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Who Drives After Using Drugs?

A Review of Prominent Characteristics

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Conflict of Interest

The author has no conflict of interest.



Executive Summary

Overview

This report explores the prominent characteristics of people who drive after using drugs and the circumstances under which this behaviour occurs. Not everyone who drives after drug use displays the same characteristics and patterns of behaviour. The report tries to determine if there are prominent characteristics that define identifiable subgroups within the population of people who drive after using drugs.

This report is intended for a broad audience, including law enforcement officers, policy makers, road safety professionals, researchers and addiction professionals.

Background

Over the past 30 years, research has provided a great deal of information about the characteristics of drinking drivers and the circumstances under which the behaviour occurs. This information has been influential in developing and implementing new policies, enforcement activities, prevention campaigns and rehabilitation programs. More recently, driving after using drugs has become more common than driving after drinking. However, the state of knowledge about people who drive after the use of drugs pales in comparison with that about drinking drivers.

Method

Research to identify the prominent characteristics of drugged drivers and the circumstances of the crashes in which they become involved has used data from self-report surveys, surveys of drivers and data on drivers arrested for drug-impaired driving, as well as those who become involved in crashes related to their use of drugs. This report used a literature review and analysis of existing datasets as its two primary approaches.

Results

According to the research analyzed for this report, the prominent characteristics of people who drive after the use of drugs vary according to the population examined. These are outlined in the table that follows.

The drugs most commonly used by drivers are cannabis, central nervous system (CNS) depressants, opioids and CNS stimulants. To some extent, the characteristics of people who drive after drug use vary according to the substance used.

Conclusions

The study confirmed that there is considerable heterogeneity within the population of people who drive after the use of psychoactive substances. Nevertheless, identifying the prominent characteristics of people who drive after using drugs is of value to those working in prevention and public education, public health and law enforcement to help them develop more effective prevention and intervention programs. It might be possible to identify clusters of characteristics that serve to identify subgroups within this population. Subgroups could differ in the frequency of driving after drug use, the personal and environmental factors precipitating the behaviour, and the extent of their risk as a result of



driving after using drugs. The identification of such subgroups can be used to create targeted prevention and public education messages and programs, to enhance the implementation of enforcement activities, and to develop more effective rehabilitation programs directed at specific factors associated with the behaviour of people in these subgroups. Better understanding of the characteristics of people who drive after using drugs is a crucial step in reducing the prevalence of drugged-driving behaviour and the negative consequences associated with it.

Prominent Characteristics of Persons Who Drive after Drug Use According to Population Studied

| Questionnaire Surveys | Roadside Surveys | Arrested Drivers | Crash-involved Drivers |
|---|-------------------------|---------------------------------|-------------------------------|
| Male | Male | Male | Male |
| Age <30 | Age <30 and >55 | Age Male 19–35: Female 26–45 | All ages |
| Early onset of THC use | Late night | F: depressants, opioids | F: depressants, opioids |
| Other illegal drug use | Cannabis, cocaine use | M: cannabis | M: cannabis |
| Frequent, heavy alcohol use | | High re-arrest rates | All days, all times of day |
| Tobacco use | | High drug concentrations | |
| Other high-risk, health compromising behaviours | | Younger than alcohol offenders | |



Background

Every time a person gets behind the wheel of a motor vehicle, there is a risk that the person will become involved in a crash, possibly involving serious injury or death. The extent of risk varies according to a number of factors, such as driver age, experience, environmental conditions, the condition of the vehicle and the roadway, and interactions among these factors. Understanding of the factors that contribute to crash risk can be used to develop programs and policies to help mitigate the risk. As an example, the age and inexperience of new drivers was addressed with graduated licensing programs that restricted the time and circumstances during which novices could learn to drive, thereby allowing them to gain experience under low-risk conditions. This approach has resulted in demonstrable reductions in serious crashes among this group of drivers (Foss, Feaganes, & Rodgman, 2001; Masten, Foss, & Marshall, 2001; Mayhew, Simpson, des Groseilliers, & Williams, 2001; Shope, 2007).

Driving while impaired by alcohol is also an area of road safety where considerable work has been undertaken to better understand the personal and environmental factors that lead to this high-risk behaviour. The prominent characteristics of those who repeatedly drive with elevated alcohol levels have been well documented (Beirness, Mayhew, & Simpson, 1996) and used to develop strategies to target those at highest risk. For example, assessment and rehabilitation programs specifically designed for convicted drinking drivers with different levels of risk have become commonplace.

