Examining Risk Perceptions Related to E-cigarette and Vaping Use in College Students

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Abstract

Vaping and e-cigarette use have become a public health issue in the United States that is affecting an increasing number of young people. E-cigarettes/vapes contain a number of pneumotoxic substances that can have detrimental effects on health, and the high nicotine content amongst popular brands can further addiction. The purpose of this study was to examine the patterns of vaping and e-cigarette use amongst college students as well as student's perceptions of risk regarding e-cigarettes/vapes. A sample of 55 (n=55) college students enrolled in Academic Planning Seminar (APS) classes were recruited and asked to complete an online survey. There was no significance between gender and use, and the sample was not large enough to determine significance based on other demographics, such as race, income level, and living situation. The results of this study found 50.91% of participants reported ever using e-cigarettes/vapes, while 49.09% denied using e-cigarettes/vapes. Furthermore, 94.55% of students had not received counseling or advice from a health professional concerning e-cigarettes or vaping. These statistics outline a deficit in patient education in a population that has a significant percentage of e-cigarettes/vaping users. This population may greatly benefit from residential programs addressing the dangers of use and education about e-cigarettes/vapes from a health care setting.

Keywords: vaping, e-cigarettes, college students, perceptions, risk, public health

Introduction

E-cigarettes are combustible electronic devices used as an alternative to traditional tobacco products. E-cigarette products typically contain a refillable cartridge, of which numerous flavors are commercially available, as well as a battery and an atomizer. This atomizer is responsible for heating the liquid into a vapor, which is subsequently inhaled. E-cigarette products include vape pens, pods, and JUUL, among others, and the action of their use is commonly called "vaping" or "JUULing." While the use of tobacco cigarettes has overall declined, trends have shown an increase in e-cigarette use amongst middle and high school students in the early 2010's, with similar use patterns for adults (Sutfin, Reboussin, Debinski, Wagoner, Spangler et al., 2015). However, such data is limited for college students, who may show different trends of use than other age groups. In the studies that are currently published, data has been mixed about the main demographics of e-cigarette users. In one study, "no ethnic or sex differences were found" for e-cigarette users (Lanza & Teeter, 2017), while another identified "younger students, males, non-Hispanic Whites… ever smokers, and experimenters of tobacco cigarettes" as the main demographic (Saddleson, Kozlowski, Giovino, Hawk, Murphy, et al., 2015). This research intends to explore what factors influence students at The College at Brockport (SUNY) to initiate and continue e-cigarette use, and how risk perception influences e-cigarette initiation. The research questions that will be examined are as follows. What factors are associated with the use of e-cigarettes/vapes by first year SUNY Brockport students? How does risk perception influence e-cigarette use amongst first year college students? Analyzing the reasons behind college student e-cigarette use can aid public health efforts towards preventing their consumption.

Literature Review

E-cigarette products "have become more widely available and accessible nationwide… particularly in retail outlets near college campuses" (Spindle, Hiler, Cooke, Eissenberg, Kendler, et al., 2017). The cost-effectiveness of e-cigarettes may play in part to their appeal. Tobacco cigarettes have been recently subjected to high taxes, which have raised their prices. Currently, there is no federal tax on e-cigarettes, but the state of New York has a 20% tax on all vaping products and all businesses must register as a vapor products dealer before selling e-cigarette products (Department of Taxation and Finance, 2019). In one analysis of forty-five countries, researchers found that after the purchase of a rechargeable unit, refillable e-cigarette cartridges were overall less expensive to use than tobacco cigarettes (Liber, Drope, & Stoklosa, 2017). The novelty of a new product is attractive to some, while other groups use e-cigarettes to quit smoking. One study concluded that "adolescent and young adult smokers and nonsmokers perceive that there are several methods of using e-cigarettes for quitting and are aware of both positive and negative aspects of the product" (Camenga, Cavallo, Kong, Morean, Connell, et al., 2015).

