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Comparison of Unsafe Driving Across Medical Conditions

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Abstract

Objective: To compare risks of unsafe driving in patients with medical conditions.

Methods: This large population-based study included all patients who were referred for a fitness-to-drive evaluation at an official driving evaluation center in 2013 and 2014. Risks of unsafe driving included physician's fitness-to-drive recommendation, comprehensive fitness-to-drive decision, motor vehicle crash history, and traffic violation history.

Results: A total of 6584 patients were included in the study. Risks of unsafe driving were significantly different across medical conditions ($P<.001$ for all outcome measures). Patients with neurological conditions comprised the majority of the database (4837; 74%), but were not at the highest risk for unsafe driving. Patients with psychiatric conditions or substance abuse did worse on most driving safety outcomes, despite their low representation in the total sample (359 [6%] and 46 [1%], respectively).

Conclusion: The risk of unsafe driving varied greatly across medical conditions. Sensitization campaigns, education, and medical guidelines for physicians and driver licensing authorities are warranted to identify patients at risk, especially for those with psychiatric conditions and substance abuse problems.

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The ability to drive a car is vital for independence and freedom, especially in smaller towns and rural areas where public transportation is sparse and not a viable alternative for outdoor mobility.[1,2] Driving is an overlearned, yet complex activity that requires intact visual, cognitive, and motor skills to accurately and timely respond to a constantly changing environment.[3] Medical conditions may adversely affect the visual, cognitive, and motor prerequisites for safe driving.[4]

Traditionally, the influence of medical factors as direct cause of motor vehicle crashes (MVCs) is considered to range between 1% and 2% of all MVCs,[5] with 1 study reporting 12.7% of all MVCs to have a direct medical cause.[6] Epidemiological studies and meta-analyses revealed that some medical conditions pose higher risks of MVCs than do others.[5-8] Particularly, epilepsy, other neurological conditions, psychiatric conditions, alcohol abuse, and sleep apnea were postulated to substantially increase the risk of MVCs.[7] Cardiovascular conditions and visual deficits slightly increased the risk of MVCs.[9,10] Thus, the variability in the risk of MVCs across medical conditions is an important consideration for physicians, policymakers, and driver licensing authorities.

Although MVCs are a key indicator of driving safety, they are of limited use to driver licensing authorities. MVCs are rare events and unsafe drivers may not necessarily have had a crash. Some MVCs are inevitable, caused by factors extrinsic to the driver.[4] Obtaining crash information from the drivers' self-report or their caregivers may be subject to inaccurate recall or unwillingness to provide accurate information. Likewise, official motor vehicle records may not be comprehensive or may vary among local motor vehicle offices.[11] Ideally, MVCs due to medical conditions should not occur because of the medical regulations that are in place to proactively screen for unsafe driving before an actual MVC occurs.[12]

In addition to MVCs, another quantifiable measure of safe driving is the fitness-to-drive decision. According to the American Medical Association, fitness-to-drive criteria are increasingly based on an evidence-based model reflecting the policies on the medical aspects of safe driving and the requirement

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to justify medical standards for drivers when they are challenged in court.[12,13] The decision-making process of fitness-to-drive involves informing patients about their rights and duties regarding driving, verifying whether patients comply with the medical criteria stipulated in the law, and assessing the minimum medical prerequisites for driving. In most jurisdictions, fitness-to-drive decisions are medical procedures to identify patients who may be at risk of MVCs. Although fitness-to-drive decisions reflect different constructs of driving safety than do MVCs, they have been shown to considerably decrease the rates of MVCs and traffic violations.[12,14]

The physician may also refer to a driving assessment expert, who will make a fitness-to-drive recommendation on the basis of a comprehensive off-road and on-road driving evaluation. Studies have reported inconsistencies in fitness-to-drive agreements made by referring physicians and driving assessment experts in several neurological conditions.[15-17] Yet, it is unclear which medical conditions physicians struggle most with to determine fitness-to-drive.

The overall objective of this study was to compare different constructs of unsafe driving (physician's fitness-to-drive recommendations, comprehensive fitness-to-drive decisions, self-reported MVCs, and self-reported traffic violations) across medical conditions. A secondary aim was to compare the fitness-to-drive recommendation made by the referring physician with the comprehensive fitness-to-drive decision across medical conditions.

METHODS

Participants

From 2013 to 2014, a total of 10,519 drivers underwent a formal fitness-to-drive evaluation at the Center for Evaluation of Fitness to Drive and Car Adaptations (CARA) of the Belgian Road Safety Institute, which is the only legal fitness-to-drive authority for drivers with functional deficits in Belgium.[18] Of these, we excluded duplicate records, drivers without a comprehensive fitness-to-drive decision, and drivers with no information regarding their medical condition. We only used the data of 2013 when visitors returned in 2014. Finally, 6584 drivers were included in the analysis. They were referred to CARA because of (1) a change in their medical status; (2) an extension of the validity period of their driver's license; (3) a new driver's license category; or (4) a mandatory referral by insurance company, court, or medical expert.

Procedure

All patients completed medical questionnaires together with their referring physician, which included demographic, driving, and clinical history (Table 1). Detailed information regarding the individual medical condition was also collected, including type of diagnosis, date of diagnosis, medications, and symptoms. The primary diagnoses were categorized into 10 conditions: (1) neurological conditions (eg, stroke, multiple sclerosis, traumatic brain injury, and dementia); (2) psychiatric conditions (eg, psychotic disorder, schizophrenia, and autism spectrum disorder); (3) musculoskeletal conditions (eg, amputation, fracture, and polytrauma); (4) visual conditions (eg, cataract and glaucoma); (5) vestibular or hearing conditions (eg, hearing loss); (6) cardiovascular or pulmonary conditions (eg, hypertension and atrial fibrillation); (7) liver or renal conditions (eg, renal insufficiency); (8) sleep disorders (eg, sleep apnea); (9) diabetes mellitus; and (10) substance abuse (eg, alcohol and cannabis). The classification of medical categories was adopted from the National Highway Traffic Safety Administration of the US Department of Transportation[19] and similar to other classifications.[20,21] The driving assessment at CARA lasted between 1 and 4 hours and encompassed a medical examination, visual and road tests, and, if necessary, neuropsychological testing.

Outcome Measures

The 4 outcome measures of driving safety were as follows: (1) first-tier fitness-to-drive recommendation by the referring physician, (2) final-tier comprehensive fitness-to-drive decision, and (3) number of self-reported MVCs and (4) traffic violations in the 5 years preceding the fitness-to-drive evaluation.

Determining an individual's fitness-to-drive began with a physician's referral.

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