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Short Communication

The substance use profile of Canadian youth: Exploring the prevalence of alcohol, drug and tobacco use by gender and grade

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ABSTRACT

The current study examined the prevalence of alcohol, tobacco and drug use and comorbid use of these substances among 45,425 students in grades 7 to 12 as part of the 2008–09 Canadian Youth Smoking Survey. The results of this paper suggest that alcohol, tobacco, marijuana and illicit drugs are currently used by a substantial number of youth in Canada, and that comorbid use is also very widespread among users. Alcohol was the most prevalent substance used by youth and it was rare to find youth who had used tobacco or drugs without also currently using alcohol. By grade 12, the majority of students were current users of alcohol, tobacco or drugs. Future research should consider developing a better understanding of how to prevent substance use among this population.

1. Introduction

Substance abuse among adults is typically established during adolescence (Anthony & Petronis, 1995; DeWit, Adlaf, Offord, & Ogborne, 2000; Schmid et al., 2007). As such, substance abuse patterns among youth populations can provide a useful indication of the potential future burden among adults. Research has shown that alcohol, tobacco, marijuana and illicit drugs are used by a large number of youth in both Canada (Adlaf & Paglia, 2005; Hammond, Ahmed, Yang, Brukhalter, & Leatherdale, 2011; Leatherdale & Ahmed, 2010; Poulin & Elliot, 1997) and the United States (CDC, 2004; CDC, 2008). This occurs despite the health risks associated with their use (Hall & Solowij, 1998; Nutt, King, Saulsbury, & Blakemore, 2007; Rehm, Taylor, & Room, 2006) and restrictions prohibiting their use among youth populations. Since comorbid use of these substances is also common (Anderson, 2006; Botvin & Griffin, 2007; CDC, 2008; Leatherdale & Ahmed, 2010; Leatherdale, Hammond, & Ahmed, 2008), preventing alcohol, tobacco and drug use among youth populations should be a public health priority.

Considering the school environment is a common location for purchasing alcohol, tobacco and drugs (CDC, 2004), improving our understanding of alcohol, tobacco and drug use among student populations can provide insight to guide the provision and timing of school-based substance use prevention interventions (Botvin & Griffin, 2007). For instance, understanding when different substance use behaviours become more prevalent can inform the targeting of school-based interventions to the grades where they are most likely to have impact. Similarly, understanding patterns of comorbid substance use can inform the development or tailoring of multi-substance prevention interventions. Such insight is important as evidence currently suggests that the focus of most school-based interventions is on substance specific prevention programming rather than providing programming that can address multiple risk behaviours simultaneously (Ringwalt, Hanley, Vincus, Ennett, Rohrbach, & Bowling, 2008; Wiefferink, Peters, Hoekstra, Dam, Buijs, & Paulussen, 2006). As such, the current study seeks to examine the prevalence of alcohol, tobacco and drug use and comorbid use of these substances among a nationally representative sample of Canadian youth.

2. Methods

2.1. Design

This study used data collected from 45,425 students in grades 7 to 12 who responded to the substance use section of the 2008–09 Canadian Youth Smoking Survey (YSS). In brief, the target population for the data used in this study consisted of all young Canadian residents in grades 7 to 12 attending public and private secondary schools in the 10 Canadian provinces; youth residing in the Yukon, Nunavut and the Northwest Territories were excluded from the target population, as were youth living in institutions or on First Nation Reserves, and youth attending special schools or schools on military bases. Data were collected using a 30–40 minute classroom-based survey of a representative sample of schools and students. School sampling was based on a stratified multistage design. This technique enhances the efficiency (precision) of estimates of population means and proportions, over purely random sampling of units like boards or schools.