In recent years, driving while impaired by the use of psychoactive drugs has become a prominent road safety issue. This behaviour has often been viewed as simply another version of alcohol-impaired driving. In many respects, driving after drug use is similar to, and often overlaps with, driving after drinking. However, it is becoming increasingly apparent that there are important differences between the two behaviours that could have implications for developing prevention, enforcement and rehabilitation programs.

It is imperative to recognize that whereas driving after drinking alcohol focuses on the use of a single substance, there are a multitude of drugs that can be consumed and act in different ways to adversely affect one's ability to operate a vehicle safely. Not only can drugs differ in terms of effects, but the reasons for use, time of use, duration of use and use of multiple drugs can complicate attempts to understand drugged-driving behaviour and those who engage in it. Furthermore, testing for drug use by drivers is often inconsistent, time sensitive, intrusive and expensive. Hence, any conclusions about drugged driving are often tempered by the inherent limitations of the research.

This report documents the prominent characteristics of people who drive after using drugs and the circumstances in which the behaviour occurs. It first provides an overview of the literature on the characteristics of drinking drivers. This literature provides the context for analyzing the characteristics of those who drive after using drugs other than alcohol and establishes a starting point for research examining the factors associated with driving after the use of drugs. The existing literature on the characteristics of drugged driving is then examined. This review is supplemented by analyses of several large databases containing information on people who drive after drug use. This report is intended for a broad audience, including law enforcement officers, policy makers, road safety professionals, researchers and addiction professionals.



Research on People Who Drive After Consuming Alcohol

Research on the characteristics of drinking drivers was prominent in the 1980s and 1990s in response to rising social concern about alcohol as a cause for car crashes. Several different approaches have been used to examine the demographic and psychosocial characteristics of those identified as drinking drivers. These approaches have included general population surveys, roadside surveys, offender surveys and investigations of crash-involved drivers. The major difference among these approaches was the manner in which drinking drivers were identified. Population surveys rely on self-reported information to identify persons who drive after using alcohol; all other approaches identified persons who drive after using alcohol objectively through charge data or actual blood alcohol concentration (BAC) at the time of driving or both.

The type of information available was dependent upon the population studied. For example, general population surveys often included information on education, income and marital status, as well as social, psychological and attitudinal characteristics. On the other hand, studies of arrested and crash-involved drivers were limited in the extent of psychosocial information available, but were more likely to include the driver's BAC. The use of different populations in these studies, however, can lead to differences in the characteristics that distinguish between persons who drive after using alcohol and those who do not.

Nevertheless, from the variety of information available from these studies, the general profile that begins to emerge of people who drive after using alcohol has the following characteristics:

- Male between 30 to 45 years of age;
- Employed with low to moderate income;
- No post-secondary education;
- Engages in other behaviours that compromise health and safety;
- Enjoys the thrill and excitement of taking risks;
- May exhibit aggressive and hostile tendencies; and
- Has a record of previous traffic violations and crashes.

In addition, one group at particularly high risk can be distinguished from other groups of people who drive after drinking on the basis of several characteristics (Simpson, Beirness, Robertson, Mayhew, & Hedlund, 2004). Members of this group engage in the behaviour frequently, often at very high BACs (greater than 150 mg/dL), and may also have been convicted of an impaired driving offence on one or more previous occasions. Members of this group are typically males between 25 and 45 years of age with a history of frequent and heavy use of alcohol. Many meet the criteria for a clinical diagnosis of alcohol use disorder.

Combining the prominent characteristics of persons who drive after consuming alcohol into a single profile, however, can be misleading. Although many characteristics stand out and appear to create a profile of the typical person who drives after consuming alcohol, not all drivers who exhibit these characteristics drive after using alcohol and not all persons who drive after consuming alcohol display these characteristics. There exists considerable variability in the characteristics of persons who drive after drinking and a single profile may have little predictive validity.

