Original Article

Evaluating The Prevalence Of Vaping (E-Cigarettes) And Associated Factors Among Private / Public College Students Of Karachi

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Abstract

Background:

Modern e-cigarettes are more socially acceptable alternatives to combustible cigarettes among teenagers and young adults because of their attractive appearance, user-friendly features, less unpleasant smoking experiences, tempting flavors, and capacity for discrete usage. But, if this habit continue without supervision, may have deleterious effects on physical and mental health. Therefore, there is a need to determine the patterns of use, especially among adolescents and young adults. This study aims to assess the prevalence and factors associated with electronic cigarette use among university students in South Karachi, Pakistan.

Objective: To determine the prevalence and associated factors with e-cigarette use among young adults studying in Colleges of Karachi, Pakistan

Method: A cross-sectional study with Purposive sampling technique. All students' aged 16-19 attending college and university were included. A structured questionnaire was designed specifically for the study.

Result: Almost half (n=504, or 50.4%) of the 1000 students used to vape. The study's findings also showed that 41.9% of participants used to vape daily, 32.2% of participants who had been using e-cigarettes for less than a year. When analyzing the relationship between demographic factors and student e-cigarette usage, it was found that birth order (p=0.035), school type (p=0.013), and chronic disease (p=0.014) all exhibited statistically significant associations.

Conclusion: Vaping is incredibly popular with college and university students in Karachi. The prevalence of vaping among these college students is associated with their gender, being born in the fifth or higher position in the birth order, attending a private school, and having a chronic disease. It is crucial to spread knowledge of the negative effects of vaping, such as lung damage brought on by e-cigarette or vaping usage (EVALI).

INTRODUCTION

Smoking is one of the main threat elements for untimely loss of life and disability [1]. The mortality and morbidity related to cigarette smoking arises commonly from the inhalation of pollutants apart from nicotine contained in the smoke. By offering a heated vapour containing nicotine without tobacco combustion, digital cigarettes (e-cigarettes) seem to lessen the cravings and withdrawal signs related to abstinence in people who smoke [2], even as being a good deal more secure than normal cigarettes.

Electronic cigarettes (e-cigarettes) are battery-powered devices that deliver volatilized nicotine and induce the sensation of smoking traditional cigarettes without involving the combustion of tobacco [3]. Due to their appealing design, user-friendly functions, less aversive smoking experiences, desirable flavors, and ability to be used discreetly, modern e-cigarettes are more socially acceptable alternatives to combustible cigarettes among adolescents and young adults [4]. E-cigarettes are becoming increasingly popular, but they'll be harmful to consumers by contributing to primary nicotine addiction in young adults and the renormalization of smoking behaviors [5]. Recent studies on the prevalence of e-cigarettes have revealed a consistent increase in use among young adults [5, 6]. Between 2011 and 2018, there was a nearly 14-fold increase in rates of current e-cigarette use among adolescents in the United States, with e-cigarettes use exceeding combustible cigarette use; in 2018, past 30-day e-cigarette use was reported by 21% of high school (3.05 million) and 5% of middle school (570,000) students, compared to combustible cigarette use, which was reported by 8% of high school (1.1 million) and 2% of middle school (570,000) students [6]. A similar increase has been reported in Europe [7]. In India, to my knowledge, few studies have explored the use of e-cigarettes. The 2015 GATS – 2 estimated that the prevalence of use was 0.02% (268,000 users) [8]. In Pakistan, a cross-sectional study was conducted in 2017 among 500 medical students reveals 6.2% prevalence [9]. Similar study was conducted in 2018 at Agha Khan University Hospital, Karachi, comprised people aged above 18 years and conclude 10.1% of prevalence among the participants [10] As e-cigarettes have emerged and gaining popularity in the Pakistani population, there is need to monitor associated factors and patterns of use particularly among young adults and high school students. However, there is a paucity of studies on the associated factors, prevalence, and pattern of use among adolescents and young adults.

