



College health providers' knowledge and confidence in addressing students' vaping: Evidence from a pilot study in New York State

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ABSTRACT

Objective: This study examines the knowledge and confidence of college healthcare providers in discussing vaping with their college student populations.

Methods: This is a mixed-methods descriptive study using a sequential-explanatory approach, consisting of a cross-sectional, online survey followed by qualitative interviews. Survey data was collected from 50 college health providers located at 26 colleges in the 64-campus State University of New York system. Targeted semi-structured interviews (N = 11) were conducted by telephone with providers who completed the survey.

Results: Despite high reported levels of knowledge and confidence, few providers had participated in educational activities relative to vaping. There was evidence of misinformation about e-cigarettes, and they did not know what product (nicotine/cannabis) students typically vape.

Conclusions: Findings indicate a potential disconnect between providers' perceived and actual knowledge of college student vaping and demonstrate areas of opportunity to assist college health providers in comprehensively addressing vaping with their college student populations.

Innovation: College health providers played a key role in lowering rates of combustible cigarette smoking, but little is known about how they are now are communicating with college students about e-cigarette and cannabis vaping. This paper examines college health providers' knowledge, confidence, and training needs relative to vaping communications.

1. Introduction

Despite the declining prevalence of cigarette smoking, young adulthood continues to be an important time for the initiation of other nicotine products. Electronic cigarette (e-cigarette) use is highest among young adults, including college students, in part due to greater product awareness compared to older adults [1]. In 2012, only 50% of youth reported awareness of e-cigarettes [2]; by 2014, e-cigarettes were the leading nicotine or tobacco product currently used by US middle and high school students [3]. Awareness of e-cigarettes now exceeds 89-95% depending on the sample [1,4]. Among college students, risk factors for e-cigarette use include other substance use (e.g. alcohol, marijuana) [1], perceptions of social acceptance [4], and positive affective associations (i.e., they enjoy them) [5]. Rates of vaping are higher among youth and young adults compared to mid-aged and older adults. In 2017, 11.7% of U.S. high school students reported current (past 30 day) use of e-cigarettes [6,7]. Patient-provider interactions about e-cigarettes may shape patients' perceptions about, and use of, these products [8]. Emerging evidence shows that health care providers discuss e-cigarettes and tobacco use with their patients, including

their adolescent and young adult patients [8,9]. Other evidence suggests U.S. physicians hold misperceptions about nicotine and only recommend e-cigarettes for cessation under specific circumstances (e.g., for older smokers) [10,11]. In fact, there has been a call for health providers to increase their awareness and comfort around discussing vaping with college students [4]. Organizations like the American College Health Association have guidelines on tobacco on college and university campuses [12], but little is known about how these guidelines impact provider practices, particularly surrounding emergent products. A recent position paper from the Society for Adolescent Health and Medicine asserts vaping-related training and capacity building be supported for health providers, including school-based health providers, working with young adults [13]. Nevertheless, given that e-cigarettes are the most used product among college students, with 45% of college students reporting ever (lifetime) use [14], to our knowledge there is no data regarding how college health providers address vaping with their college populations, nor data assessing these providers' training/educational needs regarding vape products. This paper presents the results of a mixed-methods pilot study that examines college health providers' knowledge, confidence, and attitudes in addressing vaping

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with young adults. Nicotine consumption patterns among young adults have changed drastically since the introduction of e-cigarettes [13]. High levels of nicotine exposure are associated with increased risk of combustible cigarette and other substance use [13,15]. In addition, the colloquial term “vaping” may refer to the use of nicotine or the use of marijuana due to the emergence of cannabis-containing vape products. Vaping cannabis, like vaping nicotine, is a popular mode of administration. In one study, one-third of cannabis users reported administration via vaping, [16] and rates of administration by vaping are typically higher among young adults compared to mid-aged or older adults [17]. Community samples of high school students indicate rates of vaporizing cannabis are high, ranging from 10%–29%, depending on the sample [15]. In addition, there is a national trend towards the increasing availability, access, and perceived approval of cannabis products, as well as decreasing perceptions of risk surrounding their use [18].

