HHS Public Access

Author manuscript

Accid Anal Prev. Author manuscript; available in PMC 2015 July 06.

Published in final edited form as:

Accid Anal Prev. 2013 September ; 58: 70–74. doi:10.1016/j.aap.2013.04.019.

Driving with Pets as a Risk Factor for Motor Vehicle Collisions among Older Drivers

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Abstract

Increasing rates of distraction-related motor vehicle collisions (MVCs) continue to raise concerns regarding driving safety. This study sought to evaluate a novel driving-related distraction, driving with a pet, as a risk factor for MVCs among older, community dwelling adults. Two thousand licensed drivers aged 70 and older were identified, of whom 691 reported pet ownership. Comparing pet owners who did and did not drive with their pets, neither overall MVC rates (rate ratio [RR] 0.97 95% confidence interval [CI] 0.75–1.26) nor at-fault MVC rates (RR 0.84 95% CI 0.57–1.24) were elevated. However, those who reported always driving with a pet in the vehicle had an elevated MVC rate (RR 1.89 95% CI 1.10–3.25), as compared to those who did not drive with a pet. The MVC rate was not increased for those reporting only sometimes or rarely driving with a pet in the vehicle. The current study demonstrates an increased risk of MVC involvement in those older drivers who always take a pet with them when they drive a vehicle. When confronted with an increased cognitive or physical workload while driving, elderly drivers in prior studies have exhibited slower cognitive performance and delayed response times in comparison to younger age groups. Further study of pet-related distracted driving behaviors among older drivers as well as younger populations with respect to driver safety and performance is warranted to appropriately inform the need for policy regulation on this issue.

INTRODUCTION

The National Highway Safety Traffic Administration (NHSTA) broadly defines distracted driving as any secondary non-driving activity a person engages in while operating a motor

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vehicle. This is further sub-classified into distractions that could potentially remove a driver's eyes from the road (visual), their hands off the steering wheel (manual), or their concentration from the task of driving (cognitive) (NHSTA, 2009). In 2009 16% of traffic fatalities and 20% of traffic injuries were attributed to distracted driving behavior (NHSTA, 2009). Further, over half (52%) of individuals questioned in a recent survey reported feeling less safe driving today than 5 years ago, citing distraction on the part of other drivers as the primary reason (AAA, 2010).

The majority of research to date on distracted driving has focused on cell phone use, which, according to one report, was responsible for 11% of motor vehicle collisions (MVCs) in 2009 involving nearly 1,000 deaths and 24,000 injuries (NHSTA, 2009). Redelmeier and Tibshirani found that cell phone use is associated with an over 4-fold increase in MVC risk compared to drivers not engaging in this activity (1997), though the magnitude of the increased risk remains controversial (Young, 2012). Other activities such as eating and drinking while driving have been found to increase the physical workload of a driver; however, such behavior has not been specifically linked to an increase in MVC rates among these drivers (Young, 2007). Among the potential driving-related distractions that have recently been receiving attention is driving with pets in the vehicle. This is partly based upon recent reports of MVCs caused by drivers who were distracted by pets in the vehicle (Madsen, 2012; Mattar, 2012). It has been reported that roughly 70% of households own companion animals (AVMA, 2007) and that 56% of pet owners report riding with a pet in the vehicle at least once a month; 30% of those driving with pets in the vehicle admit to being distracted (AAA & Kurgo, 2011). Additionally, while 83% of those surveyed agreed that an unrestrained dog was likely dangerous in a moving vehicle, only 16% have ever used any type of restraint on their own pet. Currently Hawaii is the only state that specifically restricts drivers from having a pet in the lap (Parker-Pope, 2011). Three other states (Arizona, Connecticut, Maine) have broader laws restricting behavior or activities that could potentially distract a driver and thus could be applicable to pets in a vehicle. Other states such as California and Virginia have pursued such laws but they were either vetoed or failed to obtain legislative approval, respectively; similar legislation has been proposed in Illinois. Despite these legislative initiatives, successful or otherwise, to date there has been no research on the relationship between pets in vehicles and driving safety.

The objective of this study is to evaluate the potential relationship between MVC rates and driving with a pet in the vehicle by comparing MVC rates among older drivers who do and do not drive with pets in their vehicle. In doing so we hope to identify any significant associations and expand the literature on pets as a potential driver distraction.