However, current research trends point to e-cigarettes being not used to quit smoking, but rather for personal or social satisfaction. Saddleson and colleagues found that daily users of e-cigarettes were more likely to use e-cigarettes to quit smoking, and while amongst current, non-daily users, "72.3% used [e-cigarettes] for enjoyment" (Saddleson, Kozlowski, Giovino, Goniewicz, Mahoney et al., 2016). Social use of e-cigarettes may also contribute to their use. One study found that "the primary source for obtaining [e-cigarettes] was friends and [e-cigarettes] were most often used with friends vs. alone or with others not considered friends" (Lanza & Teeter, 2017).

In a study by the Centers for Disease Control and Prevention (CDC), researchers found that 78% of patients with e-cigarette or vaping use-associated lung injuries reported acquiring vaping products from informal sources, such as family, friends, dealers, or online, while 16% reported buying products only from commercial sources, such as dispensaries or recreational shops (Centers for Disease Control and Prevention, 2020). The report also found that younger patients (aged 13-17) are significantly more likely to obtain THC and nicotine products from informal sources (CDC, 2020). Social acceptability of e-cigarette use may also influence these trends, although there is a lack of research within this domain.

There has been a widespread public health campaign in the United States to warn of the dangers of tobacco use and the addictiveness of nicotine. The amount of nicotine in tobacco cigarettes varies from 6.17 - 12.65 mg (Taghavi, Khashyarmanesh, Moalemzadeh-Haghighi, Nassirli, Eshraghi et al., 2012). However, the range of nicotine levels found in e-cigarettes/vapes is broader than tobacco cigarettes, with values of 0.5 to 15.4 mg (Goniewicz, Kuma, Gawron, Knysak, Kosmider, 2013). JUULpods are very popular amongst adolescents and young adults, and contain high levels of nicotine. According to the JUUL manufacturing website, “each 5% JUULpod contains approximately 0.7mL with 5% nicotine by weight (approx. 40 mg per pod based upon 59 mg/mL) at time of manufacture. Each 3% JUULpod is designed to contain approximately 0.7mL with 3% nicotine by weight (approx. 23 mg per pod based upon 35 mg/mL) at time of manufacture” (JUUL Labs Inc., 2019). Conservatively, JUUL products contain approximately three times the amount of nicotine as tobacco cigarettes, increasing their likelihood for addiction.

To combat the increasing number of e-cigarette users, the U.S. government has sponsored print and television ads, as well as anti-tobacco legislation that has raised the price of cigarette

products and limited their exposure to children. A study by Trumbo and Kim found a positive reaction to e-cigarette video advertisements amongst their study subjects, as well as the belief that e-cigarettes are not as addictive as tobacco cigarettes (2015). In light of similar research findings, on September 12, 2018, FDA Commissioner Scott Gottlieb announced a campaign working to ban the sale of e-cigarettes to minors, as well as to regulate the e-cigarette industry to curtail the long-term effects of e-cigarette usage. In a statement, Gottlieb wrote of the dangers of e-cigarette use, saying, "While it's the addiction to nicotine that keeps people smoking, it's primarily the combustion, which releases thousands of harmful constituents into the body at dangerous levels, that kills people" (Gottlieb, 2018).

Recently, a national ban on flavored e-cigarette products took into effect on February 6th, 2020. The ban affects the pre-filled pods used in many vaping products, but open tank systems, disposable e-cigarettes, and flavored products not in pod form are not covered (McGinley, 2020). While tobacco and menthol flavors are still permitted, fruit, dessert, and mint flavors are all banned, and these prohibited products must undergo clearance from the Food and Drug Administration (FDA) before they are permitted to return to the consumer market. Furthermore, by May 12th, 2020, all manufacturers of all vaping products must submit applications to the FDA for their products to remain on the market (McGinley, 2020). While these measures are aimed at curtailing the use of e-cigarette products, illicit use of flavored products still may exist and can be contributing to the appeal of e-cigarettes.

