent refused to participate in the study, interval method was used to find the replacement of respondent with equal intervals. The procedure continues until the required sample size was achieved. The total duration of the study was eleven months started from September 2016. However, data collection was started following approval from ethics committee in the month of January 2017.

The questionnaire was adopted from Phansopkar et al and Rahman et al.[10,11] The questionnaire has been validated by institutional committee. The questionnaire consists of five parts. Part A consisted of nine questions concerning the socio-demographic characteristics which includes age, gender, ethnicity, household income, educational background and family history of smoking. Part B consisted of 10 questions regarding knowledge assessment of e-cigarettes. Each question with correct answer received one point and the accumulative point was a knowledge score assessment. Part C which assessed participant attitude towards e-cigarettes by answering 10 questions. Participant answered the question from "strongly agree" to "strongly disagree" using five scale items. Each items of the questions were based on the Likert's scale, ranging from 0 to 4. For example, e-cigarette can help solved a problem. 0 being "Not sure" and "Not Know", 1" strongly agree", 2 "Agree", 3 "Disagree" and 4 "Strongly Agree". The mean was used to determine either respondent has an attitude "supporting" or "opposing" use of e-cigarette. Part D consisted of six questions regarding current practice of e-cigarette. The first question was about either respondent ever used e-cigarette or not before. If the answered was yes, 0 marks was given for practice and 1 mark was given if the respondent answered no. In this section, we also assessed the reason for using e-cigarette, how respondent obtained an e-cigarette for the first time, at what age a respondent-initiated the use e-cigarette, the reason for containing use of e-cigarette and how frequently they used e-cigarette. Part E was about the practice of conventional cigarette. Respondent has been asked either they were smoking or not. Yes, answered given 0 mark and 1 mark was given for no, preferred not to say, do not know or already quitting smoking.

A pre-test of the questionnaire was done among 30 eligible participants as the minimum sample size has been conducted to test for the reliability of the instrument at local setting. However, they were not included in the actual study. The internal consistency of Cronbach's alpha was 0.7.

Data entry and analysis was done by IBM SPSS version 22.0.[12] All the sections of the questionnaire were given point and total scores were calculated for the level of knowledge, attitudes and practice of e-cigarette. Frequencies and percentage were computed for categorical responses. Chi square test of independence was used to determine the association between sociodemographic factors and knowledge, attitude and practice of e-cigarette.

Ethical approval

The study was approved by the Ethics Committee of Universiti Malaysia Sarawak (Ref. No. UNIMAS/NC-21.02/03-02 JId.2(56), dated 11/01/2017).

RESULTS

The mean age of the respondents was 36.67(16.6) years with minimum 18 years and maximum 90 years. Two thirds were male (69.8%) and the rest were female (30.2%) with a male and female ratio was 2.31:1. The highest percentages of the respondents were Malays (65.5%) followed by Iban (13.6%), Bidayuh (12.7%) and 7.1% were Chinese. Two-thirds of the respondents (66.4%) were Muslim and 28.5% were Christian. Majority of the respondents were married (64.1%) and the rest were single, divorced or separated (35.9%). Secondary level of education represented (69.5%) from total respondents followed by university level education (14.4%), primary education (7.6%). Regarding occupation, 26.3% were unemployed followed by 24% self-employed and 21.5% work in private and another 18.1% work in government sector (Table not shown).

It was found that two-thirds of the respondents (66%) have ever heard of e-cigarette and most of the respondent get information regarding e-cigarette from the shop which displayed e-cigarette. Out of 232 respondents, 45.7% had poor knowledge and the rest had good level of knowledge. More than half of the respondents said yes to 'e-cigarettes are addictive' (69.4%) and also to 'e-cigarettes are potential causes of asthma attacks and allergies' (66.4%). On other hand, 56.9% respondents answered yes to 'e-cigarettes can contain nicotine'. As a negative answer, 65.5% of respondents gave the correct answer on 'e-cigarettes to be used at smoke free place' followed by 'e-cigarettes are not harmful to health' (62.1%) and 'E-cigarettes are less harmful to health than normal cigarettes' (59.1%) (Table 1).

Table 1: Percentage distribution of respondents by item-wise knowledge on e-cigarette (n=232).

Item of questions	Yes	No	Do not know
1. E-cigarettes are addictive	69.4	11.6	19.0
2. E-cigarettes are potential cause of asthma attacks and allergies	66.4	12.1	21.6
3. E-cigarettes can contain nicotine	56.9	7.3	35.8
4. Health risk of e-Cigarette is same as normal cigarette	42.7	32.3	25.0
5. E-cigarettes have same chemicals as the normal cigarettes	33.2	45.3	21.1
6. Are you aware of any regulation by government on e-cigarettes	27.2	48.3	24.6
7. E-cigarettes are less harmful to health than normal cigarettes (F)	24.1	59.1	16.8
8. E-cigarettes are not harmful to health (F)	20.7	62.1	17.2
9. Can e-cigarettes be used at smoke free place (F)	18.1	65.5	16.4

Table 2: Attitude towards e-cigarette (n=232).

