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Vaping Prevalence Among College Students and Their Knowledge of the Associated Risk of Vaping

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VAPING PREVALENCE AMONG COLLEGE STUDENTS AND THEIR KNOWLEDGE OF THE ASSOCIATED RISK OF VAPING

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ABSTRACT

E-cigarettes are electronic devices that heat a liquid and produce a vapor that can be inhaled. Vaping is a term used in association with use of e-cigarettes. Vaping has become widespread among the young adult population. In 2018, the Food and Drug Administration and Surgeon General declared vaping an epidemic. The Centers for Disease Control and Prevention predicts at the current rate of use among United States adolescents, 5.6 million under the age of 18 will face early death due to vaping. The purpose of this study was to determine vaping prevalence and vaping knowledge among college students. The study was also utilized to determine if primary care providers are educating college students regarding vaping. The researchers in this study utilized a non-experimental, quantitative design. An electronic survey assessing demographics, vaping prevalence, vaping knowledge, and primary care provider education regarding vaping was distributed to students 18 years of age and older enrolled in two community colleges

and two universities in the southeastern United States. Data were obtained using SurveyMonkey, an online survey software company used to perform professional surveys. The *Don't Blow It: Anti-vaping Campaign* questionnaire by Essentia Health was used as the knowledge section of the survey. The researchers had a total of 182 respondents, 172 of which completed the entire survey. The prevalence of ever-vaping in participants was 63.2%, and 83.47% were considered knowledgeable regarding the health risks of vaping. Of the participants who reported vaping, only 12.9% reported being educated about the risks of vaping by their healthcare providers.

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CHAPTER I

Dimensions of the Problem

In 2018, the Food and Drug Administration (FDA) and surgeon general declared vaping an epidemic among adolescents and young adults (Centers for Disease Control & Prevention [CDC], 2018). In 2019, the CDC received more than 2,000 reports of e-cigarette and vaping-associated lung injuries (EVALI) and more than three dozen vaping-related deaths (Centers for Disease Control & Prevention [CDC], 2020). The CDC predicts at the current rate of use among United States (U.S.) adolescents, 5.6 million under the age of 18 will face early death due to smoking related illnesses. Nicotine is highly addictive, can harm brain development, and affects concentration and mood (CDC, 2020), yet e-cigarette use has been advertised as a safe alternative to cigarette smoking (Abadi et al., 2017). Understanding vaping perceptions, knowledge deficits, and potential health risks is essential for implementing strategies to address health and safety concerns regarding e-cigarette use in the public. While the researchers have yet to study the direct correlation between e-cigarette use and the long-term effects it has on the human body, current studies suggest that the effects are worse than cigarette use (Bellisario et al., 2020).

Statement of Problem

A major problem related to vaping is that it is very common among college students (CDC, 2018), yet it has been advertised and believed to be much safer than tobacco cigarettes since it was first marketed in the United States in 2007 (Abadi et al., 2017). According to the CDC, in 2019 tobacco companies spent $8.2 billion dollars marketing cigarettes and smokeless tobacco in the United States (CDC, n.d.). This

amount translates to about $22.5 million each day, or nearly $1 million every hour. Vaping advertising and promotional expenses totaled about $7.62 billion in 2019 (CDC, n.d.). One can conclude that spending that much money on advertising by the vaping industry was in anticipation of a large return on investment, which the industry has gotten. E-cigarette sales in the United States alone have surpassed $2.35 billion dollars (Brown, 2021).

Unfortunately, there are many harms associated with vaping liquids including lung disease, attention deficit disorder, weight loss, impulsivity, mood disorders, and even seizures (Essentia Health, n.d.). What is very concerning about the manufacturing and marketing of these e-cigarette liquids is that a large majority of them are fruit and candy flavored, drawing in crowds as young as pre-teens (Abadi et al., 2017; CDC, 2018). Yet the ingredients in the e-cigarette liquids are much more harmful than candy. The U.S. Surgeon General reported in December 2019 that exposure to nicotine and other chemicals in e-cigarettes poses serious health risks to young people (CDC, 2018). Blaha (2022) points out that due to a lack of research, vapers are exposing themselves to chemical reactions that are not fully understood. Most vaping devices contain nicotine, while a few other vaping products are labeled as nicotine-free; but even nicotine-free vaping products contain other chemicals that are more toxic when heated (American Lung Association, 2020). According to the American Lung Association (2020), chemicals linked to cancer, including ingredients found in antifreeze and formaldehyde, can be found in the aerosol of e-cigarettes. Acrolein, a substance used as a weed killer, can be found in e-cigarette aerosols, and may cause irreversible lung damage (American

Lung Association, 2020). However, in 2007 e-cigarettes were first marketed as a safer alternative to tobacco products (Abadi et al., 2017).

Gilpin et al. (2019) performed a quasi-experimental study for the purpose of comparing the effect of e-cigarette vapor and cigarette smoke on the virulence and inflammatory potential of four key lung pathogens (Haemophilus influenzae, Streptococcus pneumoniae, Staphylococcus aureus, and Pseudomonas aeruginosa). These four lung pathogens have been associated with declining lung function overall. According to Gilpin et al. (2019) bacteria exposed to e-cigarette vapor have been extensively implicated in the development of smoking related diseases, such as chronic obstructive pulmonary disease and asthma, by either direct infection or bacteria-mediated inflammation. Gilpin et al. (2019) points out that because of the concerns over cigarette safety, many adolescents who have never smoked are now taking up vaping, resulting in evidence of an association between e-cigarette use or exposure, and increased asthma exacerbations. Therefore, there is a need to understand the long-term impact of e-cigarette use, particularly on the lung health of vulnerable populations (Gilpin et al., 2019).

Statement of Purpose

The purpose of this study was to determine the prevalence and knowledge of vaping among college students. The study was also utilized to determine if primary care providers are educating students regarding vaping. The results of the study can be used by providers to provide patients with more effective health promotion related to vaping. The benefits of having more health promotion related to vaping will likely include a decrease in the prevalence of vaping and an increase in knowledge regarding vaping.

Significance of the Study

The significance of the study is that understanding the misconceptions and vaping prevalence among college students may lead to greater efforts and solutions by health care providers. Vaping use has surged in popularity since its introduction into the U.S. market in 2007 (Lanza & Teeter, 2018). According to Lanza and Teeter (2018), a significant proportion of younger vape users have never tried cigarette smoking, suggesting that the vaping industry is effectively recruiting adolescent and young adults that are non-cigarette smokers. According to Omoike and Johnson (2021), 27.5% of high school students and 10.5% of middle school students reported to be current users of e-cigarettes; a similar increase in the use of e-cigarettes has been noted in college students. Omoike and Johnson (2021) found that young adults 18-24 years of age had the highest percentage of e-cigarette use, with a prevalence rate as high as 25% when compared to older adults (4%) and high school students (16%). As of February of 2020, the CDC noted 2,807 reported cases of EVALI and more than three dozen vaping-related deaths in all 50 U.S. states, the District of Columbia, and two U.S. territories (CDC, 2020). The researchers hope to determine knowledge deficits among college students and the need for further education from healthcare providers, which may decrease the prevalence of vaping among college students.

Theoretical/Conceptual Framework

The Health Promotion Model by Nola Pender was used to guide the research and review of literature. Nola Pender believed that empowering patients to take better care of themselves was central to nursing (Alligood, 2018, p. 323). In her Health Promotion Model, she emphasizes the importance of an individual's health being in their own hands.

As Alligood (2018) discusses, many factors influence the ability of a person to achieve optimal health. Past health behavior influences current health behavior. Personal biological factors such as body mass index, strength, age, gender, and aerobic capacity influence health ability. Sociocultural factors like ethnicity, education, and socioeconomic status shape behavior. Psychological factors such as self-motivation, self-esteem, and perceived health status affect behavior. Belief that action will produce positive outcomes can motivate healthy behaviors. Barriers to action, either real or imagined, can prevent healthy behaviors. Perceived self-efficacy, or the belief that one can succeed, can determine motivation to take control of one's health. Interpersonal influences of people such as healthcare providers, peers, and families sway both healthy and unhealthy behavior. Activity-related affect, which includes positive or negative feelings toward healthy behaviors, can affect health habits. Competing demands or preferences, such as responsibilities and likes and dislikes, influence health behaviors. Commitment to action is imperative to attain optimal health. Finally, health-promoting behavior such as exercise, stress management, healthy eating, adequate rest, nurturing relationships, and spiritual growth are necessary to gain great health (Alligood, 2018, p. 326-327). This research utilizes Nola Pender's Health Promotion Model to gain understanding about the increase in vaping prevalence among college students, why college students perceive vaping as dangerous or not, and how promoting health education among college students about associated risks of vaping can lead to vaping abstinence and cessation. The results can help clinicians understand the need to provide effective vaping cessation strategies for their patients and drive evidence-based health interventions.

Research Questions

The following research questions were the focus of this study:

1. What is the prevalence of vaping among college students?
2. Are college students knowledgeable regarding the risks associated with vaping?
3. Are primary care providers educating college students regarding vaping?

Definition of Terms

For this study, there were several terms that needed to be defined as they apply to the study. The theoretical and operational definitions follow, respectively:

Prevalence:

Theoretical. The percentage of a population that is affected with a particular disease at any given time (Prevalence, n.d.).

Operational. The percentage of college students participating in the study who reported vaping when answering question number seven on the survey.

Vaping:

Theoretical. To inhale vapor through the mouth from a usually battery-operated electronic device that heats up and vaporizes a liquid or solid (Vaping, n.d.).

Operational. The use of any device such as cig-a-like, vape pen, mod, pod mod, or other device to heat a solution or substance to produce a vapor or aerosol intended for inhalation.

College Students:

Theoretical. One who attends an institution offering instructions usually in a professional, vocational, or technical field (College, n.d.; Student, n.d.).

Operational. Individuals who are at least 18 years of age and currently enrolled in a college or university in the southeastern United States.

Knowledgeable:

Theoretical. The range of one's information or understanding (Knowledgeable, n.d.).

Operational. A score of at least 11 out of 14 (78.5%) on the *Anti-Vaping Campaign* questionnaire.

Risks:

Theoretical. A situation involving exposure to danger (Risks, n.d.).

Operational. Negative long term or short-term consequences including lung cancer, decreased lung function, popcorn lung, increased heart rate, constricted blood vessels, increased risk of heart disease, seizures, and addiction.

Primary Care Providers:

Theoretical. Health professionals who serve as the first contact a patient makes with the health care delivery systems and acts as the principal point of continuing care for established patients by coordinating specialty care and other services a patient may need (American Academy of Family Physicians, 2022).

Operational. Doctors of Medicine, Doctors of Osteopath, Physician Assistants, and Nurse Practitioners who provided care for participants in the last 12 months and who

are responsible for educating participants about the risk of vaping using verbal education, handouts, digital information, and quitting resources.

Educating:

Theoretical. To provide with information (Educating, n.d.).

Operational. Providing a patient information regarding the risks associated with vaping using verbal education, handouts, digital information, and quitting resources.

Assumptions

For the purposes of this study, the following assumptions were made:

1. The researchers assumed the college students answered the survey truthfully and honestly.
2. The researchers assumed the survey provided insight regarding college students' knowledge about vaping and providers' education regarding vaping.
3. The researchers assumed that college students are not being educated by primary care providers regarding the risks of vaping.

Summary

In summary, the rise in vaping prevalence among college students warrants further research. Most concerning is emerging literature revealing increased risk for long-term health problems including EVALI and harmed brain development. Furthermore, the naivete of college students regarding these chronic and sometimes fatal conditions prompted reflection and motivation to action. Consequently, the researchers decided to further investigate vaping prevalence among college students, knowledge deficits these students have regarding health risks, and vaping education these students receive from primary care providers. The researchers use the free *Don't Blow It! Anti-Vaping*

Campaign questionnaire by Essentia Health (see Appendix B) as the knowledge section in their survey questionnaire. In addition, Nola Pender's Health Promotion Model served as a guide in better understanding the barriers to action in vaping abstinence and cessation among college students (Alligood, 2018).

Chapter II

Literature Review

The review of literature for the study was performed by the researchers to assess current trends in the prevalence of vaping among college students and vaping knowledge of college students of the associated risk of vaping. In addition, the Health Promotion Model by Nola Pender will be explored and its application to the research will be discussed.

Conceptual Framework

The Health Promotion Model by Nola Pender was used to guide the research and review of literature. Nola Pender's Health Promotion Model can be utilized to guide both research and medical practice in a variety of situations. According to Pender, many factors influence the ability of a person to achieve optimal health (Alligood, 2018). Among the many factors Pender explored, several apply to the research of vaping among college students including psychological factors, barriers to action, interpersonal factors, and commitment to action (Alligood, 2018). The review of literature discusses how psychological factors such as depression and anxiety, barriers to action such as vaping knowledge deficits, and interpersonal factors such as peer pressure affect commitment to action to quit vaping.

Prevalence

Jones et al. (2021) performed a retrospective cross-sectional study for the purpose of finding the relationship between five measures of interest and their relationship with e-cigarette use behaviors among college students: (a) knowledge of negative health effects from e-cigarette use, (b) self-efficacy, (c) depression, (d) anxiety symptoms, and (e)

academic performance. Approximately 40% of college students have tried or are currently using e-cigarettes. Of college e-cigarette users, 40% had not previously smoked. No theoretical framework was identified for this study (Jones et al., 2021).

