Characteristics of People who Report Both Driving after Drinking and Driving after Cannabis Use

Branka Agic\textsuperscript{1,2}, Gina Stoduto\textsuperscript{1}, Gillian Sayer\textsuperscript{1,2}, Anca Ialomiteanu\textsuperscript{1}, Christine M. Wickens\textsuperscript{1}, Robert E. Mann\textsuperscript{1,2}, Bernard Le Foll\textsuperscript{1,2} and Bruna Brands\textsuperscript{1,2,3}

1- Centre for Addiction and Mental Health, Toronto, Canada
2- University of Toronto, Toronto, Canada
3- Health Canada, Ottawa, Canada.

Abstract

Background: After alcohol, cannabis is the recreational drug most often found among dead or injured drivers. While the effects of alcohol on driving risks are well-described, the effects of cannabis on driving risks are less well understood. We have observed, in survey data, that the chances of past year collisions among drivers who report driving after drinking alcohol (DUIA) are significantly increased, and similarly that the chances of past year collisions among drivers who report driving after cannabis use (DUIC) are also significantly increased. Recently, we examined drivers who reported both DUIA and DUIC (DUIC+A) and found that the past-year collision risk in this group, at 30.5\%, was 2-4 times that seen among drivers who reported either behaviour by itself (Sayer et al., in preparation).

Aims: This DUIA+C group may be an important risk group, and the purpose of this study was to explore factors that might distinguish this group from other drivers.

Methods: Data were derived from the CAMH Monitor, an ongoing population survey of Ontario adults (18 years and older). Data from 2002 to 2010 were merged for this study (N=16,054). We compare the demographic, psychosocial, substance use and driving characteristics of four groups of drivers: DUIA, DUIC, DUIA+C, and those who reported no driving after drinking or cannabis use.

Results: The proportion of the population in the DUIA+C group is relatively small, at about 0.9\%. Preliminary analyses reveal important differences by age group, with younger drivers being significantly more likely to report DUIA, DUIC and DUIA+C. Drivers who reported any DUIC were also more likely to report DUIA+C than drivers who reported any DUIA.

Discussion and conclusions: Our analyses provide further confirmation that individuals who fall in this DUIA+C group are an important group from road safety perspectives. Further analyses will consider the potential impact of frequency of substance use, substance related problems, and indicators of mental health problems on the likelihood of an individual being in the DUIA+C group.
Introduction

Alcohol and cannabis are two of the most commonly used psychoactive substances (Ialomiteanu, Adlaf, Hamilton, & Mann, 2012). The hazards of driving after drinking have long been known. Alcohol impairs the behavioural and cognitive skills needed for safe driving, and as Blood Alcohol Content increases, the risk of collision involvement increases exponentially (e.g., Borkenstein, Crowther, Shumate, Ziel, & Zylman, 1974). Over the past several decades, many programs and policies have been directed towards preventing driving after drinking and the resulting collisions, injuries and deaths, with important success (e.g., Wickens, Butters, Flam-Zalcman, Stoduto, & Mann, 2013).

Much less is known about the effects of cannabis on driving. For many years, it has been recognized that cannabis does affect psychomotor and cognitive skills in the laboratory, but the impact of cannabis on collision risk has been much less clear. Early epidemiological studies seemed to suggest that driving under the influence of cannabis (DUIC) had little or no effect on collision risk (Bates & Blakely, 1999). However, these findings may have been due in part to methodological difficulties in conducting this research, and more recent studies are providing stronger evidence that DUIC is associated with significant increases in collision risk (e.g., Mann, Stoduto, Ialomiteanu, Asbridge, Smart, & Wickens, 2010; Asbridge, Hayden, & Cartwright, 2012).

Research on DUIC has noted that drivers who report DUIC often report DUIA as well (e.g., Walsh and Mann, 1999; Fischer, Rodopoulos, Rehm, & Ivsins, 2006). A small number of laboratory and epidemiological studies have suggested that the combination of alcohol and cannabis could by itself could result in effects that are larger than the effects of either drug individually (e.g., Biechele, Peytavin, the SAM Group, Facy, & Martineau, 2008). However, there is little that is currently known about the combined effects of cannabis and alcohol on driving performance or collision risk. As well, while it is known that some drivers report both DUIA and DUIC (hereafter referred to as DUIA+C), the characteristics of these drivers and the collision risks they experienced are not well understood.

Recently, we examined self-reported collision risks in a sample of drivers who report DUIA+C drawn from a large representative sample of the Ontario adult population (Sayer, Ialomiteanu, Stoduto, Wickens, Mann, Le Foll, & Brands, submitted). The results suggested that those who report DUIA+C may be a particularly important group from a road safety perspective. Self-reported collisions in the past year varied substantially among drivers who report no driving after using substances (6.7% reported a collision in the past year), DUIA only (collision reported by 8.5%), DUIC only (collision reported by 14.0%) and DUIA+C (collision reported by 30.5%). We are not able to determine from these survey data if the drivers who report DUIA+C drive after using both substances on the same occasions, but nevertheless their odds of collision involvement were significantly higher than those in known higher risk groups (DUIA and DUIC).
The purpose of this study was to explore factors that might be related to the much higher collision risk seen in the DUIA+C group. We compared the DUIA+C group to drivers who report DUIA only, DUIC only, and no driving after substance use on demographic factors, substance use factors, and mental health factors.

