Is alcohol mixed with energy drinks consumption associated with susceptibility to smoking?

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\textbf{Abstract}

Objective. This paper examines whether adolescent students in Canada who have never smoked but who drink alcohol mixed with energy drinks (AmED) are more susceptible to smoking than those who do not consume AmED.

Methods. A nationally representative sample of 15,875 never-smoking students in grades 9 to 12 from the 2010–2011 Canadian Youth Smoking Survey is used. The association between AmED and susceptibility to smoking is examined using a logistic regression.

Results. About 28% of the never-smoking adolescents in grades 9 to 12 are susceptible to smoking, and 13% report using AmED. Results of the adjusted logistic regression analysis show a statistically significant positive association between consuming AmED and susceptibility to smoking. Never-smoking students who reported using AmED are more susceptible to smoking when compared with those who have not consumed AmED (OR = 1.89; 95% CI = 1.71–2.10). Similar results are obtained when the analysis is stratified by gender.

Conclusions. The consumption of AmED is associated with higher odds of smoking susceptibility among Canadian adolescents. AmED use could be a potential marker for smoking susceptibility among never-smoking adolescents.

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\textbf{Introduction}

Preventing tobacco use remains a major public health concern worldwide due to its adverse health effects (WHO, 2012). At the core of prevention efforts is identifying risk factors associated with smoking initiation. Susceptibility to smoking represents an important indicator of vulnerability to future cigarette use (Pierce et al., 1996). Several studies have shown that susceptibility to smoking is a strong predictor of smoking initiation and experimentation (Forrester et al., 2007 and Jackson, 1998). The present study examine whether the consumption of alcohol mixed with energy drinks (AmED) is associated with a susceptibility to smoking among never-smoking adolescents.

Recent data show that the consumption of AmED has increased markedly among youth and young adults due to its caffeine-induced feelings of alertness, along with other sensory characteristics. About 15% to 85% of energy drink users mix these with alcohol (Azagba et al., 2013 and Velazquez et al., 2012) and that the propensity to consume AmED is highest among youth (Berger et al., 2011). There is evidence that the combined use of caffeine and alcohol may increase the rate of alcohol-related injury and sexual assault and is strongly associated with heavy drinking, increased dependence on alcohol, and illicit drug use (Arria et al., 2010; Brache and Stockwell, 2011 and O'Brien et al., 2008). Given that health-risk behaviors tend to cluster, especially among youth, we hypothesize that AmED use will be positively associated with smoking susceptibility among never-smoking adolescents. To the best of our knowledge, this is the first study to examine the association between AmED use and susceptibility to smoking.

\textbf{Materials and methods}

\textbf{Data}

A nationally representative sample (n = 15,875) of adolescent Canadian students in grades 9 to 12 from the 2010–2011 Youth Smoking Survey (YSS) is used. The YSS is a cross-sectional, biennial classroom-based survey that focuses on the attitudes and behavior of Canadian youth in grades 6 to 12, with respect to tobacco use and substance abuse. All ethical approvals related to the survey are granted from the University of Waterloo (the principal coordinator of the YSS) and Health Canada. A more detailed description of the YSS is documented elsewhere (University of Waterloo, 2011).
The analysis is restricted to never-smoking students defined as those who responded “no” to the following question: “Have you ever tried cigarette smoking, even just a few puffs?” The outcome variable of interest in this paper, susceptibility to smoking, is determined based on the Pierce et al. (1996) algorithm. Never smokers were asked the following three questions: “Do you think in the future you might try smoking cigarettes?” “At any time in the next year do you think you will smoke a cigarette?” “If one of your best friends was to offer you a cigarette, would you smoke it?” Answers to each of these three questions have four options: (1) definitely yes, (2) probably yes, (3) probably not, and (4) definitely not. Those who answer (4) “definitely not” to all three questions is considered non-susceptible to smoking and is recorded as “0”; otherwise, the respondent is taken to be susceptible and recorded as “1”.

Independent variables

The main predictor of interest, AmED consumption, is determined on a student’s response to the following question: “In the last 12 months, have you had alcohol mixed or pre-mixed with an energy drink such as Red Bull, Rock Star, Monster, or another brand?” Those reporting “yes” are considered AmED users and are recorded as “1”; those reporting “no” are recorded “0.” The multivariate analysis also controls for school grade-level, gender, friend/Parental/Sibling smoking, school connectedness, exposure to secondhand smoke (SHS), and province of residence.

Statistical analysis

To examine the association between AmED consumption and susceptibility to smoking among adolescent never-smokers in grades 9 to 12, adjusting for other covariates, a logistic regression is estimated. All regression results and descriptive analysis are population weighted using the survey weights to produce population estimates and adjust for unequal probabilities of selection. The empirical analysis is conducted using Stata version 13.

Results

The weighted socio-demographic characteristics of the study sample are displayed in Table 1. Statistics show that of the 15,875 never-smoking students in grades 9 to 12, 28% are susceptible to smoking and 13% reported consuming AmED.

Results of the adjusted logistic regression, presented in Table 2, show a statistically significant positive association between consuming AmED and susceptibility to smoking among adolescent students in grades 9 to 12. Never-smoking students who reported consuming AmED have higher odds of susceptibility to smoking (adjusted odds ratio [OR] = 1.89; 95% confidence interval [CI] = 1.71–2.10). Similar results are found when the analysis is stratified by gender; for boys (OR = 1.84; 95% CI = 1.58–2.13), and for girls (OR = 1.95; 95% CI = 1.68–2.25).

Discussion

National survey data show a high prevalence rate in the consumption of AmED among adolescents. There is evidence that AmED use is associated with other health-risk behaviors such as heavy drinking, increased dependence on alcohol, nicotine, and illicit drug use (Arria et al., 2010; Brache and Stockwell, 2011 and O’Brien et al., 2008). Factors associated with susceptibility to smoking have been documented elsewhere (e.g., Azagba and Asbridge, 2013; Forrester et al., 2007 and Wilkinson et al., 2008). In the current study, we examine whether AmED use is associated with susceptibility to smoking among never-smoking adolescents.

In this large sample of Canadian never-smoking adolescent students, about 13% used AmED, and 28% are susceptible to smoking. Results of the adjusted logistic regression analysis show that never-smoking students in grades 9 to 12, who reported using AmED, are more susceptible to smoking when compared to their peers who do not consume AmED. The findings of this paper are in line with the existing evidence on the clustering of AmED with other risk-taking behaviors and increased dependence on substance use. For example, in a recent study, Brache and Stockwell (2011), using a sample of 465 students who attended a university in Western Canada, find that students who used AmED are more likely to drink larger amounts of alcohol, to engage in higher-risk drinking practices, and to use stimulant drugs than AmED non-users.

The association of AmED with other health-risk behaviors such as heavy drinking has been explained by a subjective feeling of reduced symptoms of alcohol intoxication, and the synergistic effects of combining a stimulant with a depressant drug (Brache and Stockwell, 2011). The present study cannot determine a causal effect or the temporal ordering of the relationship between AmED consumption and susceptibility to smoking; this remains a target question for future research.

Conclusion

Never-smoking adolescent students in Canada who consume AmED are more susceptible to smoking compared with those who do not use AmED. The findings of this study support a growing body of research showing that AmED use is associated with other risk-taking behaviors. Examining whether AmED consumption facilitates smoking initiation will require further research.
Conflicts of interest statement
None.

References


