

Effects of Passengers on Older Driver Safety

Nikiforos Stamatiadis*

University of Kentucky, Civil engineering, 265 Raymond Bldg., Lexington, Kentucky 40506-0281, USA

*Corresponding author: Nikiforos Stamatiadis, University of Kentucky, Civil engineering, 265 Raymond Bldg., Lexington, Kentucky 40506-0281, USA, Tel: 85921578012; E-mail: nick.stamatiadis@uky.edu

Received date: November 23, 2015; Accepted date: January 28, 2016; Published date: January 31, 2016

Copyright: © 2016 Stamatiadis N. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Introduction

Older drivers present a unique challenge to the transportation field. Studies have shown that older drivers have high rates of crashes and injuries; however, maintaining the ability to drive is very important to older persons, and the solution must balance older driver mobility and safety [1]. The crash involvement rates for older drivers (those over the age of 65) have been increasing since the 1980's, and elderly drivers are disproportionately more at fault in crashes than other driver age groups (US DOT 2012). As the number of older persons who are licensed to drive continues to grow, there is increased concern about their risk to themselves and others on the road. Further research is required to improve the understanding of the crash propensities of this age group and thus assist in developing countermeasures. Past research that examined gender and cohort trends among older drivers indicated that differences in crash-causing propensity noted between genders might diminish in the future [2].

The United States population is aging, and by 2030, one in five Americans will be 65 or older (TRB 2004). Clearly, the demographic of older drivers is rapidly growing, and they bring with them special challenges for traffic safety. As people age, they become more susceptible to any injuries, including injuries sustained in a crash [3]. In fact, many of the same factors that increase the likelihood of injury in elderly drivers have also been found to lead to a higher crash-causing propensity [4]. Older drivers may experience a decline in physical and mental facilities that lead to or cause unsafe driving behaviours. Some of these obstacles include the "deterioration of sight and hearing, the onset of muscle, joint, and skeletal disorders, and deterioration of mental and physical response times" [3]. The higher crash propensity of older drivers is often attributed to typical aging related deterioration, which affects three functions important to safe and carefree driving: sensory (visual), cognitive and psychomotor [5]. It is estimated that 90 percent of the input that a driver receives is visual [6]. This makes vision the primary sensory function used for driving. The deterioration of visual ability does not only reduce the capability to operate an automobile but it also causes the driver difficulty in judging distances between vehicles which in turn can lead to crash involvement. Loss of peripheral vision to observe approaching vehicles from the sides is also critical [7]. While crash survivability undoubtedly plays a large role in the safety problem facing older drivers, just as much of an issue is crash avoidance (TRB 2004). If measures can be taken to reduce the likelihood that elderly drivers will even be involved in a crash, then some of the obstacles facing older driver mobility can be overcome.

Many mitigating factors have been introduced with the goal of decreasing crashes among older drivers: those target the vehicle, the roadway and the driver [8]. Most of these, however, are focused primarily on the design aspects of vehicles and the roadway. The results

of deeper passenger research may determine that more effort should be placed on the driver through awareness and education.

The effect of passengers on the crash-causing propensity of younger drivers is well established [9]. A few studies have been undertaken in the pursuit of finding the effect of passengers on elderly drivers. Geyer and Ragland [10] used adjusted odds ratios (or) to find the effects of passengers in fatal collisions between 1992 and 2002. The study found that passenger presence in general decreased the risk of the driver being at fault. More specifically, males aged 45 and older were much less likely to be at fault in fatal crashes if passengers accompanied them, and this "protective effect" increased with age. Interestingly, the study also found that passenger presence increased the likelihood that male drivers aged 50 and over were wearing their seat belts. Females also experienced this increased protective effect as well as increased seat belt usage with the presence of passengers, but not as strongly as the male drivers [10].

A study performed by the Monash University Accident Research Centre found similar correlations, with passengers affecting driver behaviour of drivers 40 and older [11]. Results showed that 16-17 year old drivers, regardless of gender, were more likely to be at fault when they carried all-male passengers [11]. The countermeasures developed by this group fell into the following categories: promotion, education, training, licensing, enforcement and research. Each countermeasure targeted a specific aspect of the issue. For example, promotion and education focused on increasing awareness of the various impacts a passenger may have on the performance of the driver targeting drivers and parents of young drivers, while licensing focused more on the restrictions of types on passengers to be in a vehicle for young drivers. The same group compiled a summary of available literature on the subject and found that talking to passengers ranked lowest on a list of most distracting in-vehicle distractors (compared with navigation devices, cellular phones, radios/CDs, climate control, eating/drinking, and smoking) [12].

Hing et al. [13] conducted one of the first systematic efforts to examine the effect of passengers on older drivers through an examination of 60,316 Kentucky crashes during the 1995-1998 periods. Older drivers were divided into two age groups: 65 to 74 years and 75 years and older. Their study found that the presence of two or more passengers in the vehicle does increase the risk of a driver over the age of 75 years being at-fault in a collision. This effect was not observed for the younger group of drivers. The data were insufficient to draw distinctions in crash patterns depending on the age of the passenger.