The study was designed to assess the psychosocial relationship between e-cigarette use among college students using five measures of interest: (a) knowledge of negative health effects from e-cigarette use, (b) self-efficacy, (c) depression, (d) anxiety symptoms, and (e) academic performance (Jones et al, 2021). The research problem was the insufficient statistical analysis of e-cigarette use among college students in relation to the five measures of interest. According to Jones et al. (2021), studies suggest the relationship between e-cigarette use among college students and knowledge deficits concerning e-cigarette use are directly correlated. The research hypothesis was that the five points of interest analysis are directly correlated to e-cigarette usage among college students (Jones et al., 2021).

A retrospective cross-sectional survey design was used to collect data from college students (Jones et al., 2021). The survey included 872 college students between the ages of 18 and 25 who completed the online survey. The sample population was primarily females (61.7%) in their senior year of college (52.1%). Over half of the respondents were non-Hispanic white (62.1%), with 13.5% of respondents identifying as Hispanic/Latino, 6.8% as African American, 0.5% as Native American, 12.1% as Asian or Pacific Islander, and 5% as “other” (Jones et al., 2021). The study was conducted on a tobacco-free, smoke-free, religious college campus. The data were collected between August 2019 and January 2020. The study was conducted through Qualtrics, a secure online data survey service. Independent variables included knowledge of negative effects

associated with e-cigarette use, self-efficacy, anxiety and depression symptoms, and academic performance. A descriptive analysis was performed using IBM SPSS Statistics 26. Significance was set at *p* value<0.05. The extent to which knowledge, self-efficacy, depression, anxiety, GPA, and gender effect e-cigarette use frequency was assessed using bivariate analysis. One-way analysis of variance (ANOVA) was used to compare mean differences among e-cigarette users on the independent variables (Jones et al., 2021).

Following analysis, researchers determined a significant association between gender and frequency of e-cigarette use was apparent ($\chi 2 = 22.94$, $p < .001$) (Jones et al., 2021). ANOVA results revealed significant relationships between knowledge [$F (3, 808) = 9.01$, $p < 0.001$], self-efficacy [$F (3, 808) = 4.85$, $p < 0.01$], depression [$F (3,808) = 8.31$, $p < .05$], and e-cigarette use. Students who never used e-cigarettes scored higher on knowledge and self-efficacy than students who used every day, somedays, or rarely, indicating never-users have higher knowledge of negative effects associated with e-cigarette use and have higher self-confidence than e-cigarette users. ANOVA analyses revealed a significant effect of knowledge on the four groups (everyday, somedays, rarely, and never users) [$F (3, 808) = 9.01$, $p < 0.001$]. Post hoc comparisons using the Hochberg's GT2 test indicated that never e-cigarette users' mean scores for knowledge on e-cigarette ($M = 28.66$, $SD = 3.10$) were significantly higher than the everyday users ($M = 26.62$, $SD = 4.77$) and someday users ($M = 27.33$, $SD = 4.2$). These findings highlight those modifiable factors such as knowledge about harmful effects of e-cigarettes and self-confidence are associated with low e-cigarette use. Jones et al. (2021) determined through the study analysis that public health implications and e-cigarette use among college students is directly correlated. The study concluded that approximately

one fourth of the participants are exposed to the harmful effects of e-cigarettes, and lack of knowledge or misinformation regarding possible long-term negative health effects of e-cigarette use was correlated with increased e-cigarette use. The researchers imply that according to the analysis of data, public health professionals should focus on education as a tool to reduce the prevalence of e-cigarette use among college students (Jones et al., 2021).

Cross sectional surveys are characteristically prone to response bias, selection bias, and sample bias. Jones et al. (2021) identified a few weaknesses of the study. First, participants were enrolled in a health-based class and may have felt uncomfortable providing information regarding e-cigarette use in the academic setting, creating a response bias to the study. Although demographic characteristics of the sample population closely mirror those of the university population, sample bias may still be present due to the high proportion of public health students present in the sample population. Regardless of the proposed response and sample bias, this study found strong public health implications regarding e-cigarette use and psychosocial factors influencing e-cigarette use among college students. Jones et al. (2021) recommend future studies be performed at other colleges, specifically colleges without religious affiliations or tobacco-free, smoke free campuses to further evaluate the relationships between e-cigarette use and the target variables. The researchers highlight that knowledge deficits, a modifiable factor in the study, is associated with e-cigarette use; they emphasize that public health professionals should focus on education as a tool to reduce the prevalence of e-cigarette use among college students (Jones et al., 2021).

While significant measures to reduce the occurrence of tobacco use over the years have been successful, the need for more education about e-cigarettes and vaping is a public health concern. The study conducted by Jones et al. (2021) provides a good foundation to incorporate statistical findings into research, including what percentage of college students are being properly educated on the risk and harm associated with e-cigarette use. Jones et al. (2021) emphasize that public health professionals should focus on education as a tool to reduce the prevalence of e-cigarette use among college students. As suggested by the researchers, a further study is warranted in exploring the extent that primary care providers educate college students regarding e-cigarette usage and the harmful effects e-cigarette usage has on the body (Jones et al., 2021).

Knowledge

Katz et al. (2020) performed a focus group study to investigate the recent increase in vaping rates among college students. When this study was performed in 2018, there was a 250% increase in use of e-cigarettes from the prior year according to *Monitoring the Future* data. Vaping is an increasing problem among college students due to social interactions and attitudes towards casual nicotine use. Greater understanding of the increase and diffusion of vaping into college campuses must be discovered. This knowledge can be utilized for the formation of policy development and interventions. This study used the diffusion theory with a KAP (knowledge, attitudes, practices) theory framework approach (Katz et al., 2020).

Katz et al. (2020) based their research questions on how college students describe their vaping knowledge, attitudes, and practices regarding pod devices. Their focus was the increase in vaping on college campuses related to the innovation of pod devices. They

wanted to better understand how this diffusion of vaping into this social structure can be curtailed by campus policy and health management (Katz et al., 2020).

This research study was conducted at a Midwestern university using a focus group of undergraduate students (Katz et al., 2020). These students received extra credit during the study from the school's Sona Systems Software® (SONA), which is a cloud-based research management tool. A total of eight focus groups were evaluated with 26 participants in all. The greatest variables being 24 out of the 26 students were female, and 21 of the students were Caucasian. The study was conducted using the KAP method through use of a short survey and an Institutional Review Board approved form. The participants were recorded with the use of a two-way mirror and microphone. The session lasted only 90 minutes per student. The students who were evaluated by the survey were asked only tobacco use and demographic questions. The students that received the formal interview were asked knowledge, attitude, and practice questions. The knowledge questions assessed what the students knew about e-cigarettes or learned from watching others vape. They distributed several pod devices and older electronic cigarettes to participants to evaluate their knowledge concerning different types of vaping devices. To determine their health risk knowledge, the students were asked how safe the vape pods were and if they had heard any of their friends talking about their safety. Attitudes were evaluated concerning how popular or cool vaping was among the students. The last portion of the tool evaluated the practice of vaping among students. They wanted to determine which form was used more socially than other forms. They compared the popularity of the Juul device to other vape pods. The audio was transcribed for analysis using the constant comparative approach (Katz et al., 2020).

The findings of the study focused on the knowledge of the addictiveness of pod devices and the uncertainty of health risks (Katz et al., 2020). The participants all expressed knowledge of the addiction potential of vaping. They also understood casual use leads to addiction. Their greatest concern related to addiction was the increased cost of vaping. Although the participants expressed a great amount of knowledge concerning addiction, they lacked knowledge concerning other health risks associated with vaping. They had little knowledge of the contents of the pods or the side effects of nicotine use. They were unable to explain what nicotine was or the possible effects to the human body. The attitudes of the students included seeing social use as being cool and solitary use as addictive behavior. They also acknowledged that social use could lead to addiction. They believed vaping is seen as socially acceptable, unlike cigarettes, which are seen as smelly and gross. They saw more of a relaxed social environment around vaping, including being able to vape without asking at friend's homes and feeling comfortable asking strangers "can I hit that?' (Katz et al., 2020, p. 5). Also, vaping in social situations was seen as an opportunity to meet people through the sharing of pods. Three stages of vaping practice were identified: social connection, addiction, and detachment. The detachment, after casual use led to addiction, was traumatic. Some students were using drastic public measures to try to rid themselves of the habit. Many described Tik Tok videos of fellow students throwing pods off cliffs and running them over with their car. The information in this study can be used to identify intervention points during the diffusion process of vaping on college campuses. This will help develop tools for campus campaigns directed at decreasing the use of vaping (Katz et al, 2020). Katz et al. (2020) noted the study should be recreated on a regular basis to identify the ever-changing environment of

vaping and e-cigarette use on campuses. Future studies should include more males and demographic varieties. The study also needs to include larger groups and be spread across several campuses in different areas of the country (Katz et al., 2020).

Katz et al. (2020) used a qualitative method surveying feelings and attitudes. The quantitative method would have given more empirical data to compare statistically with other campuses. The sample was small and lacked diversity. The significance of the findings is only relative to the small sample identified. Many variables that would alter results were present: (a) students given credit for participation, (b) overwhelmingly female, and (c) lack of ethical diversity (Katz et al., 2020).

This article is very closely related to the problem identified in the current research study, which was an investigation of the knowledge of college students of vaping and the associated risk. The framework they utilized in KAP would be an excellent guide for the formation of a tool. The questions used in their survey would be relevant to the current research in forming a survey. The article helps identify the sample needed for greater relevance in the research project (Katz et al., 2020).

Bellisario et al. (2020) performed an observational study surveying the public knowledge and perceptions of the dangers of vaping in United States (U.S.) adults. They noted that EVALI is an abbreviation for e-cigarette or vaping use-associated lung injury. They conducted the survey out of concern for the rising number of EVALI hospitalizations. According to Bellisario et al. (2020), hospitalizations due to EVALI have had an alarming increase, and the survey focused on participants' knowledge and perceptions of vaping health risks. Vaping is termed as inhaling smoke from electronic

cigarettes that may contain nicotine, tetrahydrocannabinol, and cannabidiol (Bellisario et al., 2020).

The study was performed on a sample size of 413 (N=413) U.S. adults (Bellisario et al., 2020). The survey was distributed as an electronic survey through social media websites using SurveyMonkey, Facebook, Reddit, YouTube and Instagram. Participants were 18 years or older with 65.62% between the ages of 18-24 years old. In the survey, 79.18% of participants were females and 79.42% were Caucasian. Participants included those who vape and those who did not vape. Survey questions were categorized as demographic, vaping knowledge, and vaping perception (Bellisario et al., 2020).

Bellisario et al. (2020) identified three hypotheses. The first hypothesis stated there exists an association between knowledge of the chemicals found in vape pods and vape usage. The second hypothesis stated there exists a relationship between vaping and drug use. The third hypothesis stated there exists an inverse association between knowledge of the dangers of vaping and vaping use (Bellisario et al., 2020).

Demographic variables including gender, education levels, and ethnicity were collected with a sample size of 413 (N=413) (Bellisario et al., 2020). Gender variables within the survey included 82 (19.85%) male, 327 female (79.18%), one (0.24%) transgender male, two (0.48%) gender variant/nonconforming, and one (0.24%) not listed. Education level variables included 3 (0.73%) with some high school, 41 (9.93%) with a high school graduate/diploma/GED, 140 (33.90%) with some college and no degree, 19 (4.60%) with an associate degree, 124 (30.02%) with a bachelor's degree, 67 (16.22%) with a master's degree, and 19 (4.60%) with a doctoral degree. Ethnicity of the participants included 328 (79.42%) Caucasians, 44 (10.65%) Hispanic/Latinos, 17

(4.12%) other, 15 (3.63%) Asian Americans, seven (1.69%) African Americans, and two (0.48%) Pacific Islanders. The survey also considered the medical and psychiatric diagnoses of the sample population (N=413) (Bellisario et al., 2020).

The survey results found that 46.49% of participants had never vaped but were still included in the survey to evaluate the knowledge and perceptions of vaping risks. The researchers also surveyed participants regarding whether health care providers asked about vaping use. Results were 62.71% reporting “no”, health care providers never ask about vaping usage, and 37.29% reporting “yes”, they did ask about vaping usage. When participants were asked if they would stop vaping if a healthcare provider asked them to, 181 (44.69%) strongly agreed and 152 (37.53%) agreed they would stop vaping. Vaping perceptions among participants included 253 (61.86%) stating that “vaping is a health concern”, 122 (29.83%) stating that “drinking alcohol makes a person more inclined to vape”, and 100 (24.39%) strongly disagreeing that “vaping makes a person more socially acceptable”. Vaping knowledge findings included 225 (54.61%) strongly agreeing and 176 (42.72%) agreeing that “vaping can cause lung damage.” Findings also included 111 (27.07%) agreeing and 203 (49.52%) disagreeing that “vaping is more harmful than smoking” (Bellisario et al., 2020).

