



Is vaping dependence like smoking dependence? —A literature review highlighting implications for vaping cessation among youth

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Objective: To summarise emerging literature on vaping, highlighting key aspects that may be unique compared to other forms of tobacco use and considering the potential ways they contribute to vaping dependence and cessation among youth.

Background: To date, much of the clinical guidance and strategies for addressing vaping dependence and cessation infers from the literature on smoking cessation. While there are several commonalities between smoking and vaping, there is rich evidence suggesting there are unique aspects to vaping relevant to cessation—likely stemming from the variability in the types of devices and profoundly influenced by social norms. These differences have received relatively little attention.

Methods: Narrative literature reviews are a useful tool for providing a comprehensive perspective on emerging topics. This paper is presented in accordance with the Narrative Review reporting checklist.

Conclusions: Three key differences between vaping and smoking dependence are (I) greater variability in vaping products compared to cigarettes, (II) the discreetness and convenience of vaping, and (III) greater social acceptability of vaping among youth. Suggestions for future work are outlined. There is an urgent need for vaping cessation interventions that are effective and acceptable among young people. To achieve this, the development of interventions needs to take into account the differences from smoking cessation paradigms and the subjective experiences of young people.

Keywords: E-cigarettes; vaping; youth; dependence; cessation

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Background

There are many questions about the health effects of vaping, or e-cigarette use, that remain unanswered. However, there is now “substantial evidence” (1) that vaping, particularly with nicotine, can result in symptoms of dependence. Compared to adults, young people experience greater susceptibility and longer lasting consequences from exposure to substances like nicotine (2,3). Consequently,

there is strong consensus among scientific and public health communities that children and youth can greatly benefit from effective population- and individual-level interventions targeting substance use, including vaping (4,5).

One area that has been identified as a research priority is the development of vaping cessation interventions that are both safe and effective among youth (5). To date, much of the clinical guidance and cessation strategies on vaping infers from the literature on smoking cessation (6-8). While

there are several commonalities between smoking and vaping, we highlight aspects to vaping relevant to cessation that are unique and are likely stemming from the variability in the types of vaping devices and profoundly influenced by social norms. These differences have received relatively little attention. In this narrative review, we focus on these unique aspects and consider the potential ways they contribute to dependence. Drawing from recent evidence and firsthand experience in co-designing vaping cessation interventions with youth and young adults in Canada, we speculate on why we see these differences and how they might be incorporated in future interventions. We conclude with three suggestions for future work. This paper is presented in accordance with the Narrative Review reporting checklist (available at <https://dx.doi.org/10.21037/jphe-21-48>).

Differences between vaping and smoking dependence among youth

Several recent studies focused on vaping cessation among youth and young adults have shown that addiction and dependence are significant barriers to successful quit attempts (8-11). A similar finding has been consistently demonstrated in smoking cessation (12-14). However, a unique aspect to vaping that can affect dependence is the wide range of variability in the types of products and flavours available, which has been described in plenty of studies (15-17). Two of them found that nicotine dependence can vary by device type and that use of pod devices, such as JUUL, was associated with greater levels of dependence (18,19). A few studies compared nicotine delivery and dependence between e-cigarette and cigarette users, reporting mixed results (20-22). Beyond nicotine, enjoyment of flavours was also identified as a barrier. It would seem that though flavours are highly influential in vaping initiation, dependence and withdrawal symptoms have an equal or greater impact on sustained vaping (8-11), which is consistent with the literature on cigarette smoking onset and escalation (23).

One particularly challenging aspect unique to vaping is that as an activity, it is conveniently discreet. Free from that powerful and unmistakable scent associated with cigarette smoking, if desired, vaping can be pursued without others noticing. If there is some smell that breaks through, it is usually subtle—some even describe it as sweet (24)—and not distinctive enough to bother most people. Combined with an absence of a unit of delivery like cigarettes, this

allows young people to vape constantly without needing to make a conscious decision to vape and with limited behavioural cues telling them to stop. In our own work of conducting focus groups and interviews with young people who vape, we were often surprised by their ingenuity and determination in finding ways to vape in highly unusual places and scenarios: on the subway, in the shower, while driving or watching a movie in the theatre, under the sheets, or even at school in the classroom and hallways. Indeed, several youth participants report that they “pretty much vape everywhere” (8). This is noteworthy as it can result in a greater likelihood of developing habitual patterns, as well as greater difficulty in reducing or limiting use (11,15). Ironically, in the context of cessation, this discreetness and convenience of vaping might prove to be its most inconvenient feature.

