ANALYSIS

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Prevalence of electronic cigarettes users among University of Ha'il health science students

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ABSTRACT

Background: In recent years, Electronic cigarettes became popular worldwide, especially in the Kingdom of Saudi Arabia. With the lack of data regarding this subject, this study aims to assess the prevalence of electronic cigarette users among health science students. *Materials and Methods*: Random cross-sectional study, including six different health science colleges and their students at the University of Ha'il. *Results*: A total of 335 students completed the questionnaire, with only 22.98% smoking conventional cigarettes, and 29.9% using electronic cigarettes. 31% of the electronic cigarette users are using it for entertainment purposes only. More than three-fourths (77.7%) of the participants who used electronic cigarettes to quit smoking conventional cigarettes were partially successful. When asked about addictiveness, almost half (46.2%) of those aged between 19 and 22 believed that both conventional cigarettes and electronic cigarettes are equally addictive. *Conclusion*: Electronic cigarettes use is common among health science students, mostly for entertainment purposes. Electronic cigarettes are more prevalent than conventional cigarettes among health science students and have not been proven as a successful method to stop conventional cigarettes.

Keywords: Electronic cigarettes, Conventional cigarettes, Health science students, University of Ha'il, Saudi Arabia.

1. INTRODUCTION

Electronic cigarettes also known as vape are smoking products that became known for the public globally in the past few years. It gained a tremendous reputation globally, apparently due to the continuously focused invading advertisement by the corporations, as an alternative in public places, believing that they are harmless, additionally advertised as a way for quitting smoking. Studies

claiming that non-smokers' use of electronic cigarettes induces the use of other tobacco products. This may have an adverse health effect, as smoking tobacco is responsible for most cases of lung cancer worldwide (Andrade et al.,2013; Malhotra et al., 2016; Galvan & Tubera-Panes, 2020; Ahmed et al. 2020). In comparison, the impact associated with long term exposure to chemicals from electronic cigarette vapors that contain potentially hazardous compounds such as formaldehyde has not been identified (Jensen et al., 2015).

There are insufficient data among health science students in Saudi Arabia and the Middle East in general about the use and awareness of electronic cigarettes. Regarding the raised prevalence of electronic cigarettes, health science students should have some ideas about them in order to improve potential recognition among their relatives and patients. The goal of the study is to assess the prevalence of electronic cigarette users among health science students and to assess their effectiveness as a form of smoking cessation.

2. MATERIALS AND METHODS

The study aim was explained to each participant and ensured that their information is confidential, they have been given a choice whether to participate or abstain. The study obtained ethical approval from the ethics committee at the College of Medicine, University of Ha'il (Code: HREC 00102/CM-UOH.03/20). The study sample size calculated to be 320 participants, estimated using the Raosoft sample size calculator with a 5% margin of error and 95% confidence interval, with that in mind there were 335 students completed the questionnaire (http://www.raosoft.com/samplesize.html). Targeted population were health science students, from six different health science colleges (College of Medicine, College of Nursing, College of Applied Medical Science, College of Pharmacy, College of Public health and health information, and College of Dentistry), at the University of Ha'il, Ha'il city, Saudi Arabia. A 19-item self-reported questionnaire related to demographic data, conventional cigarettes, and electronic cigarettes was used. The questionnaire is pre-validated from a previous study in the Universities of Jeddah, Saudi Arabia (Qanash et al., 2019). A link to an online questionnaire was sent through health science student social media platforms targeting female health science students only through the period of March to April 2020. While male students were presented with a hard copy questionnaire and collected by the researchers themselves during the period between March and April 2020.

Data collection

Data collection and organization were performed using Excel program (Version 16.0.8730.2046). Statistical analysis was performed using IBM SPSS (Version 23.0. Armonk, NY: IBM corp). A chi-square test was used to assess the number of students quitting conventional cigarettes through the use of electronic cigarettes. A P-value of less than .05 was considered statistically significant. For smoking cessation and electronic cigarettes cessation, the participants were asked about the duration of their cessation. For harmfulness estimation, on a score of six, the classification is as follows; zero stands for not harmful. One stands for do not know. Two stands for low harm. Three stands for mildly harmful. Four stands for moderately harmful. Five stands for very harmful. Those are smoking conventional cigarettes also use electronic cigarettes have been classified as 'Dual users' in this article.

