

Adolescents Who Vape Nicotine and Their Experiences Vaping: A Qualitative Study

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Substance Abuse: Research and Treatment
Volume 17: 1–9
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DOI: 10.1177/11782218231183934



ABSTRACT

INTRODUCTION: Understanding adolescent perceptions of vaping and roles it plays in their lives is needed to design effective interventions to help adolescents quit. We explored vaping experiences of 11 adolescents from initiation through quit attempts.

METHODS: A convenience sample of students who vaped in the last 90 days was recruited from one suburban high school in Massachusetts. Qualitative interviews were transcribed and coded. An inductive thematic analysis approach was employed. Areas of agreement and range of responses in code reports were summarized.

RESULTS: Eleven open-ended semi-structured interviews were conducted (mean = 32.5 minutes each). Vaping initiation often occurred when socializing with friends who also supplied vaping devices. Vaping was “something to do” and new flavors engaged adolescents further. Solitary activities coupled with vaping included video gaming, getting ready for school, talking on the phone, or studying. Peak hours for vaping included morning, before and after school, before parents returned from work, and after parents went to bed. Several vaped to address anxiety/stress. For some, anxiety control was a main reason for vaping. Participants were concerned about health effects and nicotine dependence. Cost and health effects were drivers of quitting. Quit strategies relied on willpower and distraction.

CONCLUSIONS: Peers have powerful influences on the initiation and maintenance of adolescent vaping. Vaping habits can become routinized into adolescent lives. Addiction is a concern although nicotine’s anxiolytic effects were valued by many. Social connection was enhanced by communal vaping, sharing, and common vernacular, secrecy and rule-breaking. We describe the context in which adolescents vape nicotine, their reasons for vaping, and reasons to quit. This information can inform the development of interventions to better address adolescents’ triggers to vape, and social and psychosocial barriers to quitting. Our findings suggest a desire to quit vaping but a limited awareness of quitting strategies.

KEYWORDS: Adolescent vaping, nicotine, adolescence, vaping cessation

RECEIVED: February 1, 2023. **ACCEPTED:** June 6, 2023.

TYPE: Original Research

FUNDING: The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Institutes of Health, National Institute on Drug Abuse, USA Grant Award R34 DA050992, Principal Investigators Lori Pbert (LP) and Rajani Sadasivam (RS). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

DECLARATION OF CONFLICTING INTERESTS: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Introduction

The FDA and the U.S. Surgeon General have characterized the widespread use of vape products (e-cigarettes) among U.S. adolescents as an epidemic.^{1,2} In the early stages of the Covid-19 pandemic, a reduction of e-cigarette use occurred.³ During that time, although most adolescents continuing to vape at the same level (39%) or less (44%), the remaining 17% increased use representing a concerning minority at greater risk for nicotine dependence and frequent use.⁴ Yet the early pandemic reduction in adolescent vaping proved to be a temporary reprieve as use returned to pre-pandemic levels in 2021/22.⁵ It is currently estimated that 14.1% of U.S. high schoolers vape

at least once in the past 30 days, and more than a quarter (27.6%) of current users use daily.⁶

Among high school and middle school students, vaping is more common than smoking any tobacco product.⁷ New social practices related to vaping and its association with fun, vape tricks, and flavors might partially explain the attraction of e-cigarettes to adolescents.⁸ The most popular vape products among youth contain nicotine and comprise the majority of vape products sold (65%).⁹ Adolescents who vape regularly have been found to have higher levels of nicotine dependence¹⁰ or greater levels of nicotine in their bodies than adolescents who regularly smoke cigarettes.¹¹ However the question of



