Evaluation of a Re-training Program for Older Drivers

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ABSTRACT

Background: Some older drivers may have a higher crash risk than others. Because many of these drivers have not received formal driving training, we evaluated the effectiveness of a re-training program for older drivers as it is currently being offered. Specifically, we examined if older drivers who received the training would have better scores on a driving evaluation than drivers who did not receive the training.

Methods: We used a randomized controlled trial. Participants first took part in on-road driving evaluations (possible scores ranged from 0 to 100), after which they were block randomized into training (treatment) or waiting (control) groups based on the driving evaluation results, age, and sex. Individuals in the treatment group attended driver re-training sessions, and were tested once more with the on-road test. Those in the control group completed their second driving evaluation and were then offered the re-training sessions. The second evaluations took place approximately two months after the first evaluations.

Results: Sixty-five participants completed two driving evaluations. Despite the overall improvement in driving scores (3.73, SD = 6.87, p = 0.001), we found no statistically significant difference between the control and treatment groups. The mean improvement for the control group was 3.46 (SD=6.72) compared to 4.02 (SD=7.11) for the treatment group (p = 0.747). Drivers' age was related to overall driving scores (r = -0.55, p = 0.001) but not changes between the first and second evaluations (r = 0.01, p = 0.955).

Interpretation: Although we have not demonstrated a statistically significant impact of the intervention, the overall increase suggests that an initial driving evaluation may underestimate the actual driving ability of many older drivers. Furthermore, although older drivers may have lower driving scores initially, they have the ability to improve on these scores. These findings should encourage us to explore diverse approaches to improve driving safety.

La traduction du résumé se trouve à la fin de l'article.

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Acknowledgements: We thank Mr. Terry Willie from Young Drivers of Canada (Thunder Bay) and the Thunder Bay Council on Positive Aging for their involvement in this project. Thanks are also extended to the instructors of the re-training program, to Bruce Nugent, Public Relations Officer at Lakehead Psychiatric Hospital for his assistance in the recruitment process, to members of the Advisory Committee for the valuable input they provided into the project, and to Dr. Michelle Porter for her comments on a previous draft of this article. This study would not have been possible without the enthusiasm of the participants and funding provided by the Ontario Neurotrauma Foundation. The results and conclusions are those of the authors. Michel Bédard is a Canada Research Chair in Aging and Health, and acknowledges the support of the Program.

The proportion of older adults licensed to drive and the distance they drive is increasing.[1] These changes, combined with older adults' elevated susceptibility to the traumatic effects of crashes,[2,3] place an increasing number of older adults at risk of serious traffic-related injuries. In 1975, adults aged 65 and over represented 10% of all fatally injured vehicle occupants, in 1998 this proportion reached 18%, and if the current trend continues, this proportion will be 27% by 2015.[4]

Preventive strategies to address the specific needs of older drivers are crucial. While young drivers are typically implicated in single-vehicle crashes involving alcohol and/or aggressive driving,[5-8] older drivers are typically implicated in multi-vehicle crashes, especially at intersections.[5,7,9] Problematic maneuvers for older drivers include turning, merging into traffic, changing lanes, leaving a parking position, and backing.[5,7,10]

Although reduced driving abilities and health-related impairments are often behind older drivers' difficulties, an issue seldom examined is that few older drivers received formal driver training. One intervention developed to fill this void is the 55Alive program of the American Association of Retired Persons (AARP). The 55Alive program was adapted for Canadian drivers by the Canadian Safety Council. However, it is unclear if the 55Alive program achieves its objectives, specifically 1) to promote safe driving habits in older drivers, and 2) ultimately to reduce crashes involving older drivers. We designed this study to examine the first objective. We hypothesized that older drivers would obtain higher driving scores, based on standardized on-road evaluations, after taking the 55Alive program.

METHODS

Participants

Participants (living in a city of 120,000 in Ontario) were recruited from several sources: radio/television interviews conducted with the principal investigator, articles and ads in newspapers, and posters distributed to hospitals and seniors' centres. Inclusion criteria were: age 55 or greater, valid driver's licence, currently drives, and fluency in English. The only exclusion criterion was the presence of

cognitive impairment as determined with a Mini-Mental State Examination (MMSE) score of less than 24. No participants were excluded for this reason.