3. RESULTS

Baseline characteristics of the studied group

A total of 335 students completed the questionnaire; the majority of the participants (91.9%) were males, where as females were 8.1% only. The decrease number of females in the study is explained by the lack of communication between the male and female sides, and reduced effectiveness of the online questionnaires compared to the hard copy ones used for male students. For the age groups, most of the participants (68.4%) were aged between 19 and 22 (Table 1).

Table 1 General features of the studied group.

Variable	N (%)
Gender	
Male	308 (91.9)
Female	27 (8.1)
Age	
19-22	229 (68.4)
23-25	92 (27.5)
26 and Above	14 (4.2)

Major	
Medical	131 (39.1)
Nursing	72 (21.5)
Applied Medical Science	61 (18.2)
Pharmacy	24 (7.2)
Public health and health information	12 (3.6)
Dentistry	35 (10.4)

Prevalence of conventional cigarette smoking and electronic cigarette using

When it comes to conventional cigarettes, 22.98% of the samples are smokers. The majority (70.3%) smoke on a daily basis, two-fifths of the smokers (41.5%) smoke 1-10 cigarettes per day. When asking about the reason behind smoking, 34% are smoking for anxiety and stress relief, while the second most common cause is sadness and depression. For smoking cessation, 36.3% have tried quitting for less than 30 days. Almost a third (29.9%) was using electronic cigarettes, with fruit flavor as the most prevalent flavor (42%). Two-fifths (42%) were using it on a daily basis. For electronic cigarette cessation, (37%) have stopped for a period of 30 days to 1 year (Table 2).

Table 1 Smoking habits

Variable	N (%)
Smoking conventional	
Yes	77 (22.9)
No	258 (77.1)
Frequency of smoking	
Daily	54 (70.3)
Weekly	12 (15.5)
Occasionally	11 (14.2)
Number of cigarettes smoked per day	
1-10	32 (41.5)
10-15	20 (25.9)
15-20	18 (23.3)
More than 20	7 (9.3)
Reason for smoking	
Peer effect	15 (19.4)
Sadness and depression	20 (25.9)
Anxiety and stress relieve	26 (34)
Entertainment	16 (20.7)
Smoking cessation attempts	
Did not try	18 (23.3)
Less than 30 days	28 (36.3)
30 days to 1 year	21 (27.5)
More than 1 year	10 (12.9)
Using Electronic cigarettes	
Yes	100 (29.9)
No	235 (70.1)
Flavors used	
No flavor	3 (3.0)
Tobacco flavor	35 (35.0)
Menthol flavor	12 (12.0)
Mix of tobacco and menthol	8 (8.0)
Fruit flavor	42 (42.0)
Frequency of using	

Daily	42 (42.0)
Weekly	17 (17.0)
Occasionally	41 (41.0)
Reason for using Electronic cigarettes	
Peer effect	26 (26.0)
Sadness and depression	9 (9.0)
Anxiety and stress relieve	17 (17.0)
Entertainment	31 (31.0)
To quite conventional cigarette	12 (12.0)
Financial	5 (5.0)
What got their interest in Electronic cigarettes	
No distinctive odor	32 (32.0)
Fire safety	18 (18.0)
Considered less harmful to your health than conventional cigarettes	19 (19.0)
Can use electronic cigarettes in places where smoking is prohibited	8 (8.0)
Curious to test a new product	11 (11.0)
Previously failed to quit with either products	5 (5.0)
Financial	7 (7.0)
Electronic cigarettes cessation attempts	
Did not try	23 (23.0)
Less than 30 days	31 (31.0)
30 days to 1 year	37 (37.0)
More than 1 year	9 (9.0)

Electronic cigarette perception

As a general question for all participants, 202 (60.3%) stated that they would not recommend electronic cigarettes as a way for conventional cigarette cessation. Most of the students (45.1%) agree that electronic cigarettes are less addictive, whereas conventional cigarettes are more addictive, while 42.7% claimed all are similarly addictive. Twenty-eight-point seven percent of participants agreed that electronic cigarettes are mildly harmful, while 28% said it is very harmful (Figure 1).