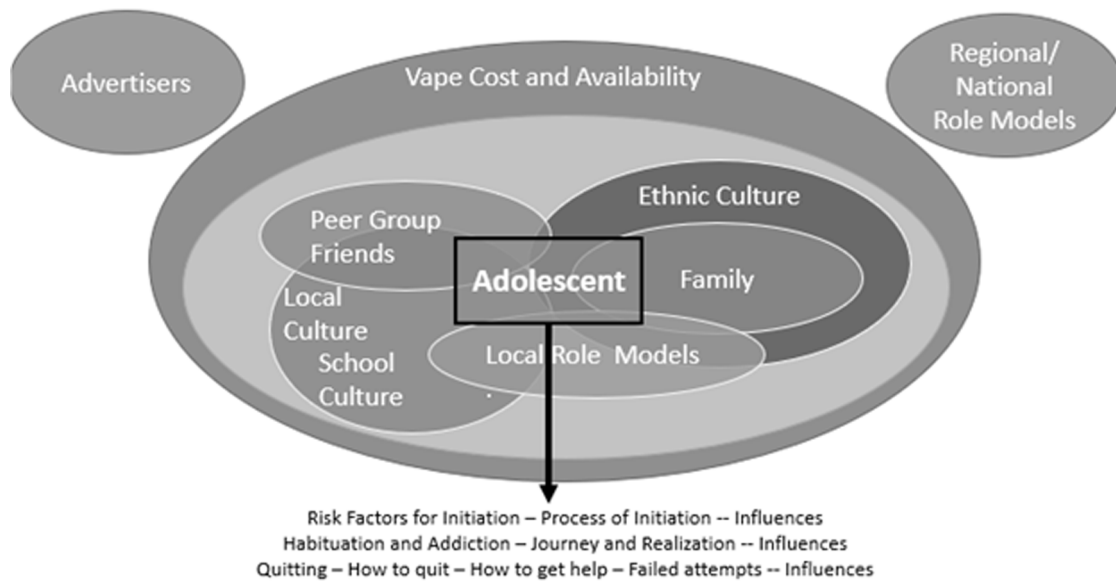


Figure 1. Conceptual Model –Based on Socio-Ecological Model.¹³

nicotine levels among adolescent vapers is not fully resolved. At least one study did not detect an increase in nicotine dependence at the population level while vaping rates rose.¹² Since 2015, nicotine levels in vape devices in the U.S have been increasing with the introduction of a device called a “pod mod” containing a form of nicotine estimated to be 2 to 10 times more concentrated than nicotine found in other vape liquids.¹³ By March 2022, 81% of vape sales in the U.S were of products with >5% nicotine strength,¹⁴ the nicotine equivalent of a pack of cigarettes in a single pod.¹⁵ Vapers seeking an even larger dose of nicotine in each puff can also manipulate the amount of nicotine delivered by adjusting the device wattage, temperature, and airflow.¹⁶ Among adolescents, high amounts of nicotine that can be consumed from vaping have serious effects, harming brain development, impacting learning, memory, and attention, and increasing the risk of addiction.¹⁷

We have taken a deeper dive into the experience of adolescent nicotine vaping and the roles vaping and nicotine play in their lives. Using qualitative interviews, our intent was to add to existing quantitative and qualitative findings in the literature to further inform future intervention design aimed at helping adolescents who vape to quit. To accomplish this, we asked adolescents who vaped nicotine about how and why they started vaping, how they maintained their vaping habit, and their experiences and thoughts about ways to quit. Narratives collected from 11 adolescents who vape nicotine provide new insights into the nature of adolescent nicotine vaping habits.

Methods

Human subjects

Prior to enrollment, participants over 18 years old were consented and for those under 18 who were not opted out by their parents, assent was obtained. Participants received a \$20 gift card as compensation for their time. The University of

Massachusetts Chan Medical School Institutional Review Board approved the study (H00021082).

Interview guide development

For qualitative semi-structured interviews, we developed an interview guide based on a Socio-Ecological Model¹⁸ (Figure 1).

CD, LP, and DS drafted detailed questions addressing all research domains including:

- Adolescent experience, thoughts, and opinions about vaping including initiation, regular use, and attempts to quit
 - Risk Factors for Initiation – Process of Initiation – Influences
 - Habituation and Addiction – Journey and Realization – Influences
 - Quitting – How to quit – How to get help – Failed attempts – Influences
- Adolescent perceptions of family and friends’ views and experiences with vaping
- Adolescent preferences for intervention approaches to help with quitting

The initial guide was tested in practice interviews and revised and streamlined. The revised protocol was re-assessed after the first interview. It was found to be effective and was adopted for all subsequent interviews (See Supplemental Appendix 1).

