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A Cross-sectional Study Examining Factors Associated with Youth Binge Drinking in the COMPASS Study: Year 1 Data

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Abstract

Frequent alcohol use and binge drinking are associated with numerous negative health outcomes. Using data from 17,497 grade 9 to 12 students participating in the COMPASS Study (Year 1), we examined the factors associated with current alcohol use and current binge drinking. Overall, 38.4% of students were considered current alcohol users and 25.5% were current binge drinkers. Tobacco or marijuana use, bullying others, weekly spending money, ethnicity, and grade were associated with increased likelihood of current alcohol use and current binge drinking. It is evident that a substantial number of youth in the Year 1 COMPASS sample report frequently using alcohol and in volumes considered harmful to their health. Considering that numerous risk factors were found to predict alcohol use and binge drinking, future research should evaluate the impact of tailoring interventions to change the modifiable factors associated with high-risk drinking or targeting interventions to at-risk youth.

Introduction

Alcohol use is associated with the leading causes of death among youth [1]. Despite the risks, evidence suggests alcohol use is very common and more prevalent than other forms of substance use among Canadian youth [2]. In order to develop and appropriately target prevention interventions, it is important to understand the factors associated with high-risk alcohol use. For instance, research has demonstrated that youth are more likely to binge drink if they are male or older [2], if they are aboriginal [3], if they are a smoker or marijuana user [4], if they are overweight or obese [5], if they are physical active [6], or if they have more disposable income [4]. Recent evidence also suggests that bullying behaviour is also associated with binge drinking among youth [7]. As such, the present brief examines how these factors, when considered concurrently, are associated with current alcohol use and binge drinking among a large sample of underage youth.

Methods

This cross-sectional study used self-reported data collected from grade 9 to 12 students attending 43 purposefully sampled Ontario secondary schools as part of the Year 1 sample for the COMPASS study (2012-2013) [8]. The data were collected using the COMPASS Student Questionnaire (Cq) and active-information passive consent procedures. All procedures were approved by the University of Waterloo Office of Research Ethics and participating School Boards. Additional details on the COMPASS study design, recruitment procedures, and measures are available in print [8] and online (www.compass.uwaterloo.ca).

A total of 30,147 eligible grade 9 to 12 students were enrolled in the 43 COMPASS schools in Year 1. Overall, 80.2% (n=24,173) of eligible students completed the Cq. Missing respondents resulted from scheduled spares or absenteeism at the time of the survey (18.8%), student refusal (0.1%), and parental refusal (0.9%).

Current alcohol use was measured by asking respondents: "In the last 12 months, how often did you have a drink of alcohol that was more than just a sip?" Respondents who reported consuming alcohol 'once a month or more' or 'daily' were classified as current drinkers. Current binge drinking was assessed by asking respondents: "In the

last 12 months, how often did you have 5 drinks of alcohol or more on one occasion?" Respondents who reported consuming 5 or more drinks of alcohol in one occasion at a frequency of 'once a month or more' or 'daily' were classified as current binge drinkers, respondents who reported consuming 5 or more drinks of alcohol in one occasion at a frequency of 'less than once a month' or 'I did not have 5 or more drinks on one occasion in the last 12 months' were considered non-current binge drinkers, and respondents who reported 'I have never done this' were considered never binge drinkers.

Consistent with previous research [2,3], respondents also reported their current grade (9, 10, 11, 12), gender (male, female), ethnicity (white, off-reserve Aboriginal, other), weekly spending money ($0, $1-$20, $21-$100, more than $100, or I don't know), as well as their smoking status, marijuana use, physical activity, bullying behaviour in the past month, and weight status. Smoking status was assessed by asking respondents, "Have you ever smoked 100 or more whole cigarettes in your life?" and "On how many of the last 30 days did you smoke one or more cigarettes?". Students who reported ever smoking 100 cigarettes and any smoking in the previous 30 days were classified as current smokers, students who reported ever smoking 100 cigarettes but no smoking in the previous 30 days were classified as former smokers, and student who had not smoked 100 cigarettes in their lifetime were non-smokers. Marijuana use was assessed by asking respondents, "In the last 12 months, how often did you use marijuana or cannabis? (a joint, pot, weed, hash…)". Those who reported marijuana use once a month or more were classified as current marijuana users,

