

Health Conditions of Heavy Vehicle Drivers involved in a Crash in Western Australia: A Retrospective Study using Linked Data

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ABSTRACT

Issue Addressed:

Truck drivers in the course of their normal work are exposed to a variety of hazards that can impact on their health and well-being. This retrospective study investigated the health conditions of a cohort of heavy vehicle drivers involved in a crash in Western Australia.

Methods:

Hospital separation records of heavy vehicle drivers admitted to hospital as a result of road crash between January 1, 1988 and December 31, 2000 in Western Australia were analysed. Heavy vehicle drivers involved in a crash were first identified using the Western Australian Road Injury Database before linking to their hospital records. All hospital admissions for each driver admitted to hospital for a crash at least once during the study period were subsequently retrieved from the Health Services Linked Database.

Results:

There were 146 heavy vehicle drivers in the cohort. A total of 964 distinct inpatient episodes (the collection of all hospital admissions for a single event) were recorded for these drivers, with a minimum of 1 and a maximum of 84 hospital inpatient episodes per driver. The mean number of inpatient episodes for each driver was 7 (S.D. = 8.44) including an inpatient episode for a heavy vehicle crash. Of the 798 health-related inpatient episodes, diseases of the musculoskeletal system (14%) was the most common cause for hospitalisation with 40 drivers ever admitted for this condition, followed by diseases of the digestive system accounting for 10% of all health-related inpatient episodes and incurred by 28% of the cohort members.

Conclusion:

The evidence presented for the cohort of heavy vehicle drivers hospitalised as a result of road crash confirms that these drivers are characterized with health conditions such as musculoskeletal problems and digestive disorders.

So what:

The findings have implications for the development of specific health promotion and education programs targeting such health conditions to reduce the occupational risks associated with driving a heavy vehicle.

Key words: crash, heavy vehicle drivers, linked data, health conditions

INTRODUCTION

Road transport plays an integral role in Australia's economy, carrying an estimated 80% of the freight and represents 5.6% of the national gross domestic product.¹ The road freight industry works 24 hours a day and 7 days a week. At the present time the long haul road transport industry is also unique in terms of standard working hours. Under current regulations truck driving is permitted up to 12 hours a day and 72 hours a week in New South Wales and other states. However, there is evidence that most truck drivers work close to this limit with a sizeable number substantially exceeding it on a regular basis.² Truck driving is generally a sedentary occupation with long periods of sedentary work followed by periods of heavy activity. It must be emphasized that long hours behind the wheel do not capture the full workload with additional hours of loading/unloading and undertaking vehicle maintenance especially in the case of owner-drivers.

It is widely recognized that truck drivers in the course of their normal work are exposed to a variety of hazards that can impact on their health and well-being. They may suffer from back, leg, arm and hand pain caused by uncomfortable seating for extended periods of time. Musculoskeletal pain in the lower back and in the joints may also be developed as a consequence of prolonged driving.³ Meanwhile, extensive body vibrations may impair chest function and abdominal organs, as well as contribute to driving fatigue.² Irregular eating, improper dietary habits and stress can cause digestive tract disorders.⁴

In the literature, research into the health conditions of truck drivers has documented the occupational hazards they encounter, with evidence of diseases of the musculoskeletal, cardiovascular and digestive systems.³⁻⁷ A number of studies have indicated a higher risk of ischemic heart disease.^{6,7} A recent study of 300 Australian long haul truck drivers found that over half the drivers reported a chronic injury such as a chronic back injury and over a quarter suffered an acute injury or illness.² In 2000, truck drivers accounted for the highest number of non-fatal work-related injuries of the entire Transport Industry with a rate of 37.6 injuries per 1000 employees.¹ Most of these were not related to crashes but other aspects of the driver's work such as manual handling and falls. Strenuous activity after hours of sitting may help explain why drivers sustain these injuries.

The aim of this retrospective analysis is to investigate the health conditions for a cohort of heavy vehicle drivers involved in a crash. To date, there has been very little analysis of health issues relating to specific occupational groups in Australia. This study is an attempt to provide evidence concerning heavy vehicle drivers using the

linked hospital data. The results would provide recommendations on the health of heavy vehicle drivers with the intention of improving safety and reducing crashes.