METHODS

Study Participants

The current study includes the entire sample of older drivers who are part of an ongoing study at the University of Alabama at Birmingham in the Department of Ophthalmology (Owsley et al. 2012). This population-based sample consists of 2,000 older drivers, who were identified from an electronic file obtained from the Alabama Department of Public Safety (AL DPS) that contained all licensed drivers in the state of Alabama aged 70 years

and older. Individuals who lived in Jefferson County or in the contiguous areas of neighboring counties were eligible for recruitment. Individuals were randomly selected and recruited, as described below, until the recruitment goal of 2,000 participants was met.

Potential participants were mailed a letter describing the study, which was followed by a telephone call from the project coordinator. During this telephone interview, the eligibility of the individual was determined and if eligible, the person was invited to participate. The inclusion criteria were: (1) age 70 or older, (2) held a current Alabama driver's license, (3) had driven within the last 3 months, (4) did not reside in a nursing home or other institution where comprehensive care was provided and/or community access and driving opportunity were controlled, and (5) spoke English. For those individuals who were eligible and agreed to participate, an appointment was scheduled at the Clinical Research Unit in the Department of Ophthalmology, University of Alabama at Birmingham. For those who declined to participate, basic demographic information (age, race/ethnicity, gender) and driving status were obtained for those who agreed to provide this information. The study protocol was approved by the Institutional Review Board for Human Use at the University of Alabama at Birmingham. Each study participant signed a document of informed consent after the purpose of the study was explained. All test examiners and interviewers were unaware of the crash histories of the participants. The study protocol is described below.

Variable Definitions

Following written informed consent, a trained interviewer administered a demographic review (age, sex, race, marital status, education completed), a general health questionnaire about the presence versus absence of chronic medical conditions, the Mini-Mental State Examination (MMSE) (Folstein, 1975), and the Driving Habits Questionnaire (Owsley, 1999), which provided information about driving exposure (miles, days, trips, and places driven in a typical, recent week, and estimated yearly mileage driven). Each participant was also asked, "Do you have a dog and/or cat as a pet?" An answer "Yes," directed the participant to the question "If yes, does your dog/cat ride in the car with you?" This question was then followed by "If yes, how frequently does your dog/cat ride in the car with you?" The choices included: "Always," "Sometimes," "Rarely," or "Never." The final question asked "If not never, where in the vehicle does the pet most frequently sit?" Choices included: "Rear cargo area," "Rear Seat," "Front Passenger Seat," "Front Floor," "In Driver's Lap," "Moves Around," or "Front Console."

Study participants also underwent both visual sensory and higher-order visual processing testing. The specific tests described below were selected because of their established relevance to driving performance, licensure and driver safety (Owsley, 2010; Owsley, 2001; Tarawneh, 1993; Edwards, 2006; Ball, 2006). For all visual testing, measurements were made under "habitual correction" if they had one, i.e., participants wore whatever spectacles or contact lenses they would normally wear for that viewing distance. All tests were administered under binocular viewing unless noted below. Visual acuity for letters was assessed using the Electronic Visual Acuity (EVA) system (Beck, 2003) and expressed as log minimum angle resolvable. Contrast sensitivity was assessed using the Pelli-Robson Contrast Sensitivity Chart (Pelli, 1988), and was scored by the letter-by-letter method

(Elliot, 1991). Visual processing speed while dividing attention was also assessed using the Trails B test (Retan, 1955), a paper and pencil test that relies on executive control abilities.

Statistical Analysis

Drivers who reported driving with a pet were compared to pet owners who reported never driving with a pet with respect to demographic and medical characteristics using t and chi-square tests for continuous and categorical variables respectively. Poisson regression was used to calculate rate ratios (RRs) and associated 95% confidence intervals (CIs) for the association between MVC involvement and driving with pet characteristics. P-values ≤ 0.05 (two-sided) were considered statistically significant.

RESULTS

Among the participants who reported owning a pet, slightly over half (58%) reported driving with a pet in their vehicle. Table 1 presents the demographic characteristics for those pet owners who did and did not report driving with a pet in their vehicle. There was no significant difference found between these two groups with respect to age, sex, and race. With regards to marital status, those who drove with a pet were less likely to be married and more likely to be single or divorced than those who did not. Those who drove with a pet were also more likely have educational attainment beyond high school.

