journal homepage: http://kont.zsf.jcu.cz
DOI: 10.32725/kont.2025.013

KONTAKT / Journal of nursing and social sciences related to health and illness

Original research article

Determinants of use and perceived harm of combustible tobacco and electronic cigarettes among high school students in Prague

Vendula Pokorná [1], Adam Kulhánek [1] *, Kateřina Lukavská [1, 2]

[1] *Charles University, First Faculty of Medicine and General University Hospital Prague, Department of Addictology, Prague, Czech Republic*
[2] *Charles University, Faculty of Education, Department of Psychology, Prague, Czech Republic*

Abstract
Background: The use of tobacco products and electronic cigarettes is a growing public health concern, especially among children and adolescents. Understanding the factors that impact both the use, and the perception of the harm related to these products is essential for developing effective prevention strategies targeting young people.
Objective: The aim of this study is to map the use of cigarettes and electronic cigarettes as well as the perceived risk of these products in a population of students from selected secondary schools in Prague. The partial aim was to determine whether the perceived harmfulness of the product, type of school, and gender play any role in the use of e-cigarettes or tobacco.
Methods: We conducted a questionnaire survey in secondary schools in the Capital City of Prague in cooperation with prevention methodologists. Data were collected in the first years of vocational and general secondary schools from students with an average age of 15 years.
Results and conclusion: The difference in frequency of tobacco product use between girls and boys was statistically insignificant, whereas the difference in tobacco product use between students at secondary schools providing general education and vocational education was found to be statistically significant. Perceived harmfulness of combustible cigarettes was significantly affected by the type of school. Regarding electronic cigarettes, the perceived harmfulness was significantly affected by both the type of school and gender. For electronic cigarettes and regular cigarettes, perceived harmfulness and school type appeared to be the predictors of use. Regarding electronic cigarettes, school type, perceived risk of the product, and gender were the predictors of use.

Keywords: Adolescents; Combustible cigarette; Electronic cigarette; Risk behaviour; Smoking; Tobacco

Introduction

In recent years, patterns of tobacco and nicotine use have changed dramatically. The introduction of novel tobacco and nicotine products, such as electronic cigarettes, heated tobacco, or nicotine pouches, has influenced user preferences, the perception of harm and even societal attitudes towards smoking and vaping in many countries. This trend has raised considerable concerns about whether using e-cigarettes during adolescence increases the risk of developing nicotine dependence, and also whether it can be the cause of smoking combustible cigarettes in future.

According to a review by Kapan et al. (2020) which used data from 18 European countries, the highest prevalence of electronic cigarette use is among young adults (10–14 years). Similarly, Laverty et al. (2021), who analysed HTP prevalence in 27 European countries, observed the highest rate of use in the age group of 14–25 years.

Electronic cigarettes have emerged as an increasingly attractive alternative to conventional tobacco products among children and adolescents. They are promoted as modern devices with a high-tech design, vibrant aesthetics, and appealing flavours (O'Connor et al., 2022). Flavourings play a significant role in enhancing the attractiveness, with flavours such as menthol, fruits (e.g., cherry, berries, apple), sweets (e.g., chocolate, vanilla, desserts), and soda drinks being particularly popular among young adults. Studies suggest that non-tobacco flavours may increase the attractiveness to try electronic cigarettes, and also increase the chance of future regular use (Leventhal et al., 2019). Flavouring chemicals can also cause significant health risks due to harmful compounds (such as cinnamaldehyde) that form when heated and converted to aerosol (Kulhánek and Baptistová, 2020). The tobacco industry has strategically targeted adolescents as young as 13 years old (Campaign for Tobacco-Free Kids, 2024). However, school-age children are not cognitively capable of critically evaluating advertising strategies (Lapierre et al., 2017). They face social