As e-cigarettes have only relatively recently entered the consumer market, longitudinal studies do not yet exist on the statistics of those who have experienced negative side effects as a result of e-cigarette use. However, there has been research done on some of the components of e-cigarettes, which are known carcinogens. Flavored e-cigarette cartridges can contain diacetyl,

which can cause bronchiolitis obliterans, a lung disease in which the bronchioles of the lung are permanently damaged (Ross, 2016). Furthermore, "propylene glycol and glycerol, the major components of e-liquids, … may decompose when heated by the vaporizer, and be transformed into toxic compounds such as formaldehyde" (Ross, 2016).

One study found that use of e-cigarettes/vapes changes the oral microbiome and can increase the risk of infection. Researchers found that epithelial cells exposed to aerosols originating from e-cigarettes were more susceptible to infection and that "the abundance of *Porphyromonas* and *Veillonella* ($p = 0.008$) was higher among vapers" (Pushalkar, Paul, Li, Yang, Vaconcelos, et al., 2020). Cells exposed to *P. gingivalis* and *Fusobacterium nucleatum* displayed an elevated inflammatory response, supporting the researcher's conclusions (Pushalkar et al., 2020).

E-cigarette or vaping use-associated lung injury (EVALI) cases are reported to the CDC. As of January 21, 2020, sixty people have died due to EVALI, and there have been 2,711 hospitalized EVALI cases have been reported from all fifty states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands (CDC, 2020). The CDC only reports on hospitalized cases, so the actual prevalence of EVALI cases may be higher. The CDC found that most of these EVALI cases are linked to vaping tetrahydrocannabinol (THC) but that Vitamin E acetate may also play a role (CDC, 2020). Vitamin E acetate is used in vaping products as an additive, and is not harmful when ingested as a vitamin. However, evidence suggests that when it is consumed in a vapor format, it may interfere with lung function. The CDC report found that Vitamin E acetate has only been found in lung fluid samples of EVALI patients, suggesting that cannabis products may not be the only substance causing lung damage from vaping (CDC, 2020). However, the evidence is still insufficient to rule out the possibility of other chemicals

found in vaping products that might cause these injuries. This toxin exposure has the high potential to cause serious long-term damage to the human body, further highlighting the need for action to curtail e-cigarette use.

The perception of e-cigarettes being less harmful than tobacco cigarettes may also contribute to their increased use. A longitudinal study done in Texas found that "perceptions of a lower degree of harmfulness… and addictiveness… of e-cigarettes predicted [e-cigarette] initiation among non-smokers" (Cooper, Loukas, Case, Marti, & Perry, 2018). Similar reports show a lack of consumer knowledge about e-cigarette products, with one such study showing that less than half of e-cigarette users did not know the nicotine concentration in their products (Abadi, Couch, Chaffee, & Walsh, 2017). Counseling from health care professionals is lacking as well. "Studies have documented that a physician's brief advice to quit [cigarette] smoking significantly increased long-term smoking abstinence rates by about 10%... [however] in this study, college students reported receiving little or no counseling related to e-cigarette use from health professionals" (Abadi et al., 2017).

Furthermore, there is evidence to suggest that risk-taking behaviors coupled with lower harm perceptions are associated with e-cigarette use (Saddleson et al., 2015). One study found that the rates of heavy drinking were at 66% amongst college-aged e-cigarette users (Littlefield, Gottlieb, Cohen, & Trotter, 2015). This same research suggested that, "nicotine use (a) enhances the reinforcing effects of alcohol use, especially among men; (b) increases the duration of a drinking episode; and (c) leads to higher levels of cravings for both alcohol and cigarettes when co-used with alcohol." (Littlefield et al., 2015).