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those who reported marijuana use less than once a month or not in the last year were classified as non-current users, respondents who reported never using marijuana were classified as never users. Physical activity was measured by asking respondents how many minutes of moderate and hard physical activity they engaged in on each of the last seven days. Consistent with the Canadian physical activity guidelines for youth (www.csep.ca), respondents who did not report performing at least 60 minutes of moderate- to vigorous-intensity physical activity daily and hard PA a day for at least three out of the last seven days were classified as not meeting the guideline. Being a victim of bullying was measured by asking respondents to report how often they have been physically, verbally or cyberbullied in the last 30 days. Bullying others was measured by asking respondents to report how often they have physically, verbally or cyberbullied other students in the last 30 days. Using previously validated measures of self-reported height and weight [9], Body Mass Index (BMI) was calculated for each student using the measures of weight (kg) and height (m) (BMI=kg/m^2). Weight status was then determined using the BMI classification system of the World Health Organization [10] based on age and sex adjusted BMI cut-points (underweight, healthy weight, overweight, obese).

Complete data were available for 17,497 students. Descriptive analyses of alcohol use and the correlates of alcohol use were examined by gender. Two logistic regression analyses were performed to examine how the correlates were associated with current alcohol use and current binge drinking. Each model included the proc genmod command with school as a class statement to control for the clustering within schools.

Results

Overall, 38.4% of students were considered current alcohol users and 25.5% were current binge drinkers. As shown in Table 1, more males than females were current alcohol users and more males than females were current binge drinkers. Males were more apt than females to be current smokers, current marijuana users, to meet the Canadian physical activity guidelines, to have bullied someone else in the past month, and be overweight or obese. Conversely, females were more apt than males to have been a bulling victim in the past month.

Factors associated with current alcohol use

As shown in Model 1 of Table 2, students were more likely to be current alcohol users if they were current smokers, if they were current or non-current marijuana users, if they met the Canadian physical activity guideline, if they had bullied someone else in the past month, if they were in a higher grade, or if they had more weekly spending money. Conversely, students were less likely to be current alcohol users if there were of non-white ethnicity or if they were underweight. Gender and being a victim of bullying in the past month were not associated with the likelihood of being a current drinker.

Factors associated with current binge drinking

As shown in Model 2 of Table 2, students were more likely to be current binge drinkers if they were current smokers, if they were current or non-current marijuana users, if they met the Canadian physical activity guideline, if they had bullied someone else in the past month, if they were in a higher grade, or if they had more weekly spending money. Conversely, students were less likely to be current alcohol users if there were of non-white ethnicity. Gender, being a victim of bullying in the past month, and weight status were not associated with the likelihood of being a current binge drinker.

	Male	Female	
	(n=8,848)	(n=8,649)	
	%	%	Chi-Square
Alcohol Use			
Never User	18.6	17.2	X^2=64.9, df=2, p<0.001
Non-current User	40.8	46.8	
Current User	40.6	36.0	
Binge Drinking			
Never	47.0	48.0	X^2=65.9, df=2, p<0.001
Non-current Binge Drinker	25.1	29.0	
Current Binge Drinker	27.9	23.1	
Grade			
9	23.9	23.7	X^2=3.5, df=3, p=0.322
10	25.1	26.2	
11	25.3	25.2	
12	25.7	24.9	
Ethnicity			
White	72.8	75.0	X^2=13.5, df=2, p<0.01
Other	22.4	20.1	
Off-reserve Aboriginal	4.8	4.9	
Smoking Status			
Non-smoker	92.2	95.6	X^2=86.5, df=2, p<0.001
Former smoker	1.1	0.6	
Current smoker	6.8	3.9	
Marijuana Use			
Never	63.4	69.4	X^2=135.8, df=2, p<0.001
Non-current (< once/month or not in last year)	16.2	16.9	
Current (last 30 days)	20.3	13.7	
Physical Activity			
Meets physical activity guideline	57.6	41.3	X^2=467.2, df=1, p<0.001
Does not meet physical activity guideline	42.4	58.8	
Ever been bullied			
No	84.1	76.4	X^2=163.7, df=1, p<0.001
Yes	15.9	23.6	
Ever bullied others			
No	86.1	89.5	X^2=46.9, df=1, p<0.001
Yes	13.9	10.5	
Body Mass Index			
Underweight	1.9	1.7	X^2=384.3, df=3, p<0.001
Healthy weight	66.8	78.9	
Overweight	20.5	14.6	
Obese	10.9	4.8	
Spending Money			
Zero	15.5	13.8	X^2=65.6, df=4, p<0.001
$1-$20	30.0	30.0	
$21-$100	26.5	30.8	
More than $100	16.9	13.7	
I don't know	11.2	11.7	

