

VAPE USE AMONG GENERATION Z STUDENTS: A SYSTEMATIC LITERATURE REVIEW OF THE SHIFT IN SMOKING BEHAVIOR, RISK PERCEPTION, AND THE INFLUENCE OF SOCIAL MEDIA

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Abstract

The rapid increase in electronic cigarette (vape) use among Generation Z has emerged as a significant public health concern, driven by changing smoking behaviors, evolving risk perceptions, and the widespread influence of digital media. This study aimed to systematically review the current evidence regarding vape use among Generation Z students, focusing on the shift in smoking behavior, risk perception, and the influence of social media. A Systematic Literature Review (SLR) was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. Literature searches were performed in Scopus, ScienceDirect, PubMed, SpringerLink, and Google Scholar, yielding 500 records. After duplicate removal, title and abstract screening, and full-text eligibility assessment, ten studies published between 2023 and 2026 met the inclusion criteria. The findings indicate that vaping has become increasingly common among Generation Z, accompanied by misconceptions regarding its health risks and reinforced by social media exposure, peer influence, and digital marketing. Environmental and psychosocial factors also contribute to vaping initiation and continuation. This review concludes that comprehensive tobacco control policies, evidence-based health communication, digital media literacy, and stricter regulation of online vape promotion are essential to reduce vape use and prevent nicotine dependence among Generation Z students.

Keywords: Generation Z, Electronic Cigarettes, Vaping Behavior, Risk Perception, Social Media

Introduction

The use of tobacco products, including conventional cigarettes and electronic cigarettes (e-cigarettes or vapes), remains one of the leading public health concerns worldwide. Adolescents and young adults, particularly Generation Z, are among the most vulnerable populations to nicotine initiation due to rapid technological advancement, peer influence, favorable risk perceptions, easy product accessibility, and the widespread promotion of tobacco-related content across digital platforms and social media. To monitor tobacco use among adolescents, the Global Youth Tobacco Survey (GYTS), developed by the World Health Organization (WHO), serves as a standardized global surveillance system for assessing tobacco-related behaviors among individuals aged 13–15 years. The survey supports the implementation of tobacco control policies through the WHO Framework Convention on Tobacco Control (WHO FCTC) and the MPOWER strategy, providing evidence for the development and evaluation of national tobacco control programs ^[1].

In Indonesia, tobacco consumption continues to represent a major public health challenge. According to the Statistics Indonesia (Badan Pusat Statistik/BPS), 28.68% of individuals aged 15

years and older reported smoking tobacco during the previous month in 2025. Several provinces recorded smoking prevalences above the national average, including Lampung (34.25%), West Nusa Tenggara (32.32%), West Java (32.07%), Bengkulu (32.03%), and South Papua (31.62%). These findings indicate that tobacco use remains highly prevalent despite ongoing tobacco control initiatives, emphasizing the need for more comprehensive prevention and intervention strategies ^[2].

Recent evidence suggests that subnational tobacco control policies can significantly reduce smoking among adolescents in Indonesia. Kusuma and Megatsari demonstrated that comprehensive district-level tobacco control measures were associated with substantial reductions in both current and lifetime smoking prevalence among adolescent boys, highlighting the importance of strengthening tobacco control policies beyond the national level ^[3]. However, alongside the persistent burden of conventional cigarette smoking, the use of electronic cigarettes has increased considerably over the past decade. A nationwide cross-sectional study reported that most Indonesian vape users were young adult males living in urban areas, had been using e-cigarettes for more than three years, and a considerable proportion continued to smoke conventional cigarettes concurrently, indicating the growing phenomenon of dual use and the need for evidence-based regulatory policies ^[4].

The increasing popularity of vaping is often driven by the perception that e-cigarettes are safer than conventional cigarettes. Nevertheless, emerging evidence indicates that disposable e-cigarettes contain multiple chemical compounds, including high concentrations of ethyl maltol and benzoic acid, which may pose potential toxicological risks to users ^[4]. Furthermore, vaping has been associated with adverse respiratory outcomes. Individuals who use nicotine or cannabis through vaping devices have been reported to experience significantly higher odds of dyspnea and other respiratory symptoms compared with non-users, suggesting that vaping should not be considered a harmless alternative to combustible tobacco ^[5].

Beyond physical health consequences, vaping has also been linked to psychological well-being. Previous studies have demonstrated significant associations between e-cigarette use, nicotine dependence, nonsuicidal self-injury, and suicidal behaviors among adolescents and young adults ^[6]. In Indonesia, mental health problems among adolescents remain highly prevalent. A school-based study conducted in Jambi reported considerable levels of psychological distress, depression, self-harm, internet addiction, and fear of missing out (FoMO), while also identifying the presence of cigarette and vape use among adolescents. These findings suggest that vaping behavior should be understood within a broader psychosocial context rather than solely as a tobacco-related behavior ^[7].