In summary, the research findings regarding the first hypothesis indicated an association between lack of knowledge of the chemicals found in vape pods and vape usage. Findings indicted 91.04% of participants were unaware of the ingredients in a vape pod. The second hypothesis evaluated drug use among the participants. Findings indicated significant correlation between marijuana use and vaping. Marijuana use among the participants surveyed was 19 (4.60%) daily, 42 (10.17%) weekly, 41 (9.93%)

monthly, 85 (20.58%) less than monthly, and 226 (54.72%) never. Other drugs surveyed included cocaine, inhalants, ecstasy, hallucinogens, heroin, ketamine and methamphetamines. There was little correlation with vaping and other illicit drug use. The third hypothesis was supported by findings that participants who lack knowledge of the content and dangers of vaping are more likely to vape and vape more frequently. More than half of the participants reported that if the dangers of vaping were discussed with them by their healthcare provider, they would be more likely to quit vaping (Bellisario et al., 2020).

Bellisario et al. (2020) recognized weaknesses within the study. First, the data were collected during the COVID-19 pandemic, and they had to stop research early because New York City shut down. Another weakness was the large percentage of female and Caucasian participants. Lastly, the researcher was unable to answer questions by participants about unfamiliar terminology because of electronic social media distribution of the survey. Regardless of the limitations of research, the data collected provided insight on the vaping knowledge and perceptions in adults (Bellisario et al., 2020).

This research is relevant to the current research study. The article evaluates the perception and knowledge of vaping of mainly young adults in the United States. The researchers' goal is to assess the relationship between vaping prevalence and knowledge deficits and the associated risk of vaping in college aged students.

Abadi et al. (2017) conducted a quantitative cross-sectional study assessing the use of electronic cigarettes (e-cigarettes) among college students, the factors associated with their use, and the education they received about e-cigarettes from health care professionals. E-cigarettes are devices powered by batteries that convert a liquid

containing nitrosamines (carcinogens), diethylene glycol, nicotine (usually), and other contaminants into a vapor that is inhaled. The associated risks of e-cigarettes are still not fully known but are currently being studied. E-cigarette usage by adults rose 5.2% from 2010 to 2013. Also, e-cigarettes have been marketed as safer alternatives to cigarettes, and this could account for one reason for this rise in usage (Abadi et al., 2017).

Abadi et al. (2017) suggested three hypotheses. The first hypothesis was that increased e-cigarette usage is due to being marketed as a safer alternative to traditional cigarettes. The second hypothesis was that e-cigarettes are a possible "gateway product" leading to other substance abuse, including cigarette smoking or marijuana usage. The third hypothesis was that efforts by healthcare providers to assess usage and encourage cessation can lead to higher percentages of e-cigarette abstinence (Abadi et al., 2017).

Students aged 18 years and older were recruited from a public university in San Francisco, California. Two professors at the university helped recruit students. The professors distributed a letter describing the study and a consent form to be signed in order to participate. The survey consisted of 18 items including: (a) e-cigarette awareness, (b) use status, (c) harmfulness of e-cigarettes, tobacco and marijuana, (d) addiction to e-cigarettes, tobacco, and marijuana, (e) healthcare counseling, (f) social acceptability, (g) e-cigarette usage risk, (h) and demographics. Answers to surveys were calculated and arranged using Microsoft Excel (2010). The researchers used Mann-Whitney U-test with a level of significance of £0.05 (Abadi et al., 2017).

According to Abadi et al. (2017), out of 300 surveys dispersed, only 91 were completed. The results of the survey indicated almost 50% had used e-cigarettes before and 10% used e-cigarettes in the previous 30 days. Participants who had used e-cigarettes

reported not knowing the concentration of nicotine they inhaled; but most preferred candy, fruit, or mint/wintergreen flavors. This suggests that flavor variety plays a major role in enticement of e-cigarette use in young adults, whereas knowing the amount of nicotine inhaled is of less concern. When asked about associated risks of vaping, participants who never used e-cigarettes anticipated higher social and physical risks than participants who had used one or more times. Most participants believed cigars, cigarettes, and smokeless tobacco are "extremely harmful" but believed marijuana is not harmful or "slightly harmful"; and almost half believed e-cigarettes are "moderately harmful", supporting hypothesis one and two. Cigars, cigarettes, and smokeless tobacco were believed to be more harmful to the environment than e-cigarettes and over half of the participants believed cigars, cigarettes, and smokeless tobacco are less acceptable socially. These results suggest that the rise in e-cigarette usage may be related to the perception of users that e-cigarettes are less environmentally and physically harmful and more socially acceptable than cigars, cigarettes, and smokeless tobacco. Few participants reported receiving e-cigarette counseling from a healthcare professional, although counseling regarding cigarette usage was much more likely. These survey results suggest that lack of counseling from trusted healthcare professionals about e-cigarette usage and cessation may contribute to the rise in use among college students, supporting hypothesis three (Abadi et al., 2017).

Abadi et al. (2017) suggests several weaknesses of this study. First, the study was conducted at a university in northern California. This state has strict regulations on smokeless tobacco, cigarette, and e-cigarette usage due to clean indoor air laws. This limitation may affect the applicability of this study to all college students in the United

States. Second, the low number of responders to the survey may suggest that those who participated had a greater affinity for e-cigarettes, leading to skewed results. Third, the low number of participants made it necessary to combine and study participants who were current users with participants who had used in the past, no matter how little they had used. Therefore, more data is needed about current users and their nicotine exposure in relation to beliefs and perceptions about risk. Finally, this study did not look at trends related to use of tobacco products, which may have been used concurrently with e-cigarettes by study participants. Therefore, results may have been influenced by that information. However, this study does provide valuable insight into e-cigarette usage among college students and can guide future research (Abadi et al., 2017).

This study will benefit the current research study by providing data about college students' knowledge about the associated risks of vaping. First, Abadi et al. (2019) supports the idea that vaping is on the rise and need for continuing research is warranted. Second, this study proposes that college students are misled into believing that e-cigarette usage is a healthier alternative to cigarette smoking, suggesting that they are not knowledgeable about its associated risks. Third, this study highlights the fact that healthcare providers are rarely assessing for and speaking to their patients about e-cigarette usage, which adds to the lack of knowledge among college students about associated risks of vaping, highlighting the need for further research (Abadi et al., 2017).

Risks

Grant et al. (2019) performed a study for the purpose of determining the prevalence of e-cigarette use (vaping) among university students and the relationship of psychosocial behaviors. The prevalence of electronic cigarette (e-cigarette) usage in the

United States has progressed rapidly since its introduction more than ten years ago. E-cigarettes are advertised as less harmful nicotine delivery devices. However, their contents are not regulated and vary widely. Studies show that nicotine dependence has been associated with impulsivity, mood disorders, anxiety, suicidality, and depression. The popularity of e-cigarettes among the general population, including young adults, raises a question regarding the association between e-cigarette use and mental health. Researchers proposed that the use of e-cigarettes would be associated with increased rates of substance use, mental health issues, impulsivity, and poor academic achievements as compared to students who do not use e-cigarettes (Grant et al., 2019).

Ten thousand university students, graduate and undergraduate, at a large midwestern university were selected by randomly using their email addresses to complete an online survey. Of the 10,000 email invitations sent, only 9,449 were received; furthermore, only 3,659 responded to the survey (Grant et al., 2019).

Grant et al. (2019) developed the Health and Addictive Behaviors Survey. This survey examined the use of alcohol, drugs, tobacco, and mental health issues in university students. It consisted of 156 questions that surveyed demographics, self-reported academic achievement, and a range of behaviors. Participants were asked to report whether they had used e-cigarettes within the past 12 months, had used e-cigarettes in the past but greater than 12 months ago, or had never used e-cigarettes. Researchers recorded data for past year e-cigarette use rather than the past month to capture sustained rather than short-term/more acute associations with other variables (Grant et al., 2019).

“Only respondents who answered the question regarding the use of e-cigarettes were included in the analysis (*N*= 3572/3659 survey completers, 98%)” (Grant et al.,

2019). Researchers used SPSS for all statistical analyses (version 24; IBM Corp). Of those participants who responded, 57.1% were female. The prevalence of past 12-month e-cigarette use was 9.2%, with 9.8% reporting having used more than 12 months ago. Three hundred and thirty-one had used e-cigarettes within the past 12 months. However, 2,936 had never used e-cigarettes. Researchers found that e-cigarette users were more likely to be Caucasian males, undergraduates, and have lower GPAs (all $p<.001$). E-cigarette use was also associated with the use of other drugs, including alcohol and opiates. Students who reported e-cigarette use within the past 12 months were also more likely to report illicit drug use within the past 12 months. When asked to select all illicit drugs used in the last 12 months, the 331 participants who reported drug use responded the following: Amphetamines 5.7 (18), Cocaine 14.9 (47), Heroin 1.9 (6), Hallucinogens 23.8 (76), Marijuana 72.0 (231), prescription opioid pain medicine 9.7 (31) and sedatives 11.0 (35). Data analysis revealed those who used e-cigarettes were significantly more likely to have a mental health history of ADHD, PTSD, gambling disorder, anxiety, report low self-esteem, and endorse traits of impulsivity. Data analysis revealed that 0.9 (3) reported a gambling disorder, 22.22 (70) reported having ADHD, and 80.0 (248) reported low self-esteem, and 5.9 (18) reported compulsive sexual behavior (Grant et al., 2019).

Grant et al. (2019) found several limitations to the study. Researchers felt that by using a cross-sectional study, the direction of causality could not be determined. Also, a lack of representation may have been due to the self-selected nature leading to a more significant problem. Fourth, a more detailed inquiry of frequency and pattern of e-

cigarette use, type of e-cigarette device used, and constituents of e-liquids would provide a more in-depth analysis of college students (Grant et al., 2019).

In summary, Grant et al. (2019) found e-cigarette use to be very common in university students. E-cigarette use was associated with several other concerns including poor academic performance, increased likelihood of using other substances, and increased rates of anxiety, ADHD, and PTSD. However, the strongest associations were illicit drug use, alcohol use, and undergraduate single males (Grant et al., 2019).

McClelland et al. (2021) performed a mixed factorial experimental study assessing the short-term physiological effects of participants who vaped and/or were exposed to e-cigarette vapor for 20 minutes. As noted in this study, a substantial amount of vaping-related lung injury reports occurred nationally in 2019, prompting state and federal agencies to impose stricter regulations on the sale of vape products. Most concerning to parents and health care professionals is the significant rise in e-cigarette vaping use among young people, including some middle school children. Even more concerning is the potential for long-term health complications, about which most of these young people are naïve. Consequently, McClelland et al. (2021) felt this study could shed light on short-term physiological effects of vaping and/or vaping exposure that are almost guaranteed to lead to long-term health complications. No theoretical framework was identified in this study (McClelland et al., 2021).

McClelland et al. (2021) identified seven main hypotheses. The first hypothesis suggested heart rate is affected by vaping and exposure to e-cigarette vapor. The second hypothesis suggested blood pressure is affected by vaping and exposure to e-cigarette vapor. The third hypothesis suggested respiration rate is affected by vaping and exposure

to e-cigarette vapor. The fourth hypothesis suggested blood sugar is affected by vaping and exposure to e-cigarette vapor. The fifth hypothesis suggested pulmonary function is affected by vaping and exposure to e-cigarette vapor. The sixth hypothesis suggested oxygen saturation (SpO2) is affected by vaping and exposure to e-cigarette vapor. The seventh hypothesis suggested body temperature is affected by vaping and exposure to e-cigarette vapor (McClelland et al., 2021).

The study involved an assessment of short-term physiological effects on two groups of people aged 18 or older. The first group consisted of 76 individuals who currently vaped. The second group consisted of 73 individuals who currently did not vape. Participants were asked not to eat or drink anything 60 minutes prior to the experiments. After obtaining informed consent from all subjects, measurements were taken of all participants' heart rates, calculated mean arterial blood pressures, breaths per minute, forced vital capacities, SpO2, blood sugars via finger pricks, and oral temperatures. The total sample size of $N = 149$ was then brought into an enclosed 12-foot by 12-foot room at a University of Detroit Mercy laboratory. The first group of vapors were each given a vaping device and asked to vape for 20 minutes. The second group of non-vapers were asked to simply remain in the room during that time while being exposed to second-hand vapor. After the 20 minutes had elapsed, measurements were again taken of all 149 participants' previously measured physiological data (McClelland et al., 2021).

After a mixed factorial variance analysis (ANOVA) and covariance analysis (ANCOVA), with the Mann-Whitney and the Wilcoxon tests used to ensure significant statistics remained significant, and a p value £ 0.05, hypothesis results varied

(McClelland et al., 2021). Hypothesis one was statistically supported ($p = 0.01$), as the non-vaping group showed a reduction in heart rate and the vaping group show ed an increase. Hypothesis two was statistically supported given that the non-vapers' mean arterial blood pressures went down, and the vapers' blood pressures stayed approximately the same, suggesting that non-vapers were able to relax as indicated by the reduction in blood pressures, and vapers were unable to relax, as indicated in their blood pressures remaining the same. The third hypothesis was statistically supported, as the vaping group had higher breathing rates than the control group both pre- and post-vaping, suggesting that short and long-term vaping leads to higher respiratory rates. The fourth hypothesis was not statistically supported, as there was no real change in blood glucose for either group after vaping by the experimental group took place. The fifth hypothesis that vaping affects pulmonary function of forced vital capacity was not statistically supported after controlling for covariates was performed. The sixth hypothesis that SpO2 is affected by vaping was supported, as both the experimental and control groups showed lower mean values of oxygen saturation after the experiment. Finally, the seventh hypothesis was statistically supported, as the mean values of oral temperatures rose for both the experimental and control groups post-vape (McClelland et al., 2021).