Importantly, the co-use of tobacco and cannabis is more common than cannabis use alone [19]. National rates of vaping cannabis and nicotine doubled from 2017 to 2018 among youth in the Monitoring the Future Study [20]. Concurrent use of nicotine and marijuana products has been associated with lower odds of quitting nicotine product use, and higher odds of developing respiratory illness [21]. At the end of 2019, the United States experienced a nationwide outbreak of e-cigarette, or vaping, product use-associated lung injuries (EVALI) [22], wherein vaping-associated lung diseases and deaths were reported in all 50 states [22,23]. A recent analysis provides corroborating support that the EVALI outbreak is attributable to informally purchased or modified cannabis containing vape products [24]. Understanding how providers are addressing vaping is particularly relevant given the rapidly changing vape landscape.

The outbreak of vaping-related lung diseases and deaths [25] has created mixed messages and uncertainty, among the public and among health experts, about the safety of vaping nicotine [8]. Such mixed messages and uncertainty may exist regarding the vaping of cannabis, as well: despite the implications for cannabis-containing vape products in the pulmonary diseases outbreak, the medical and recreational use of cannabis is increasing in states across the U.S., and risk perceptions of cannabis use have been decreasing [18]. Students hearing these mixed messages about vaping may respond by seeking clarification from the campus health/wellness center, a resource available to students on many college campuses. Healthcare providers are good sources of health information, and some evidence suggests they are being queried about the role of e-cigarettes in smoking cessation [8], although it is unknown if and how these queries translate to the college health environment.

The changing landscape of vape products and how they are perceived represents a paradigm shift, and this research presents a unique assessment of how college healthcare providers address vaping among young adults. This research focused on assessing attitudes, knowledge, and confidence in identifying, counseling, and disseminating information around vaping, and explored the following specific aims: (1) to survey college health providers’ knowledge, attitudes, and confidence around discussion of nicotine/cannabis vaping with their patient population; (2) to survey providers’ training needs, including preferred training approach, and perceived priority of addressing nicotine/cannabis vaping as part of smoking cessation and substance use prevention discussions; (3) to qualitatively explore providers’ perceptions about vape products and explore what type of information they share with their patients.

2. Methods

This is a mixed-methods descriptive study using a sequential-explanatory approach [26,27] consisting of quantitative surveys followed by qualitative interviews. Using this approach, quantitative data is collected first, followed by the qualitative data, which is then used to explain and interpret the survey results [26]. This approach allows the survey findings to be supplemented by more detailed explanations of participants’ responses. All research procedures were approved by the SUNY Buffalo State College Institutional Review Board (STUDY00001679).

2.1. Study sample

2.1.1. Survey participants

For this cross-sectional pilot survey, we recruited 50 U.S. college healthcare providers from the 64-campus State University of New York (SUNY) college system. Postcards were mailed to each SUNY campus health center to alert the staff of an upcoming survey opportunity; subsequently, the survey was distributed by email to SUNY campus health center directors. Due to the nature of recruitment, a response rate cannot be calculated. The survey was administered electronically in English via Qualtrics to college health employees (excluding student employees) aged 18 and older eligible to participate. College health employees were defined broadly to be more inclusive of staff working at smaller campuses, including technical and community colleges, where they may be limited in resources and have staff in dual roles. Survey questions were modified, with permission, from a similar survey conducted on providers’ knowledge and confidence of veterans’ health [28]. Surveys were completed between July and November 2019. Participants were located at 26 distinct campuses, spanning metro (n = 18) and non-metro (n = 8) areas as designated by the USDA Rural-Urban Continuum Codes [29]. Participants were entered into a lottery to receive one of thirteen \$50 gift cards. Sample characteristics are presented in Table 1.