Participant recruitment

DS recruited one public high school in Massachusetts, USA (n = 513 students) from 4 potential schools. (Figure 2) Three schools expressed interest but chose not to participate due to

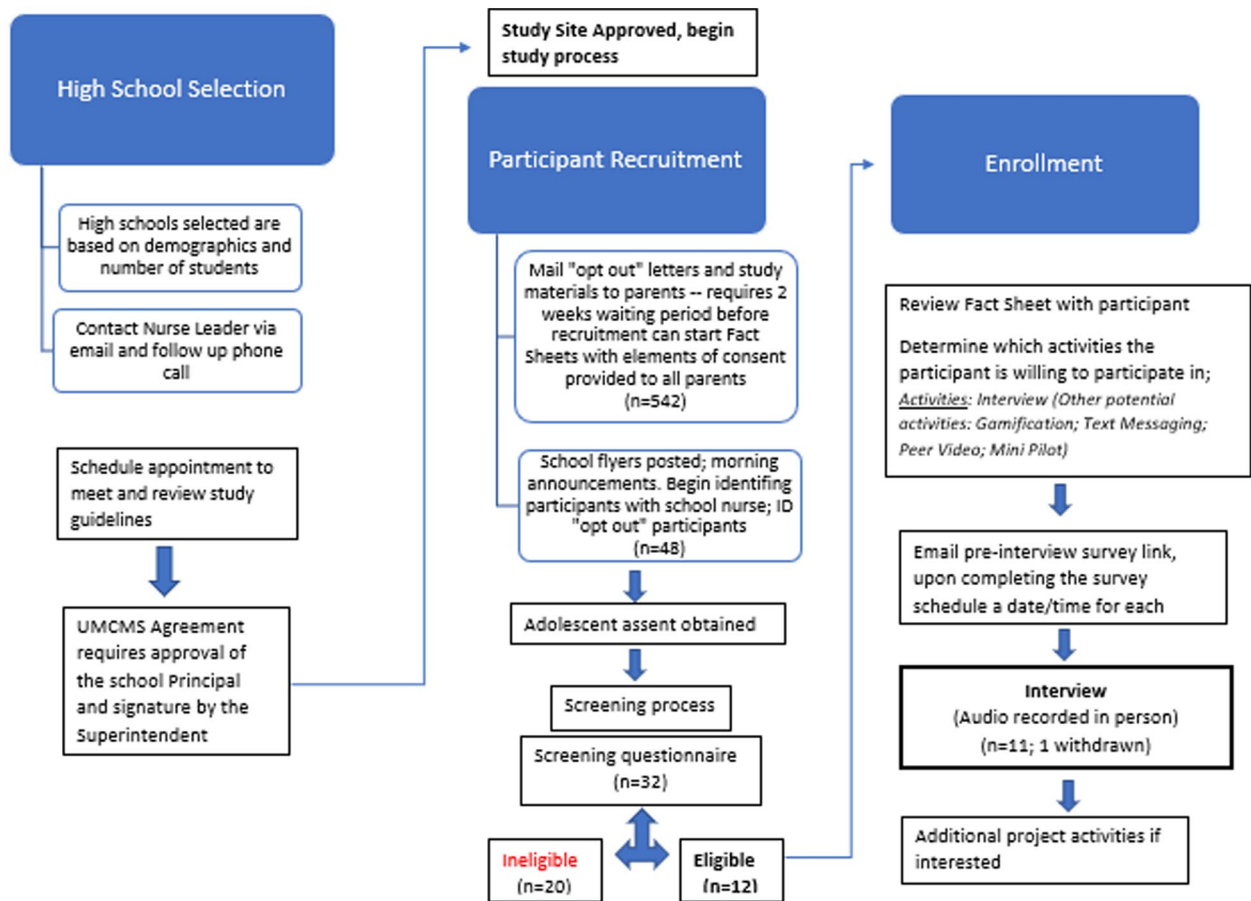


Figure 2. High school and participant recruitment/enrollment process.

extenuating circumstances from COVID-19. During the COVID-19 public health emergency, school administrators and school nurses had increased responsibilities and added stress related to pandemic response. Several schools were approached and expressed enthusiasm about participating but were simultaneously overwhelmed with other work associated with the pandemic. Even though the burden of school participation in this study was low (help with enrollment, providing space for interviews) this additional demand for most schools was too burdensome at the time. This resulted in only one school's willingness to participate. The participating school had previously participated in a UMass Chan smoking-related study. It is located in a suburban town with a median household income ~ \$80,000. High school enrollment is: 82% white; 10% Hispanic; 5% multi-race non-Hispanic; 2% African American; and 1% Asian. A convenience sample of students was recruited using flyers posted in the school, school-wide announcements, and materials mailed to parents. Parents could opt their child out if desired and 48 opt-out letters were returned. In collaboration with the school nurse, potentially eligible participants who had vaped in the last 90 days were identified and screened. Enrolled participants completed a short survey and were scheduled to be interviewed for 1 hour during the school day. Assent and consent procedures were conducted prior to enrollment and data collection.

