Original Article

Vaping and Associated Health Problems in University Students of Lahore

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Abstract

Objective: This study was carried out to assess health issues associated with Vaping among medical and non-medical students of Lahore.

Method: An analytical cross sectional study was conducted from March 2020 to July 2020 among students of multiple medical and non-medical colleges and universities. A sample of 160 students who were involved in vaping was collected through snow ball sampling technique. After IRB approval, pre-tested structured questionnaire was disseminated via Google forms. Students who were using E cigarettes and were willing to participate, were included in this study. Data was analyzed using SPSS version 22. Chi-square test was applied and p-value at <0.05 was considered significant to find out an association between knowledge and side effects reported in medical and non-medical students.

Results: This study included 160 students who were already involved in vaping, out of which 111(69.38%) were male and 49(30.63%) were female. Health effects associated include cough 38(27%), shortness of breath 24(15%), palpitations 18(11.25%) and loss of appetite 16(10%).When asked about different reasons behind starting e-cigarettes it was concluded as better alternative than smoking 70 (43.75%) followed by social up-gradation by 48 (30%) of the participants. Significant association was found among respondents using e-cigarettes and awareness regarding presence of nicotine (p=0.02), harmful chemicals (p=0.05) and adverse effects associated with it (p=0.002)

Conclusion: The study concluded that Vaping is more common in the students from other discipline rather than Medical students due to lack of information about its health hazards. Friends were the commonest source of information. Most of the non-medical students were unaware of harmful chemical ingredients present in e-cigarettes and the most common adverse effect reported was productive cough.

Keywords: vape, medical and non-medical students, health issues.

Introduction

The industry of E-cigarettes has flourished in recent years with the ubiquity surpassing standard cigarette use among adults. Electronic cigarettes also known as electronic nicotine delivery systems (ENDS) which simulates tobacco smoking are battery-operated atomizers which delivers nicotine via inhalable aerosol generated from a nicotine-containing solution.[1] Other terms also used for this product includes "electronic cigarette," "e-cigarette," "e-cig," "e-pen," "e-hookah," "electronic hookah," "hookah pen," "hookah vape," "pen".[2] Recent statistics of WHO suggest that global market of E-cigarettes is increasing gradually accounting for 56 % by USA,12% by UK,21% is divided among China, France ,Germany, Italy and Poland.[3] The burgeoning of electronic Vaping products raises many solicitudes as they expose adolescents to different respiratory health issues, carcinogens and increasing nicotine dependence.[4]

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There is significant disparity in the prevalence of e-cigarettes from country to country. The prevalence of e-cigarettes usage in developed countries between years 2009-2013 is 7% in Australia, 6% in the U.S and 4% in the UK. In Asia, Malaysia has the highest prevalence of e-cigarette at 14% and Republic of Korea at 7% and notably China at 0.05%.[5] The prevalence in Bangladesh in 2018 was 0.4%, in India was 0.02% and in Pakistan the prevalence among adults is 7.1%.[6] There have been a multitude of studies carried out on the health impacts of e-cigarettes which included pulmonary ailments like upper and lower respiratory irritation, bronchitis, cough and emphysema.[7] In a study regular use of e-cigarette was linked to increased sympathetic control on the heart and oxidative stress, both related to increased cardiovascular disease risk.[8] Psychosocially e-cigarettes have shown an increase chance of development of depression, panic disorder, obsessive compulsive disorders, and alcohol drug use and abuse.[9]

Currently E-cigarettes are being promoted as a safer option to smoking traditional cigarettes or to facilitate quitting smoking completely.[10] E-cigarettes are commonly advertised to youth and young adults through television ads and can easily be bought online with little to none age verification making them easily accessible to even minors.[11] There is a ban on selling e-cigarettes in certain countries (Australia, Brazil, Canada, Mexico, Panama, Singapore, and Switzerland), and is regulated in 68 countries.[12] In Pakistan however, the import and sale of e-cigarettes is considered legal.[13] E-cigarettes are now an emerging public health concern across the globe. With an immense dearth of data and understanding of the prevalence, access, attitudes and awareness in the youth and young adults of developing countries, in-depth analysis of e-cigarettes are the need of the hour. Our study focuses on students of multiple medical colleges and non-medical institutes of Lahore and is aimed to assess the knowledge and health issues of students about the related health risk behavior specific to Vaping.