Studies in this area using complex statistical analyses have revealed that it is possible to identify related clusters of characteristics that could be used to identify subgroups or typologies of persons



who drive after consuming alcohol whose risk of experiencing adverse consequences differed. Various studies have examined groups of driving while impaired (DWI) offenders to identify subgroups (e.g., Arstein-Kerslake & Peck, 1986; Donovan & Marlatt, 1982; Steer, Fine, & Scoles, 1979; Wells-Parker, Cosby, & Landrum, 1986; Wilson, 1991). Although these studies examined somewhat different characteristics, there were similarities in their findings. First, all studies reported one or more “deviant” subgroups, described variously as “irresponsible,” “depressed,” “aggressive/hostile” or “excessive drinkers.” Perhaps the most striking finding was that the largest subgroup of offenders was typically described as “well-adjusted” and could not be distinguished from non-offenders.

Identifying clinically relevant subgroups of drivers who drink not only served to help understand some of the underlying conditions that give rise to this behaviour, but also illustrated the diversity of characteristics of drivers who drink. These findings had immediate relevance in two areas: prevention and rehabilitation. It was apparent that prevention strategies needed to be more diverse. First, the fact that the largest subgroup of drivers who drink could not be distinguished from drivers who do not drink indicated that broad, general prevention campaigns remained important to enhance deterrence, raise the level of understanding and appreciation of the legal and human consequences, assist in developing alternative behaviours, and change social attitudes about the behaviour. In addition, targeting subgroups of offenders with specific messages and tactics was viewed as a means to reach those at high risk of engaging in driving after drinking. Rehabilitation programs for convicted offenders also needed to move beyond the simple “one size fits all” model towards a system that involved a comprehensive assessment of patterns of alcohol use, driving behaviours and personal characteristics as a means to direct offenders to a tailored program that better reflected their needs.



Research on People Who Drive After Using Drugs

Recent interest in the use of drugs by drivers has prompted several investigations of the characteristics of those who engage in this behaviour and of those most likely to experience the adverse consequences of doing so. As was the case for studies of persons who drive after consuming alcohol, studies of those who drive under the influence of drugs have examined various populations – the general population of drivers, drivers on the road, drug-impaired driving offenders and crash-involved drivers. The following section reviews the findings from existing studies and also includes some original analyses using available data that has information about people who drive after using drugs.

Population Surveys

Young drivers are at high risk of crash involvement and have been the focus of several studies. In an examination of data from the U.S. National Survey on Drug Use and Health, Azofeifa, Mattson and Lyerla (2015) found that among 16 to 25-year-olds who reported cannabis use but no other illegal drug use in the past 12 months, 3.2% had driven under the influence of cannabis. Males were more likely to have done so (3.7%) compared to females (2.7%). Males were also more likely to have driven after drinking and after a combination of alcohol and cannabis use.

Benotsch and colleagues (2015) conducted an online survey of the non-medical use of prescription drugs and driving among college students aged 18 to 25. Non-medical prescription drug use was reported by 28% of respondents. Among the 12.2% who reported driving after the non-medical use of these drugs, the use of other psychoactive substances was significantly more likely. These drivers also scored higher on measures of impulsivity, hopelessness and sensation seeking, and reported lower perceptions of risk associated with driving after non-medical drug use.

Using data from a survey of drug use among high school students in Atlantic Canada, Asbridge, Cartwright and Langille (2015) examined driving under the influence of opioids. Overall, 4.3% of all senior students eligible to drive (aged 16 to 18; n=3,655) reported driving under the influence of opioids in the past year. Among those who had used a prescription opioid, 14% had driven after use. The rate of driving under the influence of an opioid was higher (25.1%) among those who used opioids both medically and recreationally than among those who used opioids for medical purposes only (9.6%). Driving under the influence of opioids was associated with higher socio-economic status, higher sensation seeking, lower parental attachment, recreational use of opioids and engaging in other risky driving behaviours.

Le Strat, Dubertret and Le Foll (2015) examined data from the 2001–2002 National Epidemiological Survey on Alcohol and Related Conditions in the United States. This survey involves over 43,000 adults aged 18 and over. Among those who reported ever having used cannabis, 5.15% also reported having driven after use. Early age of onset of cannabis use was found to be associated with an increased risk of driving after cannabis use, with those who used cannabis before the age of 14 being three times more likely to report having driven after using cannabis than those who began using cannabis later.