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In this technique, within each province, stratification was based on two classifications: 1) health region smoking rate (above or below median); and 2) type of school (elementary or secondary). In each province, schools were then randomly selected to participate with probabilities proportional to the total enrolment in their boards. The number of private schools randomly selected to participate was proportional to the number of students enrolled in private schools in each province compared to the total in public schools. Within each participating school, all students in the survey grades were eligible to participate. Research ethics approval for this study was obtained from the University of Waterloo Human Research Ethics Committee and local institutional review boards where required. The survey design and sample weights allow us to produce population-based estimates within this manuscript. Student data collected in elementary schools (grade 7 and 8) required active parental consent. In 81% of participating secondary schools (grades 9 to 12), active information with passive consent was used to reduce demands on schools and to increase student participation rates. The researcher informed the parents of the students via mail and asked them to call a toll-free number if they refused their child's participation. Based on school or board request, in the remaining 19% of secondary schools, active parental permission (signed parental permission for students to participate in the survey) was required. The University of Waterloo Office of Research Ethics and appropriate School Board and Public Health Ethics committees approved all procedures, including passive consent. Detailed information on the 2008–09 YSS is available in print (Health Canada, 2010) and online (www.yss.uwaterloo.ca).

2.2. Measures

The measures used in this manuscript are consistent with previous research using YSS data (Hammond et al., 2011; Leatherdale & Ahmed, 2010; Leatherdale et al., 2008). Alcohol use was assessed by asking respondents, "In the last 12 months, how often did you have 5 drinks of alcohol or more on one occasion?". Those who reported any binge drinking in the previous month were classified as current alcohol users. Tobacco use 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?". Those who reported ever smoking 100 cigarettes and smoking in the previous 30 days were classified as current tobacco users. 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 any marijuana use in the previous month were classified as current marijuana users. Illicit drug use was assessed by asking respondents, "In the last 12 months, have you used or tried" each of the following substances: Amphetamines (speed, ice, or meth…); MDMA, (Ecstasy, E, X…); Hallucinogens (LSD, PCP, acid, magic mushrooms, mesc…); Heroin (smack, junk, crank…); Cocaine (crack, blow, snow…); and DACS (links…). For this measure, DACS was a bogus pipeline substance used to identify respondents who were lying about their illicit substance use. As such, respondents who reported using any of these substances in the previous 12 months, excluding those who reported using DACS, were classified as current illicit drug users; data were not available to determine illicit drug use in the past month. Data from respondents who reported using DACS (n = 383) were excluded from all analyses.

2.3. Analyses

Descriptive analyses of alcohol, tobacco, marijuana and illicit drug use were examined by grade and by sex and grade. We also examined the different patterns of comorbid substance use by sex. In all analyses, survey weights were used to adjust for non-response between provinces and groups, thereby minimizing any bias in the analyses caused by differential response rates across regions or groups. The development of the survey weights was accomplished in two stages. In the first stage a weight (W_1) was created to account for the school selection within health region and school strata. A second weight (W_2) was calculated to adjust for student non-response. The weights were then calibrated to the provincial sex and grade distribution so that the total of the survey weights by sex and grade would equal the actual enrollments in those groups. Finally, bootstrap weights for each province (to estimate sampling error) were generated. The statistical package SAS 9.2 was used for all analyses (SAS Institute Inc., 2008).

3. Results

The sample was 51.4% (n = 1,269,104) male and 48.6% (n = 1,199,516) female. The sample distribution was fairly consistent across grades; 16.1% (n = 398,700) in grade 7, 16.6% (n = 409,026) in grade 8, 17.1% (n = 422,665) in grade 9, 17.5% (n = 432,365) in grade 10, 17.1% (n = 421,740) in grade 11, and 15.6% (n = 384,120) in grade 12. The prevalence of alcohol, tobacco, marijuana or illicit drug use is presented by grade in Fig. 1, and by sex and grade in Fig. 2. The prevalence of comorbid substance use is presented by sex in Fig. 3.