Items	SA	A	NS	D	SD	NK
1. Using e-cigarettes is fun	5.2	17.7	9.9	42.2	25	0.0
2. E-cigarette adverts make using e-cigarette look cool	20.3	45.3	3.9	22.4	7.3	0.9
3. E-cigarette has problem-solving effect.	4.0	7.8	8.2	54.3	28.4	0.9
4. E-cigarette helps to cut down tobacco smoking.	4.0	25.0	8.6	39.2	23.3	3.4
5. E-cigarette relieves one's stress.	0.9	13.8	12.9	47.4	24.6	0.4
6. E-cigarette enhances one's performance.	0.9	3.9	9.5	67.2	15.5	3.0
7. E-cigarette increases one's concentration.	4.7	0.0	9.5	68.1	14.7	3.0
8. E-cigarette improves one's image.	1.7	22	4.3	56.9	13.4	1.7
9. E-cigarettes should be banned in Malaysia (R)	46.1	34.9	8.2	6.9	2.6	1.3
10. E-cigarette make someone look stylish	4.3	26.7	3.0	37.9	25.9	2.2

SA= strongly Agree; A=agree; NS=not Sure; D=disagree; SD=strongly disagree; NK=Not Know, R= reverse scoring

Regarding attitude toward e-cigarette, 52.6% respondents do not support e-cigarette use. A total of 157 respondents agreed that the e-cigarette advertisement made e-cigarette look cooler. Most of the respondents agreed e-cigarette cannot help them in solving problems, stress relievers or improved their images when using e-cigarette. They also agreed that e-cigarette cannot help them to concentrate or perform while working. Only 22 (9.5%) respondent disagrees that e-cigarette should be banned in Malaysia (Table 2).

For the practice of e-cigarette, respondents have been divided into two categories, non-e-cigarette user and e-cigarette user. Respondents who answered never heard, never used, do not know and prefer not to say have been classified as never use e-cigarette. Meanwhile

respondents who answered ever used or currently use e-cigarette considered as an e-cigarette user. From the classification, there were 313 (88.4%) respondents never use e-cigarette and only 41 (11.6%) were classify as e-cigarette user (Table 3).

Table 3: Respondents by ever use of e-cigarette (n=354).

Ever use of e-cigarette	Frequency	%
I have never heard e-cigarette	121	34.2
I have never used e-cigarettes	190	53.7
I have only tried using e-cigarettes once or twice	34	9.6
I use e-cigarette daily	7	2.0
I don't know	1	0.3
I prefer not to say	1	0.3

A Chi-square test of independence was done to determine factors associated with e-cigarette use. The independent variable was dichotomized into e-smoker and non-e-smoker. The variables include in this analysis were age, gender, ethnicity, religion, marital status, level of education and occupation. Besides that, level of knowledge and attitude towards e-cigarette were also analysed in this test. Standardize adjusted residual for each cell were examined to find which cell was statistically significant. The analysis revealed that gender and attitude toward (support or not support) practice of e-cigarette were found to be significantly associated with practice of e-smoking ($p<0.05$). Meanwhile, there was no statistically significant association found between the practice of e-cigarette with age, ethnicity, religion, marital status, level of education, occupation and level of knowledge ($p>0.05$). Therefore, male who is not e-smoker is more likely not supporting the practice of e-cigarette (Table 4).

The relationship between e-cigarette use and conventional cigarette smoking was also determined in this study. Out of 115 current smokers, 6.08% (n=7) were current e-cigarette user, 23.5% (n=27) were ever used e-cigarette and the rest (n=81,70.4%) were never used e-cigarette. For the past smokers, five (29.4%) from 17 respondents were ever tried e-cigarette while 12 of them never tried e-cigarette. For the non- smoker, 0.9% have ever tried e-cigarette and 220 (99.1%) never tried e-cigarette. There was no past smoker or never smoker becoming current e-cigarette user (Table 5).

Table 4: Relationship between e-smoking and selected socio-demographic characteristics.