* **Corresponding author:** Adam Kulhánek, Charles University, First Faculty of Medicine and General University Hospital Prague, Department of Addictology, Apolinářská 4, 128 00 Prague 2, Czech Republic; adam.kulhanek@lf1.cuni.cz
http://doi.org/10.32725/kont.2025.013
Submitted: 2024-11-21 • Accepted: 2025-03-05 • Prepublished online: 2025-03-11
KONTAKT 27/2: 158–163 • EISSN 1804-7122 • ISSN 1212-4117

pressure from their peers, as well as influencers and YouTubers, which makes them more vulnerable than ever before (Trucco et al., 2020). Influencer marketing represents a sophisticated form of promoting novel nicotine products. It displays celebrity lifestyle and shapes the attitudes of followers by showing influencers as role-models (Hejlová et al., 2019). For example, the marketing of heated tobacco products makes novel tobacco products highly attractive to Generation Z, who subjectively perceive these products as fashionable, stylish, innovative, and less harmful than combustible cigarettes (Ilésová et al., 2023).

In addition to marketing and the attractiveness of products, there are several other determinants that increase risk behaviour in relation to tobacco and nicotine use. These include parents and family smoking, early smoking onset, mental conditions, easy availability of tobacco and nicotine products, low health literacy, low socio-economic status, lack of parental support and control, and other factors (Ellickson et al., 2003; Harvey et al., 2016; Hu et al., 2011).

E-cigarettes may attract children without previous experience with nicotine and with no prior intention to use this substance. Barrington-Trimis et al. (2016) describe electronic cigarettes use among adolescents who had no prior intention to use them, but who started smoking tobacco products as a result of experimenting with e-cigarettes. It seems that risk perception may be a significant predictor of future use. As the study by Strong et al. (2019) showed, adolescents who perceive tobacco products as highly harmful are less likely to use them. In addition, it has been found that young adults with no prior intention to use e-cigarettes perceived e-cigarettes as more harmful compared to individuals with an intention to use them (Patiño-Masó et al., 2019).

Tobacco and nicotine use among adolescents is not only a public health issue but also a social phenomenon influenced by socioeconomic factors, parenting style, and peer influence. Research suggests that students from lower socioeconomic backgrounds, particularly those attending vocational schools, are at a higher risk of smoking and vaping, often due to limited access to health education and prevention programs (Green et al., 2020; Moor et al., 2015).

With the rapid spread of electronic cigarettes, there is a lack of evidence regarding Czech adolescents' perception of the harm associated with these products, as well as how their risk perception and experience determine patterns of use.

Aims

The study aims to determine differences in the prevalence of combustible cigarettes and electronic cigarettes among students from selected secondary schools in Prague. A partial goal was to assess the perceived harm of the above products and the relation between prevalence and harm perception.

Materials and methods

Study design

This research was conducted in the form of a cross-sectional pencil-paper survey among first-year students in selected secondary schools in Prague.

Research sample

Clustered sampling was used to compose the research sample. Participants were recruited through secondary schools which were randomly selected (using the R-software) from the list of all secondary schools providing education in Prague that are registered in the database of The Ministry of Education, Youth and Sports of the Czech Republic (secondary schools providing special education were excluded). The total of 171 secondary schools were divided into two groups based on whether they provide general education (GE) or vocational education (VE). Ten schools from each group were randomly selected and invited to participate in the study; 4 secondary schools providing general education and 6 secondary schools providing vocational education agreed to participate. All first-year students at selected secondary schools were asked to participate.

The research sample consisted of 886 valid questionnaires (4 questionnaires were rejected due to invalid responses). The average age was 15 years. Of the total sample, 474 were VE students and 412 were GE students, out of which 448 were girls and 421 boys.

Data collection

Data collection took place in late 2019 and early 2020 in selected schools, conducted by prevention methodologists who had been trained in advance to instruct students and distribute questionnaires. The questionnaires were distributed to the students in their classrooms in paper form during educational activity. The completed questionnaires were submitted by the students in a sealed paper box.

The battery of questionnaires included a questionnaire on the prevalence of e-cigarette and combustible cigarette use ("never used", "tried once in my life", "used within the last year", "used within the last month"), intention to try combustible cigarettes and e-cigarettes (Likert scale from zero to 3, where 0 = definitely do not want to try, continue using, 1 = would rather not try, continue using, 2 = quite want to try/continue using, 3 = definitely want to try, continue using), perceived risks of combustible cigarettes and e-cigarettes (students rated statements about the harmfulness of these products on the Likert scale from 0 to 4), and a knowledge questionnaire.