Design

We used a randomized controlled design. After completing the cognitive screening, participants completed the first of two driving evaluations. Based on these scores, their age, and sex, they were block randomized to either the control or intervention group (block sizes were five units for driving evaluation and age). Participants from the control group waited and then completed a second driving evaluation. Places were then made available for these individuals to attend re-training sessions. Participants in the intervention group attended re-training sessions and then took part in their second driving evaluations. Approximately two months separated both evaluations.

Intervention

The re-training program was the Canada Safety Council adaptation of the 55Alive program developed by AARP. It emphasizes the acquisition of information and development of skills to improve driver safety and consisted of two half-day sessions of three hours led by one of three instructors. Nine topics were covered: 1) overview, 2) self-assessment, 3) vision/hearing, 4) normal driving situations, 5) hazardous driving environment, 6) driver guidance, 7) the vehicle, 8) alcohol and medication, and 9) driver decision. The local program is administered by volunteers and is free of charge with the exception of the course material ($25/participant), which was covered by the researchers as an incentive to encourage participation. Each group was composed of approximately 10-12 participants to maximize interactions between participants and instructors. In some training sessions, participants were mixed with members of the general public who were taking the course. The instructors were blind as to who were study participants.

Data collection

We obtained informed consent and administered the MMSE in participants' homes. We evaluated participants' driving skills on one of two standardized driving circuits (each 35 minutes). The circuit used was the one located closest to participants' homes; the same circuit was used for both evaluations. Circuits are set up to mimic the Ministry of Transportation licensing examination. Briefly, the aspects examined focussed on the application of the rules of the road and safe driving practices (i.e., how well the participants drove), including but not limited to: compliance, vehicle handling, route planning, observation, and crash prevention practices. One trained and certified evaluator with 10 years experience, from a Ministry of Transportation-approved driving school, conducted all evaluations. The evaluator was blind to group allocation and provided a final score ranging from 0 to 100. Consistent with Ministry of Transportation guidelines, scores of 70 or greater were considered a "pass", except in cases of serious errors which resulted in an automatic "fail".

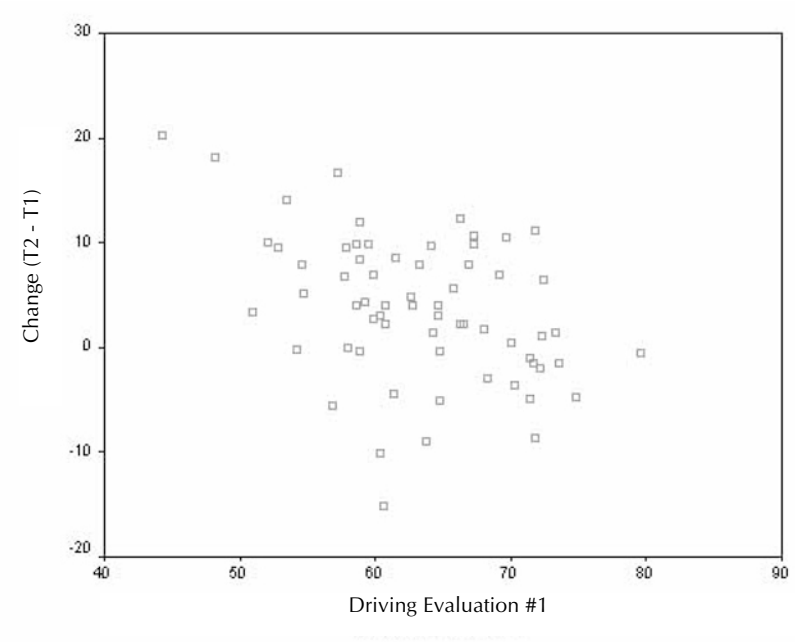

Figure 1. Change by baseline score

Statistical analyses

To determine if driving scores improved over time for the whole sample, we used a related-samples t-test; we used an independent-samples t-test with change scores (difference between the first and second evaluations) as the dependent variable to compare the control and intervention groups. To determine if a greater number of participants passed the test on the second evaluation, we used the McNemar test. We used a one-way analysis of covariance (ANCOVA) with change scores as the dependent variable and baseline driving score as the covariate to examine differences across instructors for participants in the intervention group. Relationships between age and driving scores and change scores relied on Pearson correlations. These correlation coefficients were formally compared using Howell's procedure for related correlation coefficients.[11]

