Driving Safety in Mild Cognitive Impairment Compared with Cognitively Normal Adults Assessed with On-Road Test and Off-Road screening tools

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Abstract

We aimed to evaluate the safety of older drivers with Mild Cognitive Impairment (MCI) compared with cognitively healthy drivers living independently in the community.

Background

It is known that some people with mild dementia can continue to drive safely but that eventually they will need to retire from driving. There is a paucity of data on the road safety of individuals who have cognitive impairment that is not severe enough to meet the criteria for dementia. MCI is the classification given to adults with measurable cognitive impairment but who do not have dementia. Although a high proportion of adults with MCI will progress to dementia, others will revert to cognitive health or remain stable with MCI and not progress to dementia. MCI is more prevalent than dementia, affecting approximately 20% of the population aged 70 and older. Our review identified one paper reporting on-road assessment of drivers with MCI in a sample of 95 participants. MCI drivers made more errors and performed less well on the on-road test (ORT) but did not demonstrate impairment in driving to a degree that would render them unsafe(Wadley et al. 2009).

Method

The sample for this study comprised 302 participants who completed an on-road driving tests, and an off-road assessment (Mallon and Wood 2004). Current drivers aged 65 to 96 (M = 75.3, SD = 6.18, 40% female) were recruited through community advertising as part of an NHMRC Funded study on Driving Ageing Safety and Health (DASH). Participants were screened for dementia with the Mini-Mental State Examination (Folstein, Folstein, and McHugh 1975) and those with probable dementia were excluded from this analysis. The neuropsychological tests (see Strauss, Sherman, and Spreen 2006) included: Digit Span Backward, Stroop Colour Word Test, Boston Naming Test, Benton Visual Retention Test, Letter Fluency, California Verbal Learning Test, and Trail Making Test, as well as Useful Field of View (Ball and Roenker 1998), Game of Dice Task (Brand et al. 2005) and Reading the Mind in the Eyes (Baron-Cohen et al. 2001). We defined cognitively 'at risk' psychometrically as scoring more than 1.5 standard deviations below the mean on one or more cognitive domain including complex attention, learning, language, perceptual-motor function, executive function, and social cognition. Of the sample, 86 were identified as cognitively 'at risk' and 216 participants were identified as cognitively healthy. Off-road driver screening measures including the Useful Field of View (Ball et al. 2006), Maze test, Drivesafe, the RoadLaw Test (Unsworth et al. 2012), and the Multi-D battery were administered. The Multi-D comprises a measure of sway, colour choice reaction time and balance (Wood et al. 2008). Generalized linear models adjusting for age, sex and education estimated whether those who were cognitively 'at risk' were less safe than those who were cognitively healthy.

Results

Of the cognitively healthy group, 12.5% were classified as unsafe drivers by an on-road assessment and likely to fail a formal driving test, 48% were assessed as definitely safe, with the remained

scoring in a range where they may or may not pass a driving test. Of the cognitively at risk group, 23.25% were assessed as unsafe drivers and 33% were assessed as definitely safe. The average driver safety rating of the MCI group was lower than the cognitively healthy group ($p < .01$) but the distribution of scores across Unsafe, Possibly Unsafe, and Safe categories did not differ. The cognitively at-risk participants had statistically significantly lower scores on all off-road screening measures, and results were unchanged after adjusting for age, sex and education. However, there was a wide range of scores on the off road tests, with some cognitively at risk participants scoring very well and some cognitively healthy participants scoring poorly.

Conclusion

Mild cognitive disorders increase the risk that older drivers will be unsafe and a higher proportion of this group will potentially fail an on-road driving test. However, due to the wide-rang range in performance in this group, a full assessment of driving safety is required with regular follow-ups.

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