



Professional experience and traffic accidents/near-miss accidents among truck drivers



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ABSTRACT

Aim: To investigate the relationship between the time working as a truck driver and the report of involvement in traffic accidents or near-miss accidents.

Methods: A cross-sectional study was performed with truck drivers transporting products from the Brazilian grain harvest to the Port of Paranaguá, Paraná, Brazil. The drivers were interviewed regarding sociodemographic characteristics, working conditions, behavior in traffic and involvement in accidents or near-miss accidents in the previous 12 months. Subsequently, the participants answered a self-applied questionnaire on substance use. The time of professional experience as drivers was categorized in tertiles. Statistical analyses were performed through the construction of models adjusted by multinomial regression to assess the relationship between the length of experience as a truck driver and the involvement in accidents or near-miss accidents.

Results: This study included 665 male drivers with an average age of 42.2 (± 11.1) years. Among them, 7.2% and 41.7% of the drivers reported involvement in accidents and near-miss accidents, respectively. In fully adjusted analysis, the 3rd tertile of professional experience (>22 years) was shown to be inversely associated with involvement in accidents (odds ratio [OR] 0.29; 95% confidence interval [CI] 0.16–0.52) and near-miss accidents (OR 0.17; 95% CI 0.05–0.53). The 2nd tertile of professional experience (11–22 years) was inversely associated with involvement in accidents (OR 0.63; 95% CI 0.40–0.98).

Conclusions: An evident relationship was observed between longer professional experience and a reduction in reporting involvement in accidents and near-miss accidents, regardless of age, substance use, working conditions and behavior in traffic.

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1. Introduction

Traffic accidents represent an important cause of morbidity and mortality worldwide (Mathers and Loncar, 2006). The situation is no different in Brazil, where deaths and injuries associated with traffic accidents overall and especially among the occupants of cargo vehicles have remained at high levels or even increased in recent years (Morais Neto et al., 2012; Waiselfisz, 2013). Traffic accidents involving trucks are more severe, particularly when they occur on roads where the speed of the vehicles tends to be higher (Andrade and Jorge, 2001; Who, 2004). The consequences of

these events include post-traumatic stress (Cavalcante et al., 2009), trauma and death in addition to health services costs for the victims' families and society in general.

In addition to the physical condition of the vehicle, the behavior of truck drivers and their intense and irregular working hours (Souza et al., 2005a) may expose them to the risk of involvement in traffic accidents (Robb et al., 2008; Brodie et al., 2009; Williamson and Friswell, 2013). Driving experience also appears to be an important factor associated with involvement in accidents (Mullin et al., 2000; McCartt et al., 2003; Jimenez-Moleon et al., 2004; Silva et al., 2012; Gulliver et al., 2013; Curry et al., 2015). A cross-sectional study in Brazil showed that younger motorcyclists had a higher frequency of reported accidents in the 12 months preceding the study (Silva et al., 2012). In Spain, a case-control study showed a decreasing trend in the risk of accidents with a longer time holding a driver's license in all age groups (Jimenez-Moleon et al., 2004). A cohort study performed in New Zealand on drivers who had

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obtained a provisional driver's license indicated a lower risk of traffic accidents in the last quartile of time holding a driver's license (longer than 14 months) (Gulliver et al., 2013).

However, few studies have assessed the involvement of truck drivers in traffic accidents (Cavagioni and Pierin, 2010; Ulhoa et al., 2010; Catarino et al., 2013; Kircher and Andersson, 2013; Chen et al., 2015). In a study performed in Tanzania (Kircher and Andersson, 2013), approximately 40% of truck drivers were involved in at least one traffic accident during their professional career. In Portugal, 37% of truck drivers reported involvement in traffic accidents in the 5 years prior to the study (Catarino et al., 2013). In the United States, a study revealed that 2.6% of long-haul truck drivers had reported a truck crash within one year, and 24% had reported at least one near miss in the last seven days (Chen et al., 2015). In Brazil, one investigation showed that the percentage of truck drivers that reported involvement in accidents in the year preceding the study was 10.9% (Ulhoa et al., 2010), and another study reported that 35% were involved in accidents during the entire period of their employment as a professional driver (Cavagioni and Pierin, 2010).

We found only one report in the literature (a case-control study performed in Australia) that identified a relationship between a shorter period of experience as a truck driver and an increased occurrence of accidents (Stevenson et al., 2014). Thus, studies that evaluate this relationship by taking into account confounding factors are important and may represent the groundwork to confront these events. Therefore, the objective of the present study was to investigate the relationship between the time of experience as a truck driver and reports of involvement in traffic accidents or near-miss accidents.