Behavioral determinants of vaping extend beyond individual characteristics. Social class discrimination has been shown to increase the likelihood of combustible tobacco use, nicotine vaping, and dual use among adolescents, highlighting the influence of social inequalities on tobacco-related behaviors ^[8]. Likewise, adverse childhood experiences have been consistently associated with greater risks of tobacco initiation, nicotine dependence, and e-cigarette use later in life ^[9]. In addition, exposure to tobacco imagery on streaming television platforms significantly increases adolescents' intentions to smoke cigarettes and use e-cigarettes, emphasizing the influential role of digital media in shaping health-related behaviors ^[10].

Easy access to vaping products further contributes to their widespread use among young people. Following California's restriction on flavored tobacco sales, physical retail stores remained the primary source of flavored e-cigarettes among college students, indicating that regulatory policies require stronger enforcement to effectively reduce youth access to vaping products ^[11]. At the same time, innovative digital interventions such as artificial intelligence (AI)-powered chatbots have emerged as promising tools for smoking and vaping cessation by providing personalized education and behavioral support, although further evidence regarding their long-term effectiveness is still required ^[12].

Although previous studies have examined the chemical composition of e-cigarettes, health consequences, psychosocial determinants, media exposure, accessibility of vaping products, and emerging digital cessation interventions, the existing evidence remains fragmented across different disciplines and populations. Moreover, limited evidence has systematically synthesized how the shift in smoking behavior, risk perception, and social media influence interact to shape vaping behavior among Generation Z university students. This knowledge gap limits the development of comprehensive public health strategies and evidence-informed tobacco control policies targeting young adults.

Therefore, this study aims to conduct a systematic literature review to synthesize current evidence on vape use among Generation Z students, with particular emphasis on the shift in smoking behavior, risk perception, and the influence of social media. The findings are expected to provide a comprehensive understanding of the factors driving vape use and to inform future research, health promotion initiatives, and tobacco control policies targeting Generation Z.

Method

This study employed a Systematic Literature Review (SLR) following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. Relevant articles were retrieved from Scopus, PubMed, ScienceDirect, SpringerLink, and Google Scholar using the keywords *vape*, *electronic cigarette*, *Generation Z*, *college students*, *smoking behavior*, *risk perception*, and *social media*, combined with the Boolean operators AND and OR. Eligible studies were original research articles published in English between 2020 and 2026, focusing on vape use among adolescents, university students, or Generation Z populations, and available in full text. The study selection process included the stages of identification, screening, eligibility, and inclusion in accordance with the PRISMA 2020 guidelines, as illustrated in Figure 1. Data were extracted based on the authors, publication year, study design, participant characteristics, variables, and key findings. The extracted data were synthesized using a narrative synthesis approach by categorizing the findings into three main themes: the shift in smoking behavior, risk perception, and the influence of social media on vape use among Generation Z students.

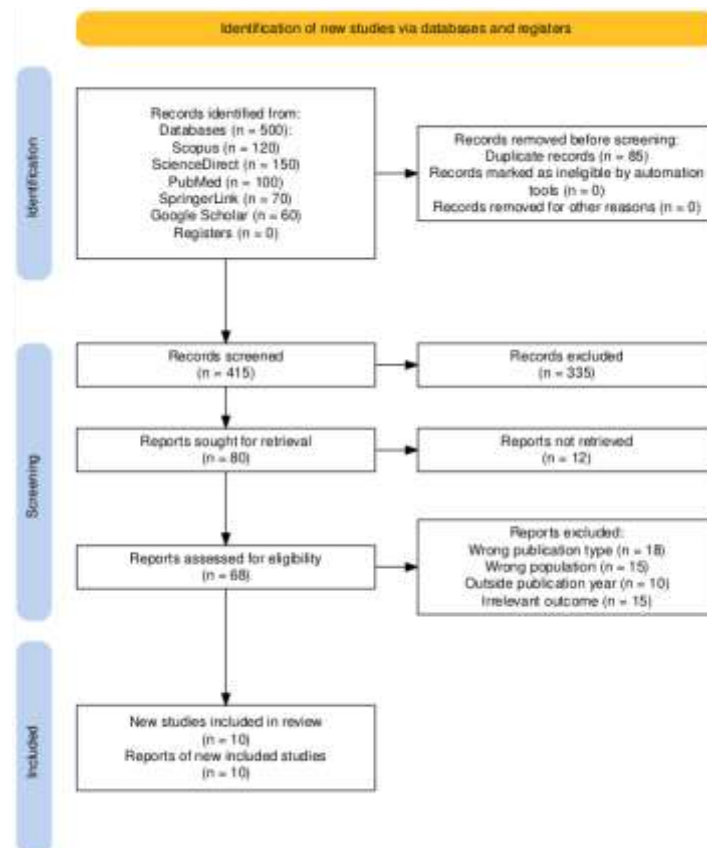


Figure 1. PRISMA 2020 Flow Diagram of the Study Selection Process

Results

A comprehensive literature search was conducted using Scopus, PubMed, ScienceDirect, SpringerLink, and Google Scholar to identify studies related to vape use among Generation Z students. The article selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Figure 1). After removing duplicate records and applying the predefined inclusion and exclusion criteria, 10 studies were included in this systematic literature review.