In 2008, 27.0% (n = 605,956) of youth reported current alcohol use, 18.8% (n = 437,837) of youth reported current marijuana use, 8.2% (n = 173,561) of youth reported current illicit drug use, and 8.9% (n = 219,251) of youth reported current tobacco use. Males (29.4%) were more likely than females (24.5%) to report current alcohol use ($\chi^2 = 128.3$, $df = 1$, $p < 0.001$). Males (22.2%) were more likely than females (15.3%) to report current marijuana use ($\chi^2 = 332.8$, $df = 1$, $p < 0.001$). Males (8.1%) and females (8.2%) reported similar rates of current illicit drug use ($\chi^2 = 0.20$, $df = 1$, $p = 0.656$). And finally, males (10.3%) were more likely than females (7.4%) to report current tobacco use ($\chi^2 = 113.0$, $df = 1$, $p < 0.001$).

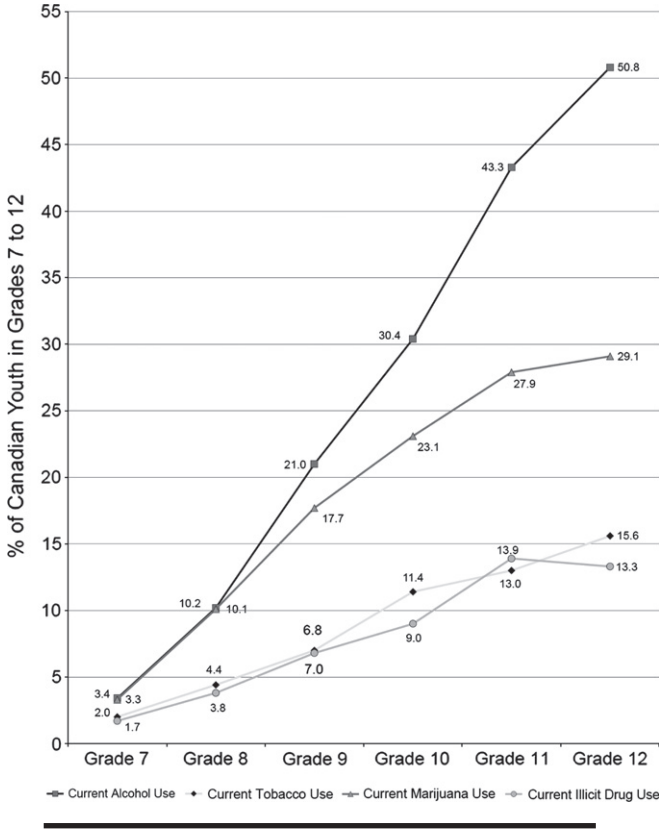

Fig. 1. Prevalence of alcohol, tobacco, marijuana and illicit drug use by grade. Canada, 2008. Source: 2008 Canadian Youth Smoking Survey (grades 7 to 12).