McClelland et al. (2021) suggested one main strength and two weaknesses of this study. First, a strength of this study was that physiological data were collected on both vapers and non-vapers exposed to e-cigarette vapor. This is important because vapors frequently vape around non-vapers. One weakness could be considered the fact that vapers of this study had greater rates of smoking, alcohol use, recreational drug use, treated mental illness, and lung disease, suggesting that the study results could have been

influenced by these things. Finally, another weakness was that fewer vapers (36.8 %) considered themselves to have excellent health than non-vapers (47.9 %). This contrast may have influenced the study due to vapers believing they have risky health behavior (McClelland et al., 2021).

This study is relevant to the research because of its evidence that vaping results in negative health effects on the body. Several physiological measurements post-vaping in the study by McClelland et al. (2021) changed in unhealthy ways compared to pre-vaping measurements. This suggests that vaping has not only short-term health effects but will eventually have long-term health complications for vapers as well (McClelland et al., 2021).

Literature Related to Conceptual Framework

Vu et al. (2020) performed a quantitative survey study with statistical analysis. The purpose of the study was to determine the degree of understanding of vaping risk among different adolescent demographic groups. The study evaluated the perception of adolescents regarding the dangers of nicotine and other chemicals in e-cigarettes. The evidence from previous studies did not involve data on vulnerable groups. The researchers used Nola Pender's Health Promotional Model as a guide for this study (Vu et al., 2020).

Vu et al. (2020) believed that a positive correlation existed between race, gender, and socioeconomic group and their perceptions of the safety of e-cigarettes. The researchers believed vulnerable subgroups should be identified for the proper formation of educational tools. This study intended to identify these subgroups with a cross sectional survey (Vu et al., 2020).

Vu et al. (2020) evaluated a survey conducted by the American Heart Association Tobacco Regulation and Addictive Center. The survey was conducted online with a target group of 3,174 adolescents. The participants were further divided into two groups: those who have never smoked and those who have tried e-cigarettes. The study was conducted from August to October of 2017. Data were further divided into gender, age group, race, socioeconomic group, and place of residence (Vu et al., 2020).

Vu et al. (2020) discovered the highest perception of health risks of e-cigarette liquids was the never smokers. The next group with high perception of health risks were the females tested. The most surprising group were the LGBTQ individuals, which tested higher for perception of risk of e-cigarette liquids than their heterosexual counterparts. The lowest results were identified in the non-Hispanic black males with low socioeconomic status. These results will help in the formation of an educational tool which targets this subgroup. There is a need for continuing research to discover the cause of this decreased perception of e-cigarette risk among disadvantaged socioeconomic groups (Vu et al., 2020).

The study had limitations (Vu et al., 2020). The cross-sectional nature of the study by Vu et al. (2020) limited data analysis possibilities. The group surveyed was a random sample taken via online across the United States, which may have yielded different results from a sample of individuals without internet access. However, a strength was the study also tested a large group, making the results more applicable (Vu et al., 2020).

The study is relevant because the testing of knowledge concerning e-cigarette health risk is very relatable to the framework of the research project. Vu et al. (2020) used the survey method via online questionnaire, which mirrors the research project. The

Health Promotion Model was used for direction, just as the current research project. Finally, testing different demographics of college students concerning knowledge of vaping risk to determine educational needs is the main objective of the current research project, which is similar to the framework of the study by Vu et al. (2020).

Summary

In summary, as explored in the review of literature and understood through Nola Pender's Health Promotion Model, many things influence a college student's decision to vape. However, as the review of literature points out, a recurring influence for vaping is a knowledge deficit of the harmful effects vaping has on the body. This knowledge deficit can be considered a barrier to action as understood through Nola Pender's Health Promotion Model (Alligood, 2018). Jones et al. (2021) found in their research that e-cigarette never-users had more knowledge about the negative effects of vaping, which likely influenced their decision to not vape. Katz et al. (2020) found that vapers lacked knowledge about the health risks vaping has on the body. Bellisario et al. (2020) found that lack of knowledge of the harmful effects of vaping had a direct correlation with e-cigarette use. Abadi et al. (2017) highlighted that a rise in vaping is likely correlated with the fact that e-cigarettes were first marketed in 2007 as a safer alternative to tobacco cigarettes and also that a very low percentage of primary care providers were educating their study participants about vaping, both of which contribute to a knowledge deficit about the associated risk of vaping. Finally, Grant et al. (2019) and McClelland et al. (2021) confirm that there are a number of negative psychological and physiological effects of vaping including mental illness, impulsivity, academic impairments, use of additional substances, increased heart rate, increased breathing rate, decreased blood

oxygen saturation, and the inability to relax. All these studies help paint a clearer picture of how lack of knowledge about the negative effects of vaping likely contributes to e-cigarette use. Finally, from the viewpoint of the Health Promotion Model, this knowledge deficit can be seen as a barrier to vaping abstinence and cessation (Alligood, 2018).

Chapter III

Design and Methodology

This study was designed to determine vaping prevalence among college students and their knowledge of the associated risks of vaping. The study was also utilized to determine if primary care providers were educating students regarding vaping. This chapter describes the study's design, setting, population and sample, methods of data collection, methods of data analysis, and the expected correlation of variables from the collected data.

Design of the Study

A non-experimental, quantitative design was used in this research study utilizing a 29-question survey assessing vaping prevalence, vaping knowledge, and provider education regarding vaping (see Appendix A). The *Don't Blow It: Anti-Vaping Campaign* questionnaire questions created by Essentia Health (see Appendix B) were included in the survey. Essentia Health is an integrated health system that serves as a reputable educational resource for healthcare providers. Their questionnaire questions were used in the survey of this study to assess college students' knowledge regarding vaping. The researchers chose this format and design because it gathered information effectively over a limited time frame for statistical analysis. This type of design also allowed survey participants to maintain anonymity. The survey tool for the current research included questions concerning demographic information, vaping status, vaping knowledge, and healthcare provider education to give a clearer picture of the correlation vaping knowledge deficits have with vaping use among college students.

Setting for Research Project

The research was conducted in the southeastern United States using participants enrolled in two community colleges and two universities. The Institutional Review Board (IRB) (see Appendix C) gave approval to conduct the study in the southeastern United States. The survey was distributed via various electronic means to students 18 years of age and older currently enrolled in the participating colleges and universities. Data were obtained using SurveyMonkey, an online survey software company used to create and perform professional surveys.

Population and Sample

The population consisted of students aged 18 years and older who attended a college or university in the southeastern United States. This was a sample of convenience due to availability and time constraints. The human rights of the participants of this study were protected. Risks and benefits of the study were discussed with the participants and consent was given upon participation (see Appendix D).

Methods of Data Collection

To collect data, a written request was submitted to university and college campuses in the southeastern United States (see Appendix E) and permission was requested to conduct the proposed research study via the university email listserv. QR codes were distributed via flyers, and faculty email (see Appendix F). Surveys were not distributed until IRB approval was obtained (see Appendix C). Upon approval of the IRB and consent from participating institutions, the survey was electronically submitted to students 18 years of age and older currently enrolled in college. Attached to the survey was a cover letter providing potential participants with information regarding

confidentiality, informed consent, and a freedom from harm clause (see Appendix D). The cover letter states that participants would remain anonymous. The university consent letter stated the data collected would help determine the prevalence of vaping among college students and their knowledge regarding the risks associated with vaping. The data would also be utilized to determine if primary care providers are educating students regarding vaping. Participants were aware that participating in the study was voluntary and would not affect their academic standing with the participating university. Participants were free to withdraw from the survey at any time. Upon request to complete the survey, the participants were provided contact information for the researchers, research advisor, and the Institutional Review Board (IRB) for questions or concerns.

The survey consisted of 6 demographic questions and 4 vaping status questions. The *Don't Blow It: Anti-Vaping Campaign* questionnaire questions were also included in the survey, which consisted of 14 knowledge-based questions regarding vaping. The last section contained 5 questions regarding educational resources received from their primary care providers. The survey was available for 35 days.

Method of Data Analysis

Upon survey completion, data were compiled via SurveyMonkey. The data collected was then sent to a third-party statistician for data analysis. Data were analyzed by the statistician using SPSS statistics to illustrate correlations between prevalence, vaping knowledge, provider education, and vaping status. Healthcare providers can use this data to educate patients regarding the risks of vaping.

Summary

In summary, the study was conducted at colleges and universities in the southeastern United States. The population sample included participants aged 18 and older currently enrolled in a college or university. After permission was obtained from the participating universities and the IRB, a SurveyMonkey link was electronically emailed to participants. QR codes with a link to the participant letter and survey were also distributed. After informed consent was obtained and surveys completed, data were obtained from SurveyMonkey and sent to a third-party statistician for analysis. Data analysis was then reviewed to understand its applicability to the correlation between vaping prevalence and knowledge deficits regarding vaping health risks to assess the need for further education from healthcare providers.

Chapter IV

Results

The purpose of this study was to determine the vaping prevalence and vaping knowledge among college students. The study was also utilized to determine if primary care providers are educating patients regarding vaping. A survey questionnaire was sent to students from two colleges and two universities in the southeastern United States through various electronic means asking participants demographic, vaping prevalence, vaping knowledge, and provider education questions (see Appendix A). The knowledge section of the survey was taken from the *Don't Blow It: Anti-Vaping Campaign* questionnaire developed by Essentia Health. This chapter reviews participant demographics, statistical results of the survey, and answers found to the research questions of the study based on analysis of the results from the survey. The results of this study can help providers understand the need for greater screening and more effective health promotion regarding vaping, which the researchers hope will lead to an increase in knowledge regarding vaping and a decrease in the prevalence of vaping.

Profile of Study Participants

Data for the study were obtained from a convenience sample of college students in the southeastern United States via a SurveyMonkey questionnaire. The research was conducted in the southeastern United States using participants enrolled in two community colleges and two universities. The survey was distributed via various electronic means to students 18 years of age and older currently enrolled in the participating colleges and universities. The survey was available for 35 days between April and May of 2022. The survey consisted of 6 demographic questions, 4 vaping status questions, 14 knowledge-

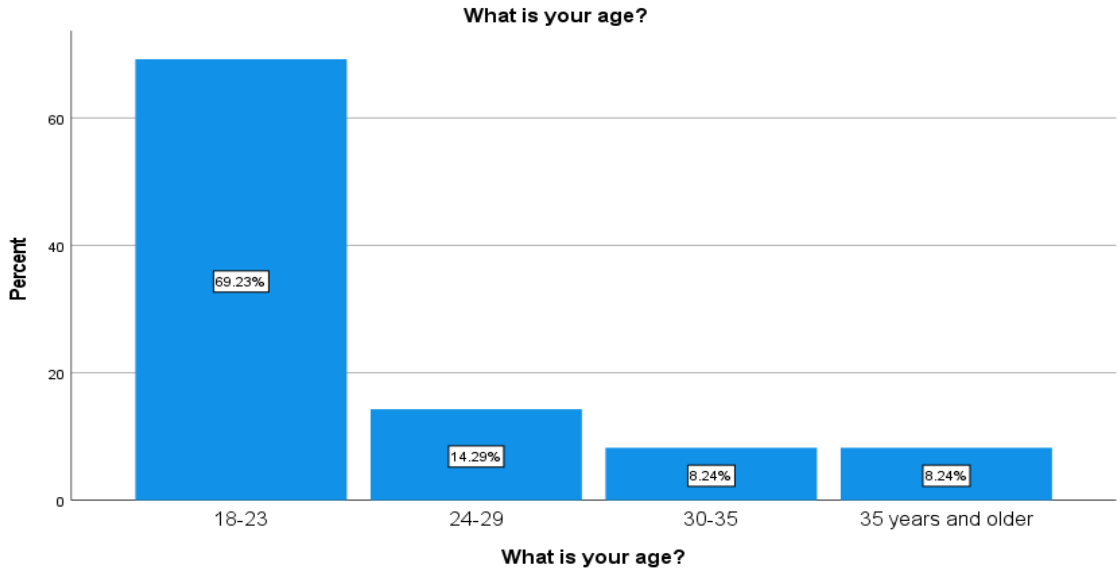
based questions, and 5 health care provider education questions (see Appendix A). The *Don't Blow It: Anti-vaping Campaign* questionnaire by Essentia (see Appendix B)**.** Health was also included in the survey. The researchers had a total of 192 respondents. Of the respondents, only 172 completed the entire survey and were included in the analysis.

When reviewing demographic data of the study population, the college students' age was assessed first (see Figure 1). Of the 172 respondents, 69.2% of students were age 18-23, 14.3% were age 24-29, 8.2% were age 30-35, and 8.2% were 35 years and older. The next question was used to determine participants racial or ethnic identification (see Figure 2). Of the 172 respondents, 82.4% identified as white, 1.6% identified as Hispanic or Latino, 12.6% identified as Black/African American, 0.5% identified as Native American or American Indian, 1.1% identified as Asian or Pacific Islander, and 1.6% identified as other. The next question was used to determine the description of participants gender (see Figure 3). Of the 172 respondents, 27.5% identified as male, 72% of participants identified as female, and 0.5% preferred not to disclose their gender. The next question was used to assess the participants' classification in college (see Figure 4). Of the 172 respondents, 11.5% of were classified as freshman/first year students, 19.2% as sophomores, 22% as juniors, 34.1% as seniors, 10.4% as graduate students, and 2.7% were unclassified college students. The next question determined participants' current GPA (see Figure 5). Of the 172 respondents, 54.4% reported a current GPA of 3.5-4.0, 30.2% reported a current GPA of 3.0-3.4, 8.8% reported a current GPA of 2.5-2.9, 3.3% reported a current GPA of 2.0-2.4, .5% reported a current GPA of 1.0-1.9, .5% preferred not to say, and 2.2% reported not knowing their current GPA. The last

demographic question included participants' health history (see Figure 6). Of the 172 respondents, 57.10% reported having anxiety, 35.70% reported having depression, 30.02% reported having ADHD/ADD, 9.90% reported having high blood pressure, 12.10% reported having asthma, 41.80% reported having seasonal allergies, 8.79% reported having other health conditions, and 16.48% reported having no health conditions.