Another trend amongst young adult e-cigarette users shows e-cigarette devices being used to vape cannabis. Researchers from Arizona State University identified that "some

vaporizers are capable of vaporizing not only nicotine but also cannabis herb, wax, or e-liquid" (Jones, Hill, Pardini, & Meier, 2016). Jones et al hypothesized that vaping cannabis may be perceived to be less harmful than cannabis smoking, which may contribute to the trend of its use (2016). In their study, the researchers reported cannabis vaping amongst college students at 29%, with the main demographics being young, Caucasian or Hispanic adult men from higher SES families. Vaping cannabis is particularly dangerous, as the same study found that "psychotic-like experiences were associated with more frequent cannabis vaping," although there continue to be research deficits on this area of e-cigarette research (Jones et al., 2016). Another study examining the use of other substances used in e-cigarettes found that "electronic cigarette users reporting [other substances used in e-cigarettes] generally reported past 30-day use of other drugs at significantly higher rates than those not reporting [other substances used in e-cigarettes]" (Kenne, Fischbein, Tan, & Banks, 2017). Finally, most EVALI incidences are associated with the use of THC-containing vape products (CDC, 2020). The presence of EVALI incidences are a concerning trend that highlights the dangers of e-cigarette and vaping use.

Methods

A cross-sectionally designed survey was sent out to research subjects to gather data about e-cigarette use and participants perceptions of risks associated with e-cigarettes. The survey collected data from series of questions asking about exposure to e-cigarettes, trends of use, and personal perceptions. Recruitment occurred during the Spring and Fall 2019 semesters. Students enrolled in Academic Planning Seminar (APS) classes were sent an anonymous email link to complete an online survey using the Qualtrics system. Participation was voluntary and responses collected were not linked back to the participant.

Exempt status was granted by The College at Brockport's institutional review board to waive documented/signed consent. The statement of consent was included in the cover letter for the survey. Notice was given that consent to participate in the study will be voluntary, and by participating, the participants are consenting to non-identifiable use of their data. There will be no penalty for electing not to participate, and participants will be able to stop at any time and choose whether or not to answer any questions without penalty. By agreeing to participate and completing the anonymous survey, participants provided consent as stated in the cover letter. Participants were not compensated for the completion of the survey. No incentives for the survey were implemented. Survey participation was entirely voluntary, and participation could be withdrawn at any time.

The inclusion criteria of the study included newly enrolled college students in Academic Planning Seminar (APS) classes. Subjects are 18 years of age or older. APS classes contain a diverse population of students which is preferable for study aimed at gathering data about a specific population (re: college students). The age criteria prevented minors from participating in the survey.

The exclusion criteria included students not currently enrolled at SUNY Brockport, as they are not the target population and recruitment efforts will be conducted only at SUNY Brockport. Minors were excluded from the study to avoid a parental or legal guardian consent requirement. Students indicated if they are newly enrolled at SUNY Brockport as part of the consent and eligibility documentation prior to survey completion.

Results

Demographics

There were fifty-five (n=55) participants who took the survey. 50.91% (n=28) of participants reported ever using e-cigarettes/vapes, while 49.09% (n=27) denied using e-cigarettes/vapes. Of ever users, 35.71% currently use. Of the participants who disclosed their age, over three-quarters (74.55%) were eighteen years of age. 32.73% of participants identified as male, 65.45% as female, and 1.79% as nonbinary. A Chi-square Test of Independence was conducted to examine whether Gender and Use were independent. There were 2 levels in Gender: Female and Male. There were 2 levels in Use: No and Yes. The results of the Chi-square test were not significant based on an alpha value of 0.05, $\chi^2(1) = 0.93$, $p = .336$, suggesting that Gender and Use could be independent of one another. This implies that the observed frequencies were not significantly different than the expected frequencies. Table 2 presents the results of the Chi-square test.

Table 1

Observed and Expected Frequencies

	Use				
Gender	No	Yes	χ^2	*df*	*p*
Female	19[17.33]	17[18.67]	0.93	1	.336
Male	7[8.67]	11[9.33]			

Note. Values formatted as Observed [Expected].

