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The profile of electronic cigarette users in Turkey

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Abstract

OBJECTIVE: Data on electronic cigarette (e-cigarette) use patterns are limited worldwide. This paper examines user profile of e-cigarettes in Turkey.

MATERIALS AND METHODS: This is a descriptive study. E-cigarette users (≥ 18 ages) in Turkey were asked to participate in a web-based survey. The participants provided information on their use history, patterns of e-cigarette use, content of e-liquid (amount of nicotine, types of food additives, kinds of products purchased, etc.), attitudes regarding the product, and information on the concurrent use of classic cigarettes.

RESULTS: The online questionnaire was completed by 480 e-cigarette users. The results indicated that e-cigarette users have high incomes (100%), previous smoking dependency (100%), and a mean age of 35 ± 6 , and the majority of them are male (99.2%). They use e-cigarettes primarily to quit smoking or to reduce the harm associated with smoking (65.4%, 11.1%, respectively). The e-cigarette users (15.6%) intend to quit smoking by gradually reducing their e-liquid nicotine concentrations. The majority of them (76%) think that e-cigarettes and e-liquids could be harmful to children. Of them, 46.6% used second-generation e-cigarettes and 53.3% used third-generation e-cigarettes with direct dripping.

CONCLUSION: This study is the first description of the attitudes and use of e-cigarette users in Turkey. Results show that most of the users began to use e-cigarettes in order to quit smoking. According to the study findings, we propose an urgent need for an evaluation by health authorities for e-cigarette use and smoking cessation.

Keywords:

Cigarettes, e-cigarettes, electronic cigarettes, electronic nicotine delivery systems, online questionnaires

Introduction

Electronic cigarettes (e-cigarettes), also known as electronic nicotine delivery systems, personal vaporizers, vape pens, e-cigs, e-hookahs, or vaping devices, have become highly popular in recent years.^[1] It is estimated that the rapidly growing e-cigarette market will reach

10 billion dollars in 2017.^[2,3] According to the World Health Organization, over 3 billion dollars of e-cigarettes were sold in 2013 in the US alone. This figure is predicted to reach 17 billion dollars in 15 years.^[4,5]

E-cigarettes, are designed to vaporize a liquid solution of propylene glycol and/or vegetable glycerin in which nicotine or other flavors (such as chocolate, coffee, mint, or fruits) may be dissolved. They use a battery to vaporize this liquid mixture. As it is quite a new product, there is not enough

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information in the literature about the risks and benefits of e-cigarette use.^[6] The limited studies in the literature have shown that the liquid and vapor of e-cigarettes includes toxic chemicals such as nitrosamines, acrolein, formaldehyde, diethylene glycol, acetaldehyde, diacetyl, polycyclic aromatic hydrocarbons, and some metals.^[7] In recent years, the question of whether e-cigarette use is safe or not has become a significant matter of public and scientific debate. There is not enough scientific evidence about the effects of e-cigarettes for public institutions to help regulatory authorities and consumers.^[8]

E-cigarettes were first marketed 15 years ago and are now commonly used worldwide. In the last decade, e-cigarette use increased strikingly among teenagers and young adults in many countries, especially in Europe and the US.^[9] The results of observational and randomized studies suggest that e-cigarettes can help users to quit or cut down classical cigarette smoking.^[10,11] Percentage of e-cigarette users who said that they used e-cigarettes various reasons are shown in Figure 1.^[12] There are only a few cross-sectional studies of e-cigarette users in the literature, and their behavioral characteristics during the time they use e-cigarettes remain unclear.^[13,14] The striking increase in e-cigarette use has raised the importance of questions such as why and how people use e-cigarettes, and if they only use e-cigarettes or also smoke classic cigarettes. For this reason, this study was planned to determine the characteristics of e-cigarette users.