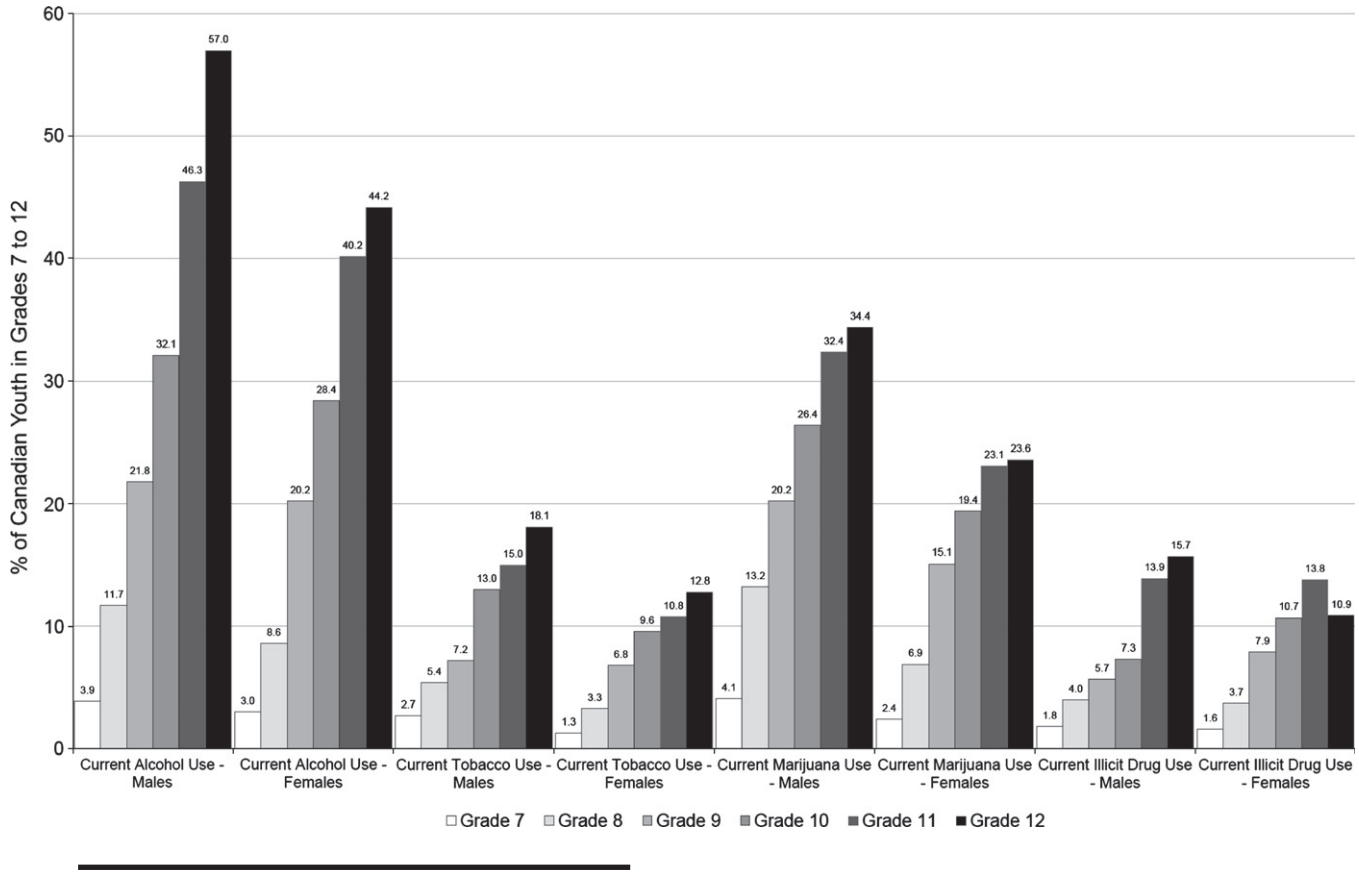

Fig. 2. Prevalence of alcohol, tobacco, marijuana and illicit drug use by grade and sex. Canada, 2008. Source: 2008 Canadian Youth Smoking Survey (grades 7 to 12).

As shown in Fig. 1, rates of all four substance use behaviours increased with grade. The prevalence of youth currently using alcohol increased the most dramatically, from 3.4% of grade 7 students to 50.8% of grade 12 students. The next largest increase was current marijuana use, which increased from 3.3% of students in grade 7 to 29.1% of students in grade 12. While the prevalence of current illicit drug use and tobacco use also increased by grade, the increases were modest relative to alcohol and marijuana use. Interestingly, only 36.1% (n = 138,491) of Canadian youth in grade 12 reported that they were not currently using alcohol, tobacco, marijuana or illicit drugs.

As shown in Fig. 2, the prevalence of current alcohol use increased more by grade among males relative to females; the grade 12 prevalence of current alcohol use was 12.8% higher among males compared to females (57.0% vs. 44.2%). Similarly, the prevalence of current marijuana use and tobacco use increased more by grade among males relative to females; the grade 12 prevalence of current marijuana use was 10.8% higher among males compared to females (34.4% vs. 23.6%) and the grade 12 prevalence of current tobacco use was 5.3% higher among males compared to females (18.1% vs. 12.8%). An interesting finding was identified for illicit drug use. The prevalence of illicit drug use was similar between males and females in grades 7 and 8, higher among females in grades 9 and 10, similar in grade 11, and higher among males in grade 12 (with female grade 12 students actually having a lower prevalence of use than grade 11 female students).

