Awareness, use and perceptions about E-cigarettes among adult smokers in Karachi, Pakistan

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Abstract

Objective: To estimate the prevalence of awareness, current use and intention to use of e-cigarettes among adult smokers.

Methods: This cross-sectional survey was carried out at the Aga Khan University Hospital, Karachi, from July to August 2016, and comprised people aged above 18 years who had smoked more than 100 cigarettes in their lifetime. Convenience sampling method was used. A self-administered questionnaire was used to collect data. SPSS 22 was used for data analysis.

Results: Of the 387 participants, 359(92.8%) were male. The overall mean age was 32.4±12.6 years. Moreover, 215(55.5%) respondents belonged to the middle socio-economic class. Besides, 249(64.3%) respondents were aware of e-cigarettes while 39(10.1%) used them, and 81(20.9%) wanted to use them. Socio-economic status was the best predictor for awareness about e-cigarettes (p<0.001), while gender (p=0.001), occupation (p<0.001) and current smoking status (p=0.009) were significantly associated with the use of e-cigarettes. E-cigarettes were perceived as less harmful than tobacco cigarettes by 175(45.3%) respondents, helpful in quitting smoking by 138(35.6%), associated with chronic diseases by 158(40.9%), addictive 142(36.7%), and not safe during pregnancy by 197(50.8%) participants.

Conclusion: The percentage of e-cigarette usage was low despite the higher than expected awareness among the subjects.

Keywords: Electronic cigarettes, Smoking, Awareness, Usage, Perception, Pakistan. (JPMA 68: 147; 2018)

Introduction

Electronic cigarettes (e-cigarettes) are battery-operated portable devices that deliver nicotine via a vaporised, flavoured liquid consisting of proylene glycol, glycerol and nicotine.[1] Marketed as healthier alternatives to tobacco smoking and a means to quit - claims not fully established yet — e-cigarettes are becoming a popular means to bypass smoke-free laws, enabling users to "smoke anywhere".[1]

Nicotine replacement therapy (NRT), though widely used to help smokers with withdrawal symptoms via nicotine gums, patches, and inhalers since 1992[2] has helped less than 5% of smokers to quit smoking successfully. Although proven safe, NRTs are not as satisfying and smokers find it hard to break the bio-behavioural feedback and hobby element.[3] The addiction is

potentially attributed to the lack of the psychological stimulus of smoke itself,[4] and the habit of cigarette holding in the hand (habits which e-cigarettes can cater to in addition to providing nicotine replacement); thus their potential superiority over other therapies despite a lack of evidence about their safety profile and effectiveness.[5]

Indeed, e-cigarette revenues have doubled every year since 2008, demonstrating the potential to render tobacco smoking obsolete,[6] as they are projected to surpass tobacco cigarettes by 2021.[6] A 2013 report from the Centres for Disease Control and Prevention (CDC) found that e-cigarette use among middle- and high-school students increased from 3.3% to 6.8% between 2011 and 2012, equating to an estimated 1.78 million youths who have tried e-cigarettes.[7]

One review article failing to link short-term e-cigarette use with any serious health risks, demonstrated weak evidence to suggest that e-cigarettes helped smokers to quit.[8] Similarly, World Health Organisation's (WHO) demonstration of a weak association of e-cigarettes with smoking cessation suggests e-cigarettes should be

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recommended only for smokers who refuse conventional treatment, or who have undergone failed trials.[9]

The global use of e-cigarettes has been rising exponentially since 2007, generating increased interest among researchers.[1] Studies conducted in the developed world show a high level of awareness about, and the use of, e-cigarettes as a means of smoking cessation.[10] However, studies from the developing world show a less encouraging response.[11] Since no such studies have been conducted in Pakistan so far, our study is the first to do so.

Tobacco smoking is a rising problem in Pakistan; an estimated 1.3% women and 27.6% men smoke cigarettes, while as many as 6.4% women and 44.6% men use tobacco regularly.[12] This is contributing to an increased burden of disease, since the link between smoking and lung cancer, coronary artery disease, and tuberculosis has been indubitably established.