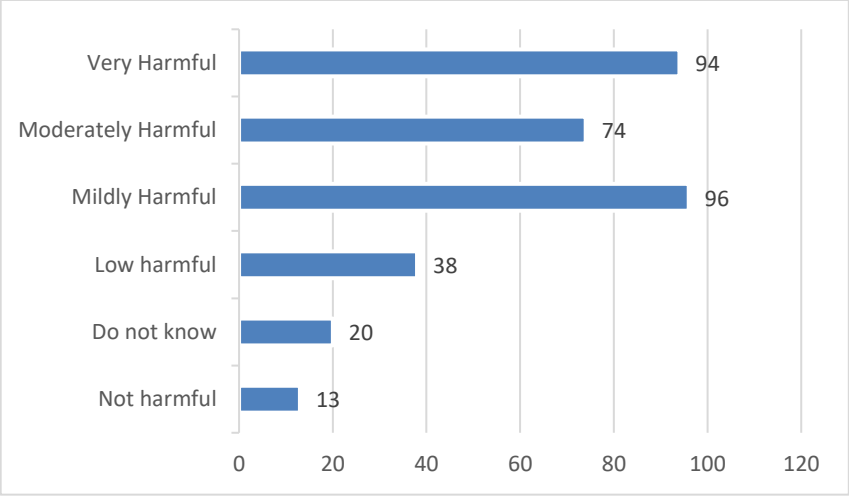

Figure 1 Number of participant's point of view on electronic cigarettes harmfulness.

Dual users and cessation of conventional cigarettes through electronic cigarettes

We found that (16.4%) are dual users, a third of them (34.54%) use a fruit flavor. Those who have been successful in conventional cigarettes cessation by the use of electronic cigarettes are only 32.7% (Table 3). In regard to the recommendation of electronic cigarettes as a way of quitting conventional cigarettes, 67.3% of the dual users do recommend electronic cigarettes. Medical students are more prone to quit conventional cigarettes via the use of electronic cigarettes compared to other health science students (Figure 2).

Table 2 Smoking cessation via electronic cigarettes.

Variable	N (%)
Smoking cessation via electronic cigarette	
Successful	18 (32.7)
Partially successful	18 (32.7)
Not successful	19 (34.6)

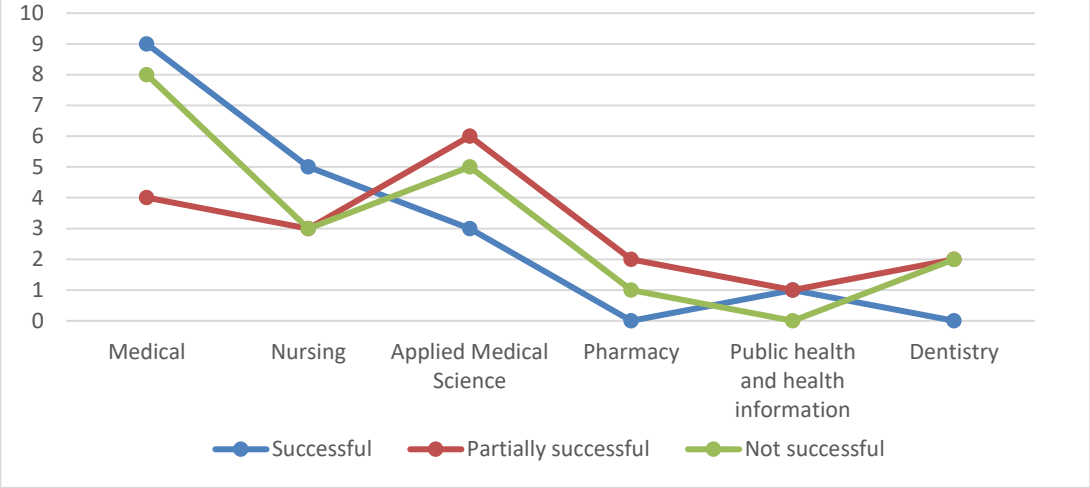

Figure 2 Relation between major and smoking cessation (P=.003).