The selected studies were conducted in several countries, including the United States, Indonesia, Singapore, Australia, and China, and employed a variety of research designs, such as cross-sectional studies, qualitative studies, content analyses, protocol studies, and multi-case studies. The reviewed articles primarily examined vaping behavior, risk perception, social media influence, product accessibility, health communication, psychosocial determinants, and regulatory issues related to vape use among adolescents and young adults.

The synthesis of the selected studies revealed three major themes. First, the shift in smoking behavior indicates a growing transition from conventional cigarette smoking to electronic cigarette use, with dual use remaining common among young people. Second, risk perception strongly influences vaping behavior, as many Generation Z users perceive e-cigarettes as less harmful than conventional cigarettes despite increasing evidence of potential health risks. Third, social media influence plays a substantial role in shaping attitudes and intentions toward vaping through exposure to online content, influencers, digital marketing, and peer interactions. Collectively, these findings demonstrate that vape use among Generation Z students is driven by the interaction of individual, social, environmental, and digital factors. A summary of the characteristics and key findings of the included studies is presented in Table 1.

Table 1. Synthesis of Systematic Literature Review Findings on Vape Use Among Generation Z Students

No	Author (Year)	Country	Design	Objective	Main Findings
1	Wang et al. (2025)	USA	Cross-sectional	Media reports and EVALI	Media increased awareness of EVALI but many adolescents misunderstood its actual cause. Media significantly influenced vaping risk perception.
2	Tan et al. (2024)	Singapore	Qualitative	Illegal vaping culture	Vaping became a social norm despite prohibition. Flavors, peer influence, and perceived low risk encouraged use.
3	Tuson et al. (2023)	Australia	Observational	Distribution of vape stores	Most vape stores were located near schools, increasing accessibility among adolescents.
4	Ranker et al. (2024)	USA	Social media analysis	Twitter discussion	Social media portrayed vaping positively and less harmful than alcohol, shaping public perceptions.
5	Hartmuller et al. (2025)	Indonesia & China	Protocol study	Packaging surveillance	Packaging and marketing appeal may attract young consumers and support regulatory evaluation.
6	Ifroh & Gai (2025)	Indonesia	Cross-sectional	ACEs and risky behaviors	Adverse childhood experiences increased smoking/vaping through executive function deficits.
7	Wolf et al. (2025)	Indonesia, UAE, Australia	Multi-case study	Health communication	Credible influencers were more effective than popularity alone in health communication.
8	Silver et al. (2026)	USA	Cross-sectional	Streaming media	Exposure to tobacco imagery increased intention to smoke and vape.
9	Mello et al. (2025)	USA	Cross-sectional	Social discrimination	Social class discrimination increased vaping and dual use among adolescents.
10	Syawqie et al. (2025)	Indonesia	Cross-sectional	Characteristics of vape users	Most users were young adults and many remained dual users of cigarettes and vape.

The characteristics and key findings of the ten studies included in this systematic literature review are presented in Table 1. The selected studies were conducted across diverse settings, including the United States, Indonesia, Singapore, Australia, and China, and employed a variety of research designs, such as cross-sectional studies, qualitative studies, content analyses, protocol studies, and multi-case studies ^[13,14]. Several studies focused on the changing patterns of smoking behavior, highlighting the increasing transition from conventional cigarette smoking to electronic cigarette use, the persistence of dual use, and the influence of psychosocial and environmental factors on vaping initiation ^[3,15]. Other studies emphasized that adolescents' and young adults' perceptions of vaping risks were shaped by health information, media coverage, and public communication, although misconceptions regarding the health effects of e-cigarettes remained common ^[5,16]. The reviewed evidence also demonstrated that social media, tobacco imagery in streaming media, influencer communication, and online discussions substantially influenced attitudes, social norms, and behavioral intentions related to vaping among Generation Z students ^[10,17]. Collectively, these findings indicate that vape use among Generation Z students is driven by the complex interaction of

behavioral, psychosocial, communication, and environmental factors, providing a comprehensive evidence base for the thematic synthesis presented in Table 1.

