

Energy Drink Consumption and Associations With Demographic Characteristics, Drug Use and Injury Among Adolescents

Hayley A. Hamilton, PhD,^{1,2} Angela Boak, MA,¹ Gabriela Ilie, PhD,^{3,4} Robert E. Mann, PhD^{1,2}

ABSTRACT

OBJECTIVE: To examine energy drink consumption and its association with demographic characteristics, drug use, and injury among adolescents.

METHODS: Data on 4,342 adolescents were derived from the 2011 Ontario Student Drug Use and Health Survey, a province-wide school-based survey of students in grades 7 through 12. The survey was based on a two-stage cluster design and analyses include appropriate adjustments for the complex sample design.

RESULTS: Overall, 49.6% of adolescents had consumed energy drinks in the previous year. A total of 13.8% of seventh grade students had consumed energy drinks in the previous week compared to 19.1% of adolescents overall. Energy drink consumption in the previous year was highly associated with having used tobacco and cannabis in the previous year, the non-medicinal use of prescription drugs in the previous year, and binge drinking in the previous month. Consumption was also highly associated with sensation-seeking and self-reports of medical treatment for an injury (reported by 16% and 42% of adolescents, respectively). The odds of consuming energy drinks did not vary significantly for males and females, and sex was not a significant moderator of the associations examined.

CONCLUSION: These findings support the need for greater awareness of the extent of energy drink consumption among individual adolescents and the potential that additional health and behavioural risks may be associated with consumption.

KEY WORDS: Energy drinks; drug use; injury; sensation-seeking

La traduction du résumé se trouve à la fin de l'article.

Can J Public Health 2013;104(7):e496-e501.

First introduced in the US and Canada in the 1990s, the popularity of energy drinks has increased rapidly, with consumption in the US estimated at 6 billion energy drinks in 2010 compared to 2.3 billion in 2005.¹ In addition, sales of energy drinks reached approximately \$9 billion in the US in 2011, a 16% increase over the previous year.² Caffeine is the primary active ingredient in energy drinks, but the level of caffeine content varies widely across the many brands sold.^{1,3} The caffeine content per 250 mL of an energy drink is usually 80-140 mg or the equivalent of two cans of cola or a 6-oz to 8-oz cup of coffee.³⁻⁵ There are, however, energy drinks with caffeine content of up to 500 mg per can.^{3,4} Additional ingredients include amino acid, vitamins, herbs, and other supplements purported to boost energy, alertness, and mental performance.⁶ The short- and long-term health effects of many of these ingredients, and energy drink consumption in general, are for the most part unknown.^{1,7-9}

Energy drinks are often aggressively marketed to adolescents through carefully crafted campaigns, including sponsorship of events that appeal to this age group (e.g., snowboarding), and product placement in video games and social media.^{4,10,11} Easy access from a convenience store, appealing names (e.g., Red Bull®, Rockstar®, Full Throttle®), product claims of greater stamina, alertness and energy,¹² and perceptions of energy drinks as a “legal drug”,¹³ make these drinks particularly appealing to adolescents. Reports indicate that the main consumers of energy drinks are adolescents and young adults,^{6,7} with between 30% and 50% of ado-

lescents and young adults consuming energy drinks.^{7,11} Yet, there is relatively little empirical data on the health and behavioural effects of energy drinks. There is research indicating that energy drink consumption helps to improve attention, maintain or improve performance on some difficult activities, and decrease reaction times.^{14,15} There is also evidence of adverse consequences such as seizures, difficulty sleeping, cardiac arrhythmia, and even death.^{1,6,7} In the US, there was a twofold increase in the number of visits to emergency departments between 2007 (10,068 visits) and 2011 (20,783 visits) that involved energy drinks, with 12-17 year olds accounting for 11.4% and 7.2% of those visits in 2007 and 2011, respectively.¹⁶

In addition to questions about the health effects of energy drinks, there are questions about the demographic, social, and behavioural correlates of energy drink consumption among adolescents. The sparse research that has been conducted suggests that the consumption of energy drinks is correlated with heavy alcohol use, licit and illicit drug use, impulsivity, and risk-taking behaviours, including fighting and risky sexual behaviours.^{7,10,17-19} Much of this