The purpose of this study is to determine the prevalence and risk factors for e-cigarette use among young adults studying at University or Colleges in Karachi, Pakistan. Furthermore, this study finding can be used as a baseline for future intervention studies, as well as to formulate regulatory policies aimed at reducing the overall burden of nicotine dependence among adolescents and young adults.

METHODOLOGY:

A cross-sectional study conducted between Dec 2020 to April 2021 in Karachi, among students of Private university to access prevalence of vaping and associated factors. Data were drawn from the students aged 16-19 years through Purposive sampling technique and given verbal consent to participate in the study. After taking their verbal informed consent, the students were interviewed by the principal investigator.

A validated structured questionnaire was designed specifically for the study after thorough literature review and were modified according to the study requirements. The questionnaire had three main sections. The first section included 6 questions about demographic information of the study participant, the second section included 10 questions to collect vaping information while the third section comprises of questions related to quit attempts, friends use of e-cigarettes and use of other tobacco products.

Demographic data was analyzed using descriptive statistics. Bivariate associations between variables were assessed using chi-squared test. Statistical analysis was done using SPSS version 21 after coding and then cleaned by checking for missing variables by running frequency analysis. Any missing variables identified were checked for entry error or missing information, and the entry errors were rectified accordingly.

The study was approved by independent local review body of the University.

RESULTS:

A total of 1000 students were enrolled in the study, all participants (100%) completed questionnaire survey. Participants had a mean age of 17.6 years and majority of the respondents were between the ages of 17-19 years. A male to female ratio of 2.2:1 was obtained within the study population (Table 1). About 86% of participants were private colleges/university students while 14% participants were public college/university students. About, 26.3% of

the participants were in 1st birth order while 23.7% were in 2nd birth order. Among participants who had ever used e-cigarettes (n=504, 50.4%) (Table 1).

Variables (n=1000)	Count (%)
Gender	
Male	**697 (69.7)**
Female	**303 (30.3)**
Age (years)	
15	**4 (0.4)**
16	**127 (12.7)**
17	**317 (31.7)**
18	**303 (30.3)**
19	**245 (24.5)**
Birth order	
1st	**263 (26.3)**
2nd	**237 (23.7)**
3rd	**207 (20.7)**
4th	**165 (16.5)**
5th or higher	**128 (12.8)**
Type of school	
Public	**140 (14.0)**
Private	**860 (86.0)**
Do you have any chronic illness?	
Yes	**220 (22.0)**
No	**780 (78.0)**
If yes, then which of the following diseases do you have?	
Any respiratory disease	**85 (8.5)**
Any cardiovascular disease	**42 (4.2)**
Any other disease (please specify)	**86 (8.6)**
Do you vape or use e-cigarettes?	
Yes	**504 (50.4)**
No	**496 (49.6)**

Table 1. Descriptive variables and sociodemographic distribution of participants.

The study results additionally uncovered that 32.2% of the participants were using e-cigarettes less than a year whereas 41.9% used to vape daily. 56.7% of students persuaded to begin vaping by their companions and friends while 19.2% of their friends do not use e-cigarettes. 67.9% of their family members do not vape. With respect to of their family members when they knew about their vaping habit 58.5% of them annoyed. 59.7% of students attempted to stop vaping while almost half of them 51.5% succeeded, and 26.8% of them revealed that they concede if they forced to quit vaping though 48.8% of them not sure about that (Table 2).