**Methods**

Data were derived from the CAMH Monitor (CM), an annual repeated cross-sectional survey of Ontario adults. The CAMH Monitor is an addiction and mental health surveillance survey using an anonymous random-digit-dialing telephone survey of the Ontario population aged 18 and older, administered by the Institute for Social Research, York University. The CAMH Monitor is continuously conducted on quarterly samples and employs a stratified (region) two-stage (telephone number, respondent) list-assisted probability sample design. The following 6 regional strata are used: Toronto, Central East, East, Central West, West, and North. Sample sizes have averaged between 2,005 and 3,039 respondents. Response rates varied between 58% and 51%. The weighted sample is considered representative of the Ontario general adult population. For purposes of the current study, data from 2002 to 2012 were merged. Our analysis is based on a subsample of respondents who reported having a valid driving license at the time of the survey (N=22,106). All survey estimates were weighted, and variance and statistical tests were corrected for the complex sampling design.

**Groups and Measures**

We constructed four groups for purposes of these analyses: (1) Neither DUIA nor DUIC – participants who reported no driving after drinking alcohol and no driving after cannabis use in the past year; (2) DUIA – participants who reported driving after drinking alcohol only in the past year; (3) DUIC – participants who reported driving after use of cannabis only in the past year; and (4) DUIA+C – participants who reported driving after drinking alcohol and reported driving after cannabis use in the past year.

We included measures of gender and age in these analyses. We also included the following measures of substance use, substance problems, and mental health:

- **Current cigarette smoker.** A current cigarette smoker was defined as someone who: 1) has smoked over 100 cigarettes in his/her lifetime, 2) is a daily or occasional smoker, and 3) has smoked in the past 30 days (yes=1).
- **Weekly binge drinking.** Weekly binge drinking was defined as drinking five or more drinks on a single occasion at least once a week during the past 12 months (yes=1).
- **AUDIT (8+).** Hazardous or harmful drinking was measured with the Alcohol Use Disorders Identification Test (AUDIT), a 10-item instrument designed to detect hazardous or harmful drinking at the less severe end of the spectrum. The percentage reported here is based on a score of 8 or more out of 40, which represents an established high-risk pattern of drinking that increases the likelihood of future medical and physical problems, or indicates harmful consequences of use already experienced. The reference period for the AUDIT is the past 12 months before the survey.
Cannabis use. We defined cannabis use as (1) reported using cannabis monthly or more often in the past 12 months; (2) reported using cannabis less than monthly in the past 12 months; (3) never used in the past 12 months. ASSIST (4+). Cannabis use problems were measured with the Cannabis Involvement Score on the ASSIST screener, which consists of 6 items assessing cannabis consumption and past-3-month cannabis-related problems. The percentage reported here is based on a score of 4 or more out of 39.

GHQ (3+). Elevated psychological distress was measured with the 12-item version of the General Health Questionnaire (GHQ), a screening instrument used to assess current mental health problems. The items assess the recent frequency of experiencing 12 symptoms (e.g., stress, depression, problem making decisions). Elevated psychological distress is defined as experiencing 3 or more of the 12 symptoms.

Poor mental health. This measure is defined as responses of “fair” or “poor” to the question, “In general, would you say your overall mental health is excellent, very good, good, fair or poor?”

More information on the CAMH Monitor survey, these measures and others included can be found in Ialomiteanu, Adlaf, Hamilton and Mann (2012).

Results

The differences among groups were explored with $\chi^2$ analyses. All analyses are based on the weighted sample size, using STATA software. The findings are summarized in Table 1.

Table 1. Substance use and mental health and demographic and driving characteristics reported by Ontario licensed drivers, aged 18+, CAMH Monitor, 2002-2012