Author Affiliations

1. Centre for Addiction and Mental Health, Toronto, ON
2. Dalla Lana School of Public Health, University of Toronto, Toronto, ON
3. St. Michael's Hospital, Toronto, ON
4. Department of Psychology, University of Toronto, Toronto, ON

Correspondence: Hayley Hamilton, Centre for Addiction and Mental Health, 33 Russell St., Toronto, ON M5S 2S1, Tel: 416-535-8501, ext. 6353, Fax: 416-595-6068, E-mail: hayley.hamilton@camh.ca

Conflict of Interest: None to declare.

research, however, has focused on consumption among college or university students and involves samples that are non-generalizable.^{7,10,17} Despite attention from media and regulatory agencies that highlight concerns about energy drinks, there is a gap in the research literature with regard to consumption among adolescents. This study will address this gap by investigating demographic factors, academic performance, substance use, sensation-seeking, and injury as correlates of energy drink consumption. The study will also examine whether these associations vary for males and females.

METHODS

Data

Data were derived from the 2011 Ontario Student Drug Use and Health Survey (OSDUHS), a representative province-wide survey of 9,288 students in grades 7 through 12.²⁰ The OSDUHS is a biennial cross-sectional survey, ongoing since 1977, that monitors students' substance use, gambling, mental and physical health, and delinquent behaviour. The survey is based on a stratified two-stage cluster design (school, class) and sampled students from 40 school boards, 181 schools, and 581 classrooms. The student participation rate was 62%. Absenteeism accounted for 12% of the non-participation rate and parental refusal or unreturned consent forms accounted for 26%.²⁰ The rate of student participation was above average for a student survey that required active consent from a parent or guardian.^{21,22} The survey consisted of two versions of the questionnaire, with about one half of the content common to both. Within each classroom, one half of the students were randomly assigned questionnaire Form A and the other half were assigned questionnaire Form B. The blank questionnaires were presorted into A, B, A, B, etc. prior to being distributed to students within each classroom. Energy drink consumption was included in only one version of the questionnaire and thus analyses to be presented are based only on this random half sample of 4,472 students. Analyses were also restricted to individuals ages 12 to 19. Greater detail about the study design and methods are described elsewhere.²⁰ The 2011 OSDUHS received research ethics approval from the Centre for Addiction and Mental Health and from York University.

Measures

Dependent Variable

Energy drink consumption was determined from a question that asked students how often they drank "a can of a high-energy caffeine drink, such as Redbull, Rockstar, Full Throttle, Monster, etc.?" Response categories referred to consumption in the last 7 days (differentiating between 1 time, 2 to 4 times, 5 to 6 times, once each day, or more than once each day); no consumption in the last 7 days, but some consumption in the last 12 months; and no consumption in the last 7 days or in the last 12 months. A dichotomous measure was also constructed to represent consumption (1) and non-consumption (0) of energy drinks in the last 12 months.

Independent Variables

Several factors, in addition to sex and grade, were included as covariates within the analyses. Cannabis use was a dichotomous measure of use (coded 1) or non-use in the last 12 months. Tobacco use was a dichotomous measure representing smoked (coded 1) or

did not smoke cigarettes in the last 12 months. Binge drinking was a dichotomous measure reflecting the consumption (coded 1) or non-consumption of five or more drinks of alcohol on the same occasion over the previous 4 weeks.²³ Non-medicinal use of prescription drugs was a dichotomous measure defined as use (coded 1) or non-use (0) of ADHD drugs, other stimulants, OxyContin, other opioid pain relievers, or tranquilizers/sedatives in the last 12 months without a doctor's prescription. These measures within the survey were adapted from another large-scale adolescent survey.²⁴

Academic performance was assessed through a question that asked students to indicate their average marks in school. Response categories ranged from 1 "90% - 100%" to 6 "below 50%". A dichotomous measure was constructed to represent average marks of less than 80% (coded 1) and 80% or higher (0). Adolescent work was derived from a question asking students to indicate the number of hours they spent per week working for pay outside the home during the academic year. A dichotomous measure was constructed to represent work (coded 1) versus did not work for pay (0).

A measure of injury and treatment was based on a question that asked students to report the number of times in the last 12 months they were "hurt or injured, and had to be treated by a doctor or nurse?"²⁵ Responses ranged from 1 (was not treated) to 5 (4 or more times). A dichotomous measure representing treated (coded 1) versus not treated (coded 0) for an injury was used for analysis.