A four-country survey conducted by the International Tobacco Control (ITC)studied awareness about electronic nicotine delivery systems (ENDS) among current and former smokers in the United States, United Kingdom, Canada and Australia.[13] The study showed that younger, male, and current smokers were more likely to have heard of ENDS than older, female, former smokers.[13]

However, there is still considerable variation in e-cigarettes awareness and usage amongst various countries. A study published in 2013 estimated global e-cigarette use to range from 0.05% to 14% in China and Malaysia, respectively and, awareness about e-cigarettes ranged from 31% to 88% in China and the Netherlands, respectively.[14] Other studies have reported high awareness and usage in high-income countries, while e-cigarettes still remain widely underused in developing countries.[10,15] A study in Egypt reported no usage of e-cigarettes in the sample population, even though awareness about them was 51.7%.[11] E-cigarette usage has also been associated with a higher socio-economic status, smoking more cigarettes, and attempting to quit within the past one year.[16] While the most popular reasons for using e-cigarettes appear to be avoiding health-related adverse effects of tobacco smoke, cutting down on current cigarette consumption, and quitting,[16] even never-smokers have reported using e-cigarettes.[17]

According to the World Bank, an estimated 180 million premature deaths can be prevented if cigarette smoking is cut to half by 2025, making it imperative to focus on promoting smoking cessation using established method, and developing new ones.[18] Current methods, though useful when used as directed, have not proven

revolutionary.[19] The exponential rise in popularity of e-cigarettes worldwide may represent the future of smoking cessation. It was therefore crucial to explore this avenue.

The current study was planned to estimate the prevalence of awareness, current use and intention to use of e-cigarettes among adult Pakistani smokers while exploring the association of socio-demographic factors and past smoking history with e-cigarette use. We also explored the perceptions of the respondents about e-cigarettes, and their sources of information.

Subjects and Methods

This cross-sectional survey was carried out at the Aga Khan University Hospital (AKUH), Karachi, from July to August 2016. Convenience sampling technique was used to enrol the subjects from the waiting area of a private tertiary care hospital and three shopping malls. The sample size was calculated using EpiInfo software, assuming a prevalence of 50%, 95% confidence interval (CI), and a bound on error of ± 5%. The estimated minimum sample size was found to be 385. Approval was obtained from the institutional review board. Informed consent was also taken from all the participants before asking them to fill out our forms (Appendix). Subjects older than 18 years of age and who had smoked more than 100 cigarettes in their lifetime were included. Subjects with missing information or refusal to answer particular questions were excluded.

Knowledge, attitude, and practices regarding the use of e-cigarettes among smokers and former smokers were assessed via a self-administered questionnaire after written informed consent. Awareness was assessed by asking if the patients had heard about e-cigarettes while use was appraised by asking if they had ever used an e-cigarette. The Kuppuswamy scale, which has been validated for use in Pakistan,[20] was used to assess socio-economic status of the participants. They were offered both the English and the Urdu-translated questionnaire.

The information was asked on demographics, existing co-morbids, general tobacco consumption, smoking history, attempts to quit smoking, and e-cigarette use, as well as on awareness and perceptions about e-cigarettes. The questionnaire was pretested on a small group of participants before collection of data for the study.

E-cigarettes was defined as a cigarette consisting of a battery and an atomiser containing volatile liquid composed of propylene glycol, glycerol, distilled water, flavourings (that may or may not be approved for food use), and nicotine, encircled by a battery-operated

APPENDIX

Questionnaire

1. Gender: Male _____ Female _____
2. Year of birth: _____
3. Highest level of education received:
a. Doctorate or Honors
b. Bachelors or Masters
c. Intermediate (FSc/ FA/ A levels/ IB/ AP)
d. Matric (O levels)
e. Middle school
f. Primary school
g. None

4. Occupation:
a. Professional
b. Semi-professional
c. Clerical/ shop owner/ farmer
d. Skilled worker
e. Semi-skilled worker
f. Unskilled worker
g. Unemployed

5. Estimate of monthly income in Pakistani Rupees:
a. $\geq$60,000
b. 30,000 - 60,000
c. 22,500 - 30,000
d. 15,000 - 22,500
e. 9,000 - 15,000
f. 3,000 - 9,000
g. $\leq$3,000

6. Do you currently smoke tobacco on a daily basis, less than daily, or not at all?
a. Daily
b. Less than daily
c. Not at all
d. Don't know

7. In the past, have you ever smoked tobacco on a daily basis, less than daily, or not at all?
a. Daily
b. Less than daily
c. Not at all
d. Don't know
If you answered (c) for Q6 OR Q7, please move on to Q14