2.1.2. Interview participants

Targeted semi-structured interviews (N = 11) were conducted by telephone with providers who completed the survey and indicated interest in participating in an interview. Post-survey, 24 out of 50 providers indicated interest in participating in the phone interview. All twenty-four who expressed interest were contacted and 11 agreed to participate. Non-participants did not respond to email inquiries for participation (n = 10), subsequently declined participation (n = 2), or were not granted approval to participate in the interview by a supervisor (n = 1). Notably, the COVID-19 pandemic peaked in New York State during the course of qualitative interviews. Health care staff (inclusive of this sample) were particularly overburdened at this time, and thus, the interviews represent a convenience sample of providers willing and able to participate. Interviews were conducted between March and July 2020. In keeping with the sequential-

Table 1
Sample characteristics.

	Survey Participants	Interview Participants
	% (n) or Mean (SD)	% (n) or Mean (SD)
Age	49.2 (12.0)	45.2 (14.4)
Sex		
Female	80% (40)	81.8% (9)
Race/Ethnicity		
Non-Hispanic White	80% (40)	90.9% (10)
Primary role in health center		
Nurse	54% (27)	45.5% (5)
Health Educator	10% (5)	27.3% (3)
Doctor	8% (4)	0.0% (0)
Other*	22% (11)	27.3% (3)
Years worked in college health	12.6 (9.5)	8.3 (8.3)
Type of college setting		
University	16% (8)	27.3% (3)
College	32% (16)	45.5% (5)
Community College	20% (10)	18.2% (2)
Technical College	12% (6)	9.1% (1)
Campus Urbanicity [29]		
Metro area	60% (30)	63.6% (7)
Non-metro area	24% (12)	36.4% (4)
Past 30-day nicotine product use		
Combustible cigarettes	6% (3)	---
Electronic cigarettes	4% (2)	---

* Other included responses such as Physicians Assistant, Director, Administrator, Behavioral Health Consultant, or individuals in dual roles (e.g., health educator and registered dietitian). Personal nicotine product use was not queried among interview participants.

explanatory design, the interviews focused on explaining the meaning of survey results. Open-ended questions allowed for the elucidation of concerns, experiences, and perceptions that may not be captured by the survey instrument (see Supplemental Table 1). On average, interviews took 16 minutes (range: 7 – 27 minutes). All interview participants were compensated for their time with \$50 gift cards. Sample characteristics are presented in Table 1.

2.2. Measures

2.2.1. Providers' knowledge and confidence

Knowledge and confidence around talking with students about nicotine/cannabis vaping were assessed using a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree), with the option to indicate "neither agree nor disagree" or "don't know." Knowledge and confidence were assessed with a variety of questions, including but not limited to, "I feel knowledgeable in talking with students on my campus about e-cigarette use," and "I feel confident talking to students on my campus about vaping."

2.2.2. Providers' professional practices and beliefs

Professional practices, such as how regularly the provider asks if students are current, former, or never users of e-cigarettes or other vaped products (e.g., cannabis vape products), and their perception of the importance of asking, and perceived time to ask, were also assessed. Additional items assessed provider demographics, campus type, and whether the providers themselves were users of nicotine or tobacco products.

2.2.3. Past training and educational activities, and future training needs

Measures pertaining to training and educational activities were assessed with a variety of questions, including but not limited to, "Have you ever participated in training or educational activities related to vaping?" and, if yes, "Please specify the training's main content focus," "Do you feel confident in relaying the message of your training to other faculty/staff members?" "Do you feel confident in relaying the message of your training to your patient/student population?" Providers were also asked to indicate their potential interest in learning more about the harms/benefits of vaping, to indicate whether learning about vaping is a priority area, and to indicate if they have time to learn more about vaping.

2.3. Analysis

Survey data were analyzed using Stata (Stata Corp, College Station, TX). As the aims of the survey arm of the study are descriptive in nature, summary statistics are used to characterize overall provider knowledge, attitudes, and confidence around addressing vaping on their college campuses.