<table>
<thead>
<tr>
<th></th>
<th>Total drivers</th>
<th>No driving after cannabis/alcohol use</th>
<th>Driving after alcohol use only (DUIA)</th>
<th>Driving after cannabis use only (DUIC)</th>
<th>Driving after cannabis use and driving after alcohol use (DUIC+DUIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total N</td>
<td>22106</td>
<td>20524</td>
<td>1190</td>
<td>242</td>
<td>150</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Men</td>
<td>50.1</td>
<td>47.5</td>
<td>80.9</td>
<td>74.7</td>
<td>83.1</td>
</tr>
<tr>
<td>Women</td>
<td>49.9</td>
<td>52.5</td>
<td>19.1</td>
<td>25.3</td>
<td>16.9</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>***</td>
<td>***</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>18-34</td>
<td>27.7</td>
<td>26.3</td>
<td>34.5</td>
<td>64.6</td>
<td>66.3</td>
</tr>
<tr>
<td>35-54</td>
<td>42.6</td>
<td>42.9</td>
<td>42.6</td>
<td>30.3</td>
<td>28.3</td>
</tr>
<tr>
<td>55+</td>
<td>29.8</td>
<td>30.8</td>
<td>22.9</td>
<td>5.1</td>
<td>5.4</td>
</tr>
<tr>
<td>Current smoking</td>
<td></td>
<td>***</td>
<td>***</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19.8</td>
<td>18.3</td>
<td>27.6</td>
<td>58.6</td>
<td>58.6</td>
</tr>
<tr>
<td>No</td>
<td>80.2</td>
<td>81.7</td>
<td>72.4</td>
<td>41.4</td>
<td>41.4</td>
</tr>
<tr>
<td>Cannabis Use</td>
<td></td>
<td>***</td>
<td>***</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Monthly+</td>
<td>6.1</td>
<td>4.0</td>
<td>7.2</td>
<td>89.6</td>
<td>87.9</td>
</tr>
<tr>
<td>Less than monthly</td>
<td>6.6</td>
<td>5.8</td>
<td>17.9</td>
<td>10.4</td>
<td>12.1</td>
</tr>
<tr>
<td>Never past 12m</td>
<td>87.3</td>
<td>90.2</td>
<td>74.9</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Substantial differences among the four groups are observed, and differences are statistically significant for all measures. Drivers in the three groups that report substance use and driving are much more likely to be male than drivers who do not report driving after substance use. The three substance use and driving groups are also more likely to be younger. The two youngest groups are the DUIC and DUIA+C groups, while the DUIA group includes more middle-aged drivers. Similarly, the DUIC and DUIA+C groups are much more likely to be tobacco smokers than the other two groups. The DUIC and DUIC+A groups are also much more likely to be cannabis users than the other two groups. There also appears to be a strong association of cannabis problems with driving after using cannabis. Over 80% of both the DUIC and DUIA+C groups scored in the problem range on the ASSIST, compared to 7.2% among DUIA drivers and 3.3% among those who reported no driving after substance use. Interestingly, alcohol use and problem measures appeared to differentiate the DUIC and DUIA+C groups; 57.7% of the latter group compared to 28.7% of the former reported weekly binge drinking, and 82.4% of the latter group compared to 44.6% of the former fell into the harmful/hazardous drinking range on the AUDIT. It is also interesting to see that the DUIA+C group are also more likely to report binge drinking and hazardous/harmful alcohol consumption than the DUIA group. Finally, similar patterns were also observed on mental health measures, although differences were not so pronounced. The three groups reporting substance use and driving show more evidence of mental health problems than those who did not report any driving after substance use. The DUIA+C group demonstrated the highest levels of psychological distress as measured by the GHQ12, and were most likely to report fair or poor mental health.
Discussion and conclusions

While these exploratory findings are interesting, it is important to keep in mind the limitations of this research. The findings are based on self-reports and while the response rate of the Monitor is considered good, nevertheless nonresponse and other forms of bias may be affecting these results. As well, we cannot determine whether or not those who reported DUIA+C combined alcohol combined use of alcohol and cannabis on individual driving occasions.

Nevertheless, the results are of substantial interest and provide additional confirmation that individuals who report both driving after drinking and driving after using cannabis may be an important group from a road safety perspective. The high rates of collisions reported by the DUIA+C group (Sayer et al, submitted) may be influenced by several factors known to affect driving safely. This group consists of predominantly young male drivers who are known to have higher collision rates and to show higher levels of risk taking and related characteristics that enhance collision risk (e.g., Mann, Stoduto, Vingilis, Asbridge, Wickens, Ialomiteanu, Sharpley, & Smart, 2010). Substance use and problem measures also appeared to characterize the DUIA+C group. Interestingly, while their rates of cannabis use and cannabis problems (as measures by the ASSIST) were similar to those seem among the DUIC group, their rates of heavy drinking and drinking problems appeared much higher than those seen among the DUIA group. Heavy substance use and substance problems are known to be associated with increased collision risk and collision-related mortality rates (e.g., Mann et al, 2010; Callaghan, Gatley, Veldhuizen, Lev-Ran, Mann, & Asbridge, 2013). As well, since these drivers already appear to be combining heavy alcohol and cannabis use, they may be more likely to use other collision-enhancing substances as well. Finally, the DUIA+C group was also characterized by highest levels of mental health concerns, which are increasingly being linked to elevated collision risk (Wickens, Mann, Stoduto, Ialomiteanu, & Rehm, 2013). The remarkably high rates of collisions seen in the DUIA+C group may thus be related to many factors, and more research to identify those most salient to increasing their collision risk is needed.

References