8. Have you smoked more than (approximately) 100 cigarettes in your life?
a. Yes
b. No

9. How many years have you smoked tobacco? _____
10. How many packs of cigarettes do you/ did you smoke daily? _____ packs

11. Have you ever received advice about quitting smoking from a doctor?
a. Yes
b. No

12. Have you ever thought about quitting smoking?
a. Yes
b. No

13. Have you ever tried to quit smoking?
a. Yes
b. No

14. Have you ever heard about electronic cigarettes (e-cigarettes)?
a. Yes
b. No
c. I don't know
If you answered (b) for Q15, the questions end here

15. Where did you hear about e-cigarettes?
a. Friends
b. Mass media and Internet
c. Doctor or health practitioner
d. Other _____

16. Would you want to use e-cigarettes?
a. Yes
b. No
c. I don't know

17. How do you think e-cigarettes compare to conventional cigarettes?
a. e-Cigarettes are more harmful
b. e-Cigarettes are equally as harmful
c. e-Cigarettes are less harmful
d. e-Cigarettes are not at all harmful
e. I don't know

18. Do you think e-cigarettes help in quitting smoking?
a. Yes
b. No
c. Somewhat
d. I don't know

19. Do you think e-cigarettes are associated with diseases such as lung cancer, COPD, asthma, or heart disease?
a. Yes
b. No
c. Somewhat
d. I don't know

20. Do you think e-cigarettes are addictive?
a. Yes
b. No
c. Somewhat
d. I don't know

21. Do you think e-cigarettes are safe to use in pregnancy?
a. Yes
b. No
c. Somewhat
d. I don't know

22. Do you use e-cigarettes?
a. Yes
b. No
If you answered (b) to Q22, the questions end here

23. How often do you use e-cigarettes?
a. Daily
b. Less than daily
c. Not at all
d. I don't know

heating wick used to vaporise the liquid for inhalation.[21]

In our study we defined smokers as individuals who had smoked more than 100 cigarettes in their lifetime.[22]

Data was then entered into SPSS 22 using a double-entry system, and manually reviewed for discrepancies and missing data. All variables were then coded for analysis. The prevalence of awareness and use was calculated using the outcome frequencies, and was expressed as percentages. Descriptive analysis of the factors associated with use and awareness were expressed as frequencies and percentages, along with their corresponding p-values. Demographic data was compared across the awareness and use of e-cigarettes via the two-sample t-test.

Results

Of the 399 participants, 387(96.9%) were included in the study. Of them, 359(92.8%) were males. The overall mean age was 32.42±12.55 years. Moreover, 215(55.6%) respondents belonged to the middle socio-economic class and 23(5.9%) belonged to the lower socio-economic class. Besides, 307(79.3%) respondents were educated at least up till intermediate level and 21(5.4%) were unemployed.

Further, 215(55.60%) smoked cigarettes daily whereas 47(12.10%) had quit smoking. The mean pack-years of smoking in the sample were 9.01 ± 22.07 (Table-1).

Also, 249(64.30%) of the respondents had heard about e-cigarettes. The majority of them had learned about e-cigarettes from friends 159(63.90%), through media 104(41.80%) and doctors 17(6.80%). Only 39(10.10%) of all respondents reported use of e-cigarettes and 81(20.90%) respondents expressed a desire to try e-cigarettes in future.

We were interested in exploring the association of e-cigarette awareness and usage with various factors. There were significant associations between awareness of e-cigarettes with gender (p=0.001), higher education (p<0.001), professional occupations (p<0.001), higher family income (p<0.001), and younger age (p<0.001). There was no significant association of awareness of e-cigarette with current smoking status (p=0.305).

There were significant associations between e-cigarette usage and current smoking status (p=0.011) and professional occupation (p=0.002). There was no significant age difference between e-cigarette users and non-users (p=0.836) (Table-2).

Moreover, 175(45.3%) respondents thought e-cigarettes

Table-1: Factors associated with awareness about e-cigarettes.