Frequencies and percentages were calculated for Age, Income, Living Situation, if the participants had Received Education from a Health Care Provider, experienced Social Pressure, Gender, Played Sports, Ever Use of e-cigarette products, Race, and if the participants were a part of Greek Life. The majority of participants lived on campus (83.64%). 52.73% of participants played sports and 1.82% were a part of Greek Life. The participants were predominantly white (80.00%) with African-Americans comprising of 5.45% and Asian American comprising of 7.27%. In terms of Ever Use of e-cigarette products, the sample was split with 50.91% of participants choosing Yes and 49.09% of participants choosing No. 34.55% of participants reported not feeling Social Pressure to use e-cigarette products, while 52.73% did not report. Frequencies and percentages are presented in Table 2.

Table 2

Frequency Table for Demographic Data

Variable	*n*	*%*
Age		
18	41	74.55
Over age 18	10	18.18
Missing	4	7.27
Income		
$0 - $19,999	5	9.09
$100,000 or more	18	32.73
$20,000 - $39,999	3	5.45
$40,000 - $59,999	7	12.73
$60,000 - $79,999	9	16.36
$80,000 -$99,999	10	18.18
Did not report	3	5.45
Living Situation		
Off campus	9	16.36
On campus	46	83.64
Received Education from a Health Care Provider		
No	52	94.55
Yes	3	5.45
Social Pressure		
No	19	34.55
Yes	7	12.73
Did not report	29	52.73
Gender		
Female	36	65.45
Male	18	32.73
Non-Binary	1	1.82
Played Sports		
No	26	47.27
Yes	29	52.73
Ever Use		
No	27	49.09
Yes	28	50.91
Race		
Asian	4	7.27

Black/African American	3	5.45
Other	4	7.27
White	44	80
Greek Life		
No	54	98.18
Yes	1	1.82

Note. Due to rounding errors, percentages may not equal 100%.

Personal Use

Most students (94.55%) had not received counseling or advice from a health professional concerning e-cigarettes or vaping. However, roughly half (50.91%) of the population reported ever using e-cigarettes, while the other half (49.09%) reported never use. Of ever users, 35.71% still currently use vaping products. JUUL products were the most commonly used vaping product with 55.56% of users reporting their use. 25.92% of e-cigarette users responded "often" or "always" feeling the need to cut down or control their e-cigarette use but had difficulty doing so.

No students reported using e-cigarettes to quit tobacco use. Of those who do vape, 18.87% reported ever using other tobacco products. In participants who used other tobacco products, 40.00% used tobacco cigarettes and 20.00% reported using chewing tobacco. However, the sample size of this demographic was small (n=4), with not enough power to detect statistically significant differences.

56.14% of those who do vape reported using vaping products once a month, while an additional 7.14% reported daily use and 25.00% reported using vaping products multiple times a day. Concern about health impact (35.82%) and dislike of "vape culture" (28.36%) were the leading reasons why students chose not use vaping products. Most students denied social pressure to use vaping products at 73.08%. Of those who did feel social pressure, the pressure predominantly came from friends (66.67%), but participants "rarely" felt pressure to vape

(57.14%). Friends were the primary mechanism that introduced students to vaping products (92.86%).

Personal Perceptions

Participants were given several statements regarding the perception of risk of e-cigarettes and vaping products. Participants were then asked to rate their responses to these statements on a Likert scale. The frequencies and percentages of these responses are presented in Table 3. For comparison purposes, the responses are split by the response to Question 1: Have you ever used e-cigarette products? The "No" column consists of participants who have never used e-cigarettes/vapes, and the "Yes" column consists of participants who have.