Qualitative interview data were audio-recorded and transcribed verbatim into Microsoft Word, and all transcripts were de-identified. Responses were analyzed independently by the first author and a research team member (CAB). Responses were analyzed using a thematic content analysis approach [30-32] to identify major content codes. A deductive method of inquiry was used wherein the same broad categories used to define the survey measures (i.e., providers' knowledge and confidence; providers' professional practices and beliefs; and past training/educational activities and future training needs) were used to organize and identify codes. After independent analysis, the first author and the research team member (CAB) met to compare identified codes and agree upon a comprehensive codebook of themes and supporting data. Discrepancies were minor (5%) and addressed through discussion between the first author and research team member (CAB) until agreement was reached. Data from the 11 participants was continuously reviewed to identify patterns until no new themes or codes emerged [30-32].

3. Results

3.1. Providers' knowledge and confidence

Participant demographics are presented in Table 1. College health providers largely describe themselves as understanding what e-cigarettes are (90%; n = 45) and 76% (n = 38) indicate e-cigarette use is a problem on their campus. Providers' confidence (86%; n = 43) in discussing e-cigarettes with students slightly exceeded how knowledgeable they felt in doing so (76%; n = 38). Despite the reportedly high levels of knowledge among survey respondents, there was some evidence providers may be confident in incorrect information. For example, one interview participant describes e-cigarettes as "just too dangerous and unregulated," despite e-cigarettes being deemed under FDA regulatory authority in 2016 [33]. Later in the interview, the same participant made the statement, "I feel pretty confident in my knowledge right now."

More than half (64%; n = 32) of providers indicated they do not know what type of product students on their campus are vaping most often (nicotine or cannabis; Table 2). Interview participants indicated it is important to distinguish between the products being vaped. One participant states, "There definitely needs to be a differentiation considering those are two different substances; even though the delivery system is the same, but the effects are very different." Another participant acknowledged the importance of querying the source and delivery system in stating:

"We see more marijuana on this campus usage than we do see nicotine. So I guess we don't ask that specific question about how they're obtaining the cannabis, whether they're vaping it or whether they're smoking it... we just ask, you know, are you smoking marijuana and they say yes. So maybe we need to ask that, too."

In addition to the types of substance students are vaping, interview participants underscored the importance of understanding the amount of product being used. One interview participant reports it is important to know:

"...what type of actual nicotine they're using. So like a JUUL versus, oh, I forget the other names of them, but like the pods have more nicotine than some of the liquids do, and even stuff like that is good to know. So, you need to know exactly what they are using."

Table 2
College health providers' knowledge of vaping product and legislation.

Do you know if students on your campus use e-cigarettes more often for vaping nicotine or vaping cannabis?			
Primary Role	Don't know	Yes, I know what students vape	Total
Doctor	2	2	4
	50.0	50.0	100.0
Nurse	19	8	27
	70.4	29.6	100.0
Health Educator	2	3	5
	40.0	60.0	100.0
Other	8	3	11
	72.7	27.3	100.0
Total	31	16*	47
	66.0	34.0	100.0

Have you heard of New York State's proposed Tobacco 21 law?			
	Yes	No	Total
Doctor	4	0	4
	100.0	0.0	100.0
Nurse	22	5	27
	81.5	18.5	100.0
Health Educator	4	1	5
	80.0	20.0	100.0
Other	9	2	11
	81.8	18.2	100.0
Total	39	8	47
	83.0	17.0	100.0

Note: First row has frequencies and second row has row percentages; *Among these 16 individuals, 11 report students on their campus most often vape nicotine, and 5 report students most often vape cannabis

Despite acknowledging the importance in knowing this, interview participants expressed concerns that neither they, nor the students, understand the amount of nicotine that students are using. Another interview participant responded:

“You know, I’m often to myself – well okay, if I smoke a pod a week or a pod a day, how much nicotine is in that? I don’t even know that all the time. Sometimes I actually look to my students to tell me what they know about that. And some do know, some don’t.”

3.2. Providers’ professional practices and beliefs

Most providers indicated they can provide better care when they know a patient’s tobacco product use status (85%; n = 40) and know a patient’s e-cigarette use status (83%; n = 39). However, providers may not fully understand the role of nicotine replacement therapies as they relate to e-cigarette use. One interview participant states, “I do wonder about for students that want to stop nicotine or want to stop vaping, what is the role of nicotine replacement therapies for those students?”