Data Collection

Interviews employed a semi-structured open-ended approach.¹⁹ CD, a professor who teaches a graduate level qualitative research methods course, provided interview training and DS (male), a trained Job Corps adolescent counselor with more than a decade of experience working on adolescent research studies, conducted interviews. Interviews occurred and were recorded in a private room at the school with only the interviewer and student present. The interviewer had no previous relationship with any participants. A professional transcriptionist with HIPAA privacy training transcribed recordings. All transcripts were reviewed, cleaned, and verified by a UMass Chan research assistant or CN. Participants were not asked to review transcripts or findings as permission for further contact for this purpose was not pre-approved in IRB protocols.

Analytic approach

CD led the qualitative analysis. Inductive thematic analysis²⁰ was employed using a coding start-list based on protocol questions (deductive coding) with additional coding driven by immersion in the qualitative data (inductive coding).²¹ Using Dedoose qualitative analysis software,²² LP and CN coded all interviews and disputes in coding decisions were discussed (LP, CN, and CD) until consensus was reached. Coding tests were

Table 1. Codes included in the analysis.

CODE NAME	DEFINITION
1stStarted	Experience with vaping from when first started – when and why started
CurrentVape	Current use including how often use, how much vape, vaping device, changes over time
Friends	How friends feel about the participant's vaping, vape with friends, different attitudes in different friend groups;
Family	How family feels about the participant's vaping; others in family vape, smoke cigarettes, or use other tobacco products, use weed/marijuana
NicotineDepSxs	Experience when unable to vape (eg, hard to concentrate, feel irritable, strong need/urge to vape, feel nervous/restless/anxious), thoughts about nicotine dependence. INCLUDES Urges/Triggers
OtherTobacco	Other tobacco products teens and participant uses (eg, cigarettes, cigars, cigarillos, Hookah), frequency and amount of each
PriorQuitAttempts	Reasons for deciding to try to cut back/stop (concerns about interfering with important things in life, health or cost, social pressure), how often made attempts; Strategies that helped/worked well when trying to cut back/stop vaping, supportive/helpful others (friends, family, healthcare provider, trusted adult); Things that made it hard to stop vaping, friends or family who interfered with efforts, mood/anxiety or stress making it more difficult, what made participant go back to using e-cigarettes last time tried to stop/vape less (c)
QuitStrategies	If participant decided to quit, how would they go about it, what think would help them stop
Reasons2Quit	Reasons participant or others should quit vaping. Benefits of quitting. INCLUDES: What interviewee does not like about vaping, concerns about vaping (eg, impact on life like sports, ability to concentrate on schoolwork, financial costs, impact on mood, health, friendships, effect of nicotine)
ReasonsNot2Quit	Reasons for not trying to cut back or stop, reasons not cutting back/stopping and what got in way of trying; Know of others who have tried to cut back or stop, their reasons and experience, what worked and what got in their way (5.2.b) INCLUDES: Likes about Vaping eg, positive effects on mood/stress, social life, social image, friendships, romantic partners; what makes it easy/fun to vape
Vapetrouble	Ever gotten into trouble because of vaping? (eg, at school, with sports, at home, legal troubles)
VapeCalled	What participant calls vaping or e-cigarette use – preferred term (pre-Q) INCLUDES: Named Vape Products – Most popular vaping products, where obtain vaping products
Weed&OthDrugs	Use of weed/marijuana/pot/THC – others and participant; what call it; whether smoke, vape or both; frequency and amount (2.3) Use of any other drugs
WhenVaping	What doing when vaping (eg, where, what)

conducted to ensure inter-rater reliability²³ and a Kappa >.94 was achieved. For each code, reports including all coded quotations were generated. Summaries of each code report were prepared by LP, CN, and CD identifying areas of general agreement and the range of responses for each code. Summaries formed the basis for results reported below. Codes included in this analysis are provided in Table 1.

Results

Participants

Thirty-two students were screened and 12 were eligible and enrolled. One participant dropped out (lost to follow-up) yielding a final sample of 11 (Table 2). Vaping status and use of nicotine was self-reported.

