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Assessment of knowledge, attitude and practices regarding E-cigarettes among the smokers in Metropolitan city of Western India

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Abstract

Background: Most people still remain unaware of the detrimental effects of electronic cigarettes (e-cigarettes). Hence the present study was conducted to assess the awareness about the use and harmful effects of e-cigarettes among young adults in Pune.

Materials and Methods: A questionnaire study was conducted among the smokers in Pune city regarding the use of e-cigarettes. The structured, self-administered close-ended questionnaire was designed to collect the data which consisted of three parts and comprised of 30 questions. The reliability and validity of the instrument were calculated. Informed consent was also taken from participants. Statistical analysis was done using descriptive analysis.

Results: In this study there were total of 150 participants between 18 to 75 years of age. Out of 150 participants, 132 participants were male and 17 were female. About 55.4% participants used e-cigarettes while 44.6% participants did not use e-cigarettes.

Conclusion: From the data collected, the attitude of the population towards use of e-cigarette was assessed; hence more comprehensive awareness program should be needed in population.

Keywords: carcinogens, e-cigarettes, E-liquid, nicotine, vaping

Introduction

Electronic cigarettes (e-cigarettes) are battery powered electronic devices, which aerosolize liquid that contains nicotine, humectants and flavours^[1]. E-cigarette smoking is becoming fast growing trend among young adults and are gaining wide acceptance as they do not cause bad breath and have no flame and carbon monoxide emission. It consists of an atomizer, a power source such as a battery, and a container such as a cartridge or tank. Instead of smoke, the user inhales vapor. As such, using an e-cigarette is often called "vaping". E-cigarettes are activated by taking a puff or pressing a button. It also lacks fire that prevents staining of teeth, fingers, or nails. These devices have various names, including e-cigarettes, e-hookahs, vaporizer cigarettes, vapes, and vape pens. They come in a range of shapes. Some look like pen drives and others look like pens^[2]. It also consists of a cartridge filled with an e-liquid, a heating element or atomiser which is important to heat the e-liquid to create a vapour that can be inhaled through a mouthpiece and a rechargeable battery^[2, 3]. Since e-cigarettes are combustion free and does not contain tobacco there is a common assumption that e-cigarettes are safer than conventional cigarette smoking.³ E-cigarette contains different levels of nicotine, which is the key addictive component of tobacco and nicotine-free options are also available.⁴ Once the atomiser is vapourised it produces a sensation which is similar to tobacco smoking without any harmful effects, however the heating process itself leads to production of decomposition products that are harmful^[4, 5]. Nicotine is extremely addictive and has various adverse effects on cardiovascular, respiratory, immunological and reproductive system. It can also compromise lung and kidney functions. In addition, its toxicological effects can disrupt brain development in adolescent and young adults^[6]. The most common component of e-liquid is Propylene Glycol (1,2 propanediol) and glycerol both used as humectants to prevent it from drying. It has been indicated that both humectants can induce respiratory irritation and increase probability of asthma development^[7, 8].

E-liquid consists of five main ingredients- vegetable glycerine, propylene glycol, flavour, nicotine and distilled water along with potential carcinogens like formaldehyde [9]. They also contain metals like chromium, cadmium, lead, manganese and nickel, arsenic which is highly toxic and may lead to liver diseases and even permanent brain damage or coma [10]. The formaldehyde component can cause brain cancer, chronic myeloid leukaemia and nasopharyngeal cancer. If overheated, the battery might explode causing tooth loss, soft tissue loss and injuries to face, hands, thighs and groin. Electrical shocks from charger and device are also possible.¹¹ Compared to traditional cigarettes; reusable e-cigarettes do not create waste and potential litter from every use in the form of discarded cigarette. Traditional cigarettes tend to end up in the ocean where they cause pollution, though once discarded they undergo biodegradation and photodegradation. Although some brands have begun recycling services for their e-cigarette cartridges and batteries, the prevalence of recycling is unknown. E-cigarettes that are not reusable contribute to the problem of electronic waste, which can create a hazard for people and other organisms. If improperly disposed of, they can release heavy metals, nicotine, and other chemicals from batteries and unused e-liquid.¹² There has been an increase in use of e- cigarette, and the general population using it has no knowledge about the long-term consequences of using e-cigarettes. Hence the present study was conducted to assess the awareness about the use and harmful effects of e-cigarettes among young adults in Pune city, Maharashtra, India.