Discussion

The findings of this systematic literature review demonstrate that vape use among Generation Z students is influenced by a complex interaction of behavioral, psychosocial, environmental, and digital factors. Three major themes emerged from the reviewed studies: the shift in smoking behavior, risk perception, and the influence of social media. These findings support the concept that tobacco-related behaviors among adolescents and young adults are no longer determined solely by individual preferences but are increasingly shaped by social environments, digital communication, product accessibility, and contemporary marketing strategies.

The first major finding concerns the shift in smoking behavior, in which conventional cigarette smoking is increasingly replaced or accompanied by electronic cigarette use. Several studies reported that many adolescents and young adults perceive vaping as a modern, socially acceptable, and less harmful alternative to smoking, resulting in increased experimentation and dual use of cigarettes and e-cigarettes ^[4,15]. This trend is consistent with evidence from Indonesia showing that comprehensive tobacco control policies can reduce smoking initiation among adolescents, although vaping continues to emerge as an alternative nicotine product ^[3]. Furthermore, a global systematic review reported that e-cigarette use is increasing particularly among young adults, indicating that vaping has become a growing public health concern across different populations ^[18]. These findings suggest that tobacco control policies should address all nicotine products rather than focusing exclusively on conventional cigarettes.

The second theme highlights the importance of risk perception in shaping vaping behavior. Although awareness of vaping-related health risks has improved, misconceptions remain widespread. Adolescents exposed to media coverage of EVALI generally recognized that vaping could be harmful, yet many incorrectly believed that nicotine alone was responsible for the disease, demonstrating gaps in health communication ^[16]. Similar findings indicate that vaping is frequently perceived as safer than combustible cigarettes despite evidence linking smoking and vaping with respiratory symptoms, cardiovascular risks, and other adverse health outcomes ^[3,5]. The persistence of inaccurate risk perceptions highlights the need for evidence-based health education that clearly communicates the health consequences of e-cigarette use among young people.

The third theme emphasizes the substantial influence of social media and the surrounding environment on vaping behavior. Online platforms, influencers, streaming media, and user-generated content continuously expose adolescents to positive images of vaping, often portraying it as fashionable, harmless, and socially desirable ^[10,19]. In addition, qualitative evidence from Singapore demonstrated that peer influence and social acceptance reinforced an illegal vaping culture despite strict regulatory policies ^[14]. Environmental factors also contribute to vaping uptake, as higher densities of vape retailers and greater exposure to e-cigarette advertising have been associated with increased vaping among youth ^[20,21]. These findings reinforce the importance of regulating digital marketing, limiting youth exposure to vaping advertisements, and strengthening policies governing the retail availability of e-cigarette products.

The reviewed studies also suggest that psychosocial conditions play an important role in vaping initiation and continuation. Adolescents with adverse childhood experiences were more likely to engage in smoking and vaping behaviors, partly through impaired executive functioning, indicating that vaping is closely related to broader mental and behavioral health issues ^[13]. Likewise, effective health communication depends not only on information dissemination but also on the credibility of communicators and meaningful engagement with young people. Studies on strategic influencer

leadership and student engagement demonstrate that trusted communicators and interactive communication approaches are more effective in promoting healthy behaviors than relying solely on message exposure ^[13].

Overall, the findings indicate that reducing vape use among Generation Z students requires comprehensive interventions that integrate tobacco control policies, digital health communication, media literacy, restrictions on e-cigarette marketing, and school- and university-based health promotion programs. Addressing behavioral, environmental, and communication factors simultaneously is likely to be more effective than interventions targeting individual behavior alone. Future research should prioritize longitudinal and intervention studies to better understand the long-term effects of vaping and to evaluate strategies for preventing nicotine use among Generation Z.

Conclusion

This systematic literature review concludes that vape use among Generation Z students is influenced by the interaction of behavioral, psychosocial, environmental, and digital factors. The reviewed evidence indicates a clear shift from conventional cigarette smoking to electronic cigarette use, supported by changing perceptions that vaping is more socially acceptable and less harmful than traditional smoking. However, these perceptions are often inconsistent with current scientific evidence regarding the health risks associated with e-cigarette use.

The review also highlights the important role of social media in shaping vaping attitudes and behaviors. Exposure to online marketing, influencers, peer-generated content, and digital communication contributes to the normalization of vaping and increases its appeal among young people. Consequently, vaping behavior should not be viewed solely as an individual choice but as the result of broader social and communication environments that influence decision-making among Generation Z.

Overall, this review suggests that effective strategies to reduce vape use should combine comprehensive tobacco control policies with digital health communication, media literacy education, and stronger regulation of online marketing and youth access to e-cigarette products. These integrated approaches are expected to improve risk awareness, discourage vaping initiation, and support healthier behaviors among adolescents and young adults. Future studies should further evaluate the effectiveness of these interventions through longitudinal and experimental research across different populations and settings.

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