Materials and Methods

Since the sale and marketing of e-cigarettes are carried out mostly over the Internet, this descriptive study planned to reach e-cigarette users on the Internet. A web-based survey was applied to the e-cigarette users in Turkey over the Internet. This study was carried out from March to September 2018 with participants who were 18 or older. Since the number of e-cigarette users in Turkey is not known, the sample size of the study could not be calculated. For this reason, the minimum number of participants was determined by reviewing

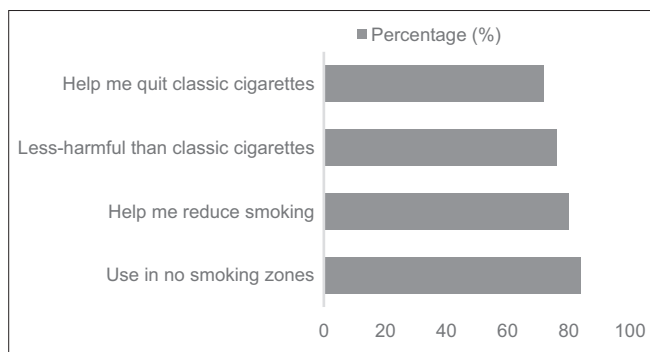


Figure 1: Percentage of electronic cigarette users who said that they used electronic cigarettes for various reason. *According to the Adkison et al. (2013)

previous studies of this subject.^[15] The aim was to reach to a higher number of people than the relevant previous studies. The survey was completed when the minimum required number of people was reached. The survey was administered to 480 e-cigarette users. Legal permission for the survey was obtained from the Ethical Commission of Clinical Research at Süleyman Demirel University (file number 2018/84).

The 24-question survey was administered to e-cigarette users to learn specific information about e-cigarette use such as reasons for using e-cigarettes, duration of use, types of e-cigarette, and e-liquid contents.

Results

Participant profiles

This study's sample included 476 men and 4 women with a mean age of 35 ± 6 years. It included young adults with high incomes (≥3000 TL) and high education levels. In this sample, e-cigarette use was much more common among men. The demographic characteristics of the participants are shown in Table 1.

The nicotine quantities and flavorings in electronic cigarettes

Most e-cigarette liquids contain flavoring substances. This study's participants used coffee (18.33%), tobacco (16.04%), mint (12.29%), vanilla (11.87%), cherry (10.00%), energy drink (6.87%), apple (6.04%), chocolate (3.33%), and cappuccino (3.33%) flavorings in their e-liquids. The flavors used by the participants are shown in Figure 2. Of them,

Table 1: The participant's demographic information

	Whole sample	
	n	Mean±SD
Age (years)	480	35±6
Gender, n (%)		
Male	476	99.2
Female	4	0.8

SD: Standard deviation

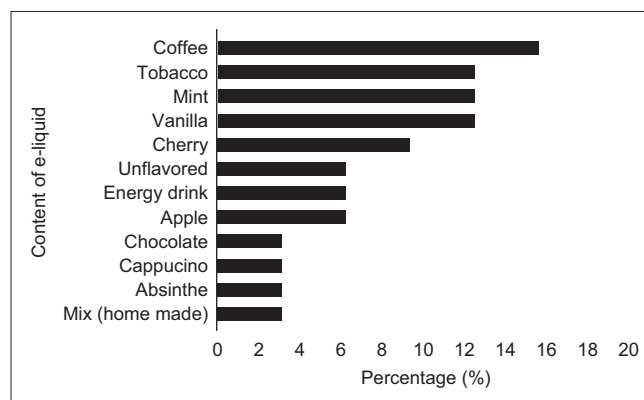


Figure 2: E-liquid flavors

7.70% used unflavored e-liquids. A few of them (3.75%) preferred to make their own e-liquids by mixing different flavors and substances in different concentrations. The fact that 0.41% of the participants used hallucinogenic absinth to their e-liquids was noted as significant information. The users' e-liquid nicotine quantities varied between 4 and 24 mg/ml. The nicotine concentrations of the e-liquids were as follows: 4 mg/ml (2.08%), 6 mg/ml (6.25%), 9 mg/ml (15.83%), 11 mg/ml (12.08%), 16 mg/ml (6.04%), 18 mg/ml (23.75%), and 24 mg/ml (6.45%). Of the participants, 18.33% preferred to make their own e-liquids using various compounds and flavoring substances in different concentrations. Of them, 9.16% chose to use nicotine-free e-liquids. Few users preferred e-cigarette cartridges with zero nicotine or little nicotine over the cartridges with medium or high levels of nicotine content. The quantities of nicotine levels of e-liquids preferred by the e-cigarette users are shown in Figure 3.