METHODS

Linked Data

The cohort consisted of all heavy vehicle truck drivers who were hospitalised for a health-related condition between January 1, 1988 and December 31, 2000 as a result of a crash. Heavy vehicle drivers involved in a crash were first identified through the Western Australian Road Injury Database. The database contains detailed information on the characteristics of the people and vehicles involved in road crashes, crash circumstances and Police reported injury. These drivers were then linked to their hospital admissions that occurred before the crash in order to assess their health conditions. Consequently, all hospital admission records for each driver admitted to hospital for a crash at least once during the study period were retrieved. The data extraction was accomplished by accessing the Health Services Research Linked Database jointly maintained by the Department of Health, Western Australia, and the School of Population Health, University of Western Australia.⁸ This database consists of individually linked hospital admissions, mental health records, cancer registrations and other health records for the Western Australian population since 1970.

The definition of a heavy vehicle referred to Austroads Class 6 and above vehicles that generally have a gross vehicle mass exceeding 27.5 tonnes.⁹ Only drivers of road trains, semi-trailer and truck and one trailer were included in the analyses.

The outcome of interest was any health condition identified as the principal diagnosis by ICD9-CM codes and ICD10-AM codes. The principal diagnosis is the diagnosis established to be chiefly responsible for the patient's episode of care in hospital.¹⁰ Data on principal diagnoses provide information on the diseases and conditions for which hospitalisations occur, and serve as an indirect measure of community morbidity. For the purpose of this study, mental disorders, diseases of the circulatory system, the musculoskeletal system and connective tissue, disease of the nervous system and sense organs, endocrine nutritional and metabolic disorders, and the digestive system were specifically targeted with up to 18 diagnostic codes extracted and analysed.

Inpatient Episodes

Any additional hospital admission records generated by transfers of a patient between hospitals were combined with the original admission to obtain a single episode. An inpatient episode was thus defined to be the collection of all hospital admissions for a single event. Hospital admissions that occurred on the same day or the next day after a separation date were deemed to be transfers and became part of an inpatient episode. Hospital admissions that did not involve an overnight stay were excluded.

Causes of Hospitalisations

Hospitalisations were classified into one of the following broad categories requiring admission for various health conditions: Infectious diseases and parasites; Neoplasms; Endocrine, nutritional and metabolic diseases and immunity disorders; Disease of the blood and blood forming organs; Mental disorders; Disease of the nervous system and sense organs; Disease of the circulatory system; Disease of the respiratory system; Disease of the genitourinary system; Pregnancy, childbirth and complications of pregnancy; Diseases of the skin and subcutaneous tissue; Diseases of the musculoskeletal system and connective tissue; Symptoms, signs and ill defined conditions; Injury and poisoning. However it was not possible to provide a detailed description within each of these medical categories due to the difficulty in correctly mapping ICD9-CM codes to ICD10-AM codes.

Crash-Related Admissions

Individuals were considered to have been involved in a road crash during the period January 1988 to July 1997 if the following ICD9-CM external cause of injury codes were contained in any of the hospital admission records: E810.0 to E816.9; E819.0 to E819.9; E929.0. For the period July 1997 to December 2000, the ICD10-AM external cause of injury codes V60 to V69.9 were used instead.

All data were coded and analysed using the SPSS package Version 11. Descriptive statistics were used to examine the demographic characteristics and hospital admissions of the sample.

RESULTS

Demographics

There were 146 heavy vehicle drivers involved in a road crash that had a previous hospital admission during the study period. The average age of drivers at their first crash was 34 (S.D. = 10) years. There were significantly more males (80%) than females in the cohort. Eighty-six (60%) of the heavy vehicle drivers lived in rural areas

of the state at the time of their first hospital admission. There were no Indigenous Australians identified in the cohort.

For these 146 drivers, there were altogether 964 distinct inpatient episodes with a minimum of 1 and a maximum of 84 hospital inpatient episodes per driver. The 84 inpatient episodes sustained by a single driver were mainly related to mental health problems. The mean number of inpatient episodes for each driver was 7 (S.D. = 8.44) including one for a heavy vehicle crash.

The 964 hospital inpatient episodes were classified as being the result of a crash (n=166) or resulting from a health-related condition (n=798).

Crash Characteristics and Crash-Related Inpatient Episodes

There were 166 crash-related inpatient episodes for the 146 heavy vehicle drivers involved in a road crash. The minimum length of stay was 1 day and the maximum was 64 days. Fourteen percent of them were driving a truck and one trailer, 58% a semi-trailer and 28% a road train at the time of the crash. Eighty-two percent of the crashes were single vehicle crashes with 61% being a rollover. Ninety percent of these crashes occurred in rural areas while the remaining 10% occurred within the Perth metropolitan area. Half of the crashes took place during daylight hours and 80% of all crashes occurred in clear weather.