Sensation-seeking was measured using the 4-item Brief Sensation Seeking Scale.²⁶ Students were asked the extent to which they agree or disagree with the following statements: "I like new and exciting experiences, even if I have to break the rules", "I prefer friends who are exciting and unpredictable", "I like to explore strange places", and "I like to do frightening things". Response categories ranged from 1 (strongly agree) to 4 (strongly disagree), but were recoded such that higher total scores reflected higher sensation-seeking. A test of reliability indicated a Cronbach's alpha of .79. High sensation-seeking was a dichotomous measure defined as summed scores of 14 or higher across the four items (coded 1), which reflects the mean of the summed scores + 1 standard deviation.

Ethnicity was derived from a question that asked students to select one or more response categories that best described their ethnic background. The 12 response categories were similar to those used in the 2006 Canadian Census.²⁷ For purposes of analysis, individuals who selected only one ethnic background were grouped into five categories: White, Black, East or Southeast Asian, South Asian, and Other. Individuals who selected multiple ethnic backgrounds (7.5% of the sample) were coded as Other.

Data analysis

Taylor series methods within Stata 12 were utilized for analyses to account for the complex survey sample design and obtain unbiased variances and point estimates.²⁸ Analyses included population weights to adjust for the unequal probability of selection.²⁰ Logistic regression was used to examine the associations between various independent variables and energy drink consumption. Separate two-way interactions were used to test interactions involving the independent variables and sex. Missing data were handled through listwise deletion. Missing values did not exceed 4.8% for any of the variables examined and the probability of energy drink consumption did not significantly differ between missing and non-missing cases.

Table 1. Energy Drink Consumption by Demographic and Behavioural Characteristics

	Not in Last 12 Months n=2396	Last 12 Months, but Not Last 7 Days n=1210	Last 7 Days n=736	Overall Percent of Sample n=4342
Sex	F(1.38, 228.98) = 3.6*, †			
Male	47.8%	29.6%	22.6%	53.2%
Female	53.5	31.4	15.1	46.8
Grade	F(4.46, 740.79) = 3.1*, †			
7	65.7	20.5	13.8	13.3
8	58.2	23.4	18.4	13.9
9	51.4	28.1	20.5	16.7
10	51.0	29.1	19.9	16.8
11	43.4	35.1	21.5	16.3
12	41.7	39.3	19.1	23.0
Ethnicity	F(5.38, 892.26) = 4.2***, †			
White	46.6	31.7	21.7	64.3
Black	55.6	27.3	17.2	5.8
East/SE Asian	64.1	25.4	10.5	10.5
South Asian	68.9	20.4	10.6	6.6
Other	49.1	31.4	19.5	12.9
Average school marks	F(1.80, 299.16) = 17.8***, †			
≥80%	58.3	28.1	13.5	51.7
<80%	41.8	33.0	25.2	48.3
Paid work during school	F(1.80, 298.63) = 16.9***, †			
No	55.5	28.2	16.3	65.0
Yes	40.6	35.1	24.2	35.0
Tobacco use last 12 months	F(1.87, 310.72) = 53.9***, †			
No	53.9	29.5	16.5	90.6
Yes	17.9	38.5	43.6	9.4
Cannabis use last 12 months	F(1.55, 257.42) = 84.6***, †			
No	58.9	27.0	14.1	76.6
Yes	23.7	41.4	35.0	23.4
Non-medicinal use of prescription drugs last 12 months	F(1.64, 271.57) = 24.9***, †			
No	54.2	28.5	17.3	83.5
Yes	31.9	40.0	28.1	16.5
Binge drinking last 4 weeks	F(1.82, 302.84) = 56.7***, †			
No	58.8	27.5	13.8	76.8
Yes	23.1	40.2	36.6	23.2
High sensation-seeking	F(1.34, 221.62) = 24.0***, †			
No	54.3	30.2	15.5	84.0
Yes	28.3	32.8	38.8	16.0
Injured and treated last 12 months	F(1.96, 325.30) = 46.4***, †			
No	57.9	29.2	12.9	58.0
Yes	39.8	32.2	27.9	42.0
Age	F(2,165) = 16.4***, ‡			
Mean	M=14.8	M=15.5	M=15.3	M=15.1
(95% CI)	(14.7-15.0)	(15.3-15.7)	(15.0-15.6)	(15.0-15.2)
Total %	50.4	30.5	19.1	
(95% CI)	(47.1-53.7)	(28.2-32.8)	(17.0-21.4)	

*** p<0.001, ** p<0.01, * p<0.05.

† Pearson Chi-Square adjusted for the survey design and transformed into an F-statistic.