RESULTS

Seventy-two individuals met inclusion/exclusion criteria and agreed to participate. Seven people withdrew; reasons cited included the death of a spouse, discomfort with driving the evaluator's car, discomfort with the in-class setting, and lack of free time. Hence, 65 participants completed both driving evaluations. Participants' age ranged from 55 to 86 years (mean = 71.09, SD = 8.46); 34 (52%) were women.

For the whole sample, mean scores for the second evaluation (66.92, SD = 7.49, ranging from 45.5 to 83.0) were higher than for the first (63.19, SD = 7.04; ranging from 44.3 to 79.6; t [64] = 4.38, p = 0.001). The 95% confidence interval around the mean difference was 2.03 to 5.44. At baseline, 14 (22%) participants

met the 70% "pass" cut-off. This number increased significantly (p = 0.035) to 23 (35%) at follow-up, an increase of 64%.

The control and intervention groups were equivalent on age, gender, and baseline driving scores. Mean age for the control group was 70.12 (SD = 8.66) compared to 72.09 (SD = 8.26) for the intervention group (t [63] = -0.94, p = 0.351). The sex split was similar (56% women in control versus 44% in intervention; χ^2 [1] = 0.75, p = 0.388). Mean baseline scores were similar, averaging 63.45 (SD = 7.01) for the control group and 62.92 (SD = 7.18) for the intervention group (t [63] = 0.30, p = 0.766). However, we did not find a statistically significant difference between the control and intervention groups on mean change scores. The mean improvement for the control group was 3.46 (SD = 6.72) compared to 4.02 (SD = 7.11) for the intervention group (t [63] = 0.32, p = 0.747). We found a statistically significant inverse relationship between baseline scores and changes scores (r [63] = -0.42, p = 0.001); participants who scored lower at baseline experienced greater improvements at follow up (Figure 1).

Because we used three different instructors and we did not provide training (to study the program as it is offered), we examined differences among instructors. Mean changes (SD) among participants of the intervention group were, for each instructor, 5.37 (7.34), 0.84 (6.04), and 2.78 (7.12). The difference across instructors did not reach statistical significance (F [2, 28] = 1.90, p = 0.168) but represents a strong effect size (Eta squared = 0.12).[12]

We examined if participants' age would predict driving evaluation scores and change scores. Age was associated with overall abilities (r = -0.55, p = 0.001) but not change scores (r = -0.01, p = 0.955). The former correlation was statistically significantly larger than the latter (t [62] = 3.59, p = 0.001).

DISCUSSION

Overall we found an increase in the driving scores of participants between the first and second evaluations. However, the difference between the control and intervention groups did not reach statistical significance; both groups improved. Several possibilities may explain the latter finding. First, participants may have received feedback from the evaluator during the first evaluation. Although the evaluator was instructed to not provide feedback until after the second evaluation, inadvertent feedback may have been provided or deduced by participants. Furthermore, being evaluated, by itself, may have raised participants' awareness of safety issues. Second, for safety reasons, all participants were tested in the driving school car; they may have needed some practice to adjust to a different car. Third, some contamination may have occurred between groups as many of the participants attend the same seniors' centre; participants who underwent the training program may have shared their experience with others from the control group. Finally, it is possible that some safety strategies were acquired (e.g., replace a potentially problematic left turn with three right turns, drive in low traffic situations) without being reflected in driving evaluation scores.