Although the research in this area has tended to focus on younger drivers, Choi, DiNitto and Marti (2015) examined factors associated with driving under the influence of alcohol or drugs or both among older adults. Using data from 11,188 respondents aged 50 and over in the National Survey on Drug Use and Health, these authors identified four risk groups based on their patterns of substance use, previous incidents of driving under the influence and previous arrests. The largest



group (63% of the sample) had the lowest risk. The highest risk group (9% of the sample) had the lowest education and income levels, the poorest self-rated health, the highest rates of divorced or never-married persons, and the highest rates of mental health problems. A subsequent study reported that higher frequency of alcohol use, heavy episodic drinking, cannabis use and history of a major depressive episode were factors that increased the risk of driving under the influence in this sample of older drivers (Choi, DiNitto, & Marti, 2016).

In an online survey of 865 individuals aged 18 and over who reported using cannabis following its legalization in Colorado and Washington, 43.6% of respondents reported driving under the influence of cannabis within the past year and 23.9% reported doing so at least five times in the past month. Knowledge of cannabis and driving laws was a weaker predictor of driving after cannabis use than increased perceptions of the dangers of the behaviour, which suggests that prevention messages might be best focused on safety rather than the law. (Davis, et al., 2016).

In an online survey that included questions about driving after using cannabis in the past 30 days, Berg and colleagues (2018) targeted individuals aged 18 to 34 years who use cannabis. Participants (n=1,567) used cannabis on an average of 17.8 days in the past month; 48.4% reported driving after cannabis use in the past month and 74% reported having been a passenger with a driver who had used cannabis. The factors associated with driving after cannabis use included: younger age, more frequent cannabis use, having more friends who used cannabis, less concern about driving after cannabis use and being more likely to rate “getting high” as the reason for using cannabis.

CADUMS Data

The Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) was a comprehensive telephone survey on alcohol and other drug use conducted by Health Canada from 2008 through 2012. It included residents of Canada aged 15 and over in all ten provinces. In addition to questions about substance use, the content included items concerning general health and well-being, harms related to alcohol and drug use, and driving after using alcohol or cannabis. Combining the datasets from 2009 through 2012 yielded 841 persons who indicated they had driven a motor vehicle within two hours of using cannabis within the past 12 months (Health Canada, 2013).¹

Among this group of drivers, 75.6% were male. Just over 40% were between the ages of 18 and 29. The majority (88.2%) rated their general health in the “good” to “excellent.” Similarly, 89.6% rated their mental health in the same range.

Although rates of tobacco smoking have decreased substantially over the past several years, over half (54.0%) of those who indicated driving after cannabis use reported currently smoking tobacco. This compares with 15% of the general population who reported smoking tobacco regularly (Health Canada, 2019a).

The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), developed by the World Health Organization to assess the risk of experiencing health and other problems associated with the use of specific substances (WHO ASSIST Working Group, 2002; Humeniuk, et al., 2008), was included in the CADUMS questionnaire to assess potential problems related to cannabis use. Scores on this instrument range from 0 to 39 with scores of four or more indicating a pattern of use

¹ The sample of 841 persons who reported driving after using cannabis were identified from the 47,836 people who completed the CADUMS surveys from 2009 through 2012. The responses of these people to the survey were used to describe the characteristics of this sample. This group is not considered a representative sample of Canadians who drive after using cannabis.



associated with a moderate to high risk of experiencing problems and dependency. Among the group that indicated they drove after using cannabis, 81.8% had ASSIST scores of four or higher.

The use of other substances was commonly reported by people who drive after using cannabis. Among this group of drivers, 32.4% reported the use of at least one other drug in addition to cannabis in the year prior to the survey.

People who drive after using cannabis also report heavy alcohol consumption. Among this group, 28% reported drinking five or more (males) or four or more (females) drinks on a single occasion at least once a week. The Alcohol Use Disorders Identification Test (AUDIT), a 10-item test developed by the World Health Organization to screen for harmful patterns of alcohol use (Babor et al., 2001), was also included in the CADUMS questionnaire. Scores of eight or more are indicative of hazardous and harmful alcohol use and possible alcohol dependency. Among respondents who reported driving after the use of cannabis, 57% had AUDIT scores of at least eight.

Among the group of 841 people identified in CADUMS who reported driving after the use of cannabis, riding as a passenger with other drivers who have used alcohol or cannabis was also commonly reported. Among those who drove after using cannabis, 42.8% reported riding as a passenger with someone who had been drinking and 73.9% indicated that they had been a passenger in a vehicle driven by someone who had recently used cannabis.