‡ Adjusted Wald test.

RESULTS

Demographic and behavioural characteristics of the sample are outlined in Table 1 along with the prevalence of energy drink consumption. Almost one half the sample was female, over 60% identified themselves as White, and the average age of the sample was 15 years. One half of adolescents reported that they consumed at least one energy drink in the past 12 months – 30.5% reported consumption in the past 12 months but not in the last 7 days, and an additional 19.1% indicated consumption in the last 7 days. Those who drank one can or more each day of the last 7 days represented 1.5% of the sample.

The results of bivariate analyses presented in Table 1 indicate significant variations in energy drink consumption by each of the demographic and behavioural characteristics examined. A slightly greater percentage of males (22.6%) than females (15.2%) consumed energy drinks in the last 7 days. Consumption also varied

significantly by school grade, with a greater proportion of adolescents in more senior grades using energy drinks than those in more junior grades. In addition, there were variations in consumption by ethnic background, with lower percentages of adolescents who reported East, Southeast or South Asian backgrounds consuming energy drinks. Energy drink consumption, both 12-month and 7-day, was more prevalent among adolescents who were employed during the school year, who reported binge drinking, and who used tobacco, cannabis, and non-medicinal prescription drugs than among adolescents who did not engage in such behaviours. There were also variations in consumption by sensation-seeking and injuries – e.g., 38.8% of those who reported high sensation-seeking and 27.9% of those who reported being injured and treated in the previous year had consumed energy drinks in the previous week compared to 15.5% and 12.9% of those who did not report high sensation-seeking and injury, respectively.

Table 2. Logistic Regression of Energy Drink Consumption (ED) in Previous Year by Demographic and Behavioural Factors (n=3939)

	(1) ED Regressed on Demographics and Drug Use	(2) ED Regressed on Demographics, Sensation-seeking and Injury	(3) ED Regressed on Demographics, Drug Use, Sensation-seeking and Injury
	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Age	1.00 (0.93-1.06)	1.12 (1.04-1.21)	1.01 (0.95-1.08)
Sex			
Male	1.00	1.00	1.00
Female	0.77 (0.58-1.02)	0.84 (0.64-1.12)	0.79 (0.60-1.04)
Ethnicity			
White	1.00	1.00	1.00
Black	0.81 (0.42-1.59)	0.75 (0.44-1.26)	0.82 (0.43-1.58)
East/SE Asian	0.63 (0.44-0.92)	0.57 (0.39-0.83)	0.68 (0.46-1.00)
South Asian	0.46 (0.31-0.70)	0.46 (0.30-0.70)	0.48 (0.32-0.72)
Other	0.85(0.55-1.31)	0.90 (0.57-1.41)	0.87 (0.57-1.34)
Average school marks (<A)			
≥80%	1.00	1.00	1.00
<80%	1.50 (1.19-1.89)	1.85 (1.47-2.32)	1.54 (1.23-1.92)
Paid work during school year			
No	1.00	1.00	1.00
Yes	1.46 (1.10-1.93)	1.46 (1.15-1.84)	1.38 (1.05-1.81)
Tobacco use last 12 months			
No	1.00		1.00
Yes	1.84 (1.20-2.80)		1.74 (1.14-2.67)
Cannabis use last 12 months			
No	1.00		1.00
Yes	2.15 (1.48-3.11)		1.92 (1.34-2.75)
Non-medicinal use of prescription drugs last 12 months			
No	1.00		1.00
Yes	1.73 (1.23-2.44)		1.54 (1.05-2.24)
Binge drinking last 4 weeks			
No	1.00		1.00
Yes	2.35 (1.72-3.22)		2.17 (1.58-2.98)
High sensation-seeking			
No		1.00	1.00
Yes		2.71 (2.02-3.65)	1.89 (1.38-2.59)
Injured and treated last 12 months			
No		1.00	1.00
Yes		1.82 (1.56-2.12)	1.56 (1.32-1.84)
Constant	0.61 (0.23-1.63)	0.09 (0.03-0.28)	0.37 (0.14-1.01)