		Yes	No	Total	Chi-square	P-value
Gender	Male	223	136	359	10.698	0.001
	Female	26	2	28		
		249	138	387		
Education	Doctorate	12	3	15	34.271	<0.001
	Bachelors	109	49	158		
	Intermediate	96	38	134		
	Matric	20	20	40		
	Middle school	7	7	14		
	Primary school	3	10	13		
	None	2	11	13		
		249	138	387		
Occupation	Professional	143	39	182	49.111	<0.001
	Semi professional	28	29	57		
	Clerical	38	39	77		
	Skilled worker	17	12	29		
	Semi skilled worker	3	8	11		
	Unskilled worker	2	8	10		
	Unemployed	18	3	21		
		249	138	387		
Family income	>60000	155	47	202	31.721	<0.001
	30000-60000	40	38	78		
	22500-30000	22	21	43		
	15000-22500	20	20	40		
	9000-15000	4	6	10		
	3000-9000	2	0	2		
	<3000	3	0	3		
		246	132	378		
SES category	Upper	124	25	149	42.625	<0.001
	Upper middle	96	74	170		
	Lower middle	21	24	45		
	Lower	8	15	23		
		249	138	387		
Current smoking status	Daily	144	71	215	3.622	0.305
	Less than daily	72	52	124		
	Not at all	33	15	48		
		249	138	387		
Thoughts about quitting smoking	Yes	189	94	283	2.200	0.138
	No	53	38	91		
		242	132	374		
Tried to quit smoking	Yes	148	72	220	2.210	0.331
	No	94	60	154		
		242	132	374		

SES: Socio-economic status.

Table-2: Factors associated with use of e-cigarettes.

		Yes	No	Total	Chi-square	p-value
Gender	Male	34	185	219	0.238	0.625
	Female	5	21	26		
		39	206	245		
Education	Doctorate	2	10	12	11.983	0.062
	Bachelors	16	92	108		
	Intermediate	14	81	95		
	Matric	3	16	19		
	Middle school	2	5	7		
	Primary school	0	2	2		
	None	2	0	2		
		39	206	245		
Occupation	Professional	15	126	141	21.429	0.002
	Semi professional	11	16	27		
	Clerical	6	31	37		
	Skilled worker	5	12	17		
	Semi skilled worker	0	3	3		
	Unskilled worker	1	1	2		
	Unemployed	1	17	18		
		39	206	245		
Family income	>60000	20	134	154	7.184	0.304
	30000-60000	10	28	38		
	22500-30000	4	18	22		
	15000-22500	4	16	20		
	9000-15000	0	3	3		
	3000-9000	1	1	2		
	<3000	0	3	3		
		39	203	242		
SES category	Upper	13	110	123	5.694	0.128
	Upper middle	21	73	94		
	Lower middle	4	17	21		
	Lower	1	6	7		
		39	206	245		
Current smoking status	Daily	19	122	141	11.170	0.011
	Less than daily	17	55	72		
	Not at all	3	29	32		
		39	206	245		
Thoughts about quitting smoking	Yes	28	157	185	0.428	0.513
	No	10	43	53		
		38	200	238		
Tried to quit smoking	Yes	26	119	145	1.193	0.551
	No	12	81	93		
		138	200	238		

SES: Socio-economic status.

were less harmful than conventional tobacco cigarettes, while 67(17.4%) thought them equally harmful. Furthermore, 138(35.60%) respondents believed that the device was helpful in quitting, and an additional 60(15.40%) were somewhat sure of its help in quitting

Table-3: Perceptions of respondents about e-cigarettes.

Variable	Category	Frequency (%)
Do you think e-cigarettes are _____ harmful as compared to conventional tobacco cigarettes?	More harmful	30 (12.1)
	Equally harmful	43 (17.4)
	Less harmful	112 (45.3)
	Not at all harmful	14 (5.7)
	Don't know	48 (19.4)
Do you think e-cigarettes help in quitting smoking?	Yes	88 (35.6)
	No	70 (28.3)
	Somewhat	38 (15.4)
	Don't know	51 (20.6)
Do you think e-cigarettes are associated with any of the diseases like asthma, COPD, lung cancer, or CAD?	Yes	101 (40.9)
	No	43 (17.4)
	Somewhat	44 (17.8)
	Don't know	59 (23.9)
Do you think e-cigarettes are addictive?	Yes	90 (36.7)
	No	62 (25.3)
	Somewhat	38 (15.5)
	Don't know	55 (22.4)
Do you think e-cigarettes are safe to use in pregnancy?	Yes	33 (13.4)
	No	125 (50.8)
	Somewhat	18 (7.3)
	Don't know	70 (28.5)

COPD: Chronic obstructive pulmonary disease
CAD: Coronary artery disease.

smoking. Besides, 158(40.90%) respondents thought e-cigarettes were associated with diseases like coronary artery disease (CAD), chronic obstructive pulmonary disease (COPD), asthma, or lung cancer. Moreover, 142(36.7%) respondents thought e-cigarettes were addictive and 197(50.8%) thought that e-cigarettes were unsafe in pregnancy (Table-3).