Table 1: Descriptive statistics for the sample of grade 9 to 12 students in the Year 1 COMPASS sample (2012-2013)

Discussion

Alcohol use was common among this large sample of underage youth and that the factors associated with current alcohol use were generally the same as those associated with binge drinking. Consistent with previous research [11], we found that students who smoke cigarettes or use marijuana were more likely to be current drinkers. Given that current marijuana use was a stronger predictor of alcohol consumption relative to cigarette smoking, and the prevalence of marijuana smoking among youth is larger than cigarette smoking [2,11], it may be advantageous to explore developing and evaluating interventions that focus on preventing alcohol use via co-occurrence with marijuana use within the school context.

Consistent with previous literature [7], students who bullied other students were more likely to be high-risk drinkers whereas victims of bullying were not at increased risk. Recent evidence has identified that not only do bullying victims often become perpetrators of peer aggression themselves, but that students who are bullies are at increased risk for harmful alcohol use [12]. This suggests that research should further consider evaluating the impact that school-based intervention related to bullying prevention has on youth drinking.

	Adjusted Odds Ratio §(95% CI)	
	Model 1ᵃ Current Alcohol Use	**Model 2ᵇ** Current Binge Drinking
Sex		
Female	1.00	1.00
Male	1.05 (0.97, 1.13)	1.07 (0.98, 1.16)
Grade		
9	1.00	1.00
10	1.78 (1.59, 1.99)***	1.92 (1.67, 2.22)***
11	2.55 (2.27, 2.86)***	2.83 (2.46, 3.26)***
12	2.98 (2.65, 3.35)***	3.36 (2.92, 3.88)***
Ethnicity		
White	1.00	1.00
Other	0.66 (0.60, 0.73)***	0.74 (0.66, 0.83)***
Off-reserve Aboriginal	0.75 (0.63, 0.90)**	0.88 (0.73, 1.06)
Smoking Status		
Non-smoker	1.00	1.00
Former smoker	1.21 (0.81, 1.80)	1.38 (0.95, 1.99)
Current smoker	1.61 (1.33, 1.94)***	2.10 (1.77, 2.49)***
Marijuana Use		
Never	1.00	1.00
Non-current (< once/ month or not in last year)	4.61 (4.20, 5.06)***	4.94 (4.46,5.46)***
Current (last 30 days)	10.41 (9.32, 11.62)***	12.18 (10.93, 13.57)***
Physical Activity		
Does not meet physical activity guideline	1.00	1.00
Meets physical activity guideline	1.29 (1.20, 1.39)***	1.35 (1.24, 1.47)***
Ever been bullied		
No	1.00	1.00
Yes	1.08 (0.98, 1.19)	0.99 (0.89,1.11)
Ever bullied others		
No	1.00	1.00
Yes	1.62 (1.44, 1.82)***	1.61 (1.42, 1.82)***
Body Mass Index		
Underweight	0.73 (0.54, 0.98)*	0.87 (0.62, 1.22)
Healthy weight	1.00	1.00
Overweight	0.98 (0.89, 1.08)	0.97 (0.87, 1.09)
Obese	0.98 (0.86, 1.13)	0.91 (0.78, 1.07)
Spending Money		
Zero	1.00	1.00
$1-$20	1.39 (1.22, 1.85)***	1.32 (1.13, 1.54)***
$21-$100	2.22 (1.96, 2.52)***	2.11 (1.82, 2.45)***
More than $100	2.56 (2.22, 2.95)***	2.49 (2.12, 2.93)***
I don't know	1.57 (1.35, 1.83)***	1.61 (1.34, 1.93)***
Note: §Odds ratios adjusted for all other variables in the table		
ᵃ1=Current alcohol user (n=6,710), 0=Non-current alcohol user (n=10,787)		
ᵇ1=Current binge drinker (n=4,464), 0=Non-current binge drinker (n=13,033)		
*p<0.05 **p<0.01 ***p<0.001		