Results from multivariate logistic regression analyses that examined energy drink consumption as a dichotomous measure of consumed versus not consumed in the past year are outlined in Table 2. Model 1 included all covariates with the exception of sensation-seeking and injury variables; model 2 included sensation-seeking and other covariates, but not tobacco, cannabis, prescription drug use, and binge drinking; and model 3 included all covariates. Findings were substantively similar across models, with the exception of findings for age that were not significant when drugs and alcohol were considered within the model, but were significant when they were not included; and East and Southeast Asian ethnic background which was no longer significantly different from White after adjusting for all covariates in model 3. Generally, model 3 results, with adjustments for all covariates, indicate that neither age nor sex was significantly associated with energy drink consumption. Analyses with grade level as a covariate, instead of age, also indicated no significant association with energy drink consumption (not presented). All other covariates, however, were significantly associated with energy drink consumption. The odds of energy drink consumption were significantly greater among adolescents with less than an 80% average in school (OR=1.54, 95% CI 1.23-1.92), and among adolescents who worked for pay during the school year (OR=1.38, CI 1.05-1.81), used tobacco (OR=1.74,

CI 1.14-2.67), used cannabis (OR=1.92, CI 1.34-2.75), used prescription drugs for non-medicinal purposes (OR=1.54, CI 1.05-2.24), reported binge drinking (OR=2.17, CI 1.58-2.98), reported high sensation-seeking behaviour (OR=1.89, CI 1.38-2.59), and reported being hurt or injured and treated medically in the past year (OR=1.56, CI 1.32-1.84). There was also a significant association between ethnic background overall and consumption ($F(4, 163)=6.18, p<0.001$), which is highlighted by findings that adolescents of South Asian (OR=0.48, CI 0.32-0.72) background were at significantly lower odds of consuming energy drinks than were adolescents who reported being White.

Results from analyses testing differences in the correlates of energy drink consumption for males and females were not statistically significant, and thus these results are not presented.

DISCUSSION

Our findings indicate that 1 in 2 adolescents consumed at least one can of energy drink within the previous year. This exceeds general reports that approximately one third of adolescents consume energy drinks,¹¹ but is generally consistent with prevalence reported among college students.¹⁹ The increasing popularity of energy drinks in the last few years^{1,2} would suggest that past-year use found in the current study more accurately reflects current use. Almost

1 in 5 adolescents were found to have consumed energy drinks within the previous week, a general indication of more frequent use.

Findings of this study indicate that, after adjusting for other demographic and behavioural factors, the odds of consuming energy drinks did not vary by sex or age. Consumption did, however, vary by ethnicity. The odds of consuming energy drinks were lower among adolescents who reported South Asian ethnic background compared to those who indicated that they were White. Previous research on US college students also indicated higher consumption among White students, but the comparison was with Black students only.¹⁷

Adolescents who reported tobacco use, cannabis use or non-medicinal use of prescription drugs in the previous year, or reported binge drinking in the previous month, were at greater odds of having consumed an energy drink. These findings are consistent with findings from studies of college students that indicate that substance use behaviours tend to cluster within individuals.^{7,10,17-19} Although it cannot be determined from these data whether binge drinking and energy drink consumption occurred at the same time, about one third of adolescents who reported binge drinking in the previous month also reported energy drink consumption in the previous week, compared to only 14% of those who did not report binge drinking. This highlights concerns about the practice of mixing energy drinks with alcohol. Energy drinks, because of their high caffeine content, are increasingly being mixed with alcohol, often in an attempt to reduce feelings of alcohol intoxication.^{11,29} There is also evidence of mixing energy drinks with cannabis and prescription drugs – 13% of overall visits to US emergency departments that related to energy drinks involved the mixing of energy drinks with alcohol and 10% involved mixing with illicit drugs such as cannabis.¹⁶

Current findings that high sensation-seeking (reported by 16% of respondents) and recent injuries (reported by 42%) are associated with energy drink consumption are consistent with research on college students that found greater jock identity and risk-taking behaviours among individuals who consume energy drinks.¹⁰ Given the images of extreme sports often portrayed in the marketing of energy drinks to adolescents, these findings are of particular concern and should be the focus of further research to determine the extent to which injury and energy drink consumption coincide. This is of particular concern for adolescents who may confuse energy drinks with sports drink – the latter reduces dehydration, whereas the former may worsen it.^{7,30}

Although the data for this study were derived from a province-wide survey of adolescents in grades 7 through 12, there are several limitations that are worth noting. First, the study is based on cross-sectional data and so temporal order cannot be determined. Thus, it is not clear whether substance use and other risk behaviours precede energy drink consumption or vice versa. Second, the sample only consists of students within the regular school system and thus approximately 7% of adolescents are not represented. It may be that this excluded group of adolescents, mostly from private and alternate schools, differs with respect to energy drink consumption.

