Collisions Of Alcohol, Cannabis And Cocaine Abuse Clients Before And After Treatment

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Abstract

Background/Introduction: Considerable research has been conducted on the impact of treatment programs for alcohol abuse on traffic collisions, and generally this research has shown that treatment is associated with reductions in alcohol related collisions. Very little research exists on the impact of treatment for cannabis or cocaine clients in terms of collisions.

Objectives: The objective is to assess whether a significant reduction in “at fault” collisions occurs after treatment for clients with a primary substance abuse problem of alcohol, cannabis or cocaine compared to a control group of licensed drivers in the general population, matched by age, sex and place of residence.

Methods: Driver records of patients admitted to substance abuse treatment in 1994 for a primary problem of alcohol (n=128), cannabis (n=80) or cocaine (n=150) were accessed from the Ministry of Transportation. A comparison group of 507 licensed drivers frequency matched by age, sex and place of residence, was also randomly selected. Three separate repeated measures, analysis of variance tests were conducted to assess changes in the average number of “at fault collisions” before and after treatment for the drug and control groups.

Results: Both the alcohol and cocaine groups had a significant interaction compared to the control group. These two treatment groups had significantly more “at fault collisions” than the control group before treatment and no differences were noted after treatment. No significant interaction over time was found for the cannabis and control group, but the cannabis group had significantly more “at fault collisions” than the controls.

Discussion: The results reaffirm past research showing significant reductions in collisions for alcohol abuse clients after treatment. The cocaine group had elevated “at fault collisions” and that a treatment effect was found for this group. Although collisions in the cannabis group did not significantly decline relative to the control group, the elevated rates of “at fault collisions” in this group illustrate that they represent a traffic safety problem, and further research is needed.
INTRODUCTION
The objective is to assess whether a significant reduction in “at fault collisions” occurs after treatment for clients with a primary substance abuse problem of alcohol, cannabis or cocaine compared to a control group of licensed drivers in the general population, matched by age, sex and place of residence. Those in treatment have substance abuse problems that have led to adverse physical or psychological consequences or dependence from prolonged high levels of drug use, resulting in loss of control over one’s use and impaired.

Alcohol, risk of traffic collisions and impact of treatment
Research is conclusive that those in treatment for alcohol abuse have much higher likelihood of collisions than the general population (1).

Also, a meta-analysis of over 200 studies conducted by Wells-Parker (2) has found that alcohol treatment of Driving Under the Influence (DUI) drivers is associated with a 7 to 9 percent reduction in alcohol related collision and DUI, compared to conventional criminal justice approaches. DUI Education, psychotherapy counselling and contact follow-ups were more effective than single-mode treatments, and resulted in recidivism reductions of more than 20% for some groups of offenders.

Cannabis and cocaine, risk of traffic collisions and impact of treatment
Little is known in relation to the collision risk that abusers of cannabis or cocaine pose. Laboratory research indicates that cannabis impairs various behavioural and cognitive skills, including those related to safe driving (3). Cocaine stimulates the central nervous system and laboratory studies have failed to find deficits in the performance of simple tasks following consumption of this drug. Other important differences in drug characteristics exist which might influence their impact on performance and driving behaviour. For example, cocaine is a more addictive drug, and withdrawal from cocaine is more severe, which may differentially affect the likelihood of adverse driving outcomes (4). Long term use of cocaine can affect personality characteristics, which in turn could elevate accident risk. The epidemiological literature is mixed and inconclusive in terms collision risks related to use of cannabis or cocaine. This research tends to be methodologically weak (5).

A useful approach to understanding the driving risks associated with substance use is to examine clinical samples of substance abusers. Those in treatment represent the people with the most severe problems, which can allow us to investigate relationships with smaller sample sizes. Very few studies exist that use clinical samples of individuals receiving treatment for substance abuse. Mann et al. (6) found abusers of stimulants (primarily cocaine) had collisions rates about 2-3 times what would be expected, while the collision rates of cannabis abusers appeared to be about the same as that observed for the general population. Interestingly, the subjects estimated that about 50% of their collisions in the preceding year occurred while they were under the influence of alcohol and/or drugs. Mann et al., (6) also examined driver records before and after treatment of 137 males between the ages of 21 and 40. About 1/3 of the sample had a problem with alcohol only, 1/3 had a problem with alcohol plus one other substance, and 1/3 had a problem with one or two substances other than alcohol. Overall, significant post-treatment reductions were found in moving violations, DWI convictions, and total collisions. Thus, these findings
suggest that reduced collisions may result from treatment for substance abuse generally, and not just from treatment for alcohol abuse.

**Objectives**

The purpose of this study is to investigate changes of “at fault collisions” for three groups of subjects: those in treatment for a primary problem with (1) alcohol, (2) cannabis and (3) cocaine. The overall objective is to determine whether there a significant decline in “at fault collisions” after treatment for each of the three substance abuse groups, compared to a matched control group of licensed drivers. In order to investigate this objective, “at fault collisions” for the substance abuse groups and the control group will be compared before treatment and after treatment.

