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Driving with pets and motor vehicle collision involvement among older drivers: A prospective population-based study

Carrie Huisingh[a,*], Emily B. Levitan[b], Marguerite R. Irvin[b], Cynthia Owsley[a], Gerald McGwin Jr.[a,b]

[a] Department of Ophthalmology, School of Medicine, University of Alabama at Birmingham, United States
[b] Department of Epidemiology, School of Public Health, University of Alabama at Birmingham, United States

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ABSTRACT

Objective: Distracted driving is a major cause of motor vehicle collision (MVC) involvement. Pets have been identified as potential distraction to drivers, particularly in the front. This type of distraction could be worse for those with impairment in the cognitive aspects of visual processing. The purpose of this study is to evaluate the association between driving with pets and rates of motor vehicle collision involvement in a cohort of older drivers.

Methods: A three-year prospective study was conducted in a population-based sample of 2000 licensed drivers aged 70 years and older. At the baseline visit, a trained interviewer asked participants about pet ownership, whether they drive with pets, how frequently, and where the pet sits in the vehicle. Motor vehicle collision (MVC) involvement during the three-year study period was obtained from the Alabama Department of Public Safety. At-fault status was determined by the police officer who arrived on the scene. Participants were followed until the earliest of death, driving cessation, or end of the study period. Poisson regression was used to calculate crude and adjusted rate ratios (RR) examining the association between pet ownership, presence of a pet in a vehicle, frequency of driving with a pet, and location of the pet inside with vehicle with any and at-fault MVC involvement. We examined whether the associations differed by higher order visual processing impairment status, as measured by Useful Field of View, Trails B, and Motor-free Visual Perception Test.

Results: Rates of crash involvement were similar for older adults who have ever driven with a pet compared to those who never drove with their pet (RR = 1.15, 95% CI 0.76–1.75). Drivers who reported always or sometimes driving with their pet had higher MVC rates compared to pet owners who never drive with a pet, but this association was not statistically significant (RR = 1.39, 95% CI 0.86–2.24). In terms of location, those reporting having a pet frequently ride in the front of the vehicle had similar rates of MVC involvement compared to those who did not drive with a pet in the front. A similar pattern of results was observed for at-fault MVCs. This association was not modified by visual processing impairment status.

Conclusion: The current study demonstrates a positive but non-significant association between frequently driving with pets and MVC involvement. More research is needed, particularly on restraint use and whether the pet was in the car at the time of the crash, to help characterize the public safety benefit of regulations on driving with pets.

1. Introduction

One of the major causes of motor vehicle collisions (MVCs) among novice and experienced drivers in the United States is distracted driving (Klauer et al., 2014). This includes distractions that could potentially remove a driver's eyes from the road (visual), their hands from the steering wheel (manual), or their attention or concentration from tasks critical for safe driving (cognitive). According to the National Highway Traffic Safety Administration (NHTSA), nearly 10% of all fatal crashes and 18% of injury crashes involve some type of distraction (National Highway Traffic and Safety Administration, 2014). In 2012, there were 3328 deaths and an estimated 421,000 people injured as a result of distracted driving behavior (National Highway Traffic and Safety

* Corresponding author at: Department of Ophthalmology, University of Alabama at Birmingham, 700 S. 18th Street, Suite 609, Birmingham, AL 35294-0009, United States.
E-mail address: huisingh@uab.edu (C. Huisingh).

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Administration, 2014). Furthermore, the percentage of injured people in distracted-related crashes as a portion of all injured people has remained relatively constant in recent years, despite efforts to raise awareness about the dangers of distracted driving (National Highway Traffic and Safety Administration, 2013, 2014).

1.1. Within-vehicle distraction among older drivers

Most commonly, distractions to the driver occur inside the vehicle, rather than outside of it (Stutts et al., 2003). While the majority of existing research on distracted driving has focused on specific activities such as texting and cell phone use, particularly among teenage drivers, other secondary activities can be equally or more distracting than cell phone use as measured by eye glances away from the road ahead and mirrors (Insurance Institute for Highway Safety, 2014). This may be particularly relevant for older drivers. Research suggests that when confronted with an increased cognitive or physical workload while driving, older drivers have exhibited slowed cognitive performance and delayed response times in comparison to younger age groups which may in turn, lead to safety errors and increased risk of crash (Thompson et al., 2012; Lansdown, 2012). Research suggests this is particularly true for older adults when the activity provides information that is not of direct relevance to the driving task (Young and Regan, 2007). Therefore it is possible that those with slowed visual processing speed under divided attention conditions are more at risk for a MVC when driving with pets than those who do not have slowed visual processing speed. In addition, since older drivers are the fastest growing segment of the driving population, research about the effect of distraction on driving performance of older drivers is important.