Given targeted marketing of energy drinks to adolescents, the ease of availability, increasing popularity, and the association of energy drink consumption with risky behaviours, there is an important need for information about these beverages.¹⁶ Safe levels of

energy drink consumption have not been established for adolescents,^{5,7} although some countries have taken steps to limit the level of caffeine in energy drinks.³¹ Whereas most adolescents who consume energy drinks are unlikely to experience serious adverse effects,¹⁷ the association between energy drink consumption and injuries as well as drug use indicates a need for greater awareness, particularly among parents and health care providers, of the extent of energy drink consumption among individual adolescents. In addition, there needs to be greater awareness among the general public of the potential for associated health and behavioural risks among adolescents who consume energy drinks.

REFERENCES

1. Wolk BJ, Ganetsky M, Babu KM. Toxicity of energy drinks. *Curr Opin Pediatr* 2012;24(2):243-51.
2. Meier B. F.D.A. posts injury data for 3 drinks. *The New York Times*. November 15, 2012.
3. Reissig CJ, Strain EC, Griffiths RR. Caffeinated energy drinks – A growing problem. *Drug Alcohol Depend* 2009;99(1-3):1-10.
4. Macdonald N, Stanbrook M, Hébert PC. “Caffeinating” children and youth. *CMAJ* 2010;182(15):1597.
5. Health Canada. Food and nutrition: Caffeine in foods. Ottawa, ON: Health Canada, 2012.
6. Babu KM, Church RJ, Lewander W. Energy drinks: The new eye-opener for adolescents. *Clin Pediatr Emerg Med* 2008;9(1):35-42.
7. Seifert SM, Schaechter JL, Hershorin ER, Lipshultz SE. Health effects of energy drinks on children, adolescents, and young adults. *Pediatrics* 2011;127(3):511-28.
8. Macdonald N, Hamilton R, Malloy P, Moride Y, Shearer J. Report by the expert panel on caffeinated energy drinks. Ottawa: Health Canada, 2010.
9. Arria AM, O'Brien MC. The “high” risk of energy drinks. *JAMA* 2011;305(6):600-1.
10. Miller KE. Wired: Energy drinks, jock identity, masculine norms, and risk taking. *J Am Coll Health* 2008;56(5):481-90.
11. Simon M, Mosher J. Alcohol, Energy Drinks, and Youth: A Dangerous Mix. San Rafael, CA: Marin Institute, 2007.
12. Sepkowitz KA. Energy drinks and caffeine-related adverse effects. *JAMA* 2013;309(3):243-44.
13. Popkin B. *The World Is Fat: The Fads, Trends, Policies, and Products That Are Fattening the Human Race*. New York, NY: Penguin Group, 2002.
14. Alford C, Cox H, Wescott R. The effects of Red Bull energy drink on human performance and mood. *Amino Acids* 2001;21:139-50.
15. Smit HJ, Cotton JR, Hughes SC, Rogers PJ. Mood and cognitive performance effects of “energy” drink constituents: Caffeine, glucose and carbonation. *Nutr Neurosci* 2004;7(3):127-39.
16. Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. The DAWN Report: Update on Emergency Department Visits Involving Energy Drinks: A Continuing Public Health Concern. Rockville, MD: Drug Abuse Warning Network, 2013.
17. Miller KE. Energy drinks, race, and problem behaviors among college students. *J Adolesc Health* 2008;43(5):490-97.
18. Arria AM, Caldeira KM, Kasperski SJ, O'Grady KE, Vincent KB, Griffiths RR, Wish ED. Increased alcohol consumption, nonmedical prescription drug use, and illicit drug use are associated with energy drink consumption among college students. *J Addict Med* 2010;4(2):74-80.
19. Arria AM, Caldeira KM, Kasperski SJ, Vincent KB, Griffiths RR, O'Grady KE. Energy drink consumption and increased risk for alcohol dependence. *Alcohol Clin Exp Res* 2011;35(2):365-75.
20. Paglia-Boak A, Adlaf EM, Mann RE. Drug Use Among Ontario Students, 1977-2011: Detailed OSDUHS Findings (CAMH Research Document Series No. 32). Toronto, ON: Centre for Addiction and Mental Health, 2011.
21. Courser MW, Shamblen SR, Lavrakas PJ, Collins D, Ditterline P. The impact of active consent procedures on nonresponse and nonresponse error in youth survey data: Evidence from a new experiment. *Eval Rev* 2009;33:370-95.
22. White VM, Hill DJ, Effendi Y. How does active parental consent influence the findings of drug-use surveys in schools? *Eval Rev* 2004;28(3):246-60.
23. Wechsler H, Nelson TF. Binge drinking and the American college student: What's five drinks? *Psychol Addict Behav* 2001;15:287-91.
24. Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. Monitoring the Future: National Survey Results on Drug Use, 1975-2010: Volume I, Secondary School Students. Ann Arbor, MI: Institute for Social Research, University of Michigan, 2011.
25. Freeman JG, King M, Pickett W, Craig W, Elgar F, Janssen I, Klinger D. The Health of Canada's Young Children: A Mental Health Focus. Ottawa: Public Health Agency of Canada, 2011.
26. Stephenson MT, Hoyle RH, Palmgreen P, Slater MD. Brief measures of sensation seeking for screening and large-scale surveys. *Drug Alcohol Depend* 2003;72:279-86.