Material and Methods

This Analytical study was conducted through an online survey from March 2020 to July 2020. Google form having structured pre-tested questionnaire was generated for the purpose of data collection. Taking prevalence at 7.1 % similar to study conducted among university students in New Zealand in 2018,[14] confidence level of 95% and keeping the margin of error at 5%, a sample size of 377 was calculated through WHO online sample size calculator. Despite of large sample size, only 160 responses were obtained. Although Snow ball sampling technique was used for data collection to identify the students who were already vaping but due to social discrimination, many students ignored the request of primary investigator to fill in the google form. Students from different medical & non-medical colleges and universities were included in this study. Before collection of data, IRB clearance (Approval no M-19/043/-CM) was obtained from Institutional Review Board of Akhtar Saeed Medical and Dental College. Maintaining confidentiality, the collected data was reviewed, coded and entered in the Statistical Package for Social Sciences (SPSS) version 22. Variables were presented in the form of tables, bar charts and pie charts. Chi-square test was applied to find out association between knowledge of medical and non-medical students and associated side effects encountered in them and p value ≤0.05 was taken as significant association between dependent and independent variables.

Results

Total sample of the study was 160 students who were already involved in vaping, identified through snow ball sampling technique. Among these 160 students, 111(69.3%) were males and 49(30.63%) were females.

Table 1: *Socio-Demographic Profile (n=160).*

VARIABLES	FREQUENCY (n)	PERCENTAGE (%)
Age in Years		
16-20	46	28.75
21-24	111	69.3
More than 24	3	1.875
Gender Distribution		
Male	111	69.3%
Female	49	30.63
Course Of Study		
Medical students	59	36.88
Non-medical students	101	63.13
Father's Occupation		
Landlord	22	13.75
Office worker	13	8.13
Professional	87	54.38
Businessman	38	23.75
Monthly Family Income(Rs)		
Less than 30,000	19	11.8
30,000 – 70,000	59	36.95
More than 70,000	82	51.25

The respondent's mean age was 19±3.31 years. There was categorization of students according to age group and highest response was obtained from age group

Table 2: *Knowledge and Awareness about E-cigarettes (n=160)*

Variables	Frequency (n)	Percentage (%)
Age since first use E-cigarettes		
12- 17 years	20	`12.52
18- 22 years	48	30.02
Above 22 years	92	57.5
Awareness regarding chemicals in E-cigarettes		
Yes	72	45
No	88	55
Chemical ingredient in E-cigarettes(n=72)		
Carcinogen	10	13.89
Nicotine	44	61.11
Tar	12	16.67
Lead	6	2.78
Frequency of E-cigarettes		
Daily	39	24.4
Weekly	7	4.4
Monthly	3	1.9
Occasionally	57	35.6
Source of knowledge about E-cigarettes		
Social & Electronic media	12	7.5
Magazines	1	0.6
Researches	2	1.2
Spouses	1	0.6
Advertisement	10	6.3
Family & Friends	85	52.5
Others	49	31.3
Knowledge about source of purchase of E-cigarettes		
Friend	20	12.5
Market	124	77.5
Online	16	10
Amount spent on E-cigarettes per month in Rupees		
Less than 10.000	54	33.75
10,000-14,000	75	46.8
More than 14,000	31	19.45
Reasons Behind Vaping		
Better alternative to smoking	11	9.4
Looks cool	10	8.1
Coping Stress	12	7.5
Trending among friends	30	18.8
Helps in quitting smoking	17	26.8
Enjoyable flavors	14	8.8
Relieve stress	12	7.5
To impress others	3	1.9
Others	51	37.3

21-24 years as this group included 111(69.3%) students. Out of total 160 students 59(36.88%) were Medical students and 101(63.13%) were from other discipline. Relating to the Father's income 82 (51.25%) were having monthly income of more than 70,000 rupees. (Table-1)

Among total 160 students 92(57.5%) were using e-cigarettes above 22 years and 20(12.52%) students were those who were using e-cigarettes from 12 to 17 years. Regarding the awareness 72(45%) students out of total were aware of different chemicals present in E-cigarettes. Out of 72(45%) participants who were aware of chemicals, 44(61.1%) of them knew about nicotine in e-cigarettes, 12(16.67%) knew about tar, 10(13.89%) knew about carcinogen and 6(2.78%) knew about lead. (Table 2)