19% of never users agreed that e-cigarettes/vapes are effective to use to quit smoking, compared to the 44% of ever users. 0% of never users agreed that e-cigarettes/vapes are less addictive than tobacco cigarettes, compared to the 15% of ever users. 44% of ever users agreed that e-cigarettes/vapes are safer to use than tobacco cigarettes, while only 19% of never users agreed to this statement. However, when given the statement, "E-cigarettes/Vapes do not contain carcinogens," the consensus disagreed for both groups, with 78% of never users and 54% of ever users. Regarding social acceptance, 44% never users agreed that e-cigarettes/vapes are more socially acceptable than tobacco cigarettes, almost half of the number of ever users (81%).

Table 3

Frequency Table for Personal Perceptions – "E-Cigarettes/Vapes are…"

Variable	Never User	Ever User
Effective to Quit Smoking		
Agree	5 (19%)	12 (44%)
Neither agree nor disagree	6 (22%)	8 (30%)
Disagree	16 (59%)	7 (26%)
Do Not Contain Carcinogens		
Agree	1 (4%)	2 (8%)

Neither agree nor disagree	5 (19%)	10 (38%)
Disagree	21 (78%)	14 (54%)
Less Addictive than Tobacco Cigarettes		
Agree	0 (0%)	4 (15%)
Neither agree nor disagree	5 (19%)	11 (41%)
Disagree	22 (81%)	12 (44%)
More Socially Acceptable than Tobacco Cigarettes		
Agree	12 (44%)	22 (81%)
Neither agree nor disagree	8 (30%)	4 (15%)
Disagree	7 (26%)	1 (4%)
Safer to Use than Tobacco Cigarettes		
agree	5 (19%)	12 (44%)
Neither agree nor disagree	8 (30%)	8 (30%)
disagree	14 (52%)	7 (26%)
Better for Air Quality and the Environment		
Agree	4 (15%)	14 (52%)
Neither agree nor disagree	9 (33%)	6 (22%)
Disagree	14 (52%)	7 (26%)

Note. Due to rounding errors, column wise percentages may not equal 100%.

Public Perception

68.52% of participants reported never having faced or seen discrimination, teasing, or bullying related to using e-cigarettes or vaping. When asked, "Do you feel that there are certain perceptions about people who use e-cigarettes/vapes?" there were a variety of responses.

Table 4 separates the total responses in three groups. Never users of e-cigarettes/vapes and not current users were put in the first column. Ever users, but not current users of e-cigarettes/vapes were put in the second column. Ever and current users were put in the third column.

Table 4

Q1-No/Q15-No	Q1-Yes/Q15-No	Q1-Yes/Q15-Yes
"They don't care about the consequences."	"People feel like those who vape are full of themselves or see themselves as 'cooler' than others, especially when	"I feel as though there is a perception of being a scumbag related to vaping."

	they show off their vaping 'tricks' on social media."	
"They are generally younger."	"It's normal. I don't use these [vapes] often at all and I get made fun of for not vaping."	"That they are into drugs."
"They are not seen as healthy individuals."	"They are bad kids or up to no good."	
"They are airheads who are trying to be cool, or have poor coping methods."	"They are usually the fun ones or the ones that can just do whatever they want or seem cool or what not to fit in better to a social atmosphere."	
"It's cool and a quick less dangerous way to get a high."	"People think that they are crazy for using them and think that they can't stop. This is not true, they can stop when they want and no one peer pressured them into using it."	
"Trashy."		
"Fake stoners."		
"They're cool."		

Note: Q1: Have you ever used e-cigarette products? Q15: Do you currently use e-cigarettes or vape?

Discussion

Vaping is an increasing epidemic in the United States, with approximately half of the sample reporting ever use, and 35.71% of ever users currently using. Leaving home to attend college is a transitional time for most young adults, who are given a freedom that they did not previously have at home. The social factor surrounding e-cigarettes/vapes and the influence of friends was highlighted by the results of the survey. 92.86% of users said that they were introduced to e-cigarettes/vapes by their friends, and 66.67% cited friends as a source giving them social pressure to use. Additionally, friends (44.64%) and roommates (16.07%) were the most selected answers when asked "Do those around you use e-cigarettes/vapes?"