Table 2 presents the medical and functional characteristics of the study participants who drove with pets versus those who did not. There was no significant difference in the number of self-reported medical co-morbidities with roughly 70% of each group reporting between 2 and 5 medical co-morbidities. There was also no significant difference with respect to visual acuity. Participants who drove with pets demonstrated faster visual processing speeds as measured by the Trials B exam and had higher MMSE scores.

With respect to driving habits, those who did and did not drive with pets reported similar days of driving per week, miles driven per week, and trips taken per week (Table 3). A difference was noted between the two groups in terms of locations visited per week. Seventy-seven percent of those who drove with a pet were more likely to report visiting between 3 to 6 places per week, where as 72% of those who did not drive with a pet reported visiting 4 or fewer places per week.

Table 4 presents the number and rate of total and at-fault MVCs between the two groups. The MVC rate per million person miles of travel was lower for both total collisions (4.9 versus 5.1) and at-fault collisions (2.1 versus 2.45) for drivers with pets than for the sample of drivers who did not drive with pets. Those who drove with pets in their vehicle were 16% less likely to have an at-fault collision on their driving record than those pet owners who did not drive with their pet (RR 0.84 CI 0.57 – 1.24). There was no evidence of confounding or effect modification by any of the demographic or general health characteristics found in Tables 1 and 2, thus no adjusted measures of association are presented in Table 4.

Among participants who reported driving with a pet in their vehicle, 54% reported that they engaged in this driving behavior only rarely; while 38% reported sometimes and only 8%

reported always driving with their pet. The highest overall MVC rate per million person miles was among those who reported always driving with a pet (9.65), nearly double (RR 1.89, 95% CI 1.10–3.25) the rate of those who reported never engaging in this behavior. However, the rates for those reporting sometimes and rarely driving with pets were similar (Table 5). Conversely for at-fault crashes, the highest rate was found for those who never drove with pets followed by those who sometimes, rarely, and always drove with a pet, respectively.

Finally, drivers were asked to report where in the vehicle the pet was located during travel. The two most common locations were the rear seat (40%) and the front passenger seat (38%). Each of the remaining locations (rear cargo area; front floor space; in driver's lap; on the front console; in multiple locations; or moving around in the vehicle) were individually less than 10%.

DISCUSSION

The current study sought to evaluate the association between driving with pets and MVC rates among a population of older drivers. The results of the current study indicate that older drivers who drove with pets did not have elevated MVC rates, either overall or at-fault. However, the majority of those who drove with pets reported doing so only rarely (54%) or sometimes (38%). The MVC rates for these groups of drivers are potentially conservative (i.e., artificially low) as the person-miles of travel denominator includes time (mileage) when the drivers did not have pets in the vehicle. If MVCs among these drivers were more likely to occur while driving with a pet, the observed null association will be an underestimate of the likely true effect. For those who reported "always" driving with a pet, such bias is less likely and these drivers had the highest MVC rate; significantly higher compared to those who reported never driving with a pet. With respect to at-fault MVCs, similarly null associations were observed for the sometimes and rarely groups; these too are likely underestimates of the true association. In contrast to the overall MVC rate, the always group had the lowest rate of at-fault crashes; however, given the small number of at-fault events (n=2) this specific result is unreliable.

Despite the prohibition of driving with pets in several states (Parker-Pope, 2010), there is no direct evidence that driving with pets is or is not a threat to public safety; however, indirect evidence exists. The number of MVCs and MVC-related fatalities attributed to distracted driving has increased in recent years (NHTSA, 2010). Among driving-related distractions cell phone use has received the most attention; this is not surprising given the four-fold increase in MVC risk associated with cell phone use (Redelmeier, 1997). Such research has been used to support legislation by state agencies prohibiting cell phone use while driving (GHSA, 2012). More recently research has focused on other potentially distracting behaviors including interacting with passengers (Koppel, 2011; Drews, 2008; Lee, 2008), eating and drinking (Young, 2008), interacting with vehicle electronics (Stutts, 2001), as well as environmental distractions and/or hazards outside the vehicle (Stutts, 2005; McEvoy, 2007). The presence of other motor vehicle passenger has been shown to reduce MVC risk for most drivers, the one exception being younger, inexperienced drivers (Lee, 2008). For such drivers, many states have graduated driver's license programs that limit the number of