Variables (n=504)	Count (%)
For how long are you using e-cigarretes?	
Less than a year	**166 (32.9)**
One year	**91 (18.1)**
Two years	**115 (22.8)**
Three years	**33 (6.5)**
More than three years	**99 (19.6)**
How often do you use e-cigarettes?	
Daily	**211 (41.9)**
Weekly	**106 (21.0)**
Seldom	**187 (37.1)**
What motivated you to start vaping?	
Friends/Company	**286 (56.7)**
Family/Relatives	**59 (11.7)**
Started Myself	**159 (31.5)**
How many of your friends use to vape?	
None	**97 (19.2)**
A few	**273 (54.2)**
All of them	**134 (26.6)**
How many of your family members use to vape?	
None	**342 (67.9)**
A few	**140 (27.8)**
All of them	**22 (4.4)**
What was the reaction of your family members when they knew about your vaping?	
Annoyance	**295 (58.5)**
Indifference	**179 (35.5)**
Encouragement	**30 (6.0)**
Have you ever tried to quit vaping?	
Yes	**301 (59.7)**
No	**203 (40.3)**
If yes, did you succeed?	
Yes	**155 (51.5)**
No	**146(48.5)**
What will you do if you are forced to quit by anyone?	
Confront	**123 (24.4)**
Cocede	**135 (26.8)**
Not sure	**246 (48.8)**

Table 2. Pattern of use and quit attempts among E-cigarette users.

While determining the association between demographic characteristics and use of e-cigarettes by students it was seen that birth order (p=0.035), school type(p=0.013) and chronic illness(p=0.014), had significant association with use of e-cigarettes, where those who were 5th or above by their birth order, studied at private school system or had chronic illness were more likely to vape than those who were 1st/2nd or 3rd/4th by their birth order (57.0% Vs. 52.4% and 45.4% respectively), went to public school system (52.0% Vs. 40.7%) and had no chronic illness (57.7% Vs.48.3%) (Table 3).

Variables (n=1000)	Use of Vape or e-cigarettes		p
	Yes (n=504)	No (n=496)	
	Count (%)	Count (%)	
Gender			
Male	**362 (51.9)**	**335 (48.1)**	**0.14**
Female	**142 (46.9)**	**161 (53.1)**	
Birth Order			
1st/2nd	**262 (52.4)**	**238 (47.6)**	**0.035**
3rd/4th	**169 (45.4)**	**203 (54.6)**	
5th or above	**73 (57.0)**	**55 (43.0)**	
School Type			
Public	**57(40.7)**	**83 (59.3)**	**0.013**
Private	**447 (52.0)**	**413 (41.3)**	
Chronic Illness			
Yes	**127 (57.7)**	**93 (42.3)**	**0.014**
No	**337 (48.3)**	**403 (51.7)**	

Table 3. Factors associated with E-cigarette ever-use

DISCUSSION:

The present study has carried out to evaluate the prevalence and factors associated with use of e-cigarettes among young adults studying in south district educational institution of Karachi. Results reveals that 50.4% of our study participants reported e-cigarette ever-use. We have also found in our results that increasing age, male sex, birth order's, studying at private schools, chronic illness, as well as friend's use of e-cigarettes, are associated with higher percentage of e-cigarette ever use.

The prevalence of using e-cigarette (vaping) is well documented in the United States and Europe. In the United States, the prevalence of current e-cigarette use was estimated at 14.9% in 2018 [11]. While in Europe, prevalence rates of ever-use of e-cigarettes amongst persons aged 15years and above were found highest in Italy (50%) and Belgium (48%) and lowest in Germany (23%) 2021 [12]. Our findings in Karachi shows a prevalence of 50.4% ever-users and 0.9% current users. These findings may suggest a relatively higher prevalence in subcontinent (Karachi) compared to Europe and the United States. The relatively high socioeconomic status of south region of Karachi may account for this higher prevalence, as well as the new entrance of these products into the market attract undergraduate students of colleges. However, if authorities unchecked this trend it may rise because e-cigarettes are less harmful than combustible tobacco products [13], the long-term effects of it use are unknown, and evidence are still gathering on the adverse health effects of e-cigarettes [14]. Also, with mass marketing strategies and access to e-cigarette shops, the use of e-cigarettes can rise correspondingly [15]. The implication of this could lead to higher prevalence in the future, and e-cigarettes aiding as gateway products for young adults to progress to combustible tobacco use [15], leading to a concurrent increase in tobacco-induced diseases.