**Methods**

**Study population and research design**

A retrospective cohort design was used. The target population for this study is clients who sought help for an alcohol or drug problem in 1994 from the Centre for Addiction and Mental Health (formerly the Clinical Research and Treatment Institute of the Addiction Research Foundation). Treatment in 1994 was chosen to allow at least 6 years of follow-up to provide a sufficient number of years from the driving records to detect significance between groups. All clients selected were at least 20 years of age at the time treatment began and lived in the greater Toronto area, thus eliminating confounding influences associated with place of residence. The substance abuse groups were composed of 7 sub-groups: alcohol only; cannabis only; cocaine only; alcohol and cannabis; alcohol and cocaine; cannabis and cocaine; and alcohol, cannabis, and cocaine. We attempted to access 80 patients from each of these 7 groups who were selected at random from the list of all clients seen initially for a substance abuse problem in 1994; however, only 47 patients met the criteria of having a drug problem with all 3 substances.

A control group of licensed drivers in the Greater Toronto area, frequency matched by age and sex, were also randomly drawn. Age and sex are important confounding variables, associated with the frequency of collisions and also the likelihood of seeking treatment for different addiction problems.

**Data sources and measurement**

Data are reported from two data sources: clinical intake forms and MTO driving records.

1. **Intake forms:** When clients first arrive at CAMH’s Clinical Institute they are asked routine questions (i.e., name, address, birth date, marital status and other demographic characteristics) and given a standardized drug use assessment interview from which their substance problems are identified. Intake forms of subjects were categorized into three substance abuse groups (i.e., alcohol, cannabis and cocaine), based on the major reported substance abuse problem. (e.g., if the major problem was cocaine and alcohol was a secondary problem, this person would be categorized as cocaine).

2. **MTO driving records:** Driver records of all selected subjects were provided by MTO in hard copy format. The dependent variable presented here is collisions where the driver was charged for a traffic offence. The records contain all traffic code violations, including moving violations such as speeding, or improper lane changes, and non-moving violations, such as seat belt violations or impaired driving. Dates of traffic collisions, suspensions and moving violations
were provided for over 20 years. Collisions from 1994, the year in which patients received treatment, were excluded from all analyses.

RESULTS
Valid licenses, based on having a valid drivers license at some time from 1988 to 2001, were obtained for 63.5% of the patients. A larger percent of driver’s in the cannabis group had licenses compared to the alcohol group. The sample sizes for each group are as follows: alcohol (n=128), cannabis (n=80), cocaine (n=150), controls (n=507). Some analyses were conducted to determine whether the groups differed by age and sex, potential confounding variables. The differences were not significant among groups for sex. Significant differences were found among groups for mean age. The average age, on September 2001, was 45.0 years for the alcohol group, 37.8 years for the cannabis group, 38.9 years for the cocaine group and 41.5 years for the control group. Although the controls were frequency matched with the patients, the patients that did not have a driver’s license tended to be older, which created a bias.

Three separate repeated measures analyses of covariance tests were conducted for alcohol, cannabis and cocaine compared to the control group, with the dependent variable “at fault collisions”. Age was entered as a covariate because the groups were significantly different in age and age is related to driving events. All “at fault collisions” for each driver were added from two six year periods: 1988 to 1993 (i.e., before treatment) and 1995 to 2000 (i.e., after treatment). Figure 1 shows the average number of “at fault collisions” before and after treatment for the alcohol and control groups. A significant interaction between the alcohol and control group was found over time (p=.001). “At fault collisions” in the alcohol group declined greatly after treatment, whereas the control group remained stable over the two time periods. Subsequent t-tests showed that before treatment, the alcohol group had significantly more “at fault collisions” than the control group and no significant differences were found after treatment. Figure 2 shows the “at fault collisions” over the two time periods for the cannabis and control groups. No significant interaction was found. The cannabis group had significantly more “at fault collisions” than controls over both time periods combined (p=.041). Figure 3 shows the results for the cocaine and control group. A significant interaction was found between groups over time (p=.011), where at fault collisions of the cocaine group declined markedly and the control group remained stable. T-tests showed that before treatment, the cocaine group had significantly more “at fault collisions” than the control group and no significant differences were found after treatment.

DISCUSSION
The results do demonstrate some significant relationships between drug problems and traffic outcomes, but we do not know whether any observed associations are caused by drug problems. Other factors related to collisions, such as stress (7), fatigue (8), aggression, risk-taking/impulsiveness (9), and criminality (10) may account for the elevated “at fault collisions”. Studies have found that these characteristics described above are over-represented in substance abuse populations, which might also explain higher level of “at fault collisions”. Another possible limitation is that records were obtained from only one treatment agency, and results may not be generalizable to all clients seeking treatment.
Significant reductions in “at fault collisions” after treatment were found for both the alcohol and cocaine groups in comparison to the control group. The decline in collisions that were found for the alcohol group is consistent with the existing literature. However, for the cocaine group little research exists to draw comparisons. The poor driving records of the cocaine group suggests that more research should be conducted to understand why cocaine abusers have elevated driving risks. Since laboratory studies don’t show the direct effects of cocaine deteriorate performance, then a likely explanation is that the syndrome of abuse can have a negative influence on driving. The marked reduction of “at fault collisions” after treatment is consistent with a positive treatment effect. Since a treatment effect was found, this evidence is suggestive that the elevated “at fault collisions” may be due to either the cocaine used or the drug abuse syndrome. One area that deserves more research is understanding the role that alcohol might play in cocaine abuse, because drinking was also very common in this group.

The results show that cannabis abusers in treatment have more “at fault collisions” than controls but there is no evidence of a treatment effect. Few studies have found a relationship between cannabis use and collisions. These results indicate that the treatment is not effective for reducing collisions. The elevated “at fault collisions” in the cannabis group may be due to other confounding variables.

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References


