

The association between sudden illness and motor vehicle crash mortality and injury among older drivers in NSW, Australia

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Abstract

This exploratory study aims to investigate the associations between sudden illness and the risk of motor vehicle crash-related mortalities and injuries among older drivers aged 60 or above. Information utilised in the study was obtained from police reports of all road traffic accidents that occurred on the roads between 1996 and 2000 in New South Wales, Australia. There were 409 older drivers involved in crashes after becoming ill suddenly. Among these the majority (62.1%) of crashes led to at least one occupant in the vehicle being killed or injured. There is a significant association between sudden illness and crash-related mortality and injury after adjusting for other risk factors. The risk of injury and death is increased by nearly six times (OR = 5.58, 95% CI = 4.54–6.85) for those who suffered a sudden illness while driving when compared to those non-sufferers. These results are discussed in the light of possible preventive strategies and the provision of risk assessment and safety counselling for older people.

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1. Introduction

Natural diseases and chronic illness have long been proposed to be associated with motor vehicle crash incidents, particularly among older people (Ysander, 1969; Baker, 1970; Dalton, 1970; Drachman and Swearer, 1993; Gresset and Meyer, 1994; Kopsell et al., 1994; Foley et al., 1995; Sjogren et al., 1996; McGwin et al., 2000; Dischinger et al., 2000). In the review of epidemiological studies on the association between medical illness and crash risk among older drivers, Wallace concluded that several medical conditions had been found relating to an increased risk of motor vehicle crashes. Conditions that had the strongest association included coronary heart disease (OR = 1.4, $p < 0.05$) and diabetes mellitus (OR = 2.6, $p < 0.05$) (Wallace, 1997).

The association between chronic medical illness and the increased risk of motor vehicle crashes may be partially, due to the disease-induced impairments, particularly a decline of

cognitive functioning. It may also be attributable to the impairing effect of medications taken as treatment for these diseases (Waller, 1970). However, it may also be due to a sudden onset of certain medical illness or a sudden deterioration of a chronic condition. In terms of the relationship between sudden illness and the risk of collision and crash-related injury, there has been very little reported research.

The aim of this exploratory study is to investigate the association between sudden illness and the risk of motor vehicle crash-related mortality and injury among older drivers utilising routinely collected crash data in New South Wales, Australia.

2. Methods

Data used in this study were made available from the Roads and Traffic Authority (RTA) of NSW for the period between 1996 and 2000. The RTA traffic accident database, records details on the drivers of the crash vehicles, the circumstances surrounding the traffic accident. Data were derived

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from the traffic incidents reported by the NSW police. According to the law in NSW, police are required to attend a serious accident if a person was killed or injured, or a minor accident when there was property damage over A\$ 500 or one or more of the vehicles was required to be towed away. The data collected are very similar to that collated in the fatality analysis reporting system (FARS) in USA. The police reports record details on the drivers of the crash vehicles, and the circumstances surrounding the traffic accident. They include details on the physical environment of the crash sites, and situational and behavioural information on the drivers and passengers that might contribute to the accident. This information is then coded and entered on the RTA database by professional data coders.

In this study, sudden illness was defined as any sudden onset of a medical condition that had a direct impact on the ability in handling the driving task. These conditions included stroke, epileptic seizure, and other medical problems. Information on sudden illness was obtained either by self-reported information from the driver or information provided by eyewitness in the crashed vehicle. The investigating police officer filled in the specific item related to sudden illness on the crash report survey form with further detail provided as free text. Older drivers were defined as drivers of a passenger vehicle aged 60 or above.

In terms of environmental risk factors, information on the day and time of crash, the weather conditions at the time of crash, and special road feature that might be a factor of the crash was collected. Day of crash was classified as Friday/weekend and other days of the week. Time of crash was divided into two main categories, late night-time and others. Late night-time was defined, according to the dark hours throughout the year in NSW, as the time between 10:00 p.m. and 5:59 a.m. The weather conditions were dichotomised into fine weather and other conditions that included rainy and hail, overcast, fog or mist, snowing or sleeting, and other unfavourable weather conditions. Potential, situational and behavioural risk factors included alcohol consumption, driving over speed limits, driver's fatigue, and driving errors made by the driver immediately prior to the crash were also collected. The outcome of the study was defined as motor vehicle crash-related mortality and injury to at least one occupant in which the vehicle was driven by the recorded driver. While acknowledging that the consequences of sudden illness to a driver of an vehicle were far greater than causing injury to the occupants in the vehicle, but also to other road users, the restricted outcome in this study was imposed due to the lack of information on other road users.

Logistic regression modelling techniques were applied to the data for examining the association between sudden illness, other potential risk factors, and the outcome of crashes. The unadjusted and adjusted odds ratios and their corresponding 95% confidence intervals were calculated. In order to elucidate the potential confounding status of other risk factors for car crashes, the associations between sudden illness and these risk factors were also examined. Should there be any

significant or near significant associations been found, these risk factors would be included and be adjusted for in the final analyses. Subgroup analyses by the ages of drivers were also conducted to investigate whether there was any difference in the risk of crash-related mortality and injury due to sudden illness between less senior (60–74 years) and more senior (≥ 75 years) drivers.

3. Results

There were, in total 383,987 recorded incidents of motor vehicle crashes in NSW, Australia between 1996 and 2000. Among these nearly 10% ($n = 36,595$, 9.5%) involved an older driver aged 60 or above. The majority of these older drivers were males ($n = 25,596$, 69.9%). Of these 36,595 crashes, 8658 (23.7%) resulted in at least one occupant being killed or injured.

Among the older drivers, 409 (1.1%) were identified to have suffered a sudden illness immediately prior to the crash. Of these, the majority ($n = 254$, 62.1%) resulted in at least one occupant in the vehicle being killed or injured. The unadjusted odds ratios were also calculated and presented in Table 1. There was a significant association between sudden illness and crash-related mortality and injury. The relative risk for motor vehicle crash-related mortality or injury to at least one occupant in the vehicle for older drivers who had suffered a sudden illness was five times (OR = 5.42, 95% CI = 4.43–6.63), as compared to non-casualty crashes (Table 1). Significant unadjusted associations were also found between sex, age, speeding, fatigue, night-time driving, special road features and driving error and crash outcome (Table 1).

To further elucidate the possible confounding status of demographic and other risk factors of car crashes, the associations between these variables and sudden illness were examined. The results were summarised in Table 2. As shown, four variables were significantly associated with sudden illness. These included age, alcohol consumption above the stated limits, weather condition other than fine, and lost of control while driving. All other variables attained a near significant level except fatigue. Fatigue was excluded from the final analyses.

The results of the adjusted association between sudden illness and crash outcome were presented in Table 3. After adjusting for other risk factors, should a crash occur, the risk of injury and death was increased by nearly six times (OR = 5.58, 95% CI = 4.54–6.85) for those who suffered a sudden illness while driving when compared to those non-sufferers. Subgroup analyses by the ages of drivers were also conducted to examine whether there was any difference in the relative risk of crash injury due to sudden illness experienced by ≥ 75 years and 60–74 years old drivers. The results indicated that there was no significant difference in terms of the relative risk of crash injury due to sudden illness. The adjusted odds for the risk of crash injury due to sudden illness among ≥ 75

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