Lastly, vaping enjoys a degree of social acceptability among younger age groups that smoking fortunately no longer benefits from (or at least, to a lesser degree). Existing evidence suggests this is influenced by multiple factors, most notably perceived acceptability among friends (8,9,11,25), parental and familial attitudes (26), and regulatory policies around availability and advertising (25,27,28). However, the effects of social acceptability on the process of vaping cessation have not been adequately addressed. Using smoke-free laws as an example, it has been noted that normative social influence is equally, if not more, important than legislation in ensuring compliance (29,30). In many social situations, a person might sooner risk non-compliance with smoke-free laws before venturing to smoke around other people and find themselves at the receiving end of disapproval and censure by others. In the case of vaping, though vape-free laws banning vaping in public spaces have been enacted in many places, the social norms often necessary to elicit desired behaviour (i.e., not vaping) are still absent. In the context of cessation, when considered with the discreetness of vaping, this demonstrates that young people lack enduring extrinsic motivation to quit.

Future work

Here, we highlight three suggestions for advancing research in this area. First, future studies should pay closer attention to these nuanced and unique aspects to vaping. Much of the research on vaping has been relative to smoking, including research on cessation. However, the extent to which this literature has relevance for vaping cessation efforts requires

critical evaluation (7-9). To date, there is little evidence of effective smoking cessation interventions for this age group (14). Therefore, although there is significant overlap between the two, it is plausible, and perhaps likely, that frameworks used for smoking cessation are insufficient when applied to vaping and that novel interventions are needed.

Second, approaches to cessation with self-reflection embedded in them are a promising area for intervention research. Considering the nature of vaping described here, it can be more challenging for young people to recognize their own behaviours. Many youths report not even knowing what they are vaping (8,26,31). Providing venues and strategies for reflection that can increase self-awareness of vaping behaviors can be a catalyst for cessation. For example, in our project for co-designing vaping cessation interventions with youth, participation in the design research process itself, and the self-reflection it engendered, resulted in behaviour change among some participants. In this way, mechanisms that increase awareness of subjective indicators of dependence can have an effect on cessation. This is an area where broader theoretical models in smoking cessation are perhaps more applicable to vaping than specific programmatic interventions. Specifically, two lines of inquiry offer valuable insight: one investigates the relationship between perceived addiction and cessation (32-34), while another is concerned with the identification of milestones in the process of smoking cessation among youth (12,13). We know from this body of evidence that nicotine dependence takes years to develop. Meanwhile, there are dependence and cessation milestones that are indicative of youth's desire to quit taking place earlier in the process. To illustrate, Kong and colleagues (11) were the first to identify that "tolerance breaks" were common among youth. This involves quitting vaping in short intervals to ensure a greater nicotine "buzz" upon reinitiation (11). In these situations, interventions aimed at this age group need to provide appropriate education for identifying and understanding subjective experiences of dependence and withdrawal symptoms through self-reflection (33,35). An increased understanding of this process will allow us to target interventions towards critical milestones and promote cessation before vaping becomes entrenched in the lives of youth. There is no reason why future interventions cannot accomplish both: deliver urgent support among youth and increase our understanding of the process of vaping cessation.

Finally, we highlight the importance of developing interventions with young people through co-design research processes. Future work in this area needs to be underpinned by youth's understanding of how vaping affects their lives. Similarly, Amato and colleagues (9) emphasized the importance of centering the "personal, subjective, qualitative experiences of young people." In this exploratory stage of the research, co-designing with youth offers rich insight into vaping, as well as guidance in discerning what is most relevant from the smoking cessation literature. An ideal setting would be where the lived experience of youth can be combined with the theoretical knowledge of researchers and practitioners that can then be leveraged into developing interventions that capture the complexities of vaping among youth.

This review has several limitations. First, the emerging research discussed and the commentary provided here are largely informed by the vaping experiences of youth in North America. As demonstrated in other studies (10,17,25,36-38), trends and social norms around vaping are subject to differences in specific regulatory, political, and socio-economic contexts. Strategies for understanding vaping dependence and cessation must be sensitive to these differences. Second, most of the research discussed were focused on the social and behavioural aspects of vaping; biopharmacological considerations were beyond the scope of this paper. Third, the vaping landscape is constantly evolving and with it, social norms among youth and their relevance to research and policy. Future work should continue to monitor these changes and their impact on vaping cessation among youth, particularly in light of the COVID-19 pandemic. Despite these limitations, this literature review has important strengths. It highlights an often-overlooked assumption in the literature on vaping cessation among youth. Additionally, this is the first synthesis of existing research on this topic, providing useful insights for future research and for the development of vaping cessation interventions.

Summary and conclusions

There is an urgent need for vaping cessation interventions that are effective and acceptable among young people. To achieve this, the development of interventions needs to take into account the differences from smoking cessation paradigms and the subjective experiences of young people through meaningful engagement.

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