Table 2: Logistic regression analyses examining characteristics associated with alcohol use and binge drinking for the sample of grade 9 to 12 students in the Year 1 COMPASS sample (2012-2013)

Active students were at increased risk for binge drinking compared to those who are less active. While counterintuitive, this is consistent with previous research [6]. It may be prudent for schools to consider having student athletes agree to follow policies designed to prevent (or limit) alcohol consumption during the school-based sports season. Future research should examine the link between physical activity and alcohol use, especially given the increasing attention in public health practice toward promoting youth physical activity.

Due to the cross-sectional nature of the data, we are not able to make causal inferences about the factors associated with current alcohol use and binge drinking. The data also relies on self-report measures which may lead to underreporting of alcohol use. The degree of underreporting is likely to have been minimized, however, by the use of an anonymous pencil and paper survey in a school setting and by ensuring confidentiality of the responses.

Conclusion

We found that alcohol use was common, and that youth were consuming alcohol frequently and in volumes that are hazardous to their health. Considering that numerous risk factors were identified, future research should evaluate the impact of tailoring interventions to change the modifiable factors associated with high-risk drinking or targeting interventions to at-risk youth.

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References

1. Miller JW, Naimi TS, Brewer RD, Jones SE (2007) Binge drinking and associated health risk behaviors among high school students. Pediatrics 119: 76-85.

2. Leatherdale ST, Rynard V (2013) A cross-sectional examination of modifiable risk factors for chronic disease among a nationally representative sample of youth: are Canadian students graduating high school with a failing grade for health? BMC Public Health 13: 569.

3. Elton-Marshall T, Leatherdale ST, Burkhalter R (2011) Tobacco, alcohol and illicit drug use among Aboriginal youth living off-reserve: results from the Youth Smoking Survey. CMAJ 183: E480-486.

4. Costello MJ, Leatherdale ST, Ahmed R, Church DL, Cunningham JA (2012) Co-morbid substance use behaviors among youth: any impact of school environment? Glob Health Promot 19: 50-59.

5. Eichen DM, Conner BT, Daly BP, Fauber RL (2012) Weight perception, substance use, and disordered eating behaviors: comparing normal weight and overweight high-school students. J Youth Adolesc 41: 1-13.

6. Rainey CJ, McKeown RE, Sargent RG, Valois RF (1996) Patterns of tobacco and alcohol use among sedentary, exercising, nonathletic, and athletic youth. J Sch Health 66: 27-32.

7. King KA, Vidourek RA, Merianos AL (2014) School violent victimization and recent alcohol use and episodic heavy drinking among youth. J Sch Nurs 30: 187-195.

8. Leatherdale ST, Brown KS, Carson V, Childs RA, Dubin JA, et al. (2014) The COMPASS study: a longitudinal hierarchical research platform for evaluating natural experiments related to changes in school-level programs, policies and built environment resources. BMC Public Health14: 331.

9. Leatherdale ST, Laxer RE (2013) Reliability and validity of the weight status and dietary intake measures in the COMPASS questionnaire: are the self-reported measures of body mass index (BMI) and Canada's food guide servings robust? Int J Behav Nutr Phys Act 10: 42.

10. (2007) Growth reference 5–19 years. World Health Organization.

11. Leatherdale ST, Burkhalter R (2012) The substance use profile of Canadian youth: exploring the prevalence of alcohol, drug and tobacco use by gender and grade. Addict Behav 37: 318-322.

12. Amundsen EJ, Ravndal E (2010) Does successful school-based prevention of bullying influence substance use among 13- to 16-year-olds? Drugs: Education, Prevention, and Policy 17: 42-54.