2. Methods

This is a cross-sectional study involving truck drivers transporting products from the Brazilian grain harvest to the Port of Paranaguá, Paraná, Brazil. A pilot study was previously performed in the port to evaluate the logistics associated with data collection systematization, approaching the drivers and data collection.

Data were collected through interviews with truck drivers. During the interviews, socioeconomic and demographic information were obtained in addition to the driver's health status, life habits, professional characteristics and practices, sleep-related issues and involvement in traffic accidents or near-miss accidents. Subsequently, the drivers answered a self-applied questionnaire concerning the use of psychoactive substances. This questionnaire contained a list of psychoactive substances (in a language that was comprehensible for the drivers, defined after the pilot study), and the participants were asked to mark those that they had previously used.

Research collaborators were trained to conduct the present study, and a manual with all of the procedures used for data collection was provided. The sample size calculation was based on the expected prevalence of accidents and near-miss accidents among truck drivers in the previous 12 months: 10% (Ulhoa et al., 2010) and 40% (Catarino et al., 2013), respectively, with a frequency variation of 4% for accidents and 7% for near-miss accidents according to the category length of professional experience. We determined that it would be necessary to obtain information from a minimum of 594 participants assuming a 5% alpha and 20% beta error. An extra 10% was added to the estimated sample size to minimize the biases of potential losses and incomplete records, resulting in a requirement for interviews with 653 drivers. The single inclusion criterion was that drivers should report at least one year of experience.

The selection of drivers was performed by convenience sampling because the flow of vehicles and the manner in which vehicles

were parked in the sorting yard of the Port of Paranaguá did not follow a predetermined order. Data collection took place in the screening area for seven consecutive days in July 2012 between 8:00 am and 6:00 pm as follows: two researchers stayed at a fixed collection point; three researchers circulated through the points where the drivers congregated to eat or to obtain products available at the sorting yard; and two researchers circulated through the sorting yard to perform the interviews of drivers who were in the parked vehicles.

The outcome analyzed in the present study was the report of involvement in truck accidents or near-miss accidents in the previous year. To identify involvement in accidents, the following question was applied to the driver: "Were you involved in any traffic accidents while driving your truck during the last 12 months?" Their involvement in near-miss accidents was identified with the following question: "Were you nearly involved in any traffic accidents while driving your truck during the last 12 months?" A near-miss accident is understood as the performance of an evasive maneuver by the driver to avoid a vehicle accident (Hanowski et al., 2007). All truck drivers were asked about involvement in near-miss accidents, even if they had reported accident involvement. The categorization of the dependent variable was performed as follows: *involvement in accidents* (drivers who were involved in accidents in the previous 12 months, regardless of involvement in near-miss accidents); *involvement in near-miss accidents* (drivers who were involved only in near-miss accidents); and *no involvement in accidents and/or near-miss accidents* (reference category). The independent variable was the length of experience as a truck driver, which was categorized in tertiles according to its distribution: less than eleven years (reference category), from eleven to twenty-two years, and over twenty-two years.

The adjustment variables were grouped into three blocks: **age group** (under 40 years or 40 years or more); **substance use** [excessive consumption of alcoholic beverages (yes; no) and consumption of psychoactive substances during employment (yes; no)]; and **professional characteristics** [type of truck (articulated; non-articulated), distance travelled from the last loading place (1000 km or less; above 1000 km), work shift (night only/mostly at night; night and day equally; day only/mostly during the day), drowsiness while driving (yes; no), overtaking in prohibited locations (frequent; not frequent), exceeding the speed of 110 km/h with the truck (frequent; not frequent), and driving while feeling tired (frequent; not frequent)]. A variable was considered *frequent* when the driver mentioned "almost all the time or always" and *non-frequent* when the driver mentioned "never, rarely or sometimes." Excessive consumption of alcoholic beverages was defined as binge drinking, i.e., when the driver reported consuming five or more (male) or four or more (female) alcoholic drinks on one occasion (during approximately two hours) in the last 30 days (NIAAA, 2005). Information on alcoholic beverage consumption was obtained according to the type and quantity and classified in standard-sized drinks. The truck driver's income was also considered as a variable of characterization (1 BRL was equal to US\$ 0.50 according to the mean exchange rate during the data collection period).

The data were double-entered in a database created in the Epi Info[®] version 3.5.3 software. Next, the data were compared and discrepancies were corrected after consulting with the collection instruments. The data analysis was performed using the Statistical Package for the Social Sciences[®] (SPSS) version 19.0 software. The associations among the variables (adjustment-outcome and factor-outcome) were verified using Multinomial Logistic Regression, with Odds Ratios (OR) and 95% confidence intervals (95% CI) estimates. Initially, a non-adjusted analysis was performed, followed by multiple factor analysis with the inclusion of the adjustment variables by blocks (*age group*, followed by *substance use* and finally *professional*

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