College health providers indicate they are largely able to provide information about e-cigarettes without bias (68%; n = 32). Despite this, there was a significant difference (p < 0.01) in the percent of providers wanting to learn more about the potential harms (n = 43) of e-cigarettes compared to those wanting to learn more about the potential benefits (n = 33) of e-cigarettes. In fact, when further asked about the harms and messaging surrounding e-cigarettes, most providers (68%; n = 32) indicated that e-cigarettes are “just as harmful as cigarettes and should not be recommended as a safer alternative for smokers;” only 6% (n = 3) believe “e-cigarettes are much less harmful than cigarettes and should not be recommended as a safer alternative for smokers.” In a separate question, when presented with two options about the messaging of e-cigarettes, college health providers largely favored (85%; n = 40) messaging that e-cigarettes are not a safe alternative to cigarettes. A small minority (15%; n = 7) indicated the most important message for e-cigarettes is that they are “not safe, but they are much safer than cigarettes.” An interview participant explained, “I’m not in favor of using e-cigarettes as a harm reduction tool. I also think it’s irresponsible to call them a quit tool...when we know more about them and they perfect them, I’ll think they’re a good idea.” Another interview participant further clarifies:

“I’m open to learning more about this based on kind of the expertise in the field. My understanding is that for a cigarette user switching to vapor—to using a vape could potentially be harm reduction over all the risks associated with smoking, but that ultimately, that’s probably not better than encouraging them to use something like a nicotine replacement product or behavioral strategies. So we introduce it to students on occasion as an option for coming off traditional cigarettes, but it’s not our go-to strategy.”

3.3. Past training and educational activities, and future training needs

Slightly less than half of providers reported participation in training or educational activities related to e-cigarettes (44%; n = 22). Immediately prior to survey administration, New York State Assembly members had voted to raise the legal age of purchase for tobacco products (including e-cigarettes) to 21 years of age (“Tobacco 21” law). Almost 1 in 5 (17%; n = 8) had not heard of the Tobacco 21 law (Table 2). Interview participants indicated that policy changes like this, or the deeming of e-cigarettes under the FDA’s authority, are a good time to provide additional training for college health professionals, with one participant stating, “I definitely would like more training if anything changes.”

The majority of providers (82%) have time to learn more about e-cigarettes as they relate to the health needs of college students (Table 3); many feel learning about e-cigarettes is a priority (74%). Multiple college health providers indicated interest in trainings formatted as webinars, as well as training materials that could be directly passed along to their student populations. One interview participant states, “I think just webinars and maybe just more patient handouts and posters...having things for

Table 3
College health providers’ attitudes towards assessing e-cigarette status.

I have time to ask about students’ use of e-cigarettes within the context of a regularly primary care visit						
Primary Role	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Doctor	0	1	1	1	1	4
	0.0	25.0	25.0	25.0	25.0	100.0
Nurse	0	1	2	12	11	26
	0.0	3.9	7.7	46.2	42.3	100.0
Health Educator	0	0	1	0	1	2
	0.0	0.0	50.0	0.0	50.0	100.0
Other	1	0	0	3	4	8
	12.5	0.0	0.0	37.5	50.0	100.0
Total	1	2	4	16	17	40
	2.5	5.0	10.0	40.0	42.50	100.0

How often do you regularly ask your students on campus if they are a current or former user of electronic cigarettes?						
Primary Role	Never	Rarely	Sometimes	Most of the time	Always	Total
Doctor	0	0	1	1	2	4
	0.0	0.0	25.0	25.0	50.0	100.0
Nurse	3	0	1	11	12	27
	11.1	0.0	3.7	40.7	44.4	100.0
Health Educator	0	1	3	1	0	5
	0.0	20.0	60.0	20.0	0.0	100.0
Other	2	0	3	2	4	11
	18.2	0.0	27.3	18.2	36.4	100.0
Total	5	1	8	15	18	47
	10.6	2.1	17.0	31.9	38.3	100.0

Note: First row has frequencies and second row has row percentages

social media campaigns would be useful so we can target all students at all different hours.”