Out of total respondents, signs and symptoms experienced within 30 days or less after using vape was that 38 (27.5%) had cough 18(11.25%) experienced palpitations, allergies in 14(8.75%), chest pain in 18(11.25%), loss of appetite in 16 (10%), shortness of breath in 24 (15%) and wheezing 10 (6.25%) of the participants as illustrated in (Fig-1).
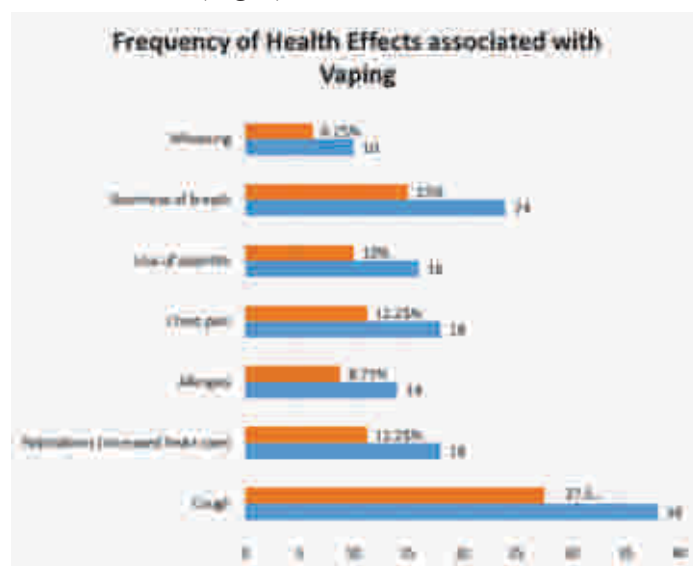
Fig-I: *Frequency of Health Effects Associated with Vaping*

Bi variate analysis was conducted to find out the difference in medical and non-medical students regarding knowledge, reason of vaping and side effects. It was observed that medical students had better knowledge about adverse effects related to E-cigarettes as compared to non-medical students. Majority of the medical students were aware that E cigarettes contain harmful

substances other than nicotine (p=0.05). Medical students had better knowledge that E cigarettes contain high level of nicotine (p=0.02). Lack of knowledge about ill health effects of vaping were observed in non-medical students. (Table 3).

Table 3: *Bivariate analysis about E-cigarettes awareness among medical and non-medical students.*

Variables	Medical students	Non-medical students	Total	p-value
E-cigarettes containing harmful substances beside Nicotine				
Not Aware	22(37%)	55(54%)	77(48%)	0.05*
Aware	37(62%)	46(45%)	83(52)	
High Levels of nicotine in E-cigarettes				
Not aware	26(44%)	59(58.5%)	85(53%)	0.02*
Aware	33(56%)	42(41.5%)	75(47%)	
Awareness regarding adverse effects related to E-cigarettes				
Not aware	15(25%)	46(45%)	61(38%)	0.002*
Aware	44(75%)	55(55%)	99(62%)	
Money spent on E-cigarettes monthly				
Less than10,000	36(61%)	56(55.4%)	92(57.5%)	
Rs.10,000-12,000	18(30.5%)	34(33.8%)	52(32.5%)	0.592
More than 14,000	5(8.5%)	11(10.8%)	16(10%)	
Sources of knowledge about E-cigarettes				
Friends	30(50.8%)	50(49.5%)	80(50%)	0.468
Advertisement	5(8.47%)	5(4.95%)	10(6.45%)	
Family	2(3.5%)	2(1.98%)	4(2.5%)	
Magazines	0	1(0.99%)	1(0.625%)	
Researches	1(1.69%)	0	1(0.625%)	
Spouses	1(1.69%)	0	1(0.625%)	
Social media	3(5%)	9(8.25%)	12(7.5%)	
Others	17(28.8%)	34(33.6%)	51(31.8%)	
Reason behind purchasing E-cigarettes				
Better alternative than smoking	5(8.47%)	10(9.9%)	15(9.3%)	0.532
Presence of enjoyable flavors	6(10.16%)	8(7.92%)	14(8.75%)	
Helps in quitting smoking	8(13.5%)	6(5.94%)	14(8.75%)	
Trending among friends	7(11.8%)	23(22.7%)	30(18.7%)	
Relieve stress	6(10.16%)	6(5.94%)	12(7.5%)	
Looks cool	7(11.8%)	6(5.94)	13(8.125%)	
To impress others	0	3(2.97%)	3(1.87%)	
Others	20(33.89%)	39(38.6%)	59(36.8%)	