Qualitative results

Eleven individual interviews were conducted between March and June 2022 (average length excluding consent discussion = 32.5 minutes; range 26–43 minutes). We identified

6 major themes related to adolescent vaping experiences. For illustrative quotes for each theme and subtheme see Supplemental Appendix 2.

How adolescents talk about vaping. The term vaping was commonly used by participating adolescents, but nicotine terms were also common. The abbreviation *nic*, (nicotine), was used to refer to the vape device (my *nic*), getting nicotine (*nic fix*) and vaping (get *nic'd*). Vaping was also called *hitting it*, *hit your vape*, or *to Juul*. Other terms included *zeroing* (Participant 09: *When you breathe in, and you don't breathe the smoke back out. You keep it inside of your lungs for so long that it becomes – it just stays there*) and *cheifing* (Participant 04: *Taking hit after hit to get a nic fix quickly*). *Feening for nic* meant strong cravings to vape. Vaping devices were called a *nic-stick*, *dispo* (ie, disposable device) or *rechargeable* (ie, reusable device). Specific products mentioned included Puff Bar, Juul and Smok.

Initiation of vaping. Most participants were introduced to vaping by one or more friends sharing their vape device. This occurred when hanging out, “chillin,” at friends’ houses, at

Table 2. Participant characteristics (n= 11).

GENDER	N
Female	3
Male	4
Non-Binary	3
Prefer not to say	1
Grade	
9th grade	2
10th grade	4
11th grade	4
12th grade	1
Race*	
White	8
Black	1
Native American	1
Not sure	1
Free lunch program**	
Yes	7
No	4
Current vaping status	
Vaping; NOT thinking about quitting	5
Vaping; thinking about quitting	2
Already quit	4
Use nicotine	
Yes	11
No	0
Amount of nicotine used when vaping	
0-6 mg	5
Don't know	6
Addicted to vaping	
Yes	7
No	4
Need to vape	
Yes	6
No	5
Confidence in ability to quit vaping	
Not at all confident	2
Somewhat/moderately	4
Very confident	1
Extremely confident	4
Use flavors when vaping	
Yes	10
No	1

*Race was self-reported and a list was provided, No participants identified as Hispanic; **Free Lunch Program: Annual household <200% of the poverty level).

parties, parks, and school bathrooms. One participant just thought vaping was “cool.” Another was pressured by his brother at his grandfather’s house (Participant 02 :“*I was peer-pressured into it by my older brother*”). One participant mentioned years of bullying and then vaping alone, and another talked explicitly about feeling left out as a non-vaper. Others mentioned that the “buzz” they got from vaping was pleasurable. Several participants were seeking relief from anxiety and stress.

Vaping in adolescent lives

When vaping. Vaping happened along with both social and solitary activities. Social activities included hanging out, listening to music, partying, walking, or hiking to isolated areas to enjoy nature, or playing video games together. Solitary activities included playing video games as well as routine activities such as waking up, getting ready for school, in the car, at home alone after school, doing homework, on the phone, cleaning their room, doing laundry, or “*not really doing anything*” (Participant 10). One participant noted that active work (eg, cleaning) resulted in less vaping. Another participant coupled vaping with using cannabis “*We would run out of weed, we still wanted to puff on something, so we had this little nicotine thing*” (Participant 04). Although a few participants said they never vaped at school, many described vaping in the school bathrooms, one in the cafeteria, and one in class. Outside of school, vaping occurred in homes, in public parks, public bathrooms, or “outside.” Many participants also vaped in a car or walking home from school. One participant vaped at their grandfather’s house and another vaped at home with their mother. Another stated “*I was vaping nicotine anytime I knew adults were not watching*” (Participant 02).

Participants described sharing vaping device when vaping in a group. Sometimes vaping itself was described as something to do with friends. With some, vaping would occur only when supplies happened to be around. One participant said they vaped because “*I see other people doing it, so I feel like I have to do it*” (Participant 06).

A few participants mentioned also vaping *caffeine sticks* (ie, vape products with caffeine from guarana (a plant from the Amazon), taurine (a sulfur-containing amino acid used in energy drinks), and/or ginseng (a plant tuber).²⁴)

Other tobacco. Some adolescents reported combustible cigarette smoking. One stated “*Everyone who vapes also smokes. They prefer cigarettes but deal with vapes, because we’re not old enough to get cigarettes.*” (Participant 09). One participant had tried smoking but preferred vaping: “*I had tried smoking a regular cigarette, and I didn’t like it, because I thought it tasted gross, and it made me feel weird*” (Participant 04). Most participants had friends and family members who smoked combustible cigarettes.