The predominant age demographic in this data set was eighteen years old. When asked how many years that they had used e-cigarettes/vapes for, 42.86% reported that they had been using for two years, and 25.00% reported one year. This suggests that students are beginning to use e-cigarettes/vapes before they are eighteen years old, supporting the growing data of e-cigarette/vape use in high school. Given the known carcinogens present in e-cigarettes/vapes and risk of EVALI, this is a significant problem affecting adolescents and young adults.

Out of all respondents of the survey, 30% agreed that e-cigarettes/vapes were safer to use than tobacco cigarettes. 63.63% of students disagreed with the statement "E-cigarettes do not contain carcinogens," so some do recognize that there are dangerous chemicals found in e-cigarettes. Another 61.81% disagreed that e-cigarettes are less addictive than tobacco cigarettes. This demonstrates that there is some baseline knowledge about the dangers of e-cigarette use, but more interventions need to be done because students are still using – approximately half the sample size in this study reported ever using e-cigarettes. As young adults are beginning to use e-cigarettes at earlier ages, their bodies have the potential to be exposed to these harmful substances for longer periods of time, prolonging the negative side effects.

E-cigarettes/vapes contain formaldehyde, a known carcinogen (Ross, 2016) as well as a number of other pneumotoxic substances, such as diacetyl, propylene glycol, glycerol (Ross, 2016), and Vitamin E acetate (CDC, 2020). Additionally, e-cigarettes/vapes contain higher levels of nicotine compared to tobacco cigarettes. Over half of e-cigarette/vape users in this study used JUUL products (55.56%). JUULpods contain higher concentrations of nicotine compared to tobacco cigarettes (Taghavi et al., 2012) (JUUL Labs Inc., 2019). While JUUL products and other e-cigarettes/vapes do not contain as many toxic substances as tobacco cigarettes, they do

contain harmful chemicals and have the potential to be more addictive than tobacco cigarettes due to higher nicotine counts. This information can be a highlight of patient education.

Social acceptance around e-cigarettes/vapes may contribute to their use. 68.52% of participants reported never having faced or seen discrimination, teasing, or bullying related to using e-cigarettes or vaping, and 61% agreed that e-cigarettes/vapes are more socially acceptable to use than tobacco cigarettes. Unlike tobacco cigarettes, there has been little regulation of vaping in public spaces, which may contribute to their social acceptance. Parties were the most selected option when asked which environments users used e-cigarettes/vapes, with 57.14% of users responding that they used “often” or “always” in this setting.

An additional 30% agreed that e-cigarettes/vapes are effective to use to quit smoking, yet zero students reported using e-cigarettes to quit tobacco use. Opponents of stringent e-cigarette regulations and bans have argued that e-cigarette and vaping products should be kept on the market to aid in tobacco smoker cessation. However, the data from this survey does not support these claims, especially in a young adult population, which makes up a significant percentage of e-cigarette/vape users in the U.S.

Finally, most students (94.55%) had not received counseling or advice from a health professional concerning e-cigarettes or vaping. When asked, “do you ever get annoyed or angry with people who criticize your e-cigarette or vaping use, or tell you that you ought to quit using e-cigarettes/vapes?”, 62.96% of ever users reported “never” feeling this way, and 22.22% reported “rarely” feeling this way. The results of the study found approximately 85% of students reporting that they feel little or no opposition to being confronted about their vaping use. These statistics outline a deficit in patient education and illustrate that college-aged students may be more open to being educated on the dangers of e-cigarettes/vapes.

During a yearly physical exam would be a great time to ask questions and provide patient education for adolescents and young adults about vaping. While most are asked if they smoke, some people may interpret that question as asking about tobacco cigarettes only, and answer that they do not. Furthermore, college-aged students may benefit from on campus programs designed to educate and prevent vaping. With 83.64% of study participants living on campus, Residential Life has a large demographic of students who can benefit from such educational programs. As more research comes to light about the harm and long-term health impact of e-cigarettes/vapes, it is important to assess perceptions about e-cigarette/vaping use amongst adolescents and young adults and educate about the risks.