Materials and Methods

A questionnaire study was conducted in Metropolitan Pune city in Western India among the smokers. The study aimed to assess the knowledge, attitude, awareness of the smokers about e-cigarettes. The participants were selected based on the following inclusion criteria: a) 18 years and above age, b) Those were willing to participate in the study, c) Tobacco and/or non-tobacco Smokers. Exclusion criteria were medically compromised people, physically, mentally challenged people. The parameters for sample size calculation using G*power software versions 3.192 were as follows: 80% power of study, alpha error 0.5, effect size 0.3 and degree of

freedom 5. Calculated sample size for study was 144. Final sample considered for the study was 150. The convenient sampling technique was used in study. The questionnaire was prepared in English language. The questionnaire was pretested and validated among 20 subjects to assess their knowledge, clarity and responsiveness. The reliability statistics were calculated and the Cronbach Alpha was 0.704. The performa was designed to collect data and consisted of different sections with 30 questions regarding knowledge, attitude and practices. Section one include the demographic data of subjects such as name, age, gender, etc. The second section included questions related to know the knowledge of participants. And third section was questions related to attitude whereas final section included practice based questions. The questionnaire was designed on Google form (Google LLC, mountain view, California United States) and the link was distributed among study population via email, WhatsApp and other social media platform. The statistical analysis was done using the descriptive statistics. The P value was set at 0.05. Statistical package for the social science (SPSS) 23.0 version software (IBM, Chicago, Illinois, United States) was used.

Results

In table 1, there were total of 150 participants between 18 to 75 years of age. Out of 150 participants, 132 participants were male and 17 were female. Majority of the participants were graduate, undergraduate and postgraduate. In table 2, around 91.3% of participants knew the difference between e-cigarette and conventional cigarette. The rest 8.7% did not know the difference. About 51.7% of participants thought that e-cigarettes are equally harmful to tobacco cigarettes, 9% of participants thought that e-cigarettes are more harmful than tobacco cigarettes. Around 34.5% of participants thought that e-cigarettes are less harmful than tobacco cigarettes. In table 3, 57.5% participants agree that professional counselling for smokers is beneficial, while 1.4% participants disagree for the same. Around 29.5% participants have neutral thoughts, on the other hand 11% strongly agree, while 0.7% participants strongly disagree. In table 4, 55.4% participants are e-cigarette smokers, while 44.6% participants do not smoke.

Table 1: Demographic details of study participants.(N=150).

Sr. No.	Demographic details	Responses	N	%	Total N (%)
1.	Age (years)	Below 18	2	1.3	150(100)
		18-40	131	87.3	
		41-75	17	11.3	
		76 and above	0	0	
2.	Gender	Male	132	88.6	150(100)
		Female	17	11.4	
		Others	0	0	
3.	Education	10 th grade or less	0	0	150(100)
		12 th grade or less	6	4	
		Undergraduate	16	10.7	
		Graduate	112	74.7	
		Postgraduate	16	10.7	
		Others	0	0	
4.	Occupation	Student	20	13.3	150(100)
		Employed	96	64	
		Business	32	21.3	
		Unemployed	1	0.7	
		Others	1	0.7	
5.	Monthly Income	30,000-50,000	80	55.6	150(100)
		50,000-70,000	28	19.4	
		70,000-1,00,000	26	18.1	

		1,00,000 and above	10	6.9	
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Note: % - percentage, N- number.

Table 2: Knowledge related questions' responses of the study participants. (N=150).