Results of our study shows young adults of 17 years or above were use more e-cigarettes than adolescents between 15 and 16 years. Similarly, more males than females used e-cigarettes, with significantly higher percentage of ever-use among males than females. Our findings are consistent with previous researches done in United States and Nigeria [16, 17]. This marvel may be explained by the social perception towards smoking that is generally more tolerant of male than female smokers [18], as well as the common social disapproval of women smoking in many Asian societies. The more use of e-cigarettes among young adults may be due to strict policies of prohibiting combustible cigarettes among adolescents, its affordability and access, and the increase exposure to advertising among young adults over time [18]. Hence, targeted health alerts through messaging based on gender differences and age are essential in justifying the uptake of e-cigarettes, especially among adolescent and young adult never-users in the community.

Respondents that self-reported chronic illness and higher percentage of e-cigarette ever-use, while those with a history of ever-using tobacco products or substances had four times significantly higher percentage. Corroborating our findings, several studies have reported a positive association between e-cigarette use and chronic illness [19].

As like previous studies [20-22], our results suggest that e-cigarette users with friends who were current users of e-cigarettes had 6% higher percent of e-cigarette ever-use. The link between the ever-use of e-cigarette and friends' e-cigarette use may mean adolescents and young adults who perceive greater social approval are more likely to use e-cigarettes [22]. In our survey of college students, we have found that socializing with friends who used e-cigarettes were positively associated with likelihood of having been offered an e-cigarette by their friend previously, the perceived likelihood of taking this offer in the future and use of e-cigarette as well. Therefore, careful monitoring and counselling must be given to young adults with a history of tobacco use in any form, social network of e-cigarette users and young adults who have any form of addiction.

Currently, the prevalence of tobacco uses among the youth (ages 13-15 years) in Pakistan is estimated to be 10.7% use any form of tobacco (boys 13.3%; girls 6.6%) [23]. Tobacco control policies in the country at present, Smoking is prohibited in all places of public work or use, and on all public transport. Ban on advertising and promotional activities from tobacco manufacturers and retailers, however, a breeches in the law permits advertising activities to consenting adults [24]. In addition, except in designated smoking areas (hotel guest rooms), all forms of smoking are prohibited in indoor public places and outdoor social venues, buses, trains and restaurants [24].

Presently, there are no restrictions to the buy, sale, and market e-cigarettes in Pakistan, according to the Tobacco Control Cell, 2007 [24]. Similarly, there are no regulations in place for the contents and labelling of e-cigarettes and products. The lack of policies regulating e-cigarettes can potentially give a free hand to tobacco industry to market these products, encouraging unintended effects that can be compounded by their inherent novelty, flavors, and addictive nicotine content. An evaluation of e-cigarette products at a major online retail store in Karachi indicates the presence of 2nd to 4th generation devices at prices ranging from 1800 rupees (~$9) to 16000 rupees (~$78) [25]. These prices propose e-cigarettes are more expensive than combustible cigarettes. However, they remain reachable and affordable for a substantial proportion of Karachi, especially those of middle to upper socioeconomic status. The results from this study can provide evidence for making and revising policies of Tobacco Control Cell to capture e-cigarettes or support the design and implementation of a State-wide policy aimed at regulating e-cigarettes in Karachi, Pakistan.

Conclusion:

In Karachi, the habit of vaping is getting popular among university students particularly males, who were studying in private school system and had $1^{st}/2^{nd}$ birth order. Therefore, due to these alarming results, it is essential to raise awareness about the harmful consequences of vaping, including e-cigarette or vaping associated lung injury (EVALI), as well as other known health risks of vaping in college campuses by utilizing all the possible resources through social media and arranging seminars highlighting e-cigarettes hazards.

Availability of Data:

Authors confirm that data supporting the results of this study are available in the article.

Conflict of Interest:

All authors declared no conflict of interest.

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