The Canadian Cannabis Survey (n=12,958) determined that among persons who indicated they used cannabis, 38.7% also reported that they had driven a vehicle within two hours of using it. Males were almost twice as likely as females to report having done so (47.9% and 25.5%, respectively). Persons aged 25 and over were most likely to report driving after using cannabis (40.9%), than people younger than 25 (Health Canada, 2019b).

Driver Surveys

Roadside surveys of drivers provide a unique perspective on alcohol and drug use by drivers. By collecting biological samples from drivers on the road, these surveys determine alcohol and drug use at the time of driving. The U.S. National Roadside Survey 2013–2014 (Kelley-Baker et al., 2017) collected oral fluid or blood samples or both from 5,907 nighttime drivers and 1,991 daytime drivers. Overall, 22.3% of daytime drivers tested positive for drugs and 22.5% of nighttime drivers were drug-positive.

Overall drug use was similar during the day and at night, but medications were higher during daytime hours. The combination of alcohol and drugs was more common at night. Cannabis use was more commonly found among male drivers both during the day and the night. Male drivers were more likely than females to test positive for cannabis at all times.

Illegal drugs were detected most frequently among drivers age 16–34 during the day and the night, whereas medications were more common among those over 44 years of age.

Although almost all drivers were found to be wearing seat belts (99%), those who were not using restraints were more likely to test positive for cannabis or other drugs, particularly during nighttime hours.

Roadside surveys similar to those conducted in the United States have also been conducted in various jurisdictions in Canada. The province of British Columbia has conducted several such surveys, most recently in 2018 (Beirness, 2018). A total of 1,878 drivers were interviewed on Wednesday through Saturday nights between the hours of 9 p.m. and 3 a.m. in five cities across the



province. Overall, 8.5% of drivers tested positive for drugs; 4.9% were positive for alcohol. Cannabis accounted for 70% of all drugs detected.

Male drivers were twice as likely as females to be positive for drugs. Drivers age 19–25 and those over 55 were most likely to test positive. Drug use was most prevalent on Thursday night and least common on Saturday night. Drivers on the road between 1:30 and 3:00 a.m. had the highest rates of drug use. Drug use was most common among drivers of pick-up trucks and least common among drivers of mini vans. Drivers with a single same-sex passenger were most likely to be drug-positive.

Arrested Drivers

A good deal of what is known about the characteristics of alcohol-impaired drivers has been derived from studies that have examined groups of drivers who were arrested for their behaviour. In many cases, studies of this population have been conducted within educational and rehabilitation programs designed specifically for the purpose of preventing subsequent occurrences of the behaviour. For a variety of reasons, convicted alcohol-impaired drivers still outnumber drug-impaired drivers by a wide margin. Very few rehabilitation programs have been developed specifically for drug-impaired drivers. Nevertheless, a few studies of drug-impaired offenders have emerged.

Holmgren and colleagues (2008) used a large database of alcohol- and drug-impaired offenders in Sweden to examine re-arrest rates. Males comprised 85% of the sample. Re-arrest rates were significantly higher among drug-impaired drivers (68%) than among alcohol-impaired drivers (14%). Drug concentrations were also higher upon re-arrest than at the time of first arrest.

Maxwell (2012) used a large database of patients entering a substance use treatment program in Texas who had one or more prior impaired driving arrests. Those with a primary problem with cannabis were younger and more likely to be male; females were more likely to use sedatives or opioids. Those whose problem involved alcohol were approximately 10 years older than those with a drug problem. Individuals who used drugs reported more severe problems, more daily use and more mental health issues.

Drug Recognition Expert Evaluations

Drivers suspected of drug-impaired driving are often subject to evaluation by a Drug Recognition Expert using the Drug Evaluation and Classification (DEC) protocol. With the cooperation and assistance of the International Association of Chiefs of Police and the DEC coordinators in Canada and several states, DEC evaluations ($n=5,920$) were collected from police agencies in Canada and United States for use in various projects examining the signs and symptoms of different categories of drugs (e.g., Beirness, Beasley, Porath, & Smith, 2017; Beirness & Porath, 2019; Porath & Beirness, 2019). These data do not represent a random sample of all drivers arrested for drug-impaired driving. Nevertheless, the large sample of cases provides valuable information on the characteristics of drug-impaired drivers and the circumstances of their arrest.

Overall, males comprised 72% of the drug-impaired drivers in this sample. Females were somewhat older than males with 52% between the ages of 26 and 45; 56% of males were between 19 and 35 years of age. The most frequent type of drug used by females was depressants; cannabis was most commonly found among males.