additional passengers a younger driver can have in their vehicle (GHSA, 2012). With regard to driver distraction and aging, research suggests that compared to younger drivers, drivers 70 years and older have the lowest relative risk for distraction-related death or injury from hand-held cell phone use yet the highest relative risk from other inside distractions (Lam, 2002). Other research has reported that elderly drivers demonstrate lengthened response times when faced with the increasing physical or cognitive workload of a complex internal environment (Ho, 2002; Rizzo, 2004; Thompson, 2011). It has also been observed that drivers over the age of 60 are more likely to maintain lower minimum speeds as well as exhibit larger decreases in speed in response to an in-vehicle distraction and/or a more hazardous environment (Horberry, 2006). While this evidence demonstrates compensatory behavior on the part of elderly drivers in response to distraction, it is unclear whether this is adequate to overcome any potential safety risk. Finally, with respect to pets, a recent survey of individuals who drove with pets reported over half engaging in activities such as grooming, using arms to restrict movement of the animal, reaching into the back seat to pet an animal, as well as allowing the animal to sit in the driver's lap, all while driving (AAA & Kurgo, 2011). Any of these behaviors, according to the definition put forth by the NHSTA, would be classified as distracted driving; in fact, many result in visual, physical, and cognitive inattention.

The results of this study must be interpreted in light of several strengths and limitations. A large sample size ensures that the current study has sufficient power to detect a significant association if one actually exists and decreases the likelihood that such as association is due to random error. The population-based nature of the study population increases the external validity of the observed results. Also, the use of police accident reports provides an objective measure of MVCs and the at-fault status of each event for study participants, removing the potential of a recall bias. Limitations include the self-report nature of the pet ownership. The observed results may reflect recall bias if those who had MVCs were more likely to report owning a pet; however, we do not expect such reporting to be differential. Additionally, participants were asked to categorize the frequency of their exposure into always, sometimes, rarely, or never, which does not provide exact information on the percentage of time spent driving with a pet in the vehicle. Also not available is information regarding whether the pets were restrained in any way, which may impact their potential for distracting the driver. The study precludes any direct temporal or casual association between the occurrence of a MVC while driving with a pet in the vehicle. That is, we do not know if those who experienced an MVC were actually driving with their pet at the time. Moreover, for MVCs that occurred several years prior, we can only assume the participants' reported behavior was constant over time. Additionally, our study did not make a distinction between a dog and a cat for the pet in question. This would allow us to determine if the association was limited to either type of pet. Such a determination of the intensity of one type of distraction compared with another would necessitate a naturalistic driving study whereby driver behavior and driving performance were directly observed via video or simulation. Finally, our study included only licensed drivers over the age of 70, calling into question whether the results should be extended other age groups. As with other activities like cell-phone use and the presence of additional passengers, the possibility that pets are a greater distraction to a younger population needs further investigation.

In summary, this is the first study to evaluate vehicle presence of pets as a potential internal distraction for elderly drivers. The increased risk of involvement in MVCs in elderly drivers who always drive with pets is important in the context of both increasing driver awareness about potentially dangerous driving habits and informing or refuting the need for regulations on such driver behaviors.

Acknowledgments

This research was funded by the National Eye Institute (R01EY18966) and the National Institute on Aging (P30AG22838) of the National Institutes of Health; The American Recovery and Reinvestment Act of 2009; the EyeSight Foundation of Alabama; the Able Trust; and Research to Prevent Blindness, Inc.

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HIGHLIGHTS

- Distractions while driving have been shown to increase the risk of motor vehicle collisions.
- Media reports and legislative initiatives highlight pets as a potential source of distraction.
- Older drivers who always drive with pets have an increased rate of motor vehicle collisions.

Table 1

Demographic Characteristics among Older Adults Who Do and Do Not Drive with Pets

Characteristic	Drives with Pet (n = 401)	Does Not Drive with Pet (n = 290)	*P* value
	N (%)	N (%)	
Demographics			
Age			
70–79	317 (79.1)	213 (73.5)	
80–89	80 (20.0)	72 (24.8)	0.2028
90–99	4 (1.0)	5 (1.7)	
Sex			
Male	224 (55.9)	181 (62.4)	0.0843
Female	177 (44.1)	109 (37.6)	
Race			
White	369 (92.0)	259 (89.3)	
African American	30 (7.5)	29 (10.0)	0.6841
Other	2 (0.7)	2 (0.5)	
Marital Status			
Married	224 (55.9)	184 (63.5)	
Single	40 (10.0)	13 (4.5)	
Separated	0 (0.0)	1 (0.3)	0.0160
Divorced	32 (7.9)	14 (4.8)	
Widowed	105 (26.2)	78 (26.9)	
Education			
Less than High School	107 (26.7)	105 (36.2)	
High School Grad or GED	11 (2.7)	11 (3.8)	0.0381
1 – 4 Years of College	228 (56.9)	141 (48.6)	
Post-Graduate Degree	55 (13.7)	33 (11.4)	