Measures

The prevalence of the use of combustible cigarettes, e-cigarettes with nicotine, and e-cigarettes without nicotine over the past year, past 30 days, lifetime, or never was collected. The perceived risk of tobacco products was measured using 9 statements regarding the harmfulness of combustible cigarettes and e-cigarettes. Some of the items in this questionnaire section were adopted (Oncken et al., 2005). Statements regarding the perceived degree of risk associated with tobacco products were rated on the Likert scale from 0 to 4, with 4 representing "strongly agree" with the statement, 3 "somewhat agree", 2 "neither agree nor disagree", and 1 "somewhat agree".

Statistical analysis

Descriptive statistics were used to describe the prevalence of the use of combustible cigarettes, e-cigarettes with nicotine, and e-cigarettes without nicotine. Differences in the use of combustible cigarettes, e-cigarettes without nicotine, and e-cigarettes with nicotine between girls and boys, as well as differences in the use of combustible cigarettes, e-cigarettes without nicotine, and e-cigarettes with nicotine between GE and VE students were investigated using chi-squared test. Descriptive statistics was used to describe perceived harm of e-cigarettes and combustible tobacco. The difference in perceived harm of combustible cigarettes and e-cigarettes between girls and boys and between GE and VE students was investigated using Cohen's d. The perceived harm was assessed using logistic analysis, with gender and type of school as po-

tential predictors of use of combustible cigarettes. The data were processed using complete case analysis in the statistical application Jamovi (Version 2.3).

Results

Lifetime prevalence of cigarette and e-cigarette use

The highest prevalence of use was for combustible cigarettes. These were used at least once in their lifetime by a total of 50.6% (n = 448) of respondents, including 35.4% (n = 146) of GE students and 63.7% (n = 302) of VE students. Out of those respondents who had used a regular cigarette at least once in their life, 51.1% (n = 229) were girls and 48.9% (n = 206) were boys.

Out of all respondents, 44.5% (n = 394) had used a nicotine-free e-cigarette at least once in their lifetime, including 29.1% (n = 120) of GE students and 57.8% (n = 274) of VE students. Out of those respondents who had used a nicotine-free e-cigarette at least once in their life, 42.4% (n = 190) were girls and 46.3% (n = 195) were boys. Electronic cigarettes with nicotine had the lowest prevalence of use, with 36.3% of respondents (n = 322) having used them at least once in their lifetime, with the highest prevalence among VE students, specifically 49.8% (n = 236) of students. Out of the GE students, 20.9% (n = 86) of the students used a nicotine-free e-cigarette. Out of those students who had used an e-cigarette containing nicotine at least once in their life, 37.5% (n = 168) were girls and 34.4% (n = 145) were boys.

Prevalence of cigarette and e-cigarette use by gender and education

Differences in the use of combustible cigarettes, e-cigarettes without nicotine, and e-cigarettes with nicotine between girls and boys were investigated using chi-squared test. The difference in frequency of use between combustible cigarettes [$\chi^2(1) = 0.414$, $p = 0.52$], e-cigarettes with nicotine [$\chi^2(1) = 0.881$, $p = 0.348$], and e-cigarettes without nicotine [$\chi^2(1) = 1.34$, $p = 0.246$], and between girls and boys was found to be statistically insignificant.

Differences in the use of combustible cigarettes, e-cigarettes without nicotine, and e-cigarettes with nicotine between GE and VE students were investigated using chi-squared test. The differences in frequency of use of combustible cigarettes [$\chi^2(1) = 70.5$, $p < 0.001$, OR = 3.2], e-cigarettes with nicotine [$\chi^2(1) = 79.7$, $p < 0.001$, OR = 3.8], and e-cigarettes without nicotine [$\chi^2(1) = 73.4$, $p < 0.001$, OR = 3.3] were all statistically significant. Among students at VE schools, the prevalence of use was approximately three times higher than among students at GE schools.