Figure 1

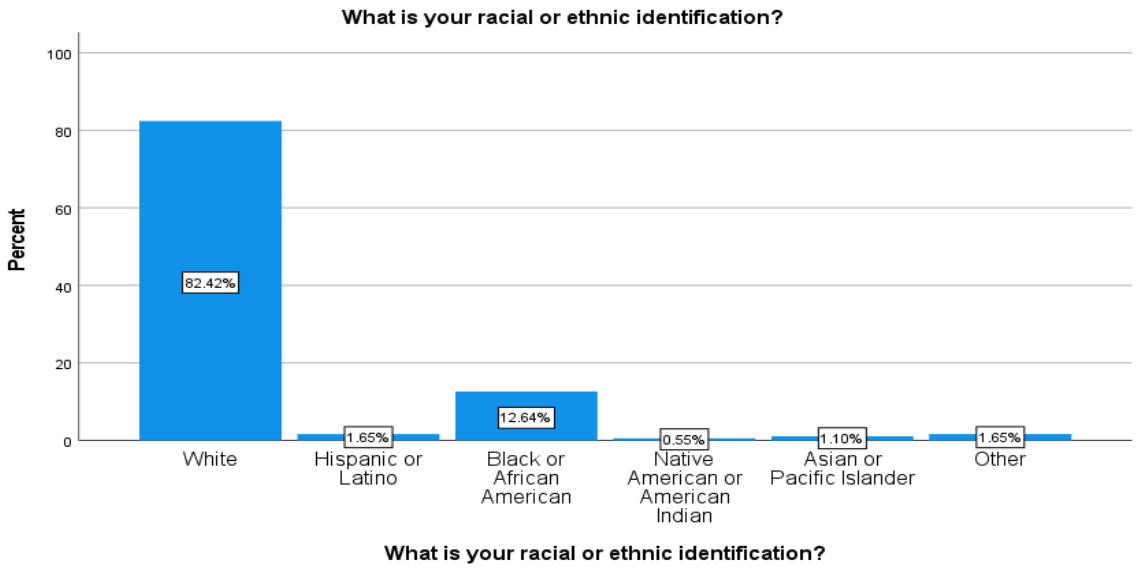
What is your age?



Note. This figure identifies participant age percentages.

Figure 2

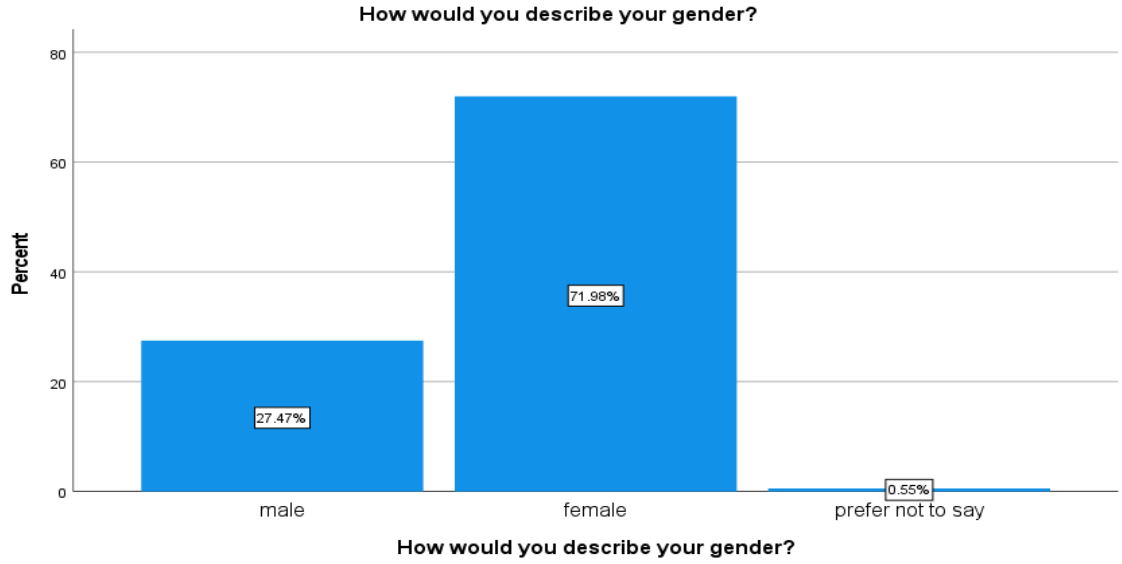
What is you racial and ethnic identification?



Note. This figure identifies racial and ethnic identification.

Figure 3

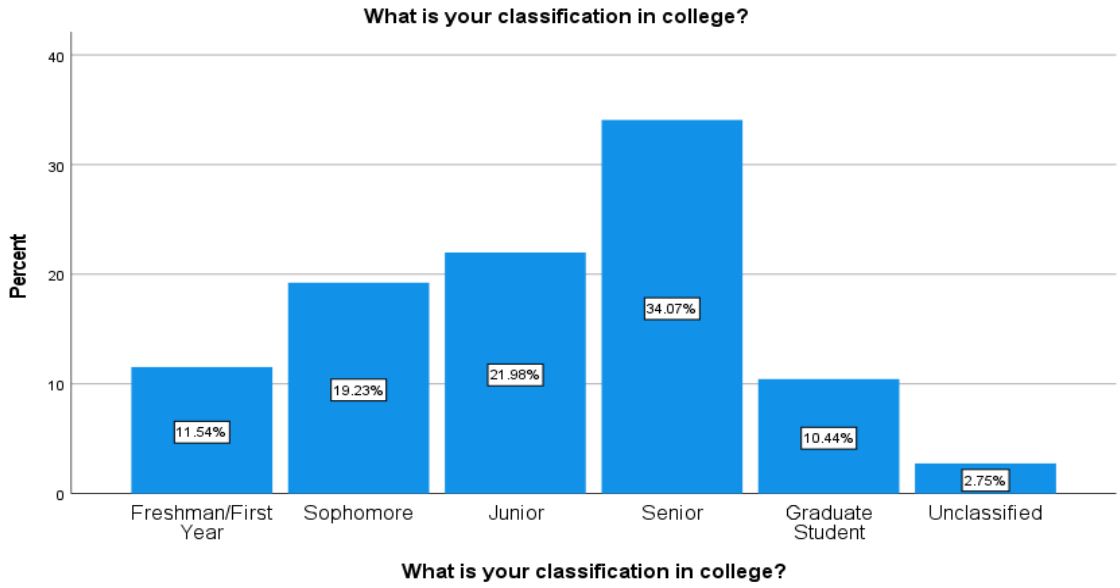
How would you describe your gender?



Note. This figure identifies gender identification of sample participants.

Figure 4

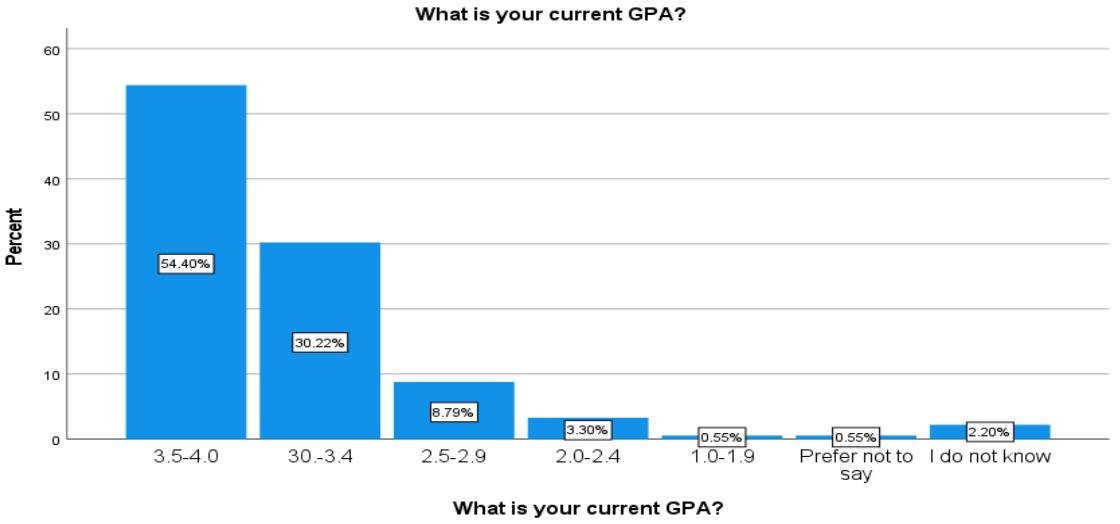
What is your classification in college?



Note. This figure identifies college classification of sample participants.

Figure 5

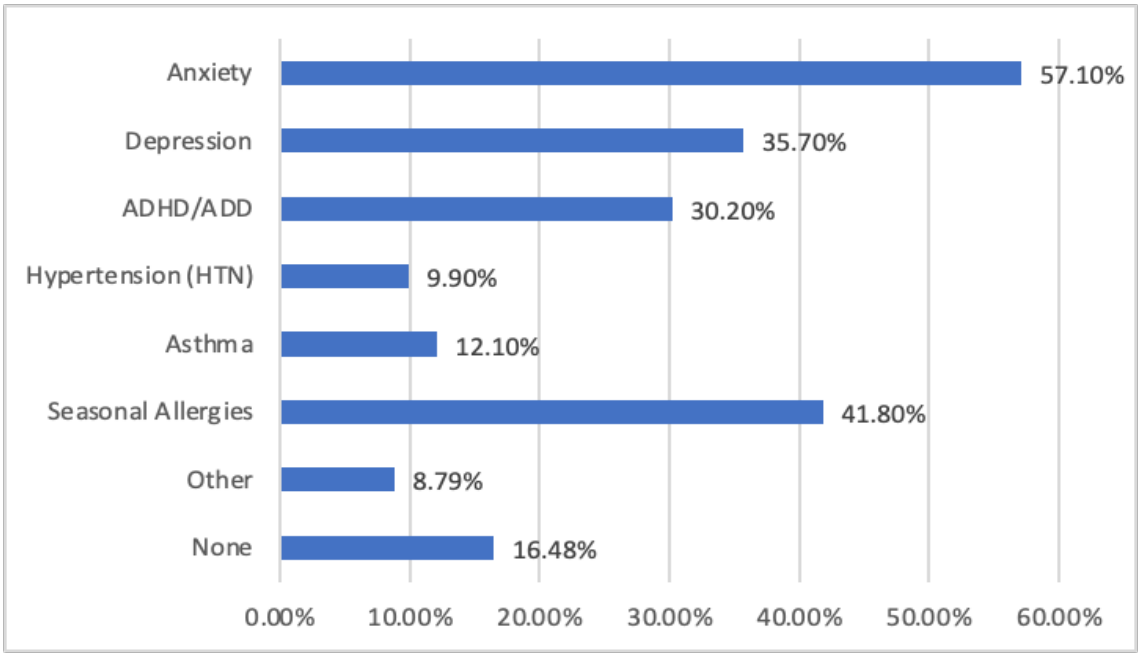
What is your current GPA?



Note. This figure identifies current GPAs of sample participants.

Figure 6

Health History



Note. This figure identifies elements of the health history of participants.

Statistical Results

This study aimed to determine what percentage of college students vape, their knowledge of the risks of vaping, and if health care providers are educating their patients about the risks of vaping. Data were collected from 172 surveys completed by college students. The *Don't Blow It: Anti-vaping Campaign* questionnaire (see Appendix B) questions were also included in the survey (see Appendix A), which consisted of 14 knowledge-based questions regarding vaping. Data for the study were obtained from a convenience sample of college students via a SurveyMonkey questionnaire. SurveyMonkey compiled the results, and the researchers transferred the data to a professional statistician for statistical analysis. The statistician utilized SPSS 28.0 to

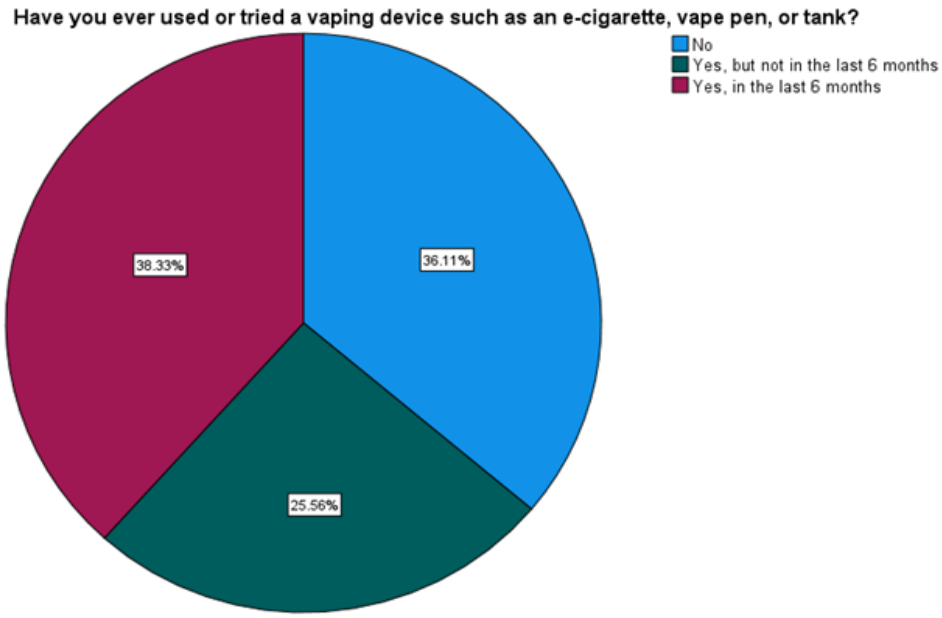
conduct descriptive analysis and chi-squared analyses of association. The researchers examined the statistical results to answer the three research questions.