27. Statistics Canada. Census 2006 - 2B (Long Form). Ottawa, 2006.
28. StataCorp. Stata Statistical Software: Release 12.0 [computer program]. College Station, TX: StataCorp, 1985-2011.
29. Azagba S, Langille D, Asbridge M. The consumption of alcohol mixed with energy drinks: Prevalence and key correlates among Canadian high school students. *CMAJ OPEN* 2013;E19-E26.
30. Fogger S, McGuinness TM. Update on energy drinks and youth. *J Psychosoc Nurs Ment Health Serv* 2011;49(12):17-19.
31. Health Canada. Health Canada's proposed approach to managing caffeinated energy drinks. Ottawa, ON: Health Canada, 2011. Available at: <http://www.hc-sc.gc.ca/fn-an/legislation/pol/energy-drinks-boissons-energisantes-eng.php> (Accessed March 25, 2013).

Received: April 17, 2013

Accepted: October 17, 2013

RÉSUMÉ

OBJECTIF : Examiner la consommation de boissons énergisantes et son association avec le profil démographique, la consommation de drogue et les traumatismes chez les adolescents.

MÉTHODE : Les données sur 4 342 adolescents provenaient du Sondage sur la consommation de drogues et la santé des élèves de l'Ontario (2011), une enquête provinciale menée en milieu scolaire auprès des élèves de la 7^e à la 12^e année. Le sondage était planifié selon un échantillonnage en grappe en deux étapes, et les analyses ont été adaptées à la complexité du plan d'échantillonnage.

RÉSULTATS : Globalement, 49,6 % des adolescents avaient consommé des boissons énergisantes au cours de l'année précédente. En tout, 13,8 % des élèves de 7^e année en avaient consommé au cours de la semaine précédente, contre 19,1 % des adolescents dans l'ensemble. La consommation de boissons énergisantes au cours de l'année précédente était fortement associée à la consommation de tabac et de cannabis au cours de l'année précédente, à l'utilisation de médicaments sur ordonnance à des fins non médicales au cours de l'année précédente et aux excès occasionnels d'alcool au cours du mois précédent. La consommation était aussi fortement associée à la recherche de sensations fortes et aux déclarations autonomes de soins médicaux pour traumatisme (déclarées par 16 % et 42 % des adolescents, respectivement). La probabilité d'avoir consommé des boissons énergisantes ne variait pas sensiblement entre les garçons et les filles, et le sexe n'était pas une variable modératrice significative dans les associations examinées.

CONCLUSION : Ces constatations confirment le besoin de mieux connaître l'ampleur de la consommation des boissons énergisantes par les adolescents et la possibilité que cette consommation soit associée à des risques supplémentaires pour la santé et le comportement.

MOTS CLÉS : boissons énergisantes; consommation de drogue; traumatismes; recherche de sensations fortes