The largest proportion of arrests (45%) occurred between 6 p.m. and midnight; 27% occurred between noon and 6 p.m. An exception to this pattern was arrests involving cannabis; 25% of drivers arrested for driving while impaired by cannabis occurred between midnight and 6 a.m.



Just under 20% of drivers were arrested following involvement in a crash. The highest proportion (38%) of these crashes occurred between noon and 6 p.m.; 34% occurred between 6 p.m. and midnight. Depressant drugs and narcotic analgesics were found in over half of all drivers involved in crashes.

Crash-involved Drivers

Impaired drivers who become involved in crashes are of considerable interest because they are the ones whose behaviour directly affects others as well as themselves. The key to studying this population is the collection of a biological sample for drug testing as soon as possible following the crash. This can be challenging. Testing crash-involved drivers for drugs and alcohol is not the first priority at a crash scene. Getting the injured to hospital, investigating the crash and clearing the scene generally take precedence.

Blood samples are often collected at the hospital for medical reasons. If there is sufficient sample volume, the blood remaining after medical needs have been met can be tested for the presence of alcohol and psychoactive drugs. Brubacher and colleagues (2016) collected such samples from 1,097 drivers in British Columbia. Cannabis was detected more often in drivers involved in nighttime crashes, crashes that occurred on the weekend and crashes that involved only a single vehicle. Alcohol and cannabis were often used together.

Fatal crashes are generally subject to more rigorous investigation than either property damage or personal injury crashes. Although testing for the presence of alcohol among fatally injured drivers has been common practice for many years, testing rates for drugs in Canada² (81.9%) have only recently become comparable to rates of testing for alcohol (87.7%) (Brown, Vanlaar, & Robertson, 2017). A comparison of the alcohol and drug data in 2014 show that drug use (42.4%) now exceeds that of alcohol use (28.4%) by fatally injured drivers. Drug use is more common than alcohol among both men and women. Drug use was common among fatally injured drivers of all ages, exceeding 40% in all age groups except those aged 16 to 19 (36.2%). Although alcohol and drugs are about equally likely to be found among drivers who die in single vehicle crashes (49.2% alcohol, 48.8% drugs), multiple vehicle crashes are considerably more likely to involve drugs (37.9%) than alcohol (13.7%). The most commonly found drug in driver fatalities is cannabis (44.7%), followed by depressants (41.2%).

Romano and Pollini (2013) examined drug and alcohol test results from 16,942 drivers killed in single vehicle crashes contained in the Fatality Analysis Reporting System in the United States. Alcohol was detected in 45.1% of fatalities; drugs were detected in 25.9%. Male drivers were significantly more likely than females to be positive for alcohol, but there was no sex difference in overall drug prevalence. However, there were differences between males and females by drug category. Males were more likely to test positive for cannabis whereas females were more likely to test positive for depressants and opioids. Perhaps most revealing was the fact that the characteristics of drug-involved fatal crashes differed markedly from those that involved alcohol. Whereas alcohol-involved crashes are most prominent on weekend nights and particularly during late night–early morning hours, drug-involved crashes were distributed evenly throughout all times of day and all days of the week.

² This statement does not apply to data for British Columbia.



Discussion

Information from research examining various subgroups of drivers reveals insights into the characteristics of those who drive after drug use. Population surveys provide data on people who self-identify as having driven following the use of drugs. These surveys allow a comparison of the characteristics of those who engage in the behaviour with those who do not. In addition, population surveys can assess a broad range of psychosocial characteristics such as health status, other drug and alcohol use, and personality dimensions such as sensation seeking. These studies are valuable, but are limited by the extent to which drivers are willing to admit engaging in the behaviour. Studies of drivers whose drugged-driving behaviour has come to the attention of police either through an impaired driving arrest or crash involvement provide information on a subgroup of all drugged drivers. The scope of information available can vary considerably. Special studies with arrested drinking drivers have been particularly important in identifying high-risk subgroups of alcohol-impaired drivers, but few such studies with groups of drug-impaired drivers have emerged.

From the available research, it is apparent that males predominate among those who drive after drug use. The exception is among fatally injured drivers, where males and females are equally likely to test positive for drug use. Male drivers, however, tend to drive after using cannabis; females are more likely to drive after using sedatives or opioids.

