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The use of psychoactive prescription drugs among DUI suspects

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ABSTRACT

Background: The study seeks to increase understanding of the use of psychoactive prescription drugs among persons suspected of driving under the influence (DUI). We studied whether the use of prescribed psychoactive medication was associated with DUI, and examined the difference in the use of prescription drugs between DUI recidivists and those arrested only once.
Methods: In this register-based study, persons suspected of DUI ($n = 29\,470$) were drawn from the Register of DUI suspects, and an age- and gender-matched reference population ($n = 30\,043$) was drawn from the Finnish general population. Data on prescription drug use was obtained by linkage to the National Prescription Register. The associations of DUI arrest and use of psychoactive prescription drugs in different DUI groups (findings for alcohol only, prescription drugs, prescription drugs and alcohol, illicit drugs) were estimated by using mixed-effect logistic regression.
Results: The use of psychoactive prescription drugs and DUI appeared to be strongly associated, with DUI suspects significantly more likely to use psychoactive prescription drugs compared to the reference population. Gender differences existed, with the use of benzodiazepines being more common among female DUI suspects. Moreover, DUI recidivists were more likely to use psychoactive prescription drugs compared to those arrested only once.
Conclusions: In addition to alcohol and/or illicit drug use, a significant proportion of DUI suspects were using psychoactive prescription drugs. When prescribing psychoactive medication, especially benzodiazepines, physicians are challenged to screen for possible substance use problems and also to monitor for patients' alcohol or illicit drug use while being medicated.

1. Introduction

Numerous different studies have shown that the use of alcohol and/or other psychoactive drugs impairs driving abilities and that driving under the influence (DUI) increases the risk of a traffic accident (Dassanayake et al., 2011; Gjerde et al., 2011; Hels et al., 2011; Kelly et al., 2004; Li et al., 2013; Schnabel et al., 2010). Therefore, it is understandable that drunk/drugged driving is often considered a traffic-safety-related problem.

DUI suspects are mainly identified as driving under the influence of alcohol, both in Finland (Impinen et al., 2008; Ojaniemi et al., 2009) and elsewhere (Schulze et al., 2012), while those driving under the influence of illicit drugs and/or prescription drugs that impair driving skills constitute a minority. Police practices may explain some of this: DUI suspects may not be tested for other substances if an illegal level of alcohol is already found (Acar et al., 2013; Lillsunde and Gunnar, 2005), or the impairment caused by prescription drugs is not identified. Hence, DUI suspects may actually also be using other substances, but these remain undetected. DUI of prescription drugs is, however, one of the growing traffic concerns (Berning et al., 2015; Rudisill et al., 2014) and in this study we strive to explore DUI suspects' use of psychoactive prescription drugs irrespective of whether they were detected already during the DUI arrest.

In addition to being a traffic safety problem, DUI can be seen as a possible indicator of excessive or problematic substance use. Being apprehended by the police for drunk/drugged driving (possibly several times) can be seen as a reference to some kind of substance use problems per se. DUI has shown to be associated with substance use disorders and other mental health problems (Freeman et al., 2011; Karjalainen et al., 2013; Lapham et al., 2001),

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social and economic problems (Impinen et al., 2011; Karjalainen et al., 2011, 2014) and other criminality (Räsänen et al., 1999), all factors that are linked with problematic substance use, too. In addition, drugged drivers are commonly found to be using psychoactive prescription drugs that have abuse potential (Christophersen and Morland, 2008; Karjalainen et al., 2010), and there is some evidence that sedative-hypnotics are widely abused by these drivers (Kriikku et al., 2015). Since the use of psychoactive prescription drugs with abuse potential (such as benzodiazepines or opioids) is associated with substance use problems in general (Connor et al., 2014; Rönkä et al., 2015), this important research topic is relevant also in regard to DUI suspects.

The purpose of this study is to provide increased understanding about the use of psychoactive prescription drugs among DUI suspects, a population with a higher propensity for substance use problems. Our study was based on extensive register-based data linkage between the register of Finnish DUI suspects and the National Prescription Register. The first aim was to study the use of prescribed psychoactive medication (described as prescription drug purchases) among persons suspected of DUI and to examine whether it differed from a reference population. Additionally, we set out to examine the difference in the use of prescription drugs between DUI recidivists and those arrested only once.

2. Material and methods

The legislation concerning DUI varies from country to country. In Finnish drunk driving legislation (Ministry of Justice, 2003), the punishable threshold for blood-alcohol concentration (BAC) for drunk driving is 0.5‰ (g/kg). Since February 2003 there has been a zero tolerance law for illicit drugs and driving, which includes also medicinal substances (e.g., benzodiazepines) listed in the Government Decree on substances, preparations and plants 548/2008 (Ministry of Social Affairs and Health, 2008) and used illicitly, i.e., without prescription. However, if the use of these medicinal substances is licit (driver has a prescription), DUI of psychoactive prescription drugs is then controlled with the impairment law: the driver will be convicted of driving while intoxicated from the use of any substance if impairment can be proven in court.