The characteristics of electronic cigarette use

The most important reason (65.44%) why e-cigarette users preferred e-cigarettes was determined to be quitting smoking. Of the participants, 11.10% said that they began using e-cigarettes because they thought it has less side effect than classical cigarettes. They said that they used e-cigarettes in order to quit smoking (65.4%) because they thought it has less side effects than classic cigarettes (11.1%) and because they could use e-cigarettes in the places where smoking classic cigarette is prohibited (6.6%). They also said that, compared to classic cigarettes, e-cigarettes include less chemical substances (6.6%). They use them in order not to bother nonsmokers (4.4%), to avoid unpleasant smells (4.4%) and because, in the long term, e-cigarettes are more cost-effective than classic cigarettes (1.2%). Percentage of e-cigarette users who said that they used e-cigarettes for various reasons is shown in Figure 4.

The participants were also asked about how long they had used e-cigarettes and how often they used them each day. The participants said that they used e-cigarettes once or more every half hour (50.83%), once an hour (25.00%), once every 1.5 h (10.62%), once every 2 h (1.87%), once every 3 h (5.00%), once or twice a day (2.50%), and twice to 4 times a day (4.16%). While 5% of the participants had been using e-cigarettes for 3 months or less, 49.16% had been using them for 3–6 months and 11.04% had been using them for more than 6 months. Of the participants, 21.87% had been using e-cigarettes for 1–2 years and 12.91% had been using them for more than 2 years. The participants' duration and frequency of use of e-cigarettes are shown in Figures 5 and 6.

Attitudes toward electronic cigarettes

The e-cigarette users heard about e-cigarettes from their friends (25%), e-cigarette commercials (40%), and

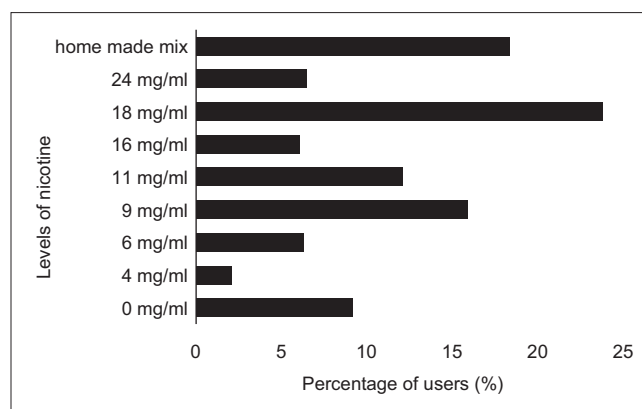


Figure 3: Nicotine levels of e-liquids

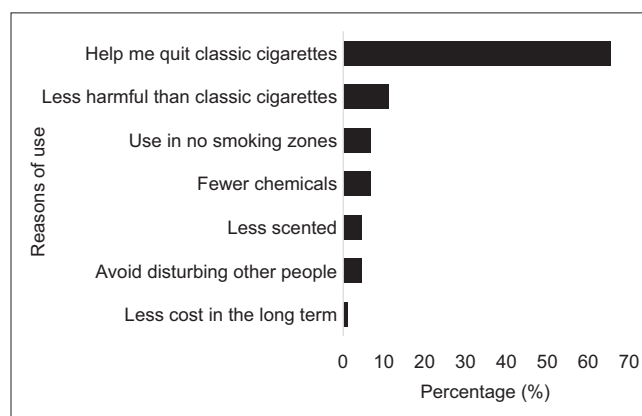


Figure 4: Percentage of electronic cigarette users who said that they used electronic cigarettes for various reasons