Perceived harm of combustible cigarettes and e-cigarettes

The perceived harm was assessed for e-cigarettes in general (no distinction was made between e-cigarettes without nicotine and e-cigarettes with nicotine). On average, both products (combustible tobacco and e-cigarettes) were perceived as rather harmful, with mean scores higher than 2 on the Likert scale ranging from 0 to 4. Combustible cigarettes were perceived as more harmful (M = 3.22, SD = 0.54) than e-cigarettes (M = 2.39, SD = 0.85): $t(829) = 33.0$, $p < 0.001$, with large effect size (Cohen's d = 1.15).

Perceived harm of combustible cigarettes was significantly affected by the type of school [$F(1;838) = 13.526$, $p < 0.001$, $\omega 2 = 0.015$], with students of GE schools showing higher scores than students of VE schools (Table 1): *post-hoc* $t(838) = 3.68$, Cohen d = 0.26. Gender-based differences were insignificant ($p = 0.12$), as was the interaction between type of school and gender ($p = 0.495$).

Perceived harm of e-cigarettes was significantly affected by the type of school [$F(1;826) = 20.598$, $p < 0.001$, $\omega 2 = 0.023$] and gender [$F(1;826) = 6.613$, $p = 0.10$, $\omega 2 = 0.007$], with girls attending GE schools showing the highest scores (Table 2).

Association between prevalence and perceived harm

The perceived harm was assessed using logistic analysis, with gender and type of school as potential predictors of use of combustible cigarettes (Table 3) and e-cigarettes (Table 4). In the case of both, the perceived harm and type of school were significant predictors of use. In the case of e-cigarettes, gender was also found to be significant.

Table 1. Perceived harm of combustible cigarettes by gender and school type

				95% Confidence interval	
School type	Gender	Mean	SE	Lower	Upper
GE	Girls	3.26	0.0341	3.19	3.32
	Boys	3.34	0.0423	3.26	3.42
VE	Girls	3.14	0.0386	3.07	3.22
	Boys	3.18	0.0339	3.11	3.24

Table 2. Perceived harm of e-cigarettes by gender and school type

				95% Confidence interval	
School type	Gender	Mean	SE	Lower	Upper
GE	Girls	2.58	0.0341	2.48	2.69
	Boys	2.48	0.0423	2.35	2.61
VE	Girls	2.36	0.0386	2.24	2.48
	Boys	2.17	0.0339	2.06	2.27

Table 3. Logistic regression model predicting the probability of combustible cigarettes use (R^2 = 0.09)

		95% Confidence interval					
Predictor	Estimate	Lower	Upper	SE	Z	*p*	Odds ratio
Perceived harm of combustible cigarettes	–0.827	–1.116	–0.5385	0.147	–5.62	<0 001	0.437
Gender Boy – girl	–0.255	–0.550	0.0392	0.150	–1.70	0.089	0.775
Type of school VE – GE	1.134	0.840	1.4286	0.150	7.55	<0.001	3.109

Note: Estimates represent the log odds of "use of combustible cigarettes = 1" vs. "use of combustible cigarettes = 0"

Table 4. Logistic regression model predicting the probability of e-cigarettes use (R^2 = 0.14)

		95% Confidence interval					
Predictor	Estimate	Lower	Upper	SE	Z	*p*	Odds ratio
Perceived harm of e-cigarettes	–0.777	–0.974	–0.580	0.101	0.101	<0.001	0.460
Gender Boy – girl	–0.542	–0.868	–0.216	0.166	0.166	0.001	0.582
Type of school VE – GE	1.282	0.953	1.611	0.168	0.168	<0.001	3.604

Note: Estimates represent the log odds of "use of e-cigarettes = 1" vs. "use of e-cigarettes = 0"

Discussion

Key findings

We found that combustible cigarettes had the highest lifetime usage, particularly among students at VE schools compared to students at GE schools. Nicotine-free e-cigarettes were the second most used in the research sample, while e-cigarettes with nicotine had the lowest prevalence. Analyses indicate no significant gender differences in prevalence, but significant differences were observed between students of VE and GE schools, with students at VE schools showing substantially higher prevalence rates across all products.

Perceived harm was greater for combustible cigarettes than for e-cigarettes, with differences influenced by the type of school. Students at GE schools generally perceived both products as more harmful compared to students of VE schools. We also identified perceived harm and type of school as significant predictors of tobacco product use, with gender also influencing the use of e-cigarettes.