Limitations

The limitations for this study included a small sample size (*n=55).* Other studies with larger sample sizes may provide different data and greater insight on vaping and e-cigarette use in college students. Additionally, the sample size was geographically homogenous. All of the responses except for one reported zip codes from New York State, with the outlier being from Oklahoma. The sample was only sent to students attending The College at Brockport (SUNY), a public rural university in Western New York. Data from other geographic locations and locations outside the United States may yield different results. The average age of the sample is eighteen years old (74.55%), and data may be different if collected from other age groups. Finally, minors (those under age eighteen) were not included in this study. This is significant to note as the vaping epidemic is growing amongst school aged populations (Sutfin et al., 2015). Minors were not recruited in this study, nor were participants asked about vaping habits as a minor.

Future studies should include younger populations as part of the sample size. Additional studies that may provide valuable information comparing e-cigarette and vaping use to other

risk-taking behaviors such as alcohol and drug use. This survey did not ask about alcohol or marijuana/THC use in regards to vaping activities. Vaping cannabis products has been a major source of EVALI incidences (CDC, 2020). Finally, increased research on Vitamin E acetate, diacetyl, propylene glycol and glycerol (all chemical compounds found in e-cigarette products) should be conducted to understand the dangers of these substances and their effect on the body when inhaled after combustion.

Conclusion

Vaping has become a substantial problem in the United States that is affecting an increasing amount of young people. E-cigarettes/vapes contain a number of pneumotoxic substances that can have detrimental effects on health and the high nicotine content amongst popular brands can further addiction. The results of this survey outlined several important points and how they relate to nursing practice.

The first is that college students do have some baseline knowledge about e-cigarettes, yet they are continuing to use. Approximately half the sample size in this study reported ever using e-cigarettes, with 35.71% of ever users currently using. As young adults are beginning to use e-cigarettes at earlier ages, their bodies have the potential to be exposed to these harmful substances for longer periods of time. Research has shown that e-cigarettes/vapes can be a gateway drug into other harmful substances (Littlefield et al., 2015) (Jones et al., 2016) (Kenne et al., 2017). Thus, nurses, particularly nurses working at schools and on college campus health centers, should be intervening early and giving this population education on the dangers of e-cigarettes/vapes.

The second point is that the influence of friends plays an important role in a college student's decision to use e-cigarettes/vapes. While survey participants did cite specific

perceptions about using e-cigarettes/vapes, data suggests that friends are the primary means to introduction and the primary source of social pressure to use, even if social pressure was predominately rare. Parties - settings with high social interaction - were the highest rated (57.14%) environment of e-cigarette and vaping use. Public health initiatives combating the use of tobacco cigarettes in public spaces increased the social stigma of smoking. Further public health initiatives are needed to decrease vaping. Radio, print, and television ads targeting this population are already in place in the State of New York, but college campuses and public facilities must act further. A total ban of the use of e-cigarettes/vapes in outdoor spaces, in restaurants, and in school buildings may be effective in increasing the stigma around e-cigarettes/vapes and curtail use.

The final and most significant point for nursing practice is that the majority of college aged students are not receiving advice from health care providers about the dangers of vaping and e-cigarette use. As there are a number of different avenues that nurses interact with college aged populations, there are many different opportunities for education to be provided. Everyone should be screened during health visits, and when asked about smoking habits patients should be asked about e-cigarette and vaping use as well. College aged students may benefit from on campus programs about the dangers of e-cigarettes/vapes, and this can be an opportunity for nurses working in schools or on campus health centers to collaborate with residential life. In conclusion, the use of e-cigarettes/vapes is a significant public health issue amongst college aged students. This population may greatly benefit from residential programs addressing the dangers of use and education about e-cigarettes/vapes from a health care setting.

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