4. DISCUSSION

In this article, we captured the health science students' awareness, understanding, and thoughts towards electronic cigarettes, as well as the prevalence of electronic cigarette smoking. More questions have been posed following a new study demonstrating that electronic cigarettes affect the airway profile of innate resistance proteins in a specific and similar fashion to cigarette smoking (Reidel et al., 2018). Such questions led us to perform the current research to get a deeper understanding of the prevalence and interpretation of electronic cigarettes among health science students. Conventional cigarette smoking prevalence in the surveyed population is 22.98% (24.02% in male and 11.1% in female). This prevalence is close to another recorded prevalence in Jeddah city, Saudi Arabia of them 20.6% for male and 10.6% for female medical students (Qanash et al., 2019). We have tried to find a relation between the quitting of conventional cigarettes and the major. We found that medical students are more prone to quit conventional cigarettes via the use of electronic cigarettes. This might be related to their field of study in medicine in general.

The electronic cigarette has only been partially available in Saudi Arabia due to the regulations made by the authorities; however, our study has shown it becomes a common habit among the health science students. Electronic cigarette usage prevalence was 29.9%, which surpassed conventional cigarette smokers. Compared to another study at King Saud University, it was recorded that the prevalence was 25.6% (Awan, 2016). We are assuming that the reason behind this massive growing popularity of electronic cigarettes was the use of large-scale promotional strategies targeting the youth and might be due to peer effect. The prevalence identified in our sample is substantially higher than recorded among Polish medical students, where the prevalence was 3.5% (Brożek et al., 2017). The growing of electronic cigarettes prevalence is related to several factors that can vary across various populations. Most of the electronic cigarettes users in our sample used it for entertainment purposes. When compared to a similar study conducted over medical colleges in Riyadh city, Saudi Arabia, it was shown that the most common reason for the use of electronic cigarettes was for fun and exploration (Alshomran et al., 2019). This might explain the increase in popularity and prevalence.

In our study, only (16.4%) of participants use both conventional and electronic cigarettes, compared to a study done in the United States, found that most participants are dual users (Pearson et al., 2012). This high percentage may be clarified by the research group's small, accumulated experience of smoking, and therefore less prone to the smoking habit. The explanation for this is as follows: First, the observed group's comparatively young age, as they are more prone to discover and use new things. Second, 33.3% of smokers smoke less than half a pack daily. Compared to a randomized controlled trial included 24 studies aiming to affirm the efficacy of electronic cigarettes in the reduction of smoking conventional cigarettes. They have found that electronic cigarette users were more likely to abstain smoking relative to placebo for at least Six months (RR = 2.29) (Pearson et al., 2012). Electronic cigarette itself may be a way for non-smokers to start conventional cigarette smoking; we could not deduce that from our cross-sectional survey any inference at this stage (Andrade et al., 2013; McRobbie et al., 2014).

As a general question for all participants whether they would recommend electronic cigarettes as a way to conventional cigarette cessation, 60.3% said that they would not recommend electronic cigarettes. In regard to the addictiveness and harmfulness of electronic cigarettes, 42% of the users of electronic cigarettes stated that conventional cigarettes are more addictive than electronic cigarettes. On the other hand, 29% of the users of electronic cigarettes said that electronic cigarettes are mildly harmful. In a study conducted in the United Sates regarding the perception and awareness of electronic cigarettes, they found similar results, ever electronic cigarette users tend to perceive electronic cigarettes as less harmful and less addictive (Grana, 2013).

This study is among the fewest using a validated tool to assess the prevalence of electronic cigarettes used by health science students in Saudi Arabia. Nevertheless, when interpreting the results of this study certain limitations should be considered. The data of this study were collected mainly from male health science students; the shortage of data regarding female health science students is due to the decrease in communication between the two sides. About a third of the study population are using electronic cigarettes, we prompt more research regarding it to determine its health manifestations.

