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Brief Report

MINOR INJURY CRASHES: PREVALENCE OF DRIVER-RELATED RISK FACTORS AND OUTCOME

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□ **Abstract—Background: The majority of crashes cause "minor" injuries (i.e., treated and released from the emergency department [ED]). Minor injury crashes are poorly studied. Objectives: This study aims to determine the prevalence of driver-related risk factors and subsequent outcome in drivers involved in minor crashes. Methods: We interviewed a convenience sample of injured drivers, aged over 17 years, who were treated and released from the ED. Follow-up interviews were conducted 6 months after the crash. Results: We approached 123 injured drivers; baseline interviews were completed in 69 and follow-up interviews in 45. Prior to the index crash, 1.4% of drivers drank alcohol, 1.4% used illicit drugs, and 7.2% used sedating prescription medications. Nine drivers (13%) were distracted. In this sample, 5.8% met criteria for being aggressive drivers, 7.2% were risky drivers, and 11.6% drove while experiencing negative emotions. At 6-month follow-up, many drivers were still having health problems, 53.3% were not fully recovered, 46.7% had not returned to usual activities, and 28.9% were off work. Of the 42 participants who resumed driving, 16.7% had a near miss and 4.8% had another crash. Nine (21.4%) reported drinking and driving, and 9.5% reported driving after cannabis use. Cell phone use (16.7%) and use of other electronics while driving (23.8%) were also common. Conclusions: Driver-related risk factors are common in drivers involved in minor injury crashes, and drivers persist in taking risks after being involved in a crash. Despite their name, minor injury crashes are often associated with slow recovery and prolonged absenteeism from work.**

□ **Keywords—motor vehicle crashes; risk factors; alcohol; drug-impaired driving; distraction; aggressive driving**

INTRODUCTION

Globally, road trauma is responsible for over 1.3 million fatalities and 54 million injuries per year (1,2). Although road trauma surveillance is based on serious injury crashes, the majority of crashes that result in an emergency department (ED) visit cause *minor injuries*—defined as those that do not require hospital admission. Despite their name, minor injury crashes can result in adverse sequelae such as "whiplash," concussion, and chronic pain (3–7). Minor injury crashes are also a burden on society. They use police and health care resources, interfere with traffic, and cause property damage.

The majority of crashes are attributed to driver-related factors such as distraction, aggressive driving, and impairment from alcohol or drugs (8,9). The prevalence of distracted driving is believed to be increasing as more drivers use cell phones and other electronic devices (10). Research into driver-related factors has largely focused

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on serious injury crashes and it is not known if minor injury crashes have the same risk-factor profile.

Long-term disability as a result of orthopedic, spinal, or brain injuries or from chronic pain or psychological sequelae is common after major motor vehicle collisions (MVCs) (11–14). However, sequelae of minor injury crashes are seldom studied, and their subsequent outcome is poorly understood (3,15). Much of the available evidence comes from studies performed decades ago when vehicle safety features such as airbags and crumple zones were less common, or from research conducted in Europe, or Australia (7,15–18). These findings may not be generalizable to North America because recovery after an MVC is related to patient expectations, or compensation seeking, which may be different in North America (18,19).

The current pilot study aims to provide preliminary estimates of 1) the prevalence of driver-related risk factors (distraction, aggressive driving, substance use) in drivers treated and released from the ED after a crash, and 2) the 6-month health outcome and subsequent driving behavior of drivers after minor crashes.

METHODS

This study was approved by the University of British Columbia institutional research ethics board. The study was conducted at an urban, Level I trauma center with an annual census of approximately 85,000 adult visits at the time of the study. Volunteer medical student research assistants (RAs) were trained and supervised by the principal investigator and by a research associate. RAs interviewed a convenience sample of injured drivers who were treated in the ED of Vancouver General Hospital using a structured questionnaire. RAs practiced the interview prior to commencing the study and reviewed interview questions and possible responses with the principal investigator and research associate to ensure that they understood the meaning of each question. During times when an RA was available, injured drivers who were being treated in the ED were identified by manually scanning the electronic ED visit log to identify all patients with trauma-related chief complaints and then reviewing trauma flags (added by ED registration clerks at time of admission) to identify which patients were drivers in a car crash. We have previously confirmed the high accuracy of these trauma flags (20). We included all injured drivers aged over 17 years. We excluded drivers who were: 1) nonresidents of British Columbia; 2) unable to communicate in English; 3) amnestic for the event; 4) unable to complete the interview due to pain or injuries; or 5) admitted to hospital.

Baseline Interviews

Drivers were approached for consent while still in the ED. RAs screened potential participants to confirm that they were alert and oriented prior to explaining the study and asking for verbal consent to participate. Baseline interviews were conducted in person while drivers were still in the ED during times when they were not being actively treated by clinical staff. Participants received a $25 honorarium. RAs read each interview question verbatim and provided additional explanation as required. Interviews lasted 30 min and included: 1) a description of the crash event; 2) drug or alcohol use in the 6 h preceding the crash; 3) dangerous driving behavior (Dula Dangerous Driving Index); and 4) general driving history including perceived driving ability, previous crashes and citations, and use of seatbelts and child seats (21,22). Participants were asked to describe how the crash occurred, where the crash occurred, and exactly what they (i.e., the driver) were doing at the time of the crash (RAs mentioned the following examples—talking to a passenger, using a cell phone, sipping a beverage, looking at a map—but the term “distraction” was not mentioned). Driver’s responses were recorded. RAs used feedback and follow-up questions to clarify ambiguous responses. In this study we define distraction as occurring when drivers were actively engaged in any non-driving-related activity at time of crash.

The Dula Dangerous Driving Index (DDDI) asks about aggressive driving and other dangerous driving indicators (22). The DDDI questionnaire captures three domains relevant to aggressive driving: 1) risky driving, which is dangerous driving without intent to cause harm, such as running a red light or weaving in traffic; 2) negative emotions felt while driving (including frustration, anger, rage, but also other negative emotions such as sadness or jealousy); and 3) intentional acts of aggression toward others, such as trying to run another driver off the road (21,23). The DDDI has been validated in known dangerous drivers from the United States (US) and Belgium (22).

Follow-Up Interviews

Drivers who consented to follow-up were contacted 6 months after the index crash. They were contacted by telephone (up to five attempts) and asked questions about 1) personal health, financial, social, and legal sequelae resulting from the index crash, and 2) subsequent driving records including other collisions, and risky driving behavior (impaired, speeding, distracted driving).