Discussion

Electronic nicotine delivery systems usage, which is referred commonly as e- cigarettes or Vaping has surged in popularity since its introduction in markets. Electronic cigarettes (e-cigarettes) and vape devices have rapidly become the most commonly used tobacco products by youth, driven in large part by marketing and advertising by e-cigarette companies.[15]

This research was carried out to see the frequency of Vaping, smoking and its related health issues in medical and non-medical students from other courses. Out of 160 respondents, 111(69.35%) were males and 49(30.63%) were females. However, in a similar study related to e- cigarettes usage carried out in Canada, 295(53.6%) were males and 256(46.4%) of the respondents were females.[16] In current study, the respondents of age group 21-24 years that is 111(69.3%) were the maximum number of the respondents, and was similar from the study conducted in United States of America where the age group with highest percentage of Vaping was also among 20-24 years old.[17] In this study, 59(36.88%) were medical students and 101(63.13%) students were from other courses of study. While a study conducted in Poland, 141(25.87%) were medical students and 195(37.28%) students were from other courses.[18] In our study, students from other fields of education were indulged more in Vaping and smoking than the students of medical universities which was due to ignorance about carcinogens and other harmful ingredients present in e-cigarettes and was similar to the research conducted in Poland in 2017 where the students of other courses used e-cigarette more than the medical students.[19] In this study, 39(24.38%) used e-cigarette daily, 10(6.24%) used e-cigarette weekly, and 111(69.38) used e-cigarette occasionally. In another study conducted in USA, 10.3% used e-cigarette daily, 59.5% used occasionally, 29.2% reported regular usage which was not similar to our study.[20]

In this study, 13(8.13%) of the respondents got information about e-cigarettes through Social & Electronic media, 11(6.8%) from advertisement and 136(85%) from family and friends. Similarly, in a qualitative study conducted in USA in 2020 showed friends was the most acceptable source of information.[21] Out of total participants, 20(12.5%) purchased e-cigarette from their friends, 124(77.5%) bought their e-cigarette from market and 16(10%) got their e-cigarette through online shopping platforms. Whereas an online study conducted in United States of America, 537(31.1%) of their respondents purchased from a store or online, 282(16.3%) bought from friends and 259 (15%) from market and home deliveries.[22] In this regard our study was not similar to the study conducted in United States of

America where easy availability of e-cigarettes in markets along with online shopping stores with free home delivery has increased the usage of e-cigarettes among the students of different universities.

In our study, majority of participants thought that e-cigarettes are better alternative to smoking, while 30 (18.8%) used e-cigarette as a trend and 24(15%) used e-cigarette for coping with stress and depression. Similarly, in another survey conducted in the Germany, 2150 (85.6%) of the participants thought Vaping was helpful for cutting down on smoking while 430(14.4%) used for stress management.23 Out of 160 respondents, 84 (52.5%) were unaware of the chemicals/ingredients used in e-cigarettes whereas 72 (45%) were aware of the chemicals/ingredients used in e-cigarettes. Another study conducted in Flanders, where 53(70%) believed that e-cigarette contain chemicals which are carcinogenic, increase cardiovascular risk and increase the risk of lung disease.[24] The result indicated that highest percentage of students in this study did not know about the ingredients used in e-cigarettes.

In this study out of total respondents, signs and symptoms experienced within 30 days or less after using e-cigarette were, palpitations(increase heart rate) in 18(11.25%), allergies in 14(8.75%), chest pain in 18 (11.25%), loss of appetite in 16(10%), shortness of breath in 24(15%) and wheezing 10(6.25%),whereas in another study conducted in USA, symptoms experienced within 30 days were, chest pain 52(9.9%), shortness of breath 222(41.8%), wheezing 171(32.1%), chest tightness 119(22.5%), headache 234(44.1%) which were not similar to our study.25 Out of total respondents, 75 (46.875%) knew about different levels of nicotine in each cigarette and 85(53.125%) did not know about the levels of nicotine in e-cigarette. Similarly, another study conducted in United States of America, 146(28.5%) were using nicotine free e-liquid and 175(34.1%) were not knowing much about the e-liquid nicotine concentration.

Conclusion

The result of this study showed that students having less information and knowledge about harmful effects of E-cigarettes are more prone to Vaping. Male students were more involved than female students and friends were the commonest source of information about Vaping and e-cigarettes.

Conflict of Interest   *None*

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Authors Contribution

SB: Conceptualization of Project

MJ: Data Collection

AI: Literature Search

MA: Statistical Analysis

SP: Drafting, Revision

MH: Writing of Manuscript