Sr. No.	Questions	Responses	N	%	Total N (%)
1.	Are you aware of Electronic Cigarettes?	Yes	138	92	150(100)
		No	12	8	
2.	Do you know the difference between e-cigarette and conventional cigarette?	Yes	136	91.3	150(100)
		No	13	8.7	
3.	If yes, then what is the difference?	E-cigarettes does not Contain tobacco	14	9.5	150(100)
		E-cigarettes does not produce flame	33	22.3	
		E-cigarettes are operated on battery	39	26.4	
		E-cigarettes are relatively expensive than conventional cigarettes	16	10.8	
		All of them	74	50	
		Don't know	11	7.4	
4.	Electronic cigarettes are?	Absolutely healthy and safe	7	4.8	150(100)
		Less harmful than tobacco cigarettes	50	34.5	
		Equally harmful than tobacco cigarettes	75	51.7	
		More harmful than tobacco cigarettes	13	9	
5.	What are the side effects caused due to electronic cigarettes?	Insomnia (lack of sleep)	41	27.3	150(100)
		Depression / Anxiety	34	22.7	
		Dry throat	27	18	
		Allergic reaction	5	3.3	
		All of them	42	28	
		Don't know	39	26	
6.	Do you know the disease caused due to electronic cigarettes?	Oral disease	43	28.7	150(100)
		Lung disease	77	51.3	
		Liver disease	15	10	
		Brain disease	1	0.7	
		All of them	25	16.7	
		Don't know	37	24.7	
7.	Do you know that electronic cigarettes have carcinogenic properties (cancer causing agents)?	Yes	119	79.3	150(100)
		No	31	20.7	
8.	Do you know that electronic cigarette comes with different concentration of nicotine?	Yes	126	84	150(100)
		No	24	16	
9.	Which of the nicotine concentration liquid are you familiar with?	6 mg/ml	66	44.3	150(100)
		12 mg/ml	35	23.5	
		27 mg/ml	8	5.4	
		36 mg/ml	8	5.4	
		All of them	14	9.4	
		Don't know	42	28.2	
10.	Are you aware that electronic cigarette can cause battery explosion/ electric shock?	Yes	76	50.7	150(100)
		No	74	49.3	
11.	Do you know that electronic Cigarettes are banned in India?	Yes	98	65.3	150(100)
		No	52	34.7	

Table 3: Attitude related questions' responses of the study participants. (N=150).

Sr. No.	Questions	Responses	N	%	Total N (%)
1.	Do you think electronic cigarettes are more in trend than regular cigarettes?	Strongly agree	17	11.6	150(100)
		Agree	72	49	
		Neutral	41	27.9	
		Disagree	14	9.5	
		Strongly disagree	3	2	
2.	What did your Dentist/Physician advised you concerning the use of e- cigarettes?	To continue using it if it helps you stay off or reduce smoking	5	3.4	150(100)
		To stop using it	94	64.8	
		Did not express any opinion	16	11	
		You did not inform your Dentist/Physician about it	30	20.7	
3.	Do you think your dependency on smoking affects your family and social life?	Strongly agree	24	16.4	150(100)
		Agree	90	61.6	
		Neutral	28	19.2	
		Disagree	3	2.1	
		Strongly disagree	1	0.7	
4.	Do you think professional counselling for	Strongly agree	16	11	150(100)

	smoking is beneficial for addicts?	Agree	84	57.5	
		Neutral	43	29.5	
		Disagree	2	1.4	
		Strongly disagree	1	0.7	
5.	Do you think that long term Use of e-cigarette has	Strongly agree	20	13.7	150(100)
		Agree	96	65.8	
	detrimental effects on you overall health?	Neutral	27	18.5	
		Disagree	2	1.45	
		Strongly disagree	1	0.7	
6.	Do you think that e- cigarettes are equally harmful to regular cigarettes?	Strongly agree	18	12.3	150(100)
		Agree	67	45.9	
		Neutral	40	27.4	
		Disagree	19	13	
7.	Do you think e-cigarettes helps in quitting tobaccosmoking?	Strongly disagree	2	1.4	150(100)
		Strongly agree	5	3.4	
		Agree	67	46.2	
		Neutral	60	41.4	
		Disagree	10	6.9	
		Strongly disagree	3	2.1	

Note: % - percentage, N- number.