3.1. Comorbid substance use

In 2008, just over half of Canadian youth in grades 7 to 12 reported that they were not currently using alcohol, tobacco, marijuana or illicit drugs (55.4%; n = 1,367,574); females (59.4%) were more likely than males (51.6%) to report not currently using alcohol, tobacco, marijuana or illicit drugs ($\chi^2 = 279.7$, $df = 1$, $p < 0.001$). As shown in Fig. 3, the largest subgroup of current substance users consisted of youth who reported only using alcohol (8.8%); very few youth reported using marijuana only (2.0%), tobacco only (0.7%) or illicit drugs only (0.4%). In terms of comorbid use, the largest subgroups consisted of youth who reported using alcohol and marijuana only (4.1%) or alcohol, marijuana and illicit drugs only (2.3%). Overall, 2.0% (n = 49,435) of youth reported using all four substances. Some significant gender differences were also identified. For instance, males (2.4%) were more likely than females (1.6%) to report marijuana use only ($\chi^2 = 32.7$, $df = 1$, $p < 0.001$), and males (4.6%) were more likely than females (3.6%) to report comorbid alcohol and marijuana use ($\chi^2 = 28.6$, $df = 1$, $p < 0.001$).

4. Discussion

We identified that current use of alcohol, tobacco and drugs is common among youth in Canada, and that comorbid experimentation was very widespread among users. Considering that such a large number of Canadian youth a placing themselves at increased future health risk, the prevention of these behaviours should be a public health priority. First, alcohol was the most prevalent substance currently used by youth and it was rare to find youth who currently used marijuana, illicit drugs or tobacco without also currently using alcohol. This is concerning considering that our measure of current alcohol use was based on binge drinking. Second, a substantial proportion of Canadian youth also reported current use of marijuana or illicit drugs. Considering that youth who use alcohol and drugs are substantially more likely to continue using these substances when they are older (Anthony & Petronis, 1995; DeWit et al., 2000; Schmid et al., 2007), there is an immediate need to develop more effective poly-substance use prevention interventions for youth populations.

Our data also clearly highlight the importance of examining current substance use patterns by grade, especially among youth in the

