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Work and non-work-related vehicle crashes: The contribution of risky driving practices

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ABSTRACT

Background: This study compared the characteristics of non-work and work-related crashes using linked population data on police-reported road crashes and hospital admission records in order to shed new light on the contribution of risky driving behaviour.
Method: A retrospective analysis was conducted of vehicle crashes involving injured car drivers and motorcyclists identified in linked police-reported and hospitalisation records during 1 January 2001–31 December 2011 in New South Wales (NSW), Australia. Working status was identified from hospitalisation records. Univariate and multiple variable logistic regression was conducted.
Results: There were 38,240 car drivers and motorcyclists identified, of which 10.2% were travelling for work-related purposes. For car drivers, work-related crashes were less likely to involve alcohol (OR 0.17; 95%CI 0.13–0.22) or fatigue (OR 0.80; 95%CI 0.69–0.93), occur at an intersection, or involve a dry road, but were more likely to have worn a seat belt (OR 1.66; 95%CI 1.06–2.58), occur in a metropolitan area and at speeds greater than 50 km/h than non-work-related crashes. For motorcyclists, work-related crashes were less likely to involve alcohol (OR 0.12; 95%CI 0.07–0.21) or excessive speed (OR 0.68; 95%CI 0.55–0.85), occur on a curved section of roadway, involve a dry road, or occur on roadways with speed limits of between 100 and 110 km/h, but operators were more likely to have worn a helmet (OR 2.40; 95%CI 1.24–4.66), and crashes were more likely to have occurred in a metropolitan area, than non-work-related crashes.
Conclusion: Alcohol, fatigue and speed are less likely to be involved in work-related vehicle crashes compared to non-work-related crashes. Individuals injured while driving for work purposes were more likely to engage in safety promoting behaviours, such as wearing a seat belt or a motorcycle helmet, compared to individuals not driving for work purposes. It appears that there could be a higher motivation to conform to safe driving behaviours for individuals while driving for work.

1. Introduction

Road traffic injury is a significant and increasing public and occupational health issue. Despite advances, road crashes account for an estimated 1.3 million deaths annually and are projected to become the third leading cause of the burden of disease by 2030 (World Health Organization, 2008). In Australia, work-related vehicle crashes are the most common cause of occupational injury (Driscoll et al., 2001; World Health Organization and World Bank, 2004; Stuckey et al., 2010). It has been estimated that 20–30% of fleet vehicles crash each year, with drivers of company vehicles experiencing 50% more crashes than private vehicle drivers (Haworth et al., 2000). Fleet vehicle crash costs have been estimated to account for 13–15% of all fleet spending (Haworth et al., 2000). Within New South Wales (NSW) Australia, work-related road traffic crashes resulted in 530 compensation claims and cost an estimated $22.3 million in 2008–2009 (WorkCover NSW, 2010). During this same time period, there were also a further 3512 claims for vehicle crashes while commuting to or from work in NSW with total payments of $83.9 million (WorkCover NSW, 2010).

Some prior research has suggested that individuals who are engaged in work-related driving, including commuting to and from work, are more likely to crash and to engage in risky driving practices, such as speeding, than if they were driving for non-work-related purposes (Downs et al., 1999; Lynn and Lockwood, 1998; Adams-Guppy and Guppy, 1995). Downs and colleagues (Downs et al., 1999) postulated

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that individuals driving for work purposes could be exposed to more time pressure, which could lead to higher vehicle driving speed, and also a higher likelihood of driving while fatigued. Lynn and Lockwood (Lynn and Lockwood, 1998), in a survey of 4479 company car drivers and drivers of private vehicles in the United Kingdom (UK), found that company car drivers had about 50% more vehicle crashes than drivers of private vehicles, even after accounting for demographic and exposure differences. Newnam et al. (2002), in a survey of 204 individuals regarding their driving found that individuals reported experiencing higher vehicle crash rates in their work vehicle compared to their private vehicle, but reported that they were less likely to speed or to engaged in unsafe driving practices while driving a work vehicle than their private vehicle.

Information on driving practices and the influence of risky driving behaviour on work and non-work-related vehicle crashes has usually been obtained from driver surveys among a sample of the population (Downs et al., 1999; Lynn and Lockwood, 1998; Adams-Guppy and Guppy, 1995; Newnam et al., 2002). Because survey responses can be influenced by various biases, such as response rates and self-reporting bias, there is a need to examine the influence of risky driving behaviour and crash characteristics among work and non-work-related vehicle crashes on a larger scale through a population-level data collection, such as police-reported vehicle crashes. Prior research has compared population fatality rates for working, commuting to and from work, and non-work-related vehicle crashes in France during 1997–2006 (Charbotel et al., 2010). However, this research did not examine in-depth the demographic, crash and environmental characteristics by type of road user, nor did it identify potential risky driving practices and their influence on the crash. There is also a need to examine work-related risky driving practices in an Australian context.