4. Discussion and conclusion

4.1. Discussion

Results from this state sample of college health care providers indicate high levels of knowledge and confidence in addressing e-cigarette use with their student/patient population. These high levels of knowledge and confidence are surprising, given that less than half had participated in a training or other educational activity related to e-cigarettes. Together, these findings underscore the need to better understand from where health providers are obtaining their knowledge of vaping, and if this knowledge is, in fact, accurate. Future research should query college health providers about the source of their perceived knowledge. In addition, and despite the reported high knowledge and confidence, most of these health providers reported they “don’t know” what product college students are vaping (i.e., whether it is nicotine or cannabis) and are unsure about nicotine levels in popular vape devices, such as JUUL pods. Recent research supports the needs to address the use of both substances in developing interventions [34]. Given that the co-use of tobacco and cannabis is more common than cannabis use alone [19], educational interventions that help providers parse out nicotine/cannabis vaping, and co-use of these substances, may help providers better engage with their student/patient population.

Results suggest that college health providers agree vaping is a problem on their campus. Providers largely indicated they can provide information about e-cigarettes without bias, but despite this, there was a significant difference in the percent of providers wanting to learn more about the potential harms of e-cigarettes compared to those wanting to learn more about the potential benefits of e-cigarettes, with more providers interested in learning of the harmful effects. Understanding both the potential harms and benefits of vaped products will assist college health providers to address vaping more comprehensively with their college student populations.

Providing educational interventions to address barriers that may limit college health providers’ ability to address vaping is essential given the

extensive vape marketplace that continues to evolve in product availability, product design, and how they are used [35]. For example, delta-8-tetrahydrocannabinol (delta-8-THC), a chemical analog of delta-9-THC, has recently grown in popularity and is frequently consumed as a vaped product [36]. Most providers indicated they have time to learn more about e-cigarettes and believe this to be a priority. Providers indicated strong interest in trainings formatted as webinars, as well as training materials that could be directly passed along to their student populations. Items such as posters and social media messaging would be useful to both providers and students. Given that social media consumption is associated with young people's vaping intentions [37], college health providers should ensure their health education materials have a social media presence. Social media messaging should be realistic [38] and use relevant and persuasive messages tailored to specific audiences [39] as dictated by their campus community's interest areas. Future research should additionally assess students' perspectives on the most effective way to provide educational and interventional materials relative to vaping.

The changing landscape of vape products and how they are perceived represents a paradigm shift, and this research presents a unique assessment of how college healthcare providers address vaping among young adults. Providers in this sample present as having a largely unidimensional lens in how they view e-cigarettes. College health providers believe e-cigarettes are just as harmful as combustible cigarettes, are not a safe alternative to cigarettes, and should not be recommended as an alternative for smokers. It may be appropriate for college health professionals to have a more nuanced approach to their discussions about e-cigarettes, given that college students are a population for which these products are legal, and some are using the products for quitting or reducing combustible cigarette smoking [40]. In addition, emerging ethical frameworks cautiously support the adoption of e-cigarettes as a harm reduction alternative to combustible cigarette use [41,42], although previous research indicates the public largely does not have a good understanding of harm reduction as it relates to nicotine products [43].

Providers have an important role in disseminating information that may shape patients' perceptions about, and use of, nicotine products, and previous research has acknowledged the importance of accurate provider knowledge of the relative risks of these products [43,44]. College health providers may wish to move beyond a yes/no response about substance use, and also query the product (nicotine/THC), source (licit or illicitly obtained), delivery system (smoked, vaped, dabbed, etcetera), and frequency of product replenishment [45]. Further, providers working with young adults should consider emphasizing the differential risks associated with vaping products from informal sources compared to those that are legally manufactured [24]. Messages can support cessation of these products while simultaneously providing education about the risks of black market and modified products [24]. As the greatest danger of EVALI appears to be among those who vape illicitly obtained cannabis [24,46], it may be particularly relevant to target this risk messaging to these individuals. Given this, it is important for college health providers to understand how the FDA regulates e-cigarette products (including ingredients in e-liquids (U.S. Food and Drug Administration, 2021)) in order to relay accurate information. In addition, college health providers may wish to develop graphical risk messaging, such as one using the symbolism of a traffic light [47]. A previous study found participants were more likely to accurately perceive tobacco product risk, and to share that information with others, when risk messaging was graphics-based, as opposed to text-based [47]. Certainly, there are challenges to adopting a harm reduction framework [48], and there continues to be debate as to which regulatory framework is the best way to approach nicotine vaping [49]. As such, continued surveillance of the long-term effects of e-cigarette use is warranted.

