

Rapid Deceleration and Crash Events in an RCT Evaluating a Safe Transport Program for Older Drivers

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Abstract

The aim of this project was to determine if education can enhance self-regulation of driving and promote safety of older drivers. As crashes are rare events, rapid deceleration events were used as surrogate safety events and self-reported crashes as a secondary outcome. The randomised controlled trial (RCT) found that an individual education program ('Behind the Wheel') only reduced rapid deceleration events in the drivers with better visual and cognitive functioning and did not have an effect in older drivers with poorer function. It is possible that drivers with better function were better able to implement strategies to promote their safety.

Background

Older people are a large and growing sector of the driving population. Concerns over safety of older drivers have been raised due to increased crash involvement and vulnerability to crash injury.(Meuleners, Harding, Lee, & Legge, 2006) Crash involvement per mile driven and likelihood for driver responsibility begins to increase from age 65 (Williams & Shabanova, 2003) and by age 85 likelihood of crash involvement is approximately 2.5 times higher than that of younger drivers.(Cerrelli, 2007) However, concerns over safety need to be tempered by the fact that driving is an important means to maintain independence and community participation for older people. Loss of driving privileges has been linked to depression and early admission to residential care.(Dickerson et al., 2007)

It was hypothesized that a one-on-one safe-transport program, designed to encourage planning for retirement from driving and self-regulation, could improve the safety of older drivers as measured by rapid deceleration events or 'hard braking'.

Method

The Behind the Wheel program (adapted from the KEYS® program) was evaluated using a randomised controlled trial involving 380 drivers aged 75 years and older, residing in the suburban outskirts of Sydney. Half received the program and half did not. The outcomes for this trial were differences in rapid deceleration events (RDE, > 750 milli-g) and self-reported crashes between groups. General linear models were used to model the impact of the program on the rate of RDEs and self-reported crashes, using distance travelled as an offset. A sub-group was pre-specified based on the cut-off score on the DriveSafe/DriveAware assessment categorising drivers into likely safe and needing further assessment.

Results

We recruited 380 participants (230 men) with an average age of 80 years and 366/380 (96%) completed the 12 month study. The program was delivered to 183/190 (96%) of drivers allocated to the intervention. In vehicle monitoring data was available for 351 participants (92%) for a median of 52 weeks [inter-quartile range (IQR) 44-52] and 5487 [IQR 3294-8641] km of travel. Of the

drivers in the trial, 218/351 (62%) drivers had at least one RDE and the median number of RDEs was 1 [IQR 0-4]. Overall, there was no between group difference in the rate of RDEs per distance driven (incident rate ratio (IRR) 0.85, 95% CI 0.61-1.18). Crashes were reported by 14 participants in the intervention and 19 in the control group (p=0.46). Pre-planned sub-group analyses showed that the intervention was effective in significantly reducing RDEs (IRR 0.41, 95% CI 0.20-0.81), in drivers with a DriveSafe/DriveAware score of 96 or higher (fit to continue driving).

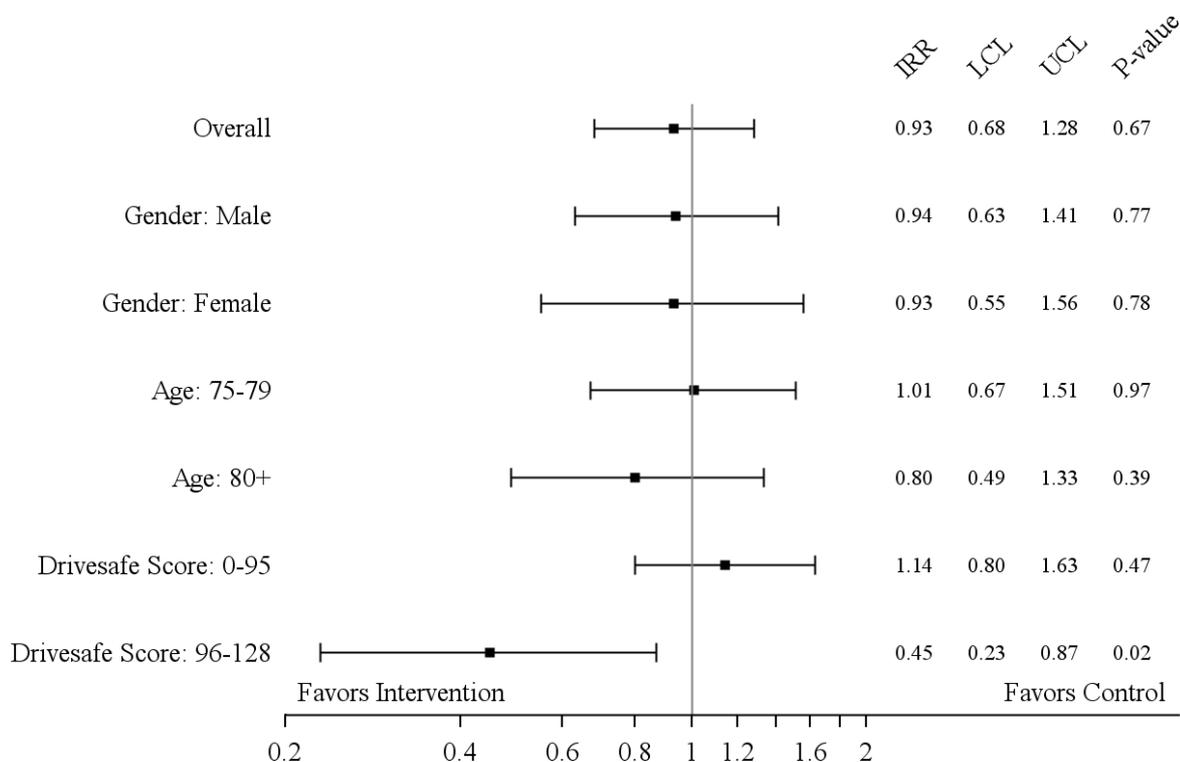


Figure 1: Forest plot showing the incident rate ratio for rapid deceleration events in the intervention compared to the control group stratified by sex, age and DriveSafe/DriveAware Score. IRR=incident rate ratio, LCL=lower 95% confidence limit, UCL=upper 95% confidence limit

Conclusions

Older drivers with good visual and cognitive function are responsive to a one-on-one education program to improve their safety on the road. These drivers reduced their involvement in RDE events by more than half, however this approach was not effective in drivers with poorer function.

References

Cerrelli, E. C. (2007). Crash data and rates for Age-Sex Groups of drivers, 1996. from <http://www.nhtsa.dot.gov/people/nca/>

Dickerson, A. E., Molnar, L. J., Eby, D. W., Adler, G., Bedard, M., Berg-Weger, M., . . . Trujillo, L. (2007). Transportation and aging: a research agenda for advancing safe mobility. *Gerontologist.*, 47(5), 578-590.

Meuleners, L. B., Harding, A., Lee, A. H., & Legge, M. (2006). Fragility and crash over-representation among older drivers in Western Australia. *Accid.Anal.Prev.*, 38(5), 1006-1010.

Williams, A. F., & Shabanova, V. I. (2003). Responsibility of drivers, by age and gender, for motor-vehicle crash deaths. *J Safety Res.*, 34(5), 527-531.