5. CONCLUSION

Usage of electronic cigarettes is not uncommon among health science students. Electronic cigarettes are more prevalent than conventional cigarettes among health science students. Only a small percentage of students who use electronic cigarettes reported that electronic cigarettes aid in smoking cessation. A major cause of using electronic cigarettes is for entertainment purposes, for about third of the participants. Considering the possible side effects, there is a lack of knowledge among health science students regarding the potential risks of using electronic cigarettes. Further studies are needed to provide sufficient data on the long-term efficacy, and side-effect of electronic cigarettes.

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Authors' contributions

Abdulilah Aldhmadi and Abdulaziz Alhumaid: Study design, questionnaire design, literature search, data collection, data analysis, data interpretation, manuscript preparation, manuscript editing and approval of the version. Abdullah Alrasheed and Hamoud Almatrood: Questionnaire design, literature search, data collection, data analysis, manuscript editing, manuscript review, approval of the version. Mohammad Altraifi: Study design, literature search, manuscript editing, manuscript review, approval of the version. Fayez Alreshidi: Questionnaire design, manuscript review, final approval of the version.

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Conflict of interests

Authors declare no conflict of interests.

Informed consent

Written and oral informed consent was obtained from all individual participants included in the study.

Ethical approval

The study was approved by the Medical Ethics Committee at the College of Medicine in the University of Ha'il (ethical approval code: HREC 00102/CM-UOH.03/20).

Data and materials availability:
All data associated with this study are present in the paper.

REFERENCES AND NOTES

1. Ahmed IE, Alqarni KS, Mesaik MA, Mohammed YI, Mirghani HO, Khalid A. Is smokeless tobacco used to mitigate the daytime sleepiness and depression? A case-control study in Tabuk City, Saudi Arabia. Med Sci, 2020, 24(105), 2925-2931
2. Alshomran AT, Almalki AS, Aldosari BA, Alnefaie NS, Alqumaizi KI, Alzaid HM, Alshamrani NA. Electronic Cigarettes Use among Medical Students: Prevalence, Social Determinants and Purpose of Use. Majmaah J Heal Sci 2019; 7(3):62-9.
3. Andrade DM, Hastings G, Angus K. Promotion of electronic cigarettes: tobacco marketing reinvented? Bmj Brit Med J 2013; 347:f7473.
4. Awan KH. Experimentation and correlates of electronic nicotine delivery system (electronic cigarettes) among university students - A cross sectional study. Saudi Dent J 2016; 28(2):91-5.
5. Brożek G, Jankowski M, Zejda J, Jarosińska A, Idzik A, Bańka P. E-smoking among students of medicine - frequency, pattern and motivations. Adv Respir Med 2017; 85(1):8-14.
6. Galvan JAA, Tubera-Panes D. GATS core survey in a highly urbanized city. Med Sci, 2020, 24(101), 376-385
7. Grana RA. Electronic cigarettes: a new nicotine gateway? J Adolesc Health 2013; 52(2):135-6.
8. Jensen RP, Luo W, Pankow JF, Strongin RM, Peyton DH. Hidden formaldehyde in e-cigarette aerosols. New Engl J Med 2015; 372(4):392-4.
9. Malhotra J, Malvezzi M, Negri E, Vecchia CL, Boffetta P. Risk factors for lung cancer worldwide. Eur Respir J 2016; 48(3):889-902.
10. McRobbie H, Bullen C, Hartmann-Boyce J, Hajek P. Electronic cigarettes for smoking cessation and reduction. Electronic cigarettes for smoking cessation and reduction. Cochrane DB Syst Rev 2014; (12):CD010216.
11. Pearson JL, Richardson A, Niaura RS, Vallone DM, Abrams DB. e-Cigarette awareness, use, and harm perceptions in US adults. Am J Public Health 2012; 102(9):1758-66.
12. Qanash S, Alemam S, Mahdi E, Softah J, Touman AA, Alsulami A. Electronic cigarette among health science students in Saudi Arabia. Ann Thorac Med 2019; 14(1):56-62.
13. Reidel B, Radicioni G, Clapp PW, Ford AA, Abdelwahab S, Rebuli ME, Haridass P, Alexis NE, Jaspers I, Kesimer M. E-Cigarette Use Causes a Unique Innate Immune Response in the Lung, Involving Increased Neutrophilic Activation and Altered Mucin Secretion. Am J Resp Crit Care 2017; 197(4):492-501.

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