While this pilot study fills a novel gap in college student health, it is not without limitations. Whereas the participants were from campuses spanning metro and non-metro areas, and included universities, colleges, technical colleges, and community colleges, our sample may not be generalizable to the larger college system in New York State or the U.S. Given the nature of this pilot study, more advanced statistical analyses

were not possible due to small samples sizes. During survey collection, the nation was experiencing an outbreak of EVALI, which may have influenced responses. In addition, due to the nature of how the survey was distributed, we cannot calculate a response rate. Importantly, the survey responses were collected amid the EVALI outbreak, and the interviews were conducted during the COVID-19 pandemic; perhaps these environmental influences underly the unidimensional view of vaping demonstrated in this sample. Certainly, the COVID-19 pandemic influences the interpretation of these findings in several ways. New evidence has examined the role of combustible cigarettes [50], e-cigarettes, and dual use of e-cigarettes and combustible cigarettes [51] on health outcomes as they relate to COVID-19. Of particular note, e-cigarette use and dual use have been associated with greater odds of COVID-19 testing and diagnosis [51]. Given these emerging findings, there has been a call for health care providers to query all young, COVID-19 positive individuals about their e-cigarette use history [51]. It is unclear how college health providers' practices of querying nicotine product use have changed in light of the pandemic; there remains a need for a better understanding of the role of nicotine and other vaped products in the pandemic, particularly around the risks and benefits of alternative nicotine delivery systems as they relate to COVID-19 [52]. Finally, the COVID-19 pandemic hit the U.S., particularly New York State, in the middle of the qualitative interviews; this may have affected response rates for our qualitative interviews or influenced the nature of those responses.

4.2. Innovation

The innovation of this research lies in the timeliness of the research question, as understanding how providers are addressing vaping is particularly relevant given the rapidly changing vape landscape. Related to this, there are nearly 20 million students attending 9,166 postsecondary title IV institutions in the United States [53]. Most of these college campuses allow access to health care through the campus health/wellness center for little or no cost to enrolled students. In fact, there has been exponential growth in the expansion of student health services to meet increasing demands for these services [54]. College health providers are in environments with a high prevalence of at-risk individuals, putting these healthcare providers in prime position to effect change with these high-risk young adults. In fact, three decades ago, when the public health community was focused on lowering rates of combustible cigarette smoking, college health services were identified as a "natural ally" [55]; despite this history, there is no current research, to date, to identify how college health providers are communicating with college students about vaping.

This work is particularly important given that what is known about non-collegiate health providers may likely not translate to college health providers, given the nuances of campus culture and how college students differ from the general adult population. This work is contributing to our understanding of college health providers' approaches to health education and health behavior communications. It presents novel considerations for these providers to use in clinical practice to elicit accurate information about young adults' substance use (i.e., through a query of the product, source, delivery system, and frequency of product replenishment).

4.3. Conclusions

This pilot study is an important first step in providing empirical evidence as to college health providers' knowledge, confidence, and attitudes in addressing vaping with young people. It is essential to examine the risk and protective factors for vaping among vulnerable individuals, with a focus on informing the development of prevention and intervention initiatives that serve environments with a high prevalence of at-risk individuals (i.e., college campuses). Results of this pilot study highlight areas of clinical opportunity for college health providers and underscores priority areas for substance use researchers.

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Declaration of Competing Interest

The authors have no conflicts of interest to disclose.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pecinn.2023.100123>.

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