Citron et al. [14] conducted a study to further explore the findings of the Hing et al. [13] study. The study examined 22,450 crashes of older drivers during the 2004-2006 periods. The results of their analysis indicate that passengers can and do in fact provide a "protective" impact for elderly drivers under many driving conditions. Typically, drivers over the age of 75 exhibited a higher probability of causing a

crash compared to drivers in the 65-74 age range for both single- and multi-vehicle crashes. The presence of passengers for this older age group (75+) usually had either no effect or a slightly negative effect, except in the case of night-time driving (for multi-vehicle crashes) and the cases of night time driving, driving on curvy roads, and driving on two-lane roadways (for single-vehicle crashes). In these instances of risky driving conditions, the passengers improved the safety performance of drivers in the 75+ age group, suggesting that they may serve as extra assistance when the conditions are perceived as more dangerous, thus having the potential to alter driving behaviour. In nearly all cases, the presence of passengers decreased the likelihood of being at-fault for drivers in the 65-74 age groups, but the magnitude of difference was not as large as shown by the results from the 75+ age group. The study also concluded that males of both age groups were less likely to be at-fault when carrying passengers (in single- and multi-vehicle crashes), whereas females of both age groups were more likely to be at-fault when carrying passengers than males for single-vehicle crashes. Drivers in the 65-74 age groups were more likely to cause a crash with all-male passengers for both single- and multi-vehicle crashes, suggesting that their driving behaviour may mirror to the risk-taking behaviour of male drivers. Overall, drivers of both age categories were significantly impacted when the youngest or oldest passenger in the vehicle was a child (0-20) or a peer (65+). The findings here indicate that the presence of passengers has the potential to affect driving behaviour positively for older drivers.

Citron et al. [14] support the assertion that passengers make a difference in the roadway safety of older drivers. This could be considered as an important finding for the development of safety countermeasures. Because many elderly drivers already practice self-regulation by driving during the day or off-peak hours, it is likely that they may be willing to further compensate by driving with a passenger or passengers in order to improve their safety. Educating older drivers about the safety impacts of not traveling alone, especially during risky conditions, will give them the knowledge to change their behaviours. This self-motivated change would prevent the implementation of restrictions for elderly drivers, thus allowing them to maintain their mobility while also improving safety.

Because many states have no programs in place for educating or re-training elderly drivers, another possible countermeasure would be to encourage passenger restrictions on elderly drivers in much the same way that these limits are placed on the youngest drivers. Teenage drivers in graduated licensing programs are not allowed to have passengers younger than a certain age with them during night-time [15-17], or are not allowed more than a low number of passengers; since the presence of passengers has shown to negatively affect young drivers. However, for elderly drivers, it may be suggested that when driving at night an older driver must take someone with them, or for regular driving conditions it is recommended that they carry a passenger. Older drivers can benefit from the presence of passengers, since they can offer advice and affect driving behavior. The past research has shown that they do perform better in such situations that

driving alone. Such a policy could be implemented in a similar fashion as the comparable policies that exist in the Graduated Driver License requiring the presence of an adult at certain conditions. Carpooling among elderly drivers may be another recommended practice to reduce the chances of causing a crash.

References

1. Alicandri E, Robinson M, Penney T (1999) Designing Highways with Older Drivers in Mind. *Public Roads* 62: 6.
2. Stamatiadis N (1996) Gender effects on the accident patterns of elderly drivers. *Journal of Applied Gerontology* 17: 8-22.
3. Khattak AJ, Pawlovich MD, Souleyrette RR, Hallmark SL (2002) Factors Related to More Severe Older Driver Traffic Crash Injuries. *Journal of Transportation Engineering* 128: 243-249.
4. Stamatiadis N, Taylor WC, McKelvey FX (1991) Elderly Drivers and Intersection Accidents. *Transportation Quarterly* 45: 377-390.
5. Deacon J (1988) Potential improvement in roadway delineation for older driver. In *Transportation in an Ageing Society: Improving Mobility and Safety for Older Persons*. Transportation Research Board, National Research Council, USA 2 (Special Report 218).
6. Bailey I, Sheedy J (1988) Vision screening for driver licensure. In *Transportation in an Ageing Society: Improving Mobility and Safety for Older Persons*. Transportation Research Board, National Research Council, USA 2 (Special Report 218).
7. Baxter J, Manstead ASR, Stradling SG, Campbell KA, Reason JT, et al. (1990) Social facilitation and driver behavior. *British Journal of Psychology* 81: 351-360.
8. Dellinger AM, Langlois JA, Li G (2002) Fatal Crashes among Older Drivers: Decomposition of Rates into Contributing Factors. *American Journal of Epidemiology* 155: 234-241.
9. Williams AF, Shabanova VI (2003) Responsibility of drivers, by age and gender, for motor-vehicle crash deaths. *Journal of Safety Research* 34: 527-531.
10. Geyer JA, Ragland DR (2005) Vehicle Occupancy and Crash Risk. *Transportation Research Record* 1908: 187-194.
11. Regan MA, Mitsopoulos E (2001) Understanding Passenger Influences on Driver Behavior. Monash University Accident Research Centre, Report No. 180.
12. Young K, Regan M, Hammer M (2003) Driver Distraction: A Review of the Literature. Monash University Accident Research Centre, Report No. 206.
13. Hing JY, Stamatiadis N, Aultman-Hall L (2003) Evaluating the impact of passengers on the safety of older drivers. *J Safety Res* 34: 343-351.
14. Citron K, Stamatiadis N (2008) Effect of Gender and Passengers on Crash Patterns of Elderly Drivers, Southeastern Transportation Center.
15. Kentucky Transportation Cabinet (2008) Graduated Driver Licensing Program.
16. Potts I, Stutts J, Pfefer R, Neuman TR, Slack KI, et al. (2004) A Guide for Reducing Collisions Involving Older Drivers. Research Board of the National Academies: National Cooperative Highway Research Program, USA 9 (Report 500).
17. US Department of Transportation (2006) Traffic Safety Facts. National Highway Traffic Safety Administration, USA.