Variables	Total	e-smoker (%)	No e-smoker (%)	Chi-square (df)	P value
Age in years					
<35	163	12.9	87.1	0.500(1)	0.480
≥35	191	10.5	89.5		
Gender					
Male	247	14.6	85.4	7.148(1)	0.008
Female	107	4.7	95.3		
Ethnicity					
Malays	232	11.6	88.4	0.002(1)	0.964
Non-Malays	122	11.5	88.5		
Religion					
Muslim	235	11.5	88.5	.006(1)	0.939
Non-Muslim	119	11.8	88.2		
Marital status					
Single	127	14.2	85.8	1.299(1)	0.254
Married	227	10.1	89.9		
Level of education					
Low education	30	10.0	90.0	0.104(2)	0.949
Middle	270	11.9	88.1		
Highly educated	54	11.1	88.9		
Occupation					
Unemployed	93	7.5	92.5	4.277(2)	0.118
Private	197	14.7	85.3		
Government	64	7.8	92.2		
Level of knowledge					
Poor	106	19.8	80.2	0.614(1)	0.433
Good	126	15.9	84.1		
Supporting e-cigarette					
Support	110	28.2	71.8	15.879(1)	**0.001**
Do not support	122	8.2	91.8		

Table 5: Relationship between smoking e-cigarette use and conventional cigarette smoking.

Conventional cigarette	E-cigarette use (n (%))			
	N	Current user	Ever use	Never use
Current smoker	115	7 (6.08)	27 (23.5)	81 (70.4)
Past smoker	17	0.0	5 (29.4)	12 (70.6)
Never smoker	222	0.0	2 (0.9)	220 (99.1)
Total	354	7	34	313

DISCUSSION

In our study, the majority of e-smokers were male. This finding was consistent with King et al and Wong et al.[13,14] The reason why female were unlikely to use e-cigarette, might be the similar reason as to why female smoked less conventional cigarette compared to male. Female are unlikely to confess they are smoke due to the public perception.[15] Besides that, with the safety of e-cigarette still uncertain, woman may avoid to use e-cigarette because they more concerned regarding their health comparable to the man.[16] Secondly, it was argued that majority of respondents had good knowledge about e-cigarette and also have had negative attitude toward e-cigarette. Therefore, few of them are practicing e-cigarette.

This study also revealed that, the factor which was found to be significantly associated with practice of e-cigarette was the attitude toward e-cigarette ($p<0.05$). Dockrell et al also found an association between positive attitudes to e-smoking practice.[17] Thus, male who was supporting e-cigarette are more likely to practice e-cigarette and this finding was similar to the findings by Dockrell et al.[17] Most of the ever used or current e-cigarette use in this study either current smoker or past smoker. This corresponded to the finding by Pearson et al.[18] The respondent who are ex-smokers or current smokers were more likely to try or use e-cigarette compare to the person who never smoked. This might be due to the campaign or promotion by e-cigarette company e-cigarette as an alternative to conventional cigarette. This is also a reason the never smoker respondent tried e-cigarette. Even though never smoke respondent who tried e-cigarette is only 0.9% (n=2), but it is still a concern because according to Fairchild et al e-cigarette can lead to the use of conventional cigarette.[19]

Few limitations had been encountered in the interpretation of findings of this study. Data was collected via self-reported from the respondents. Therefore, the information was given fully dependent on the memory of the respondents. This would cause a subjective error by respondent especially the older ones, who may have difficulty to remember past event, for example age of initiation of cigarette or how many cigarettes they smoked per month. Due to the limitation of study location, the finding from this study might not be representing the whole general population or the whole district because the study involved selected KOSPEN localities. The result might be different if the whole districts have been covered in this study. The result also did not depict the scenarios of e-cigarette use in Sarawak. This study has involved all the community members, regardless of their smoking status or e-cigarette status. Therefore, there is a possibility that answers given by non-smoker or never use e-smoker might not be accurate because they were not familiar with both products.

CONCLUSION

Analysis revealed that 11.2% of the respondents are currently practicing e-cigarette. More than half of the respondent has a good knowledge on e-cigarette and most of them do not support e-cigarette use. The result also showed that there are two factors associated with the e-cigarette use, gender, especially male and attitude positive toward e-cigarette has association with the use of e-cigarette ($p<0.05$). Besides that, this study also found practice of conventional smoking are not associated with ethnicity, religion, level of knowledge and attitude toward e-cigarette. Based on the finding the majority of the e-smoker and traditional smoker are private worker. Therefore, e-smoking and stop smoking program should be more targeted to this group. There is a need to collaborative effort with private sector employer to enhance the program to stop e-smoking initiatives. Secondly, the awareness on e-cigarette relatively was high, where 66% of respondent have heard about e-cigarette but the respondent who have good knowledge about e-cigarette only was 54.2%. This showed that most of the community still confuse about e-cigarette. There is a need to increase not just awareness but also imparting knowledge on e-cigarette among the public. This would help to create more effective policy in the control of e-cigarette use later.

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