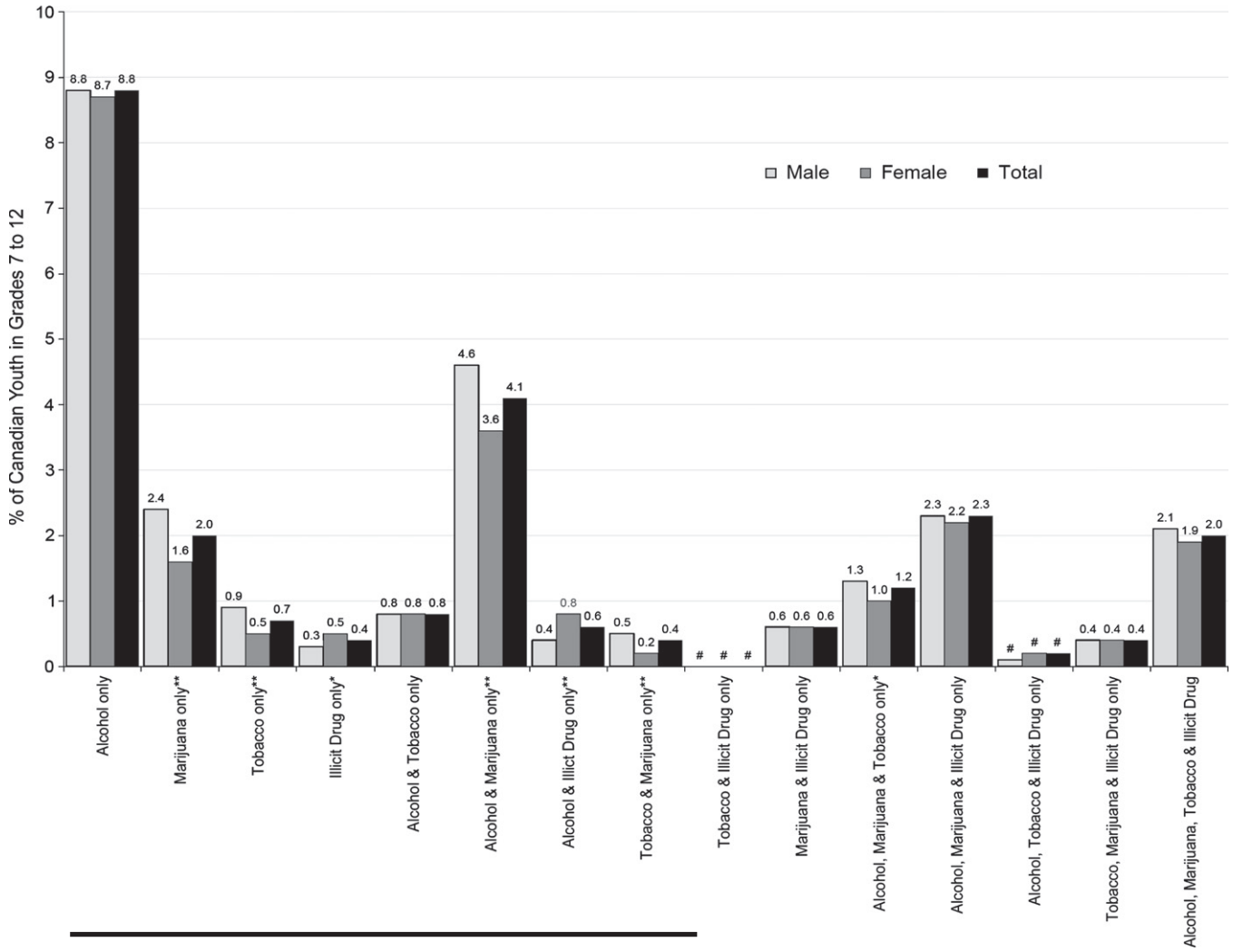

Fig. 3. Gender differences in the prevalence of comorbid substance use among youth. Canada, 2008. Source: 2008 Canadian Youth Smoking Survey (grades 7 to 12); # sample size too small to report ** significant gender difference ($p<0.001$); * significant gender difference ($p<0.01$).

senior grades of high school. In order to be able to present estimates across the different waves of the YSS, previous estimates pertaining to the substance use profile of Canadian youth were based on *ever use* of different substances and were only presented for youth in grades 7 to 9 (Hammond et al., 2011; Leatherdale & Ahmed, 2010; Leatherdale et al., 2008). However, in the present study we not only present estimates for *current use* of the different substances examined, we also presented the data for respondents in grades 10 to 12. These more recent data that include students in higher grades present a bleak picture of the substance use profile of Canadian youth relative to the previously published data. For instance, Leatherdale and Ahmed (2010) reported that only 38.5% of Canadian youth in grades 7 to 9 had *ever* binge drank, compared to our finding that over half of students in grade 12 were *current* binge drinkers. What is also cause for concern is that we identified that only just over a third of grade 12 students reported that they were not current users of alcohol, tobacco or drugs. This surprising finding appears to suggest that current substance use prevention efforts provided to secondary school students appear to be failing. Since the majority of school-based substance use prevention programmes are targeted at secondary school students (Botvin & Griffin, 2007) and do not focus on poly-substance prevention (Ringwalt et al., 2008), our data suggest that there is a need to robustly evaluate the impact that existing interventions have on youth.

Ongoing surveillance of student behaviour and the programmatic components of substance specific or poly-substance prevention programming initiatives are required to determine if existing efforts are working, and to evaluate which components are having an impact.

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None.

Contributors

None.

Conflict of interest

None of the authors have any conflicts of interest to disclose associated with this manuscript.

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