Relation to previous research

Our findings are consistent with findings from a study conducted by Moor et al. (2015), which examined the impact of different educational and family environments on adolescent smoking behaviours. Their research demonstrated that students with lower academic achievement from vocational schools had higher likelihood of smoking compared to students at universities with higher satisfaction in school. Lack of significant gender differences in use and harm perception contrast with earlier findings which suggested that boys were generally more likely to engage in risky behaviour, including tobacco use (Lundborg and Andersson, 2008). This discrepancy indicates the evolving nature of novel tobacco products and adolescent lifestyle and suggests that prevention efforts must be continuously adapted to reflect changing trends.

When it comes to examining the relationship between perceived harm and tobacco product use, our study found that the perception of the risks associated with combustible cigarettes and e-cigarettes among young adults have a great influence on using these products. A study by Manzione et al. (2020) investigated perceived harm related to combustible cigarettes and e-cigarettes among young adults in Canada. The authors found that while cigarettes were perceived as more harmful, almost 35% of respondents underestimated the risks associated with e-cigarettes. This misperception was associated with increased use of e-cigarettes.

Similarly, a cross-sectional study in Australia, China, India, and the UK by Pettigrew et al. (2023) described how changes in perceived harm influenced tobacco and e-cigarette use among teenagers and young adults. The research found that adolescents who perceived e-cigarettes as less harmful than combustible cigarettes were more likely to initiate e-cigarette use and continue using them. The study emphasized that perceptions of reduced harm associated with e-cigarettes contribute to their appeal among adolescents, potentially leading to higher consumption.

As several studies have shown (Bast et al., 2016; Gabrhelik et al., 2012; Thomas et al., 2013), school-based prevention programs that incorporate skill-building, peer-led initiatives, and community engagement have proven effective in reducing tobacco use among children and adolescents. Understanding social determinants is also essential for designing effective prevention strategies that address both individual risk perceptions and broader social factors. As the tobacco and vaping industry continues to rapidly innovate its products and adapt them to the preferences of young people – making them more and more vulnerable (Trucco et al., 2020) – prevention programs should also follow the latest trends in this field. Considering the rapid increase in the use of nicotine pouches (Gaiha et al., 2023) and the growing popularity of flavoured disposable e-cigarettes (Hammond et al., 2025)

among adolescents, it is highly likely that combustible cigarettes will no longer be the first nicotine product of choice that young people will try.

Strengths and limitations

This study has several strengths but also methodological limitations. The research benefits from a robust methodological framework, including a cross-sectional survey design with a large sample of respondents. We utilised clustered sampling with a randomised selection of schools, which enhances the representativeness of the research sample and reduces selection bias. Data were analysed using standard statistical methods, including chi-squared tests, Cohen's d, and logistic regression. Despite these methodological advantages, this data represents only the population of Prague adolescents, where there may be different economic factors, different cultural aspects, and different socio-economic background to other areas – which might cause our results to differ from the rest of the country. A major limitation is that the study does not consider the latest tobacco and nicotine products, such as disposable flavoured e-cigarettes and nicotine pouches, which are increasingly widespread among adolescents. Additionally, we did not differentiate between electronic cigarettes with and without nicotine when asking about the harmfulness of the product: This might cause an underestimation of the perceived harm, as it is possible that participants assessed electronic cigarettes without nicotine which are more commonly used in this age group. Data was administered by self-reporting, which may have caused response bias, as students may have under- or over-reported their tobacco use or biased their perceptions. The presence of prevention methodologists during data collection may have unintentionally influenced students' responses, potentially impacting the authenticity and truthfulness of their answers. In an attempt to eliminate this risk, we thoroughly trained prevention methodologists and provided them with instructions for administering the questionnaires.

Conclusion

In analysing determinants of nicotine and tobacco product use among adolescents, our study contributes to the evidence of various social, educational, and psychological factors in forming health behaviour. The differences in the prevalence of tobacco and nicotine use between students in general education (GE) and vocational education (VE) programs highlight the influence of the educational environment as a key determinant. The shift in tobacco products use in adolescents draws attention to the need for updating prevention strategies that address the full range of nicotine products currently available to young people.