Table 4: Practice related questions' responses of the study participants. (N=150).

Sr. No	Questions	Responses	N	%	Total N (%)
1.	Do you use e-cigarette?	Yes	82	55.4	150(100)
		No	66	44.6	
2.	How frequently do you use e- cigarette?	Daily	24	16.2	150(100)
		Weekly	35	23.2	
		Rarely	24	16.2	
		Occasionally	40	27	
		I don't use	25	16.9	
3.	How old were you when you first started smoking e- cigarette?	15-25 year	55	39.9	150(100)
		26-35 year	76	55.1	
		36-45 year	5	3.6	
		>45 year	2	1.4	
4.	How soon after you wake up in the morning, you smoke?	After 60 min	77	56.6	150(100)
		31-60 min	37	27.2	
		6-30 min	17	12.5	
		Within 5 min	5	3.7	
5.	Do you smoke even when you are ill?	Yes	51	35.7	150(100)
		No	92	64.3	
6.	Do you have a preferred flavour of e-cigarette liquid?	Yes	92	64.3	150(100)
		No	51	35.7	
7.	Are you currently using anicotine replacement medication? (Patch, gum, tablet, inhaler, nasal spray)	Yes	6	4.2	150(100)
		No	138	95.8	
8.	Is e-cigarette really hard to quit?	Yes	81	56.3	150(100)
		No	63	43.8	

Discussion

E-cigarette is a small battery-operated handheld electronic device and is commonly known as e-cigarette. This study had results that showed a reduced awareness of the side effects of the use of e-cigarettes among the smokers. Several myths associated with e- cigarettes need to be busted with ground realities. In this study 49% of participants use e- cigarettes to follow the trend. This study correlates with the study conducted by Jun Ho Cho⁴ in United States where 50-51% students used e-cigarette for the same reason. The practice of young adults smoking e-cigarette may have been adopted as a way of smoking cessation or just to follow a trend. Around 51.7% of the participants felt that e-cigarette is equally harmful to conventional cigarette. According to the other researchers Farsalinos *et al.* [5] e-cigarettes has been used as a long-term tobacco cigarette substitutes. A study by Gravely *et al.* [7] also reported the awareness regarding the alternate nicotine delivery system (ANDS). In this study 46.2% participants believed e-cigarettes as smoking cessation tool

and according to study conducted by Patrice Marques *et al.*⁹ similar results were obtained. The current study revealed that 92% participants were aware of e-cigarette. In this study majority of the participants thought that e-cigarettes are equally harmful to conventional cigarettes on the other hand in a study conducted by Olivia *et al.* [13] participants rated e-cigarettes as less harmful.

E-cigarette was initially popularized as a safer way to intake nicotine but doctors still do not approve of it as a form of smoking cessation. These flavoured e-cigarette and cartridges contain chemicals like dactyl 2,3-pentanedione and acetone which cause bronchiolitis. The study indicates that the participants were well aware of harmful effects of smoking e-cigarette. The main aim being spreading awareness among young adults about the harmful effects of this fast-growing trend as the population over dosing on e-cigarette has increased. This study was conducted based on the respective online network of the authors and relied on the circulation of the study link on different social media platforms. There is a

possibility of bias as underprivileged populations may not have been able to participate in the study. The limitations of the study were the small sample size and easy sampling method. The study can be done using large sample size and/or different variables.

Recommendations

1. The comprehensive awareness regarding harmful effects of e-cigarettes among the smokers need to be increase through various awareness programs.
2. Periodic dental health check-up followed by health education can improve attitude and practices of population regarding dental health.

Conclusion

The study concluded that half of the population had knowledge about e-cigarette and attitude of the population towards e-cigarette was average. Practice among young adults was increasing relatively.

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