In Finland, drunk or drugged drivers are in most cases apprehended by the police due to dangerous driving, traffic accidents, information from a bystander and random stop-checks. Finnish police are authorized by law to submit drivers to a preliminary breath alcohol screening test or oral fluid on-site drug test while in the field. If a field test proves positive or there are other symptoms of drug use, the driver becomes a DUI suspect, and then, at the request of the police, precision breath testing is performed or blood/urine samples are taken (Lillsunde and Gunnar, 2005). During the period 1977–2008, all these alcohol/drug analyses of DUI suspects were carried out centrally at the National Institute for Health and Welfare (THL, previously the National Public Health Institute KTL), and registered in a database (the Finnish Register of DUI suspects).

2.1. Data

This study was based on extensive register material. The study population was drawn from the Finnish Register of DUI suspects, which includes all persons arrested and suspected of DUI by the police. However, this register does not include information on whether these suspects have eventually been convicted for DUI. For the purposes of a larger study concerning DUI, a 40% random sample of all DUI suspects was drawn from the Register of DUI suspects. Age- and gender-matched control subjects (hereafter referred to as the reference population) were drawn from the general Finnish population not suspected of DUI, as identified from the Population Information System. In this study, the data consisted of DUI suspects arrested for the first time in the period 1999–2005 ($n = 29\,470$) and their reference population ($n = 30\,043$), who were matched with DUI suspects at the time of the DUI suspects' first arrest (hereafter referred to as the *index year*). The number of subjects in the reference population was slightly higher, though the impact on the results can be considered negligible, as this is a reference group, not paired case controls.

Information about the use of psychoactive medication among DUI suspects and the reference population was obtained from the National Prescription Register maintained by the Social Insurance Institution of Finland (KELA). All outpatient prescription medicine purchases reimbursed by KELA are registered in this database. Finnish residents are entitled to reimbursement for medical expenses if the medicine is prescribed by a doctor for the treatment of illness. Reimbursement covers 35–100% of the costs of the medicine, and is deducted from the price directly at the pharmacy on presentation of the health insurance card (The Social Insurance Institution of Finland, 2014). The register was linked individually to the study population by using the unique personal identity number.

2.2. Measurement

DUI suspects were classified into four categories by substances found in their blood/urine samples during their first arrest. The groups consisted of drivers suspected of driving under the influence of alcohol (DUIA, $n = 27\,861$); prescription drugs impairing driving skills (DUIP, $n = 402$, no other substance found); alcohol and prescription drugs (DUIAP, $n = 335$); and illicit drugs (DUID, $n = 872$, may have had findings for alcohol and/or prescription drugs, too). Mean BAC among DUIA suspects was 1.3‰. Most (87%) in the DUIP group had a finding for benzodiazepines, 24% for prescription opioids and 39% for other prescription drugs impairing driving abilities. Mean BAC among DUIAP suspects was 1.2‰ and in addition to alcohol, 88% were found to have benzodiazepines, 11% to have prescription opioids and 28% to have other prescription drugs in their system. DUID suspects were found to have at least amphetamines (65%) or cannabinoids (59%). In addition to illicit drugs, 22% of DUID suspects had a finding for alcohol (mean BAC 0.9‰) and 66% for prescription drugs (of these 96% had a finding for benzodiazepines, 27% for opioids, 6% for other prescription drugs).

The use of psychoactive prescription drugs was determined by the purchases of reimbursed medication registered in the National Prescription Register. In the register, reimbursed prescription drugs are classified by WHO's Anatomical Therapeutic Chemical (ATC) Classification System. The data used in this study included information about the purchases of drugs in the ATC code N group (acting on a nervous system) only. Of particular interest was the use of prescription drugs with abuse potential, and for the purpose of the analyses, these drugs were classified into three different categories. The first group, labeled 'all abusable drugs', included all prescription drugs with abuse potential: benzodiazepines (ATC codes N03AE, N05BA, N05CD), opioids (N02A), hypnotics (N05CA, N05CB, N05CF, N05CM), methadone (N07BC02), methylphenidate (N06BA04) and pregabalin (N03AX16). In addition to all abusable drugs, we were to examine two specific drug groups separately: 'benzodiazepines' (including also benzodiazepine related drugs such as zolpidem, zaleplon and zopiclone, acting on similar receptors as benzodiazepines, ATC codes N03AE, N05BA, N05CD, N05CF) and 'opioid analgesics' (painkillers, N02A).

Each purchase by the DUI suspect and the reference of the abovementioned drugs were followed up on an annual basis for a total of eight years. The index year (0) was, among DUI suspects, the year of first arrest, and among references, the corresponding year