Research Question 1: What is the prevalence of vaping among college students?

The prevalence of ever vaping in this sample is 63.2%. About a quarter of the respondents (25.3%) reported that they had used or tried a vaping device but not in the last 6 months. Additionally, 37.9% of the respondents indicated that they had used or tried vaping in the last 6 months.

Figure 7

Have you ever used or tried a vaping device as an e-cigarette, vape pen, or tank?

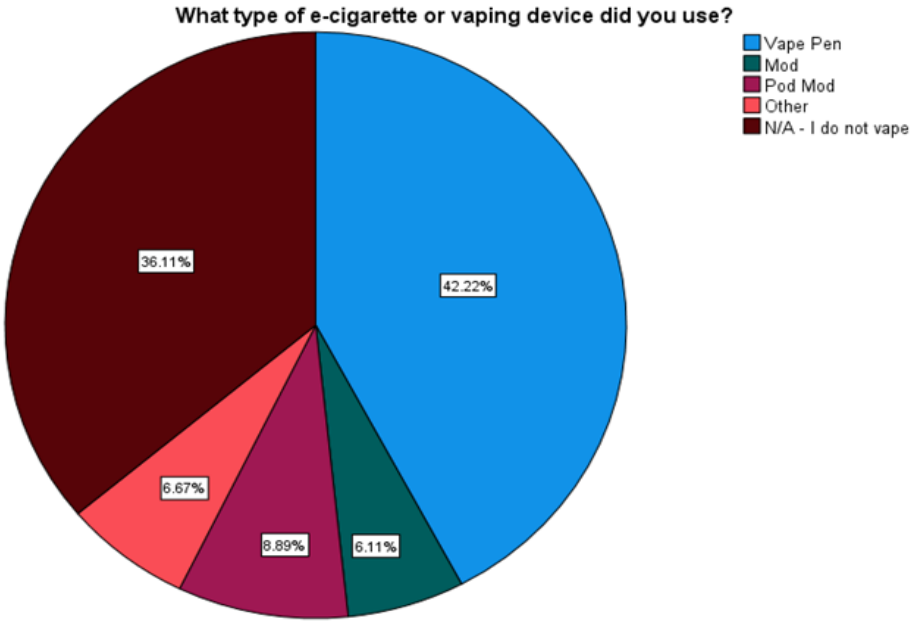


Note. This figure identifies vaping prevalence among survey participants.

The most used vaping device was the Vape Pen (42.2%), and 33% of respondents indicated that they use the vaping device every day.

Figure 8

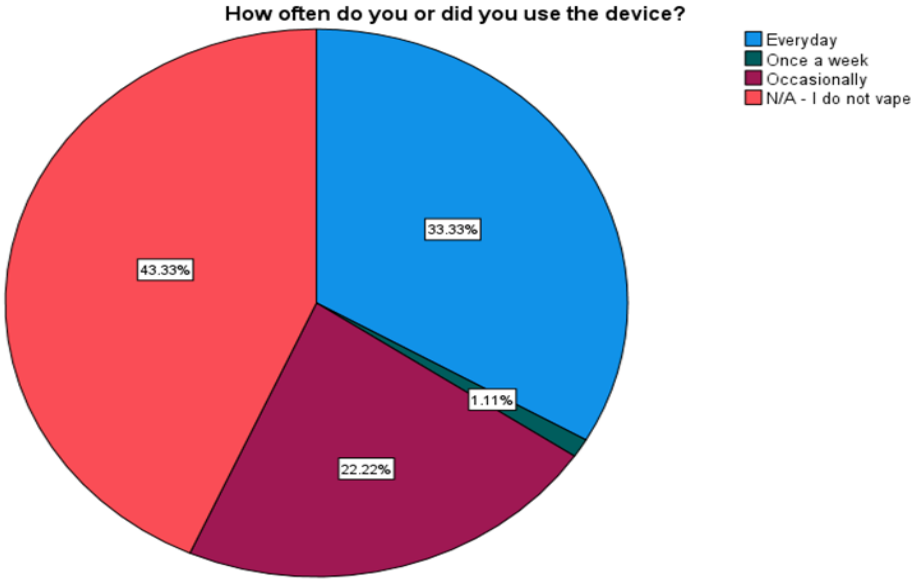
What type of e-cigarette or vaping device did you use?



Note. This figure identifies vaping device types used by survey participants.

Figure 9

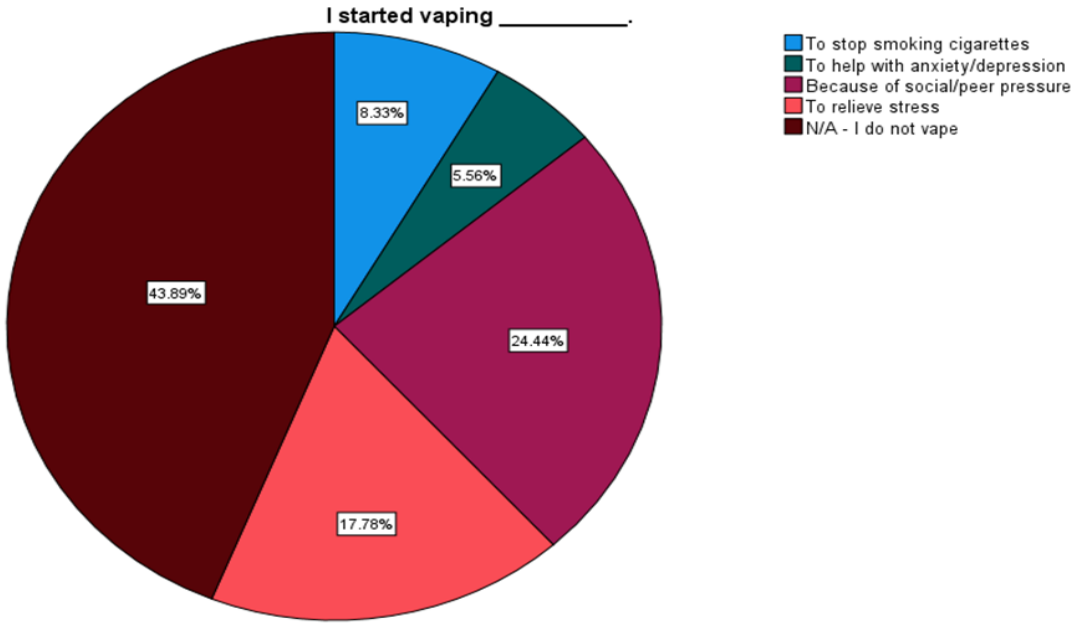
How often do you or did you use the device?



Note. This figure identifies frequency of vaping among survey participants.

Figure 10

Reasons for starting vaping.



Note. This figure identifies reasons survey participants who have ever vaped may have started vaping.

Research Question 2: Are college students knowledgeable regarding the risks associated with vaping?

Researchers had predetermined that a score of at least 11 out of 14 (78.5%) on the *Anti-vaping Campaign* questionnaire (see Appendix B) was knowledgeable. The mean knowledge score in this sample was 83.47%, SD = 13.30. To test if the mean score in this sample differed significantly from 78.5%, a one-sample *t*-test was conducted. Respondents in this sample scored significantly higher on the *Anti-Vaping Campaign* (see Appendix B) questionnaire (M=83.47, SD = 13.3) than the established score deemed to be knowledgeable (78.5%), t (171) = 4.9, $p < .001$. College students in this sample are knowledgeable regarding the risks associated with vaping. In total, 172 surveys were

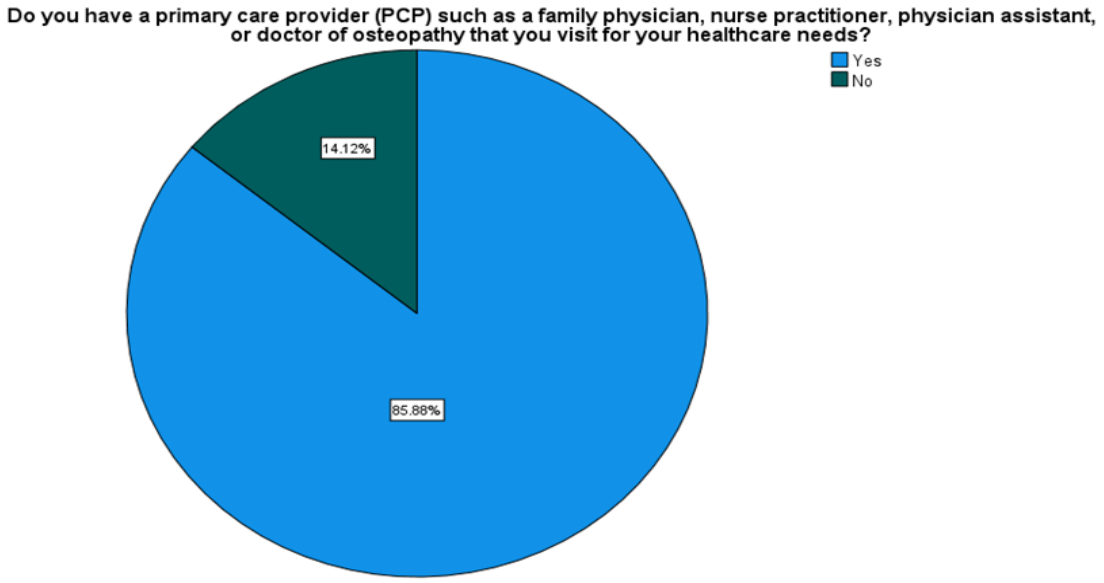
collected where participants responded in full to the survey. A knowledge score was calculated for each respondent who answered the knowledge questions (N=172). The percent correct in the knowledge section was calculated as the number of correct responses out of a possible 14 responses. The minimum score was 28.57%, and the maximum score was 100%. The mean of the scores was 83.47%, with standard deviation 13.30. The research study revealed that college students were 83.47% knowledgeable regarding the health risks of vaping.

Research Question 3: Are primary care providers educating college students regarding vaping?

Most respondents in this sample reported that they have a primary care provider (80.2%).

Figure 11

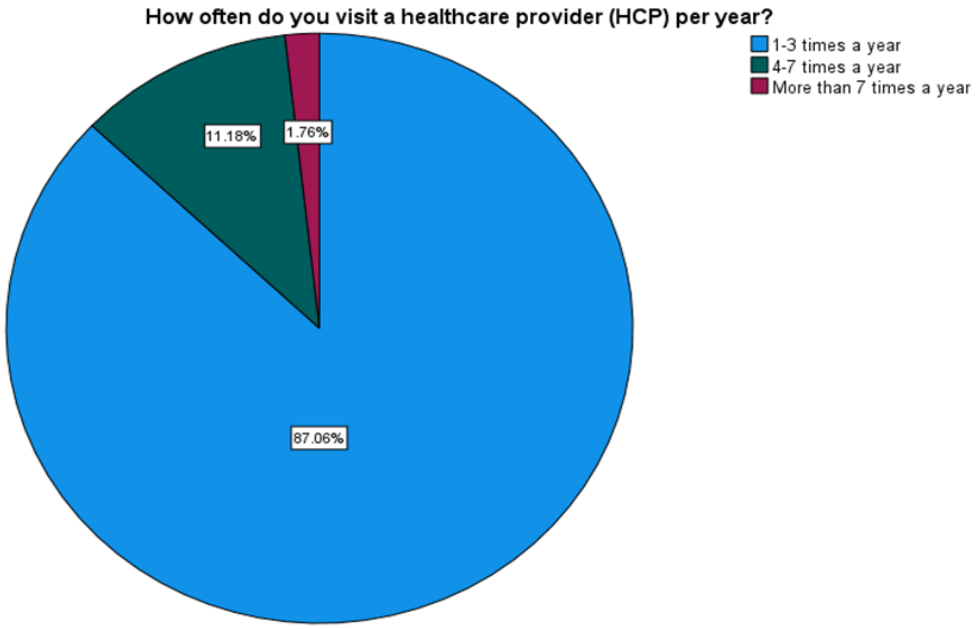
Do you have a primary care provider (PCP) such as a family physician, nurse practitioner, physician assistant, or doctor of osteopathy that you visit for your healthcare needs?