Ethical considerations

Before commencement, this study was approved by the Ethics Committee of the National Monitoring Centre for Drugs and Addiction Czech Republic under the number "EKNNMS-006/2019".

Authors contributions

VP: Project Administration, Investigation, Formal Analysis, Writing – Original Draft. *AK:* Conceptualization, Methodology, Writing – Original Draft. *KL:* Methodology, Formal Analysis, Supervision, Writing – Editing and Review.

Funding

This paper was supported by the Cooperatio Programme of the Charles University, research area MCOM and Cooperatio [HEAS].

Conflict of interest

The authors have no conflict of interest to declare.

References

1. Barrington-Trimis JL, Urman R, Berhane K, Unger JB, Cruz TB, Pentz MA, et al. (2016). E-Cigarettes and Future Cigarette Use. Pediatrics 138(1): e20160379. DOI: 10.1542/peds.2016-0379.
2. Bast LS, Due P, Bendtsen P, Ringgard L, Wohllebe L, Damsgaard MT, et al. (2016). High impact of implementation on school-based smoking prevention: the X:IT study-a cluster-randomized smoking prevention trial. Implement Sci 11(1): 125. DOI: 10.1186/s13012-016-0490-7.
3. Campaign For Tobacco-Free kids (2024). Tobacco company marketing to kids. [online] [cit. 2024-11-12]. Available from: https://assets.tobaccofreekids.org/factsheets/0008.pdf
4. Ellickson PL, Bird CE, Orlando M, Klein DJ, McCaffrey DF (2003). Social Context and Adolescent Health Behavior: Does School-Level Smoking Prevalence Affect Students' Subsequent Smoking Behavior? J Health Soc Behav 44(4): 525–535. DOI: 10.2307/1519797.
5. Gabrhelik R, Duncan A, Miovsky M, Furr-Holden CD, Stastna L, Jurystova L (2012). "Unplugged": a school-based randomized control trial to prevent and reduce adolescent substance use in the Czech Republic. Drug Alcohol Depend 124(1–2): 79–87. DOI: 10.1016/j.drugalcdep.2011.12.010.
6. Gaiha SM, Lin C, Lempert LK, Halpern-Felsher B (2023). Use, marketing, and appeal of oral nicotine products among adolescents, young adults, and adults. Addict Behav 140: 107632. DOI: 10.1016/j.addbeh.2023.107632.
7. Green MJ, Gray L, Sweeting H, Benzeval M (2020). Socioeconomic patterning of vaping by smoking status among UK adults and Youth. BMC Public Health 20: 183. DOI: 10.1186/s12889-020-8270-3.
8. Hammond D, Reid JL, Burkhalter R, East K (2025). Use of disposable e-cigarettes among youth who vape in Canada, England and the United States: Repeat cross-sectional surveys, 2017–2023. Addiction 123(3): 405–413. DOI: 10.1111/add.16596.
9. Harvey J, Chadi N, Canadian Paediatric Society, Adolescent Health Committee (2016). Preventing smoking in children and adolescents: Recommendations for practice and policy. Paediatr Child Health 21(4): 209–214. DOI: 10.1093/pch/21.4.209.
10. Hejlová D, Schneiderová S, Klabíková Rábová T, Kulhánek A (2019). Analysis of Presumed IQOS Influencer Marketing on Instagram in the Czech Republic in 2018–2019. Adiktologie 19(1): 7–15.
11. Hu MC, Griesler P, Schaffran C, Kandel D (2011). Risk and protective factors for nicotine dependence in adolescence: Factors for nicotine dependence. J Child Psychol Psychiatry 52(10): 1063–1072. DOI: 10.1111/j.1469-7610.2010.02362.x.
12. llésová L, Kulhánek A, Hejlová D (2023). "It looks like an accessory": Perception of heated tobacco products and its marketing communication among Generation Z. Adiktologie 23(2): 137–144. DOI: 10.35198/01-2023-001-0002.
13. Kapan A, Stefanac S, Sandner I, Haider S, Grabovac I, Dorner TE (2020). Use of Electronic Cigarettes in European Populations: A Narrative Review. Int J Environ Res Public Health 17(6): 1971. DOI: 10.3390/ijerph17061971.
14. Kulhánek A, Baptistová A (2020). Chemical Composition of Electronic Cigarette E-Liquids: Overview of Current Evidence of Toxicity. Adiktologie 20(3–4): 137–144. DOI: 10.35198/01-2020-002-0007.