Persons who drive after using drugs are generally younger than those who drive after drinking. Drivers in their 20s were most prominent among those who reported driving after cannabis use, whereas drinking drivers were more likely to be 30 to 45 years of age.

Those who drive after drug use are also likely to engage in other health-compromising and high-risk behaviours, including tobacco smoking, use of other drugs and riding as a passenger with a driver who has used alcohol or drugs.

Greater involvement with drug use is also characteristic of those who drive after drug use. Initiating drug use at an early age, high frequency of drug use and the use of more than one substance is commonly reported. The probability of experiencing drug-related problems is high for these drivers.

Drivers who report operating a vehicle after using cannabis also report frequent and heavy alcohol use. This subgroup of drugged drivers represents a group that is also at high-risk of driving after drinking and of experiencing serious substance use problems.

Population surveys have also reported high levels of impulsivity, sensation seeking and depression, and lower levels of perceived risk among those who drive after using drugs. These characteristics have also been reported among groups of drinking drivers and might contribute to the overall willingness of these individuals to engage in these behaviours.

Despite the fact that drug use by drivers now rivals the use of alcohol by drivers as one of the most prominent issues in road safety, research to help identify those at greatest risk of drug-impaired driving has lagged behind that on drivers who drink. Although there appears to be considerable overlap among the characteristics of those who engage in driving after using either alcohol or drugs, simply assuming that driving after alcohol- and drug use are different expressions of essentially the same behaviour and that the same characteristics and motivations underlie both could lead to erroneous conclusions about the most effective measures to deal with the behaviour.

Clearly, there are similarities between alcohol use and drug use. To a large extent, alcohol and drugs are often used to experience their pleasurable effects. However, whereas all types of beverage alcohol contain the same psychoactive ingredient (i.e., ethyl alcohol), there are numerous types of drugs, all



of which can have a different set of intoxicating and impairing effects. Some drugs (e.g., cocaine) are used for non-medical purposes; others are taken to treat medical conditions (e.g., opioids). The circumstances under which these various types of drug use occur, the characteristics and motivations of those who use them, and the associated risks and harms can vary substantially. A better understanding of drug use and driving behaviour requires additional studies to examine the similarities and differences among the two behaviours and the characteristics of those who engage in them.

Drug use among male drivers is more prominent than among females, and it was noted that the types of drugs used differ between males and females. The current focus on cannabis, which is most often used by male drivers, could unintentionally exclude or limit the inclusion of females in studies in this area. Specific studies of females who drive after drug use could provide greater insights into the underlying patterns of drug use among females and lead to better prevention and intervention programs.

Despite the existence of prominent characteristics, there remains a considerable degree of heterogeneity within this population. As we move forward in our understanding of this area, we need to be mindful of the fact that not all people who drive after using drugs will exhibit the same pattern of characteristics. As was the case for drivers who drink, there might well exist a large subgroup of drivers who use drugs that will not stand out or display any particular characteristics that would distinguish them from the general population of drivers. For this reason, continued dissemination of broad-based, evidence-informed prevention messages is required to inform, change attitudes and enhance general deterrence.

The findings from this work are also limited because they are not based on a systematic review of the literature. The objective of this review, however, was to explore the literature and data that were readily available to provide an initial indication of the characteristics of persons who drive after drug use and to determine whether this group might differ from those who drive after drinking. It is anticipated that the findings reviewed in this report could prompt further research to better understand drugged-driving behaviour and those who engage in it.

Despite the variability of characteristics within the population of people who drive after using drugs, further research could reveal sets of prominent characteristics that define distinct subgroups of this population. These subgroups might differ in the frequency of driving after drug use, the personal and environmental factors precipitating the behaviour, and degree of risk of experiencing negative consequences as a result of engaging in driving after using drugs. The identification of such subgroups can be used to facilitate the creation of targeted prevention and public education messages and programs, enhance the implementation of more efficient enforcement activities, and contribute to the development of more effective rehabilitation programs directed at specific factors associated with the behaviour within these subgroups. Better understanding of the characteristics of target groups is a critical step in reducing the prevalence of drugged-driving behaviour and the negative consequences associated with it.

As the legalization of cannabis continues to expand across countries, the landscape of drug use, driving after the use of drugs and the characteristics of those who engage in the behaviour could change substantially. Continued monitoring is essential to help ensure that prevention, intervention and rehabilitation programs remain up to date and best able to address the issues.



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