Cannabis. A few participants smoked other drugs when vaping, but the drug most frequently mentioned was cannabis. Cannabis use was mentioned by a minority of participants, but for some the connection between cannabis and vaping was strong.

For me, weed and the vaping kinda go hand in hand. I don't know why, but every time I would smoke weed, I would just get a craving, I guess. And that's how it started, too, as well, is we would go off to this trail, and we would smoke. And then when we would run outta weed, we still wanted to puff on something. So we had this little nicotine thing. (Participant 04)

Some participants mentioned having used cannabis in the past to quit smoking or identified it as a potential replacement for vaping when quitting. One rationale for this was the perceived calming effects of nicotine and cannabis.

What makes adolescents continue to vape?

Reasons to vape. Participants described how vaping made them feel – a pleasurable lightness, lightheadedness or “buzz” – a feeling they liked. Several discussed how it calmed them down, made them feel better, “*takes you away*” (Participant 05), or helped them deal with stress or anxiety. “[*It calms me down in the moment if I'm having an anxiety attack or something*” (Participant 03). Some liked the taste of various flavors. A few participants felt that vaping helped them fit in or made them look “cool.” “*It's just cool to see smoke in the air*” (Participant 01). Some described how vaping was preferable to smoking because vape devices last longer, are small, don't smell, and are easier to use without getting caught. One participant described vaping as something to do when bored (Participant 04), for another it was something to do with her boyfriend and “*in a way, a purpose,*” expressing excitement and desire to try new flavors as they came out (Participant 07). Getting a job helped with continued vaping for one participant “*I only recently got a job so now that I have an income, I can buy my own*” (Participant 04).

Friends, family, and vaping. Friends – Friends often featured prominently in participants continuing to vape. Friends vaped, supplied vape products, and offered opportunities to vape. Sometimes the sole source of vape products was from friends and when the participant wanted to vape, they would seek out friends to do so. Some had friends who were opposed to vaping but more frequently participants said their friends didn't care whether they vaped or not. In one case a participant quit vaping which led to others in their peer group to quit.

Family – Several adolescents in this study had adult family members who were current or former cigarette smokers. One participant described older family members vaping as a means of quitting cigarettes and others described siblings and younger family members who also vaped. Several participants believed their parents were largely unaware of their vaping. Others with parents who were aware reported that their parents accepted their vaping.

Family, my mom does not want me to [vape]. . . But she smokes cigarettes a lot, and she's struggling to quit, even though we are all trying to help her. My older brother, he vapes. He doesn't care. His wife, current wife, vapes. She doesn't care. Grandfather just doesn't care. (Participant 02)

One participant mentioned that their older sister supplied vaping products, and another described vaping with their mother.

My mom and probably some of my cousins, too. [Interviewer: Something you do together?] Me and my mom sometimes. (Participant 03)

Role of nicotine dependence in vaping. Mentioning Addiction – Although all participants reported using nicotine while vaping, more than half did not know how much they used (Table 2). In our demographics survey, 4 adolescents did not consider themselves addicted and 7 did, while over half (6 out of 11) reported needing to vape. Just over half mentioned addiction in their interviews stating that either they and/or their friends were addicted to nicotine.

Nicotine Dependence – Addiction was seen as a significant drawback of vaping. It was described as both an unwelcome feeling and an unappealing behavior among addicted friends who “*get irritated when they don't have it, or that's all they'll talk about*” (Participant 09).

I just thought it would be cool, and then I didn't realize that it would get me addicted to it. I feel like my cravings have been just escalating, and I feel like when I get upset, I'm like, “Oh, my God, I need this. [I dislike] how I feel like I need it. . . [When the vape pen] dies, it runs out of juice or something, and so that's what everyone seemed. . . when they get upset is when it runs out. . .” (Participant 06)

Why adolescents want to stop

Reasons to quit. Cost was a common reason for many participants to quit. Vaping was described as expensive, a “waste of money” and “not worth it.” One participant estimated that vaping for the “really addicted” costs \$100 per month. Cost concerns lead to some risky behaviors when disposable vape pens lost their charge.