15. Lapierre MA, Fleming-Milici F, Rozendaal E, McAlister AR, Castonguay J (2017). The Effect of Advertising on Children and Adolescents. Pediatrics 140(Suppl. 2): S152–S156. DOI: 10.1542/peds.2016-1758V.
16. Laverty AA, Vardavas CI, Filippidis FT (2021). Prevalence and reasons for use of Heated Tobacco Products (HTP) in Europe: an analysis of Eurobarometer data in 28 countries. Lancet Reg Health Eur 8: 100159. DOI: 10.1016/j.lanepe.2021.100159.
17. Leventhal AM, Goldenson NI, Cho J, Kirkpatrick MG, McConnell RS, Stone MD, et al. (2019). Flavored E-cigarette Use and Progression of Vaping in Adolescents. Pediatrics 144(5): e20190789. DOI: 10.1542/peds.2019-0789.
18. Lundborg P, Andersson H (2008). Gender, risk perceptions, and smoking behavior. J Health Econ 27(5): 1299–1311. DOI: 10.1016/j.jhealeco.2008.03.003.
19. Manzione LC, Shan L, Azagba S (2020). Associations Between Risk Perceptions and Cigarette, E-cigarette, and Dual-Product Use Among Canadian Adolescents. Tob Use Insights 4: 13:1179173X20903784. DOI: 10.1177/1179173X20903784.
20. Moor I, Rathmann K, Lenzi M, Pförtner TK, Nagelhout GE, de Looze M, et al. (2015). Socioeconomic inequalities in adolescent smoking across 35 countries: a multilevel analysis of the role of family, school and peers. Eur J Public Health 25(3): 457–463. DOI: 10.1093/eurpub/cku244.
21. O'Connor R, Schneller LM, Felicione NJ, Talhout R, Goniewicz ML, Ashley DL (2022). Evolution of tobacco products: recent history and future directions. Tob Control 31(2): 175–182. DOI: 10.1136/tobaccocontrol-2021-056544.
22. Oncken C, McKee S, Krishnan-Sarin S, O'Malley S, Mazure CM (2005). Knowledge and perceived risk of smoking-related conditions: A survey of cigarette smokers. Prev Med 40(6): 779–784. DOI: 10.1016/j.ypmed.2004.09.024.
23. Patiño-Masó J, Font-Mayolas S, Salamó A, Arboix M, Sullman MJ, Gras ME (2019). Predictors of intentions to use cigarettes and electronic cigarettes among high school students. J Multidiscip Healthc 12: 591–599. DOI: 10.2147/jmdh.s208031.
24. Pettigrew S, Alvin Santos J, Miller M, Sudhir Raj T, Jun M, Morelli G, Jones A (2023). E-cigarettes: A continuing public health challenge in India despite comprehensive bans. Prev Med Rep 31: 102108. DOI: 10.1016/j.pmedr.2022.102108.
25. Strong DR, Leas E, Elton-Marshall T, Wackowski OA, Travers M, Bansal-Travers M, et al. (2019). Harm perceptions and tobacco use initiation among youth in wave 1 and 2 of the population assessment of tobacco and Health (PATH) study. Prev Med 123: 185–191. DOI: 10.1016/j.ypmed.2019.03.017.
26. Thomas RE, McLellan J, Perera R (2013). School-based programmes for preventing smoking. Cochrane Database Syst Rev 2013(4): CD001293. DOI: 10.1002/14651858.CD001293.pub3.
27. Trucco EM, Fallah-Sohy N, Hartmann SA, Cristello JV (2020). Electronic Cigarette Use Among Youth: Understanding Unique Risks in a Vulnerable Population. Curr Addict Rep 7(4): 497–508. DOI: 10.1007/s40429-020-00340-w.