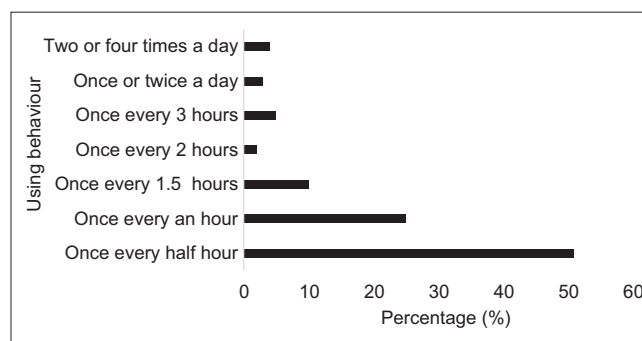


Figure 5: Frequency of electronic cigarette use

social media and websites with e-cigarette users (43%). The exposure profiles of e-cigarette users are shown in Figure 7. Among the participants, 15.41% intended to quit smoking by gradually reducing the quantity of nicotine in their e-liquids, and in the final stage, by using e-cigarettes with no nicotine. Of the participants, 75.87% thought that e-cigarettes could have harmful effects on children. None of the participants used first-generation e-cigarettes, 46.6% of them used second-generation e-cigarette, and 53.3% used third-generation e-cigarettes with direct dripping. The

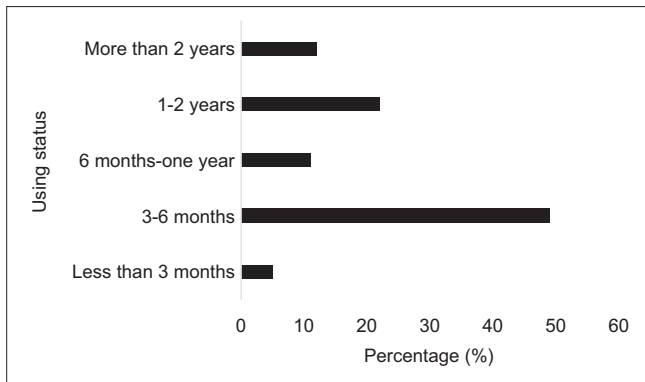


Figure 6: Use duration

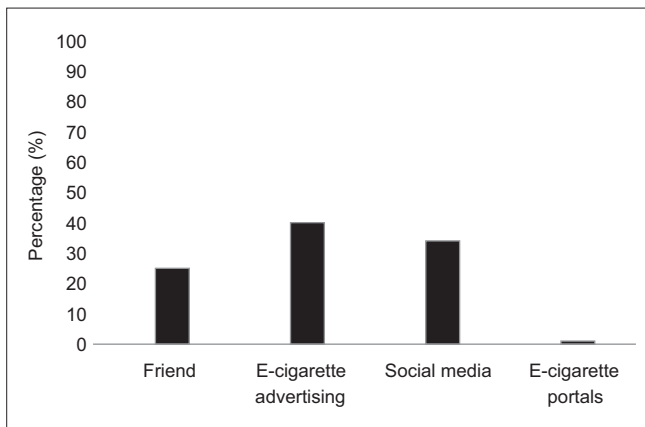


Figure 7: Exposure to electronic cigarettes

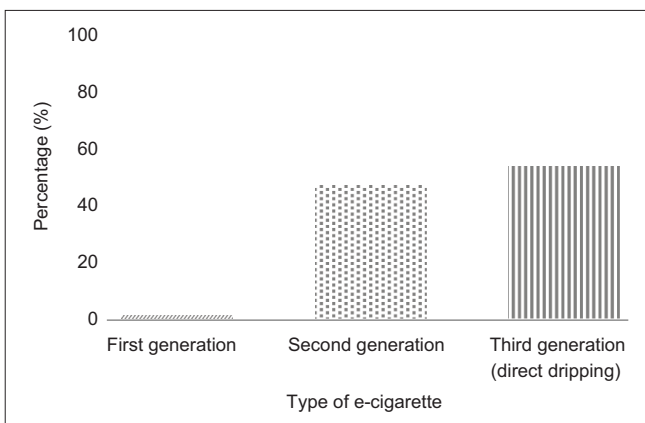


Figure 8: Type of electronic cigarettes

kinds of e-cigarettes preferred by the e-cigarette users are shown in Figure 8.