Discussion

While e-cigarette awareness and usage globally has been rising exponentially over the past few years,[1] they still remain underused in developing countries. Our study showed that 64.3% of the respondents had heard about e-cigarettes, only 10.1% of the total participants used them and 33.5% of those who had knowledge about e-cigarettes wanted to use them. This is a similar pattern of awareness and usage as seen in other developing countries like Egypt.[11,14]

The low levels of awareness and usage can be ascribed to the limited availability and perceived expense of e-cigarettes. They are not marketed as strongly as

conventional cigarettes, which are easily available at low costs. A majority of the aware participants had heard about e-cigarettes from their friends (63.90%). Only 6.80% had heard about them from health-care professionals. This can be attributed to the fact that while e-cigarette are usually considered safer than traditional cigarettes, long-term effects of e-cigarettes are as yet still unknown[20] and doctors still do not recommend them to their smoking patients as viable alternatives to traditional smoking. This can also be related to the finding that only 41.2% of the smokers had ever received advice about quitting smoking from a healthcare professional, hence indicating a worrisome trend that doctors usually tend to ignore the smoking habits of their patients rather than counselling them about the harmful effects of smoking and advising them to quit by conscientiously detailing all the available methods and alternatives including e-cigarettes.

Professionals, semi-professionals and participants with higher degree of education and a larger family income were more likely to have heard about e-cigarettes. Similar results have also been reported in Egypt and Hong Kong.[11] This could be attributed to the ease of access to varied sources of information via a more frequent use of technology.[11] The awareness levels were also high among the younger participants, as seen elsewhere as well.[23] This could be explained by the fact that younger people usually tend to be more curious about newer devices and are more active on social media and the Internet.[11] These can have worrisome implications as studies have indicated that the desire for experimentation, which might lead to younger people trying e-cigarettes, might also lead to tobacco initiation and nicotine addiction.[24,25]

While the level of education was not seen to be significantly associated with usage, or the desire to use e-cigarettes, as seen in some previous studies as well,[13,15] professionals and semi-professionals were significantly more likely to use e-cigarettes, possibly due to their higher earning status. People who smoked daily were also more likely to want to use e-cigarettes, possibly perceiving e-cigarettes as a useful aid to reduce their daily smoking habit.[10,13]

Data available from other countries has varied in terms of e-cigarettes usage and the intention to quit.[10,11,13] Our study also did not reveal any association between e-cigarette use and quitting, probably because people in Pakistan are not well aware about the role of e-cigarettes in doing so. This has been indicated by the fact that only 35.6% of the aware respondents thought that the device could help in quitting smoking.

Our study also showed that the general population is largely unaware of the side effects that e-cigarettes usage can potentially have. Almost half of the people who knew about e-cigarettes regarded them as less harmful than traditional cigarettes, 40.9% thought that e-cigarettes could cause disease and 50.8% thought that they are unsafe during pregnancy. This is because e-cigarettes are usually marketed as healthier alternatives. However, the safety and long-term hazards of e-cigarette have not yet been established and the data already available warrants the need for further research into its beneficial effects.

To the best of our knowledge, no other study of this kind has been conducted in Pakistan before. The data for our study was collected from the general population rather than through tobacco/ e-cigarette shops or online forums/ websites dedicated to e-cigarettes, hence avoiding bias.

One of the limitations of our study was the use of convenience sampling which affected the generalisability of the results. Moreover, our sample size was not specifically built for determining the associations. However, we believe that our results do suggest that these associations could be true and we recommend further research in this direction. Another limitation was that the participants using e-cigarettes were few in number. Although the total number of females participating in the study was less, possibly due to cultural biases leading to women refusing to participate or resulting in lesser number of women smoking, the ratio of male-to-female smokers was in accordance with the general trend observed in Pakistan.[12]

Conclusion

The percentage of e-cigarette usage was low despite the higher than expected percentage awareness. Additionally, since the perceived benefits and adverse effects of e-cigarettes were less well understood by the participants, we cannot conclusively attribute lack of use to that. For this reason, we suggest that studies on the long-term health risks of e-cigarettes be done, to better understand their safety profile.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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