The distribution of drivers with respect to the frequency of crashes was: 84% involved in one crash, 14% in two crashes, 1% in three crashes and 1% in four crashes. The 24 drivers who had two or more crashes during the study period incurred inpatient episodes for diseases of the musculoskeletal systems (25%, n=6), digestive systems (25%, n=6), the nervous system and sense organs (8%, n=2), and 10 of them had inpatient episodes for multiple health-related conditions.

Health-Related Inpatient Episodes

A breakdown of the 798 health-related inpatient episodes by health conditions and the numbers of drivers hospitalised at least once for a specific health condition are presented in Figure 1. The average age at the first inpatient episode for a health condition for the cohort was 21 years of age (S.D.=10.9). Of the 798 health-related inpatient episodes, disease of the musculoskeletal system (112 inpatient episodes, 14%) was the most common

cause of hospitalisation with 40 drivers (27% of cohort) admitted at least once for this condition, followed by diseases of the digestive system accounting for 77 (10%) inpatient episodes and incurred by 41 (28%) members of the cohort. Although there were 77 (10%) inpatient episodes for mental disorders, most of them appeared to be recurrent hospitalisations from a small group of drivers (n=13). There were 36 (5%) inpatient episodes by 21 drivers related to the nervous system and sense organs, and 20 (3%) inpatient episodes by 13 drivers due to circulatory problems. The minimum length of stay in hospital was 1 day and the maximum stay was 25 days.

In addition, 56% of the cohort had inpatient episodes for multiple health conditions. Thirty three percent of these drivers had inpatient episodes for two different health conditions, 16% for three different health conditions and the remaining 51% were hospitalised for four or more different health conditions.

DISCUSSION

The retrospective analysis showed that heavy vehicle drivers were characterised by several health problems including musculoskeletal, digestive, mental health, circulatory, the nervous system and metabolic disorders. The findings are consistent with previous studies.³⁻⁷ Diseases of the musculoskeletal system necessitated the greatest number of health-related inpatient episodes with over a quarter of the cohort hospitalised at least once for this problem. In comparison, admissions for disease of the musculoskeletal and connective tissue represented only 10% of the total admissions to a public hospital in Western Australia during 2000.¹⁰ Diseases of the digestive system also necessitated a large percentage of hospital admissions for the cohort of truck drivers. Irregular eating, road house fry ups and bad dietary habits brought on by their lifestyle can cause digestive tract disorders.

Several issues and limitations should be considered in conjunction with this study. Firstly, hospitalisation represents one of the most severe outcomes for a health-related disease under investigation. Without question a number of heavy vehicle drivers who did not have a crash would have developed these illnesses, but they were not captured within the Western Australian Road Injury Database. Therefore, it was not possible to make analytic comparisons concerning the association of a crash with a group of matched heavy vehicle drivers with identical health conditions. A matched analysis would provide comparability for predictors of crash risk with respect to their health conditions. It would also be worthwhile to compare the health patterns of truck drivers with those of other occupations groups or the population in general. Secondly, it appears necessary in future

research to examine the association between health conditions and the risk of crash by incorporating exposure information on kilometres travelled, demerit points, risk taking behaviour and other characteristics. Thirdly, information related to lifestyle factors such as smoking, drinking and dietary habits, was not available from the Health Services Research Linked Database. Data were also lacking on the severity of health condition, the duration of the condition and its impact on the driver's ability to work. Finally, this study adopted a non-categorical approach to a health condition without addressing specific illnesses such as epilepsy and diabetes. Because we did not have access to the patients' medical records, it was not possible to determine in each case whether disease of the musculoskeletal system was a chronic problem or due to traumatic injury.

In conclusion, health promotion and education activities targeting musculoskeletal and digestive problems of heavy vehicle drivers have been identified based on the results of this study. Currently, recommended health promotion strategies focus on achieving healthy lifestyle behaviours, such as a healthy weight, eating appropriately and exercising regularly. All have health and well-being benefits which would benefit heavy vehicle drivers. An additional reason for targeting heavy vehicle drivers as a high-risk group involves the consequence ill health has for both professional drivers and other road users' safety. A separate Delphi study conducted by the authors suggested that health promotion programs at the work environment seem to be a promising strategy, since they allow a better understanding of the workplace environment and the development of customized educational interventions.¹¹

ACKNOWLEDGEMENTS

This research was funded by Main Roads Western Australia. The authors would like to acknowledge the contributions of Bob Peters, Tony Radalj, Martin Moen, and Brian Kidd of Main Roads Western Australia, and the assistance from Arem Gavin of the Injury Research Centre, The University of Western Australia. Thanks are also due to two anonymous reviewers for their helpful comments and suggestions.

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Figure 1. Health-related inpatient episodes for heavy vehicle drivers, 1988-2000.