Note. This figure identifies whether participants have primary care providers or not. Respondents in this sample overwhelmingly visit their healthcare provider 1-3 times a year (87.06%).

Figure 12

How often do you visit a healthcare provider (HCP) per year?



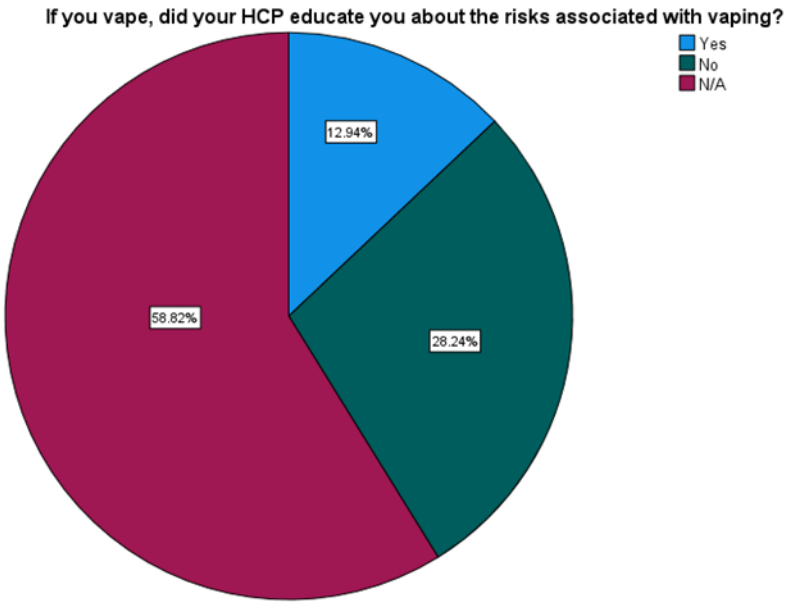
Note. This figure identifies the yearly frequency of healthcare provider visits by participants.

This research question is particularly difficult to ascertain because there is not a specific definition of a current vape user. In question 7, 25.3% (N=46) reported vaping but not in the last 6 months, and 37.9% (N=69) reported vaping within the last 6 months. Not all the respondents that ever vaped consider themselves vape users, and thus they may have responded with N/A in subsequent questions. The results for this research question are mixed. In some instances, healthcare providers appear to be educating college students regarding vaping, particularly if the student has used a vaping device in

the last 6 months. This association between being asked about vaping status and having ever used or tried a vaping device was ascertained. A chi-square test of association was performed to examine if there was a relationship between vaping status and provider queries regarding vaping status. The relationship between these variables was significant, $X^2(4, N=170) = 11.43$, p=.022. However, when asked "If you vape, did your HCP educate you about the risks associated with vaping?", of the 70 respondents that indicated that they vaped (in this question), only 31% (22 out of 70) indicated that their HCP had educated them about the risks associated with vaping. Additionally, healthcare providers did not provide many resources regarding vaping to college students.

Figure 13

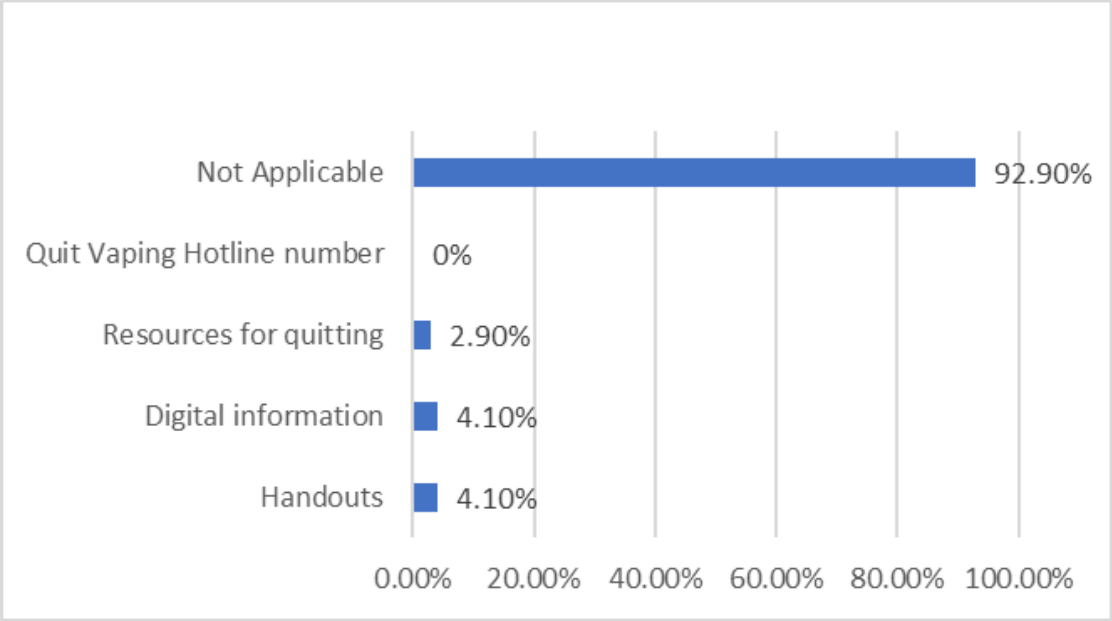
If you vape, did your HCP educate you about the risks associated with vaping?



Note. This figure identifies healthcare provider education regarding vaping received by survey participants.

Figure 14

Has your HCP given you any resources regarding vaping?



Note. This figure identifies resources participants received regarding vaping from healthcare providers.

Summary of the Findings

In summary, 172 participants fully completed the survey. The survey was conducted through SurveyMonkey. The results of the surgery showed 69.2% were age 18-23 years old with 82.4% identifying as white and 12.6% as Black/African American. The survey revealed 72% participants were female, 27.5% male, and 0.5% preferred not to identity. The survey focused on three research questions regarding vaping prevalence, knowledge of risk associated of vaping, and if healthcare providers are educating college students regarding vaping. Prevalence was found at 63.2% with 33.33% reported vaping every day, 22.22% reported vaping occasionally, and 43.33% reported they do not vape. The data revealed that 78.5% of college students are knowledgeable regarding the risks associated with vaping determined by *Anti-Vaping Campaign* with 43.89% who vape due

to social and peer pressure, 54.4% hold a GPA of 3.5-4.0, 57.10% report having anxiety, and 35.7% reported depression. The survey also revealed that only 12.94% of primary care providers are educating college students regarding vaping.

Chapter V

Outcomes of the Research

Summary and Discussion of the Findings

With the increase in the popularity of vaping, the importance of monitoring and educating college students and the public about the associated risks of vaping is imperative. Understanding vaping perceptions, knowledge deficits, and potential health risks is essential for implementing strategies to address health and safety concerns regarding e-cigarette use in the public. It is very concerning that e-cigarettes are marketed toward college-age peers with flavors, smells, and colorful packaging. The survey results indicated that the participants were knowledgeable about the risks associated with vaping and that their primary care providers asked 52.35% of them about their vaping status. However, only 12.9% answered "yes" to educational resources provided by healthcare providers about the health risks associated with vaping. Healthcare providers must be vigilant in screening, educating, and monitoring the use of e-cigarette devices. The unknown long-term effects of vaping on health are haunting, and the need for action to prevent disease is immediate.

Data analysis revealed several interesting results. The operational definition of knowledgeable was defined for this study as answering 11 out of 14 (78.5%) knowledge-based questions correctly on the survey (see Appendix A). A score less than 11 (78.5%) on the knowledge section of the survey was considered unknowledgeable. Each respondent (N=172) received a calculated knowledge score. The lowest score was 28.57%, and the highest was 100%. The average score was 83.47%, with a 13.30

standard deviation. Therefore, the researchers determined that college students are knowledgeable regarding the health risks of vaping.

The data collected in the study showed conflicting findings within the literature review. Contradictory to what most of the literature reviews showed, the findings of this study showed that being knowledgeable did not necessarily lead to a lower vaping status. Over 80% of the survey participants were considered knowledgeable based on the operational definition of knowledgeable; however, 63.2% admitted that they had vaped at one point. Furthermore, 38.33% admitted that they had vaped in the last six months. This is different from the review of literature in that it suggested that a knowledge deficit likely contributed to a higher incidence of vaping. Jones et al. (2021), Katz et al. (2020), Bellisario et al. (2020), Abadi et al. (2017), Grant et al. (2019), and McClelland et al. (2021) each found data that suggested that vaping prevalence correlated with a lack of knowledge of the health risks of vaping.

Survey results indicated that social/peer pressure was the most frequently cited reason for starting vaping (24.2%). Additionally, 17.8% of participants reported vaping to relieve stress, while 5.6% reported that they vaped to help with anxiety and depression. Finally, 8.3% of respondents reported vaping to help them quit smoking. Therefore, the researchers of this study concluded that participants vaped despite being knowledgeable of the risk associated with vaping for reasons not associated with understanding of vaping health risks.

Limitations

Data were collected from 182 participants, with 172 participants that completed the survey in its entirety. Due to time constraints, the sample size was limited. By the

time the survey was distributed, most participants had completed their spring semester, and the number of prospective participants was likely limited due to trends of lower volume of enrolled students during summer semesters. Another limitation was that the data collection process limited the number of prospective participants because the surveys were in electronic format. Consequently, the survey results may have been affected differently than had paper questionnaires been completed. Another limitation was that the *Don't Blow It: Anti-Vaping Campaign* questionnaire (see Appendix B) was developed as an educational tool and was not scored online by Essentia Health. Only the researchers of this study determined what was considered knowledgeable based on the Essentia Health quiz. Another limitation was that survey participation was not proctored, and this fact may have affected the results of the survey in multiple ways. Finally, the study population included students from two colleges and two universities, and the sample population may not have reflected adequately the target population of all college students.

Conclusions

This study aimed to determine vaping prevalence, knowledge, and education received by healthcare providers regarding vaping among college students. The findings of this study support the fact that college students are knowledgeable of the associated risk of vaping. The data showed that college students are knowledgeable regarding the risk associated with vaping, as indicated by the mean knowledge score of 83.47% on the survey. The prevalence of ever vaping in the participant sample was 63.2%. About a quarter of the respondents (25.3%) reported that they had used or tried a vaping device but not in the last six months, and 37.9% of the respondents indicated that they had used

or tried vaping in the last six months. Finally, most survey respondents reported having a primary care provider (80.2%), and 87.06% responded that they visit their healthcare provider 1-3 times a year. The research question "Are primary care providers educating college students regarding vaping?" is particularly difficult to ascertain because there is not a specific definition of a current vape user. The results for this research question are mixed. In some instances, healthcare providers appear to be educating college students regarding vaping, particularly if the student has used a vaping device in the last six months. This association between being asked about vaping status and having ever used or tried a vaping device was ascertained. A chi-square test of association was performed to examine if there was a relationship between vaping status and provider queries regarding vaping status. The relationship between these variables was significant, $X2(4, N=170) = 11.43$, $p=.022$. Of the participants who reported vaping, 12.9% reported being educated about the risks of vaping. However, healthcare providers did not provide resources regarding vaping to most of the participant college students (92.9%). Therefore, the researchers concluded that college students are knowledgeable of the associated risk of vaping even though healthcare providers are not educating them regarding the risk.

Implications

Results of the study survey revealed further research is needed regarding vaping not just in understanding vaping prevalence and consumer knowledge, but also in understand vaping health risks. Medical practice by nurse practitioners and other providers also needs improvement regarding screening practices. Finally, education given by nurse practitioners can prove a vital tool in influencing current and potential vapers to make the better choice to abstain or quit vaping.

Nursing Research

Future research is needed to understand all the long-term complications related to vaping. Due to vaping first being marketed in 2007, research regarding long-term health consequences of vaping has only accelerated in the last few years. More studies need to be done to understand consequences of long-term vaping on the human body so that results can be incorporated into future textbooks and college and university curriculums for influence in future medical practice. Research is also needed to compile data already gathered from research, as is done in a systematic review.

Advanced Nursing Practice

This study reveals that, at least in the sample population, screening for and education about vaping is done on a limited basis by providers. Consequently, much more needs to be done in the form of primary prevention and secondary prevention in advanced nursing practice by warning patients about the dangers of vaping, as well as screening for vaping and working with patients who vape to quit.

Nurse Practitioner Education

According to the definition of knowledgeable determined by the researchers, the vast majority (83.47%) of the sample population of this study were considered knowledgeable even though few participants (12.94%) were educated by healthcare providers. Most of the participants currently vaped or had vaped in the past (63.2%). Being knowledgeable of the long-term health consequences did not lead all study participants to stop vaping. Efforts by health care providers may prove more effective at influencing vaping abstinence and cessation due to the trust that is inherent in the patient-provider relationship. Therefore, is recommended that providers understand and utilize

their influence for good in encouraging and aiding their patients in abstaining or stopping vaping.

Recommendations

Based on the study's outcomes, several recommendations for future studies are encouraged. The population of this study was limited to just two colleges and two universities in the southeastern United States, reducing the validity of the data collected. In additional studies conducted regarding vaping, the researchers should expand the participation to a larger geographical area. Another recommendation for future research would be to allow more time for participation in the survey. The limited time of the study prevented greater participation in the survey. In conclusion, future research studies about vaping are needed to increase the awareness of the harmful effects of vaping.