This study aims to compare the characteristics, including risky driving practices associated with non-work and work-related car and motorcycle crashes in NSW using linked police-reported road crash and hospital admission records during 2001–2011. Cars and motorcycles were the vehicles considered because they have been found to be the most commonly used vehicles by individuals for both work and non-work-related purposes (Charbotel et al., 2001; Mitchell et al., 2013).

2. Method

A retrospective analysis of road trauma-related injuries of car drivers and motorcyclists identified in linked police-reported crash and hospital admission records aged 16 years or older during 1 January 2001–31 December 2011 was conducted. Ethics approval was obtained from the NSW Population and Health Services Research Ethics Committee (2010/10/273) and was ratified by the University of NSW Human Research Ethics Committee (HREC 11125).

2.1. Data collections

The Admitted Patient Data Collection (APDC) includes information on all inpatient admissions from all public and private hospitals, private hospital day procedures, and public psychiatric hospitals in NSW. The APDC contains information on patient demographics, source of referral, diagnoses, external cause(s), hospital separation type (e.g. discharge, death) and clinical procedures. Diagnoses and external cause codes are classified using the International Classification of Diseases, 10th Revision, Australian Modification (ICD-10-AM) National Centre for Classification in Health, 2006. Any APDC records with the separation coded as death (i.e. died in hospital) were excluded.

Hospital admissions were considered to be work-related if at least one of the following three criteria were met: (i) the activity classification indicated the person was working at the time of the admission (i.e. ICD-10-AM: working for income codes: Y93.2 or U73.0 to U73.09; or (ii) hospital payment status indicated 'compensable – NSW workers' compensation'; or (iii) supplementary factors related to causes of morbidity and mortality was identified as a 'work-related condition' (i.e. ICD-10-AM: Y96). Driving for work purposes and commuting to or from work were not able to be disaggregated and as a result both working and commuting were defined as 'work-related'.

The CrashLink data collection contains information on all police-reported road traffic crashes on a public road in NSW where a person was unintentionally fatally or non-fatally injured, or at least one motor vehicle was towed away. Information pertaining to the crash and conditions at the incident site, the traffic unit or vehicle, and the vehicle controller and any casualties resulting from the crash are recorded. Each individual is identified as being non-injured, injured or killed (died within 30 days). No information on injury severity is available and the response of 'no/unknown' to indicate whether speed or fatigue contributed to a crash were not able to be disaggregated. Individuals who were non-injured or killed were excluded. Road users were identified using the traffic unit group (i.e. motorcyclist operator or car/car derivative driver, including 4 wheel drives, panel and passenger vans, utilities, and station wagons). Car passengers ($n = 9090$) and pillion riders ($n = 409$) were excluded.

2.2. Data linkage

The APDC was linked to the police-reported crashes in CrashLink by the Centre for Health Record Linkage (CHeReL). The CHeReL uses identifying information (e.g. name, address, date of birth, gender) to create a person project number (PPN), for each unique person identified in the linkage process. The record linkage used probabilistic methods and was conducted using *ChoiceMaker* software (Choicemaker Technologies, 2011). A successful link was defined as when the PPN matched in both data collections, and the admission date in the APDC was on the same day or the next day as the crash date in CrashLink. Upper and lower probability cut-offs started at 0.75 and 0.25 for a linkage and were adjusted for each individual linkage to ensure false links are kept to a minimum. Record groups with probabilities in between the cut-offs were subject to clerical review. The overall linkage rate for road trauma recorded by the police to road traffic-related hospital admissions was 54%, so the CrashLink data collection contains 54% of the records that were identified as road traffic-related hospital admissions in the APDC.

2.3. Injury severity

Injury severity was calculated using the International Classification of Disease Injury Severity Score (ICISS). The ICISS is derived for each person by summing the probability of survival for each injury diagnosis using survival risk ratios (SRR) calculated for each injury diagnosis (Stephenson et al., 2004). In a prior study of all land transport trauma, the diagnosis classifications recorded within hospital records and survival outcome for 109,843 individuals were used to generate SRRs for all ICD-10 injury codes during 2001–2007 (Bambach et al., 2012). These data represent a census of all land transport trauma in NSW during the period, and for each ICD injury (ICD_i) the SRR was calculated from the following equation.

$$SRR_{ICD_i} = \frac{\text{Number of individuals with injury } ICD_i \text{ that survived}}{\text{Total number of individuals with injury } ICD_i} \quad (1)$$