Whenever they [disposable vape pens] die, kids don't have the money to buy a new one all the time. And they cut open phone-charger cords, and you take the actual live wires and hold it on the battery [to recharge it]. . . It's a very very dangerous thing. (Participant 11)

Some participants talked about a headache from vaping or a nauseousness, sometimes leading to vomiting, called “nic-sick” that occurred when they rapidly inhaled nicotine to get their “nic-fix” quickly.

Sometimes it makes me feel a little sick, so that can sometimes affect certain things like just hanging out with friends. They call it nic-sick. If I feel nic-sick, I'll just – I'll kinda go quiet, 'cause I'm trying not to throw up, 'cause it makes you a little nauseous. (Participant 04)

Participants expressed concerns about the effects of vaping on their physical health including lung capacity/shortness of breath, coughs and asthma, sore/burned throat, and general concerns about health or future health. Several participants voiced concerns about cancer. Negative impacts of vaping on mood or inability to focus were expressed by a majority of participants. This included irritability, frustration, “depressive mood swings,” worsening anxiety, and distraction or an inability to focus or concentrate. A few participants discussed family disapproval as a significant negative aspect of vaping. Family reactions ranged from upset to “if they ever found out, I would

be chalked up on the side of the road.” Only one participant brought up friend disapproval or losing friends due to vaping. Other reasons to quit included concerns about one’s future and avoiding serious medical consequences. Doctor advice to quit was identified by one participant and another thought that quitting could be “cool.”

Trouble caused by vaping. Most participants did not mention or denied getting in trouble due to vaping. Those who did get in trouble were caught either by parents or at school. One participant stopped vaping at school after getting caught and others described stress and anxiety resulting from rule breaking. Another described vaping at school as a sort of game:

And it’s kinda fun playing the game with the principals and the teachers: “Will you catch me today?” (Participant 11)

Quitting. Two participants had never tried to quit vaping, but most participants had tried and almost a third were successful. Most tried multiple times before they eventually quit. No assistance for quitting was mentioned. One participant considered support from friends and “willpower” to be helpful. Other strategies they employed included distraction techniques like planning activities with family, playing video games, or eating candy instead of vaping. Others tried to reduce stress or avoid contact with friends who vaped. Three participants mentioned replacing nicotine by vaping or smoking cannabis or vaping caffeine (caffeine sticks) instead.

Discussion

Our group of 11 high school students described their vaping experiences from initiation through quitting. Vaping typically started during socializing, occurring frequently when hanging out, or was described as something to do with friends. Friends also served as an ongoing source of vaping supplies. This is consistent with other studies finding that peer groups and friends are important social influences, predictors of adolescent risk behaviors,^{25,26} and serve a key role in initiation and continuation of adolescent vaping.²⁷⁻²⁹ Consistent with other research,³⁰ participants also reported vaping rituals including communal vaping behaviors. Common language was used among peers may also serve to strengthen social bonds.³¹

Our participants also described solitary activities coupled with vaping like playing video games, and routine daily activities like getting ready for school, talking on the phone, or doing homework. Peak routine hours for vaping mentioned included morning, before and after school, before parents returned home from work, and after parents went to bed at night. Vaping among our participants occurred at home, in public places, in cars, and some stated they vaped at school in bathrooms and sometimes even in class.

Nicotine dependence was described as a concern but 4 of the 11 participants did not consider themselves addicted. Participants expressed concern about negative health effects of

vaping. Similarly in prior studies of adolescent cigarette smoking, most adolescents thought they could avoid addiction and although they understood the health risks of smoking, thought they could avoid bad health outcomes of vaping.³² Pleasurable feelings, like a buzz or rush, looking cool, and fitting in with friends have been reported elsewhere as valued aspects of combustible cigarette smoking³² but were also mentioned by our participants regarding vaping. Strong urges to vape were described by our participants as disruptive, interfering with their ability to focus or concentrate. Compared to cigarettes, participants preferred vaping because: (1) it is less detectible from odor and because the devices are small and easy to hide; (2) use can be less obvious even around authority figures using techniques such as “zeroing” (holding the vapers in the lungs until they can be exhaled without a visible vape cloud).

Like cigarette smoking, vaping may appeal to normal adolescent risk-taking and reward-seeking originating in the changes to social-emotional system in adolescent brains around puberty.³³ Several of our participants expressed worry about being caught vaping by parents or teachers. One seemed to enjoy the danger of vaping as they played a sort of “cat and mouse” game at school to see what they could get away with.