Other explanations directly rooted in the intervention itself may explain our findings. The intervention may not be sufficiently intense. More hours of training, and possibly on-road training, may be required. This possibility is reinforced by the correlation between the change and baseline scores. Given that drivers with high baseline scores improved little at follow-up, we may have experienced a ceiling effect; more advanced training may be required to improve on these participants' baseline scores. Finally, a crucial issue is the potential variability in effectiveness across instructors. While our intent was to study the program as it is currently offered, the optimal effectiveness of the intervention may depend on the training of the instructors to deliver the program ("training the trainers") and their adherence to best practices for adult education. One instructor had prior experience in driving instruction, the others did not.

Age was negatively correlated with baseline scores but not with change scores. This suggests that although older drivers may have lower driving scores than their younger counterparts, they can improve on these scores. Lower driving scores for older drivers may reflect a cohort effect (the youngest driver was 55, the oldest was 86). It is conceivable that younger drivers received better basic training than older ones. In addition, because of re-testing requirements starting at age 80 in Ontario, it is possible that the study attracted older drivers who were more concerned with their driving skills, especially if they faced re-testing in the short term.

We have several suggestions regarding future studies. First, we should review the current curriculum in light of emerging data on the situations where older drivers make errors, and the type of errors committed. Second, we should consider increasing the intensity of the intervention to achieve a stronger improvement for all drivers. Third, we need to train the instructors to provide a consistent, high quality re-training program, and avoid contamination across study groups. Fourth, we need to determine if drivers acquired safe habits that were not captured by on-road evaluations. Fifth, we need to consider if the intervention would result in different findings if the participants were tested in less comfortable, more challenging, situations. Sixth, we need to determine how much of an improvement in driving scores, if any, will improve safety; there is no guarantee that increases in driving scores will result in fewer crashes. Ultimately, our aim is to reduce the incidence of crashes, injuries, and fatalities, while promoting independence; we will need prospective studies to determine if the program achieves these goals.

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Received: July 21, 2003
Accepted: January 30, 2004

RÉSUMÉ

Contexte : Certains conducteurs âgés pourraient être plus exposés aux collisions que les autres. Comme beaucoup de ces conducteurs n'ont jamais suivi de cours de conduite, nous avons évalué l'efficacité d'un programme de réadaptation à l'intention des conducteurs âgés qui se donne actuellement. Plus précisément, nous avons cherché à déterminer si les conducteurs âgés qui suivent cette formation obtiennent de meilleures notes, à une épreuve de conduite, que les conducteurs n'ayant pas suivi cette formation.

Méthode : Nous avons procédé à un essai randomisé et contrôlé. Les participants ont d'abord pris part à une épreuve de conduite sur la route (notée de 0 à 100), après quoi nous les avons classés par blocs randomisés dans des groupes de formation (traitement) ou d'attente (contrôle) en fonction des résultats de leur épreuve de conduite, de leur âge et de leur sexe. Les personnes du groupe de traitement ont suivi des séances de réadaptation à la conduite et ont subi une nouvelle fois l'épreuve sur la route. Celles du groupe de contrôle ont subi une deuxième épreuve de conduite, et nous leur avons proposé des séances de réadaptation par la suite. La deuxième épreuve s'est déroulée environ deux mois après la première.

Résultats : Soixante-cinq participants ont subi les deux épreuves de conduite. Malgré une amélioration globale des notes obtenues (3,73, DS=6,87, p=0,001), nous n'avons constaté aucune différence significative entre les groupes de contrôle et de traitement. L'amélioration moyenne dans le groupe de contrôle était de 3,46 (DS=6,72), contre 4,02 (DS=7,11) dans le groupe de traitement (p=0,747). L'âge des conducteurs présentait une association avec la note globale obtenue à l'épreuve de conduite (r=-0,55, p=0,001), mais ce n'était pas le cas des changements entre la première et la deuxième épreuve (r=0,01, p=0,955).

Interprétation : Bien que nous n'ayons pas démontré que l'intervention a eu une incidence significative, l'augmentation globale donne à penser qu'une épreuve de conduite initiale pourrait sous-estimer les capacités de conduite réelles de nombreux conducteurs âgés. Au demeurant, même si les conducteurs âgés obtiennent initialement des notes plus faibles, ils sont capables d'améliorer leur score. Ces constatations devraient nous inciter à envisager des démarches diverses pour améliorer la sécurité de la conduite automobile.