Findings Related to the Research Questions

Research Question 1

Results of this study showed much of the sample population (63.2%) were current or former vapers. Participants reported vaping for different reasons. Some participants (24.44%) reported vaping due to peer pressure. Additionally, 17.8% of participants reported vaping to relieve stress, while 5.6% reported that they vaped to help with anxiety and depression. Finally, 8.3% of respondents reported vaping to help them quit smoking. This data suggests that vaping device use is influenced by factors that could be influenced and even treated by primary care providers including stress, depression, anxiety, and smoking cessation. Additionally, peer pressure could be overcome if primary care providers used their positive influence through education to instill confidence in younger patients regarding the need to abstain from vaping.

Research Question 2

Results of this study showed most participants (83.47%) were knowledgeable about the negative health risks of vaping. Despite this fact, most participants (63.2%) had vaped at one point. Additionally, only 12.94% of participants had received education from healthcare providers about vaping. This finding suggests that more efforts could be made by primary care providers to educate, treat health problems influencing vaping status, and help and be a support system for patients who may find peer pressure to vape overwhelming.

Research Question 3

Result of this study reveal that only 12.94% of participants were being educated about vaping by healthcare providers. This statistic, though only applicable to the sample population of the study, suggests that healthcare providers need to make greater efforts to both understand and educate patients about the associated risk of vaping. These efforts are likely to contribute to a decline in the prevalence of vaping among college students who struggle with numerous challenges common among this population including peer pressure, stress, depression, and anxiety.

Summary

With the rise in popularity of vaping, the importance of monitoring and educating college students, as well as the public, about the associated risks of vaping is imperative. Understanding vaping perceptions, knowledge deficits, and potential health risks is essential for implementing strategies to address health and safety concerns regarding vaping device use in the public. It is very concerning that vaping devices are marketed towards college-age peers with the alluring flavors, smells, and colorful packaging. The

survey results indicated that the participants were knowledgeable about risks associated with vaping, and 52.35% were asked by their primary care provider about vaping status. But only 12.9% answered “yes” to educational resources being provided by healthcare providers about the health risks associated with vaping. It is critical that healthcare providers are vigilant in screening for and educating about the use of e-cigarette devices and their risks. The unknown long-term effects of vaping on health are haunting, and the need for action to prevent disease is immediate.

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Appendix A

Survey

DEMOGRAPHICS

Multiple Choice:

1. What is your age?
    a. 18-23
    b. 24-29
    c. 30-35
    d. 35 years and older

2. How would you describe your gender?
    a. Male
    b. Female
    c. Prefer not to say

3. What is your racial or ethnic identification?
    a. White
    b. Hispanic or Latino
    c. Black or African American
    d. Native American or American Indian
    e. Asian or Pacific Islander
    f. Other

4. What is your classification in college?
    a. Freshman/First Year
    b. Sophomore
    c. Junior
    d. Senior
    e. Graduate Student
    f. Doctoral Student
    g. Unclassified

5. What is your current GPA?
    a. 3.5-4.0
    b. 3.0-3.4
    c. 2.5-2.9
    d. 2.0-2.4
    e. 1.0-1.9
    f. Prefer not to say
    g. I do not know

6. Does your health history include any of the following? (Select all that apply. You may select more than one answer.)
    a. Anxiety
    b. Depression
    c. ADHD/ADD
    d. High Blood Pressure
    e. Asthma
    f. Seasonal Allergies
    g. None
    h. Other

VAPING STATUS

Multiple Choice:

7. Have you ever used or tried a vaping device such as an e-cigarette, vape pen, or tank?
    a. No
    b. Yes, but not in the last 6 months
    c. Yes, in the last 6 months

8. What type of e-cigarette or vaping device did you use?
    a. Cig-A-Like
    b. Vape Pen
    c. Mod
    d. Pod Mod
    e. Other
    f. N/A – I do not vape

9. How often do you or did you use the device?
    a. Everyday
    b. Once a week
    c. Occasionally
    d. N/A – I do not vape

10. I started vaping _____.
    a. To stop smoking cigarettes
    b. To help with anxiety/depression
    c. Because of social/peer pressure
    d. To relieve stress
    e. N/A – I do not vape

KNOWLEDGE (From the *Don't Blow It: Anti-Vaping Campaign*)

Multiple Choice:

11. Can vaping negatively affect your health?
    a. Yes
    b. No

12. What are some reasons people start vaping?
    a. Friends are doing it
    b. Flavors
    c. Stress
    d. All of the above

13. Is it hard to quit vaping?
    a. Yes
    b. No

14. What is true about e-cigarettes? It is:
    a. An electronic nicotine delivery device
    b. Advertised and targeted to youth
    c. A fire hazard
    d. All of the above

15. What are some withdrawal symptoms of vaping?
    a. Difficulty sleeping
    b. Excessive thirst
    c. Difficulty concentrating
    d. All of the above

16. how many times a day do I need to vape to get lung/mouth damage?
    a. 4
    b. 2
    c. 10
    d. Any amount of vape can potentially cause damage

17. Is vaping really addictive?
    a. Yes
    b. No

18. What are the effects of nicotine?
    a. Makes e-juice sweeter
    b. Causes comas
    c. Primes the brain for addiction
    d. All of the above

19. How does vaping affect the heart?
    a. Increases heart rate
    b. Constricts blood vessels
    c. Increases risk of heart disease
    d. All of the above

True/False Questions:

20. Vaping can cause popcorn lung.
    a. True
    b. False

21. If someone vapes around you, you can have health consequences too.
    a. True
    b. False

22. You are at risk when in without inhaling anything.
    a. True
    b. False

23. If you become addicted to nicotine at a young age, you are more likely to become addicted to other substances (i.e., alcohol, opioids, cocaine, etc.) down the road.
    a. True
    b. False

24. Vaping can cause seizures.
    a. True
    b. False

HEALTHCARE PROVIDER EDUCATION

Multiple Choice

25. Do you have a primary care provider (PCP) such as a family physician, nurse practitioner, physician assistant, or doctor of osteopathy that you visit for your health care needs?
    a. Yes
    b. No

26. How often do you visit a health care provider (HCP) per year?
    a. 1-3 times a year
    b. 4-7 times a year
    c. More than 7 times a year

27. During any visit to an HCP in the past 12 months were you asked about vaping or vaping status?
    a. Yes
    b. No
    c. N/A

28. If you vape, did your HCP educate you about the risks associated with vaping?
    a. Yes
    b. No
    c. N/A

29. Has your HCP given you any resources regarding vaping? (Select all that apply.)
    a. Handouts
    b. Digital information
    c. Resources for quitting
    d. Quit Vaping Hotline number
    e. N/A

Appendix B

DON'T BLOW IT : ANTI-VAPING CAMPAIGN

VAPING: QUIZ

Multiple Choice Questions: *(circle one)*

1 Can vaping negatively affect your health?
A. Yes
B. No

2 What are some reasons people start vaping?
A. Friends are doing it
B. Flavors
C. Stress
D. All of the above

3 Is it hard to quit vaping?
A. Yes
B. No

4 What is true about e-cigarettes? It is:
A. An electronic nicotine delivery device
B. Advertised and targeted to youth
C. A fire hazard
D. All of the above

5 What are some withdrawal symptoms of vaping?
A. Difficulty sleeping
B. Excessive thirst
C. Difficulty concentrating
D. All of the above

6 How many times a day do I need to vape to get lung/mouth damage?
A. 4
B. 2
C. 10
D. Any amount of vape can potentially cause damage

7 Is vaping really addictive?
A. Yes
B. No

8 What are the effects of nicotine?
A. Makes e-juice sweeter
B. Causes comas
C. Primes the brain for addiction
D. All of the above

9 How does vaping affect the heart?
A. Increases heart rate
B. Constricts blood vessels
C. Increases risk of heart disease
D. All of the above

True/False Questions:

True/False *Circle "T" for True and "F" for False.*

T F **10** Vaping can cause popcorn lung.

T F **11** If someone vapes around you, you can have health consequences, too.

T F **12** You are at risk when vaping without inhaling anything.

T F **13** If you become addicted to nicotine at a young age, you are more likely to try and become addicted to other substances (i.e. alcohol, opioids, cocaine, etc.) down the road.

T F **14** Vaping can cause seizures

Essentia Health

Please scan and send completed evaluations to **chna.comments@essentiahealth.org** or mail your evaluations to: **Community Health and Engagement, DTW-430, 407 East 3rd St, Duluth, MN 55805, Attention: Don't Blow It**

DON'T BLOW IT : ANTI-VAPING CAMPAIGN

VAPING QUIZ: ANSWERS

Multiple Choice: *(circle one)*

1 Can vaping negatively affect your health?
A. Yes
B. No

2 What are some reasons people start vaping?
A. Friends are doing it
B. Flavors
C. Stress
D. All of the above

3 Is it hard to quit vaping?
A. Yes
B. No

4 What is true about e-cigarettes? It is:
A. An electronic nicotine delivery device
B. Advertised and targeted to youth
C. A fire hazard
D. All of the above

5 What are some withdrawal symptoms of vaping?
A. Difficulty sleeping
B. Excessive thirst
C. Difficulty concentrating
D. All of the above

6 How many times a day do I need to vape to get lung/mouth damage?
A. 4
B. 2
C. 10
D. Any amount of vape can potentially cause damage

7 Is vaping really addictive?
A. Yes
B. No

8 What are the effects of nicotine?
A. Makes e-juice sweeter
B. Causes comas
C. Primes the brain for addiction
D. All of the above

9 How does vaping affect the heart?
A. Increases heart rate
B. Constricts blood vessels
C. Increases risk of heart disease
D. All of the above

True/False Questions:

True/False Circle "T" for True and "F" for False.

T F **10** Vaping can cause popcorn lung.

T F **11** If someone vapes around you, you can have health consequences, too.

T F **12** You are at risk when vaping without inhaling anything.

T F **13** If you become addicted to nicotine at a young age, you are more likely to try and become addicted to other substances (i.e. alcohol, opioids, cocaine, etc.) down the road.

T F **14** Vaping can cause seizures

Essentia Health

Please scan and send completed evaluations to **chna.comments@essentiahealth.org** or mail your evaluations to: **Community Health and Engagement, DTW-430, 407 East 3rd St, Duluth, MN 55805, Attention: Don't Blow It**

Appendix C

To: Dr. Beth Turner, Dr. Sueanne Davidson, and Alicia Harris

From: Irene Pintado, IRB Chair $I.P$

Date: 04/13/2022

Project: Vaping Prevalence Among College Students and Their Knowledge of the Associated Risk of Vaping

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The Mississippi University for Women IRB committee has determined that your project, Vaping Prevalence Among College Students and Their Knowledge of the Associated Risk of Vaping, is exempt under 45 CFR 46.101 (b)(4). The research uses survey procedure and information obtained is recorded in such a manner that the identity of the research participants cannot be readily ascertained.

If any changes are made to the study, the Committee must be notified. If the project is still running twelve months after the date of this memo, please be advised that we will need an update for our files.

Good luck with your work!

Appendix D

Letter to Survey Participants

Dear College Students,

We wish to invite you to participate in an online survey through SurveyMonkey. The survey answers are anonymous, and it will take approximately 10 minutes to complete. This research project focuses on Vaping Prevalence Among College Students and Knowledge of Associated Risk of Vaping. Your participation is vital in helping us understand college students' knowledge of the health risks of vaping. By completing this survey, you are consenting to participate in this research study. Your participation in this study is anonymous and will not affect your academic standing. Please do not participate in this survey if you are not a college student. Please click the link below or scan the QR code to participate. https://www.surveymonkey.com/r/8KG8DMV

Thanks in advance for your consideration to participate in our research.

Sincerely,

Alicia Harris, Lead Investigator, Graduate Student
Sarah Allman, Graduate Student
Laura Guidry, Graduate Student
Leah Nabors, Graduate Student

If you have any questions, contact: lbturner@muw.edu or srdavidson@muw.edu; svallaman1@yahoo.com; lguidry@myapps.muw.edu; apharris1@myapps.muw.edu; lrharris2@myapps.muw.edu. If you have any questions or concerns related to your rights as a subject in this research study, you may contact the MUW Institutional Review Board (IRB) at 607.255.5138

Appendix E

College Permission Letter

Date: Month Date, 2022

Dr._____

Chair of _____ Program

Mississippi University for Women

1100 College St. Box 910

Columbus, MS 37901

Dear Dr. _____,

We are students currently enrolled in Mississippi University for Women's Graduate Nursing Program. We are developing our research skills under the direction of our research advisor, Dr. Laura Beth Turner, DNP, FNP and Dr. Sueanne Davidson, DNP, FNP.

Our research group would like to formally request your permission to conduct our proposed research study using SurveyMonkey through student listserv, campus flyers with QR codes, and faculty email. We would like to collect data to determine the prevalence of college students who vape and the knowledge regarding the risks associated with vaping. The data collected will also be utilized to determine if primary care providers are educating students regarding vaping.

The research group can ensure the privacy of the participants by administering an anonymous survey. We have created the survey and are enclosing it for your review. We request your approval to administer this survey. Thank you for your consideration.

Sincerely,

Alicia Harris, RN, Sarah Allman, RN, Laura Guidry, RN, and Leah Nabors, RN.

Appendix F

DON'T BLOW IT