1.2. Pets as a source of driver distraction

Pets may be a source of within-vehicle distraction, particularly when the pet is in the front seat of the vehicle. Pets in the back seat of a vehicle may be a visual or auditory distraction, whereas pets in the front may represent an additional physical distraction. In a report by AAA and Kurgo, nearly one-quarter of pet owners have used their hands or arms to hold the pet in place while applying brakes and 19% have used their hands or arms to keep their pet from climbing into the front seat (AAA & Kurgo Pet Passenger Safety Survey, 2011). These behaviors may require both hands being taken off the wheel which has been shown to result in variability in vehicle lane position and drifting into adjacent lanes (Stutts et al., 2003).

In a recent survey of drivers, interaction with pets was one of the top three most frequently reported distracting behaviors that participants admitted did result in an accident or near-miss (Lansdown, 2012). There have been several cases of fatal (Mattar, 2012) and nonfatal (Madsen, 2012) MVCs caused by drivers who were distracted by pets in the vehicle and growing concern over safety of pets riding in vehicles (AAA & Kurgo Pet Passenger Safety Survey, 2011; Parker-Pope, 2010; CBS News, 2010). In some states, driving policies restrict drivers from having a pet in the lap while driving, whereas others restrict behaviors that could potentially distract a driver (Walsh et al., 2012; Francis, 2012; Burkert, 2012). Despite the increased attention and safety concern, there has been only one epidemiologic study examining the relationship between pets in vehicles and MVC involvement which reported that the rate of MVCs for older drivers who always drive with their pet was nearly double that of drivers who never drove with their pet (Blunck et al., 2013). This study was based on retrospective data on collision involvement; at the time the study was conducted the MVCs had already occurred so is subject to certain methodological limitations, namely positive selection bias and whether the collision involvement changed their driving habits. The participants in the aforementioned study have now been followed-up for three subsequent years. Therefore, the current study aims to assess the relationship between driving with pets in the vehicle and rate of future MVC involvement among a population-based sample of older drivers.

2. Methods

2.1. Study cohort

As described elsewhere, the study cohort consisted of a population-based sample of licensed drivers aged 70 years and older who resided in Jefferson County, Alabama or the bordering counties located in north-central Alabama (Owsley et al., 2013). Participants were enrolled between October 2008 and August 2011. Persons who stated they had an Alabama license, had driven within the last three months, and spoke English were eligible to participate. The final sample consisted of 2000 drivers. Participants completed a single in-person visit at the Clinical Research Unit at the University of Alabama at Birmingham (UAB) and were followed-up with telephone calls at one-year intervals for three subsequent years. The Institutional Review Board at UAB approved this study.

2.2. Data collection

Following written informed consent, a trained interviewer administered a demographic review (age, sex, race, education, and marital status), a general health questionnaire about the presence or absence of chronic medical conditions (i.e. “has a doctor ever told you that you have. . .”) (Owsley et al., 1998), questions about smoking and alcohol use, and the Mini-Mental State Examination (MMSE) to estimate cognitive status (Folstein et al., 1975). Reduced cognitive status was defined as a MMSE score $\leq$23.

At the baseline visit only, participants were asked, “Do you have a dog and/or a cat as a pet?” Those with an affirmative response were asked about whether the pet rides in the car (yes or no), how frequently the pet rides in the car (always, sometimes, rarely, or never), and where the pet frequently sits (rear cargo, rear seat, front passenger seat, front floor, in driver’s lap, moves around, or front console). Participants could have reported more than one usual location where the pet sits. Those who reported having the pet in the front passenger seat, front floor, in driver’s lap, moves around, or front console were defined as having a pet in the front. Those who reported a pet in the rear cargo area, rear seat, or pet-owners who never drive with a pet were defined as not having a pet in the front.

Tests for central vision and visual processing skills were administered at the baseline visit. Testing was done under habitual correction, so participants wore whatever spectacles or contact lenses normally worn when driving. All tests were administered under binocular viewing unless noted. Distance visual acuity was assessed using the Electronic Visual Acuity (EVA) system, and expressed as log minimum angle resolvable (logMAR) (Beck et al., 2003). Contrast sensitivity was measured using the Pelli–Robson Contrast Sensitivity chart and scored using the letter-by-letter method and contrast sensitivity impairment was defined as <1.5 log sensitivity (Pelli et al., 1988; Elliott et al., 1991). The visual field sensitivity was assessed using a custom test designed for the Humphrey Field Analyzer (HFA) Model II-I (Carl Zeiss Meditec, Dublin, CA, USA) using a 20-point custom test design to include target locations that are relevant when a driver gazes toward the roadway environment through a vehicle’s windshield or at the vehicle’s dashboard (called the driving visual field) (Vargas-Martin and Garcia-Perez, 2005). A detailed description of the test rationale and procedure has been published (Huisingh et al., 2015). Our