Several adolescents in our study used vaping to calm down and address anxiety and stress. For some, anxiety control was a main reason for vaping. Adolescence is a time of rapid physical and mental development riddled with “storm and stress”^{34,35} when anxiety reaches its lifetime peak.^{35,36} An anxiolytic effect from nicotine is reported by cigarette smokers and has been confirmed in research.³⁷ High anxiety among some adolescents may put them at higher risk for vaping and may make quitting even more difficult. It should be noted that our qualitative interviews occurred near the end the Omicron variant surge of the Covid-19 pandemic when symptoms of anxiety and depression among youth had doubled from pre-pandemic estimates.³⁸

In our study, a majority of participants also used cannabis and at least one participant coupled vaping with cannabis use. An understanding of the relationship between vaping and cannabis use among adolescents is emerging. In a recent study, Sun et al found a strong association at the individual level but a minimal association with the overall population level prevalence of cannabis use.³⁹ Thus adolescent vaping may be an early indicator of those at risk for cannabis adoption. This has been described as a “looming public health emergency”⁴⁰ and further examination of this issue is needed.

Only 3 of 11 participants reported concurrent vaping and combustible cigarette smoking (order of adoption is unknown), and vaping was preferred. Some authors have argued that vaping may ultimately result in a renormalizing of smoking^{41,42} and that adolescent vapers are at higher risk than non-vapers of transitioning to traditional cigarettes.^{1,2,43-50} Although there has been debate around the notion that e-cigarettes containing nicotine may serve as a “gateway” to combustible cigarette

smoking, there appears to be sufficient evidence for concern.⁵¹ Screening methods to assess adolescent e-cigarette users who may be at higher risk for nicotine addiction or progression to cigarette smoking or other addictions are needed.

About one-third of the adolescents in our study had successfully quit vaping and most had tried to quit. The most common reason to quit was cost and quit strategies relied primarily on willpower and distraction. It is currently unclear what cessation approaches might work best for adolescents due to a lack of scientific evidence regarding best practices.⁵² Further research is required.

Limitations

Recruitment of interview participants was challenging due to stress on schools during the COVID-19 pandemic. Despite this, we were able to enroll one school with 11 participants who provided a range of views and responses. We feel we reached saturation on broad areas of inquiry such as initiation of vaping, reasons to continue to vape, and reasons to quit. However, some individual stories of struggles with acceptance in friend groups, role of family, and patterns of vaping were highly personal and a broader sample of adolescents would have enhanced our understanding of a wider range of experiences. Repeating this study in more schools would also yield additional perspective.

Conclusions

Peers have powerful influences on the initiation and maintenance of adolescent vaping habits. Vaping is “something to do” when either alone or in social groups and trying new flavors engaged adolescents further. Sharing, common vernacular, and connecting around vaping serve to strengthen social bonds while secrecy and rule-breaking play into adolescent individuation and rebelliousness. Several of our adolescents who vape nicotine came to rely on it to manage anxiety. Participants became addicted although they may not have realized or welcomed it. Cost and negative effects of vaping on mood or health were primary reasons to quit, yet quitting strategies were limited. More wide-spread detection and treatment of adolescent anxiety and increased alternative opportunities for healthy social activities are needed. Our findings suggest a desire to quit vaping among adolescents. Interventions that incorporate the context in which adolescents vape may better address the social and psychosocial barriers to quitting vaping among adolescents who vape. Increasing awareness among adolescents of evidence-based quitting strategies may also boost self-efficacy or confidence in quitting and facilitate success.

Acknowledgements

We wish to thank the adolescents who openly and honestly shared their thoughts about and experiences with vaping. We also wish to thank the high school, administration, and school nurse who assisted us with recruitment and data collection for this study.

Author Contributions

CD: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Writing Original Draft, Reviewing/Editing. LP: Conceptualization, Data Curation, Methodology, Formal Analysis, Funding Acquisition, Resources, Investigation, Reviewing/Editing. RS: Conceptualization, Funding Acquisition, Resources, Reviewing/Editing. CN: Data Curation, Formal Analysis, Reviewing/Editing. DS: Methodology, Investigation, Reviewing/Editing. JW: Data Curation, Project Administration, Reviewing/Editing.

Data Availability

As this research involves a small number of children who revealed detailed personal information, we are unable to share raw qualitative data without jeopardizing confidentiality.

Supplemental Material

Supplemental material for this article is available online.

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