Table 2

Medical Characteristics among Older Adults Who Do and Do Not Drive with Pets

Characteristic	Drives with Pet (n = 401)	Does Not Drive with Pet (n = 290)	*P* value
Co-Morbidities, n (%)			
0–1	53 (13.2)	45 (15.5)	0.6902
2–3	148 (36.9)	111 (38.3)	
4–5	136 (33.9)	97 (33.5)	
6–7	51 (12.7)	31 (10.7)	
8–9	11 (2.7)	6 (2.1)	
! 10	2 (0.5)	0 (0.0)	
Visual acuity (OU), n (%)			
20/20 or better	240 (59.9)	152 (52.6)	0.1417
>20/20 to 20/40	131 (32.7)	108 (37.4)	
>20/40 to 20/200	30 (7.5)	29 (10.0)	
Contrast sensitivity (OU), n (%)			
≥ 1.8	106 (26.4)	60 (20.8)	0.3929
≥ 1.5 to < 1.8	271 (67.6)	210 (72.7)	
≥ 1.2 to < 1.5	23 (5.7)	18 (6.2)	
< 1.2	1 (0.3)	1 (0.4)	
Trails B, (minutes), n (%)			
0.0 – 1.6	123 (30.8)	58 (20.0)	0.0068
1.7 – 2.1	102 (25.5)	79 (27.2)	
2.2 – 3.0	96 (24.0)	73 (25.2)	
>3.0	79 (19.8)	80 (27.6)	
MMSE, mean (sd)	28.5 (1.48)	28.1 (1.88)	0.0002

Table 3

Driving Characteristics among Older Adults Who Do and Do Not Drive with Pets

Characteristic	Drives with Pet (n = 401)	Does Not Drive with Pet (n = 290)	*P* value
	N (%)	N (%)	
Days per week			
1–2	24 (6.0)	28 (9.7)	0.1893
3–4	77 (19.2)	63 (21.7)	
5–6	101 (25.2)	62 (21.4)	
7	199 (49.6)	137 (47.2)	
Miles per week			
1 – 45	88 (22.0)	78 (26.9)	0.1668
46 – 88	89 (22.2)	75 (25.9)	
89 – 165	94 (23.4)	57 (19.7)	
≥ 166	130 (32.4)	80 (27.6)	
Trips per week			
1 – 5	106 (26.4)	94 (32.4)	0.0987
6 – 8	120 (29.9)	78 (26.9)	
9 – 11	70 (17.5)	60 (21.0)	
> 12	105 (26.2)	58 (20.0)	
Places per week			
1–2	71 (17.7)	73(25.2)	0.0364
3–4	187 (46.6)	136 (46.9)	
5–6	122 (30.4)	65 (22.4)	
7–9	21 (5.2)	16 (5.5)	

Table 4

Comparison of Motor Vehicle Collisions and Motor Vehicle Collision Rates Between Elderly Pet Owners Who Do and Do Not Drive with Pets

	Drives with Pets (n = 401)	Does Not Drive with Pets (n = 290)
Total Collisions		
No.	137	100
Rate per 1,000,000 person-miles	4.9	5.1
RR (95% CI)	0.97 (0.75–1.26)	Reference
At-Fault Collisions		
No.	57	48
Rate per 1,000,000 person-miles	2.1	2.5
RR (95% CI)	0.84 (0.57–1.24)	Reference

Table 5

Frequency of Driving with Pets, Motor Vehicle Collisions, and Motor Vehicle Collision Rates

	Always (n = 33)	Sometimes (n = 151)	Rarely (n = 217)	Never (n = 290)
Total Collisions				
No.	15	49	73	100
Rate per 1,000,000 person-miles	9.6	4.7	4.6	5.1
RR (95% CI)	1.89 (1.10–3.25)	0.92 (0.66–1.31)	0.91 (0.67–1.23)	Reference
At-Fault Collisions				
No.	2	24	31	48
Rate per 1,000,000 person-miles	1.3	2.3	2.0	2.5
RR (95% CI)	0.52 (0.13–2.16)	0.95 (0.58–1.55)	0.80 (0.51–1.26)	Reference