Association between unsafe driving performance and cognitive-perceptual dysfunction in older drivers.


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Abstract

OBJECTIVE:
To find an association between cognitive-perceptual problems of older drivers and unsafe driving performance during simulated automobile driving in a virtual environment.

DESIGN:
Cross-sectional study.

SETTING:
A driver evaluation clinic in a rehabilitation hospital.

PARTICIPANTS:
Fifty-five drivers aged 65 years or older and 48 drivers in their late twenties to early forties.

METHODS:
All participants underwent evaluation of cognitive-perceptual function and driving performance, and the results were compared between older and younger drivers. The association between cognitive-perceptual function and driving performance was analyzed.

MAIN OUTCOME MEASUREMENTS:
Cognitive-perceptual function was evaluated with the Cognitive Perceptual Assessment for Driving (CPAD), a computer-based assessment tool consisting of depth perception, sustained attention, divided attention, the Stroop test, the digit span test, field dependency, and trail-making test A and B. Driving performance was evaluated with use of a virtual reality-based driving simulator. During simulated driving, car crashes were recorded, and an occupational therapist observed unsafe performances in controlling speed, braking, steering, vehicle positioning, making lane changes, and making turns.

RESULTS:
Thirty-five older drivers did not pass the CPAD test, whereas all of the younger drivers passed the test. When using the driving simulator, a significantly greater number of older drivers experienced car crashes and demonstrated unsafe performance in controlling speed, steering, and making lane changes. CPAD results were associated with car crashes, steering, vehicle positioning, and making lane changes. Older drivers who did not pass the CPAD test are 4 times more likely to experience a
car crash, 3.5 times more likely to make errors in steering, 2.8 times more likely to make errors in vehicle positioning, and 6.5 times more likely to make errors in lane changes than are drivers who passed the CPAD test.

CONCLUSION:

Unsafe driving performance and car crashes during simulated driving were more prevalent in older drivers than in younger drivers. Unsafe performance in steering, vehicle positioning, making lane changes, and car crashes were associated with cognitive-perceptual dysfunction.

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