The side effects of electronic cigarettes

The participants were asked whether e-cigarettes have potential side effects or not, and they mentioned six side effects as follows: shortness of breath, dry coughing, lip dryness, nasal dryness, sore throat, and heart palpitations. Of the participants, 15% said that they had respiratory problems such shortness of breath

Table 2: Reasons of electronic-cigarette use in several countries

Country	Number of participant	Sales	Reasons of use	References
Canada	1581	Illegal	To reduce the harm of smoking, or to help quit using classic cigarettes	[12]
US	1520	Legal		
UK	1325	Legal		
Australia	1513	Illegal		
Germany	319	Illegal	To reduce cigarette consumption per day or quit smoking	[15]
Turkey	480	Illegal	To quit smoking	Present study

US: United States, UK: United Kingdom

and dry coughing, 8.95% had lip dryness, and 0.20% complained about nasal dryness. Since a few of the participants had sore throat and heart palpitations and felt that their mouths were covered inside by a layer of fat, these issues were noted as adverse effects of e-cigarette use.

Discussion

Since e-cigarettes are quite a new product, the data on the profile of their users are also quite inadequate.^[16] Although measures and precautions have been taken to reduce classic cigarette smoking and the smoking of classic cigarette has decreased for the last 20 years in Turkey, e-cigarette use has started to become widespread. Studies have shown that e-cigarette use is common in the populations' high incomes and especially among young people.^[17,18] This study found that, in Turkey, e-cigarette users have high incomes and levels of education, and that most of them are male young adults. E-cigarette users use various flavoring substances in their e-liquids. Some users are attracted by e-cigarettes because of these flavorings. However, there is not enough information about the chemical content of the substances used in e-liquids and their toxicity because too few scientific studies have been conducted.^[12,19-22] The majority of this study's participants indicated that they used e-cigarettes in order to quit smoking classic cigarettes or to reduce side effects of classic cigarettes. The reasons of e-cigarette use in several countries are shown in Table 2. The results of the survey suggest that most e-cigarette users had smoking addictions before they used e-cigarettes, that they use classic cigarettes at the same time, and that they began using e-cigarettes in order to cut down or quit smoking cigarette.^[12,16,22-25] This study's participants' main reason for beginning

e-cigarette use was to quit smoking. The scientific literature has drawn attention to a distinctive increase in e-cigarette use among young people and young adults. Recently, e-cigarette use for nicotine replacement therapy and its effectiveness has been an important debate in the literature. Our study results are important since they include the first information about e-cigarette users and e-liquids. Further studies should be performed with more users, and research about passive exposure to e-cigarettes should be carried out.

Conclusion

E-cigarettes are increasingly being used by young people in recent years. Recent data showed that 1.78 million young people have tried e-cigarettes, and of them, 160,000 had never smoked before.^[4,5] Middle school use of e-cigarettes increased by 48%, and high school use increased by 78% in the US from 2017 to 2018.^[25] Thus, e-cigarette use is a significant public health problem. This study determined the characteristics of e-cigarette use and the e-liquid contents of adult e-cigarette users in Turkey. Our survey is important because it contains the first data about e-cigarette users in Turkey. Most of them began to use e-cigarettes to quit smoking. Although the participants started to use e-cigarettes in order to quit smoking, the issue of whether e-cigarettes can be used for smoking cessation is quite new, and there is not enough research on the subject. The increase in e-cigarette commercials and their sale and marketing on the Internet have made their use common. Therefore, measures and precautions should be taken for public health.

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Conflicts of interest

There are no conflicts of interest.

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