Mental Fitness for Driving
A Brief Resource and Research Guide

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**Article:**

**Abstract:**

Background: The aim of this study was to evaluate the effect of variables such as personality traits, driving behavior and mental illness on road traffic accidents among the drivers with accidents and those without road crash.

Methods: In this cohort study, 800 bus and truck drivers were recruited. Participants were selected among drivers who referred to Imam Sajjad Hospital (Tehran, Iran) during 2013-2015. The Manchester driving behavior questionnaire (MDBQ), big five personality test (NEO personality inventory) and semi-structured interview (schizophrenia and affective disorders scale) were used. After two years, we surveyed all accidents due to human factors that involved the recruited drivers. The data were analyzed using the SPSS software by performing the descriptive statistics, t-test, and multiple logistic regression analysis methods. P values less than 0.05 were considered statistically significant.

Results: In terms of controlling the effective and demographic variables, the findings revealed significant differences between the two groups of drivers that were and were not involved in road accidents. In addition, it was found that depression and anxiety could increase the odds ratio (OR) of road accidents by 2.4- and 2.7-folds, respectively (P=0.04, P=0.004). It is noteworthy to mention that neuroticism alone can increase the odds of road accidents by 1.1-fold (P=0.009), but other personality factors did not have a significant effect on the equation.

Conclusion: The results revealed that some mental disorders affect the incidence of road collisions. Considering the importance and sensitivity of driving behavior, it is necessary to evaluate multiple psychological factors influencing drivers before and after receiving or renewing their driver's license.

**Article:**

**Synopsis:**

Distractions brought on by a mental illness:
- Nearly 67% of patients with a mental illness have a driving license.
77% drive regularly

- Mental illness has a negative impact on road mobility.
  - Especially with an organic mental disorder or a schizophrenic disorder
- Data often relies on self-reports
- Traffic authorities underreport accidents involving individuals with mental disorders

Article:

Abstract:
Background: Driving a motor vehicle could be central to the functional autonomy of patients with psychiatric illnesses. For patients, a driver's license could mean independence, the ability to care for themselves, and the freedom to travel when they wish. However, both psychiatric disorders and psychiatric drug treatments can produce changes in perception, information processing and integration, and psychomotor activity that can disturb and/or interfere with the ability to drive safely. Objective: To assess the fitness to drive of psychiatric outpatients in a sample representative of current clinical practice. Method: Cognitive functioning and psychomotor performance of 208 consecutive psychiatric outpatients treated in a community mental health center in the Canary Islands (Spain) were assessed in different clinical situations. The LNDETER 100 battery, an electronic assessment unit–based measurement that consists of 5 screen-based tests, was used to assess concentrated attention and resistance to monotony, multiple discriminative reactions and their correctness, anticipation of speed, bimanual coordination, and the decision making process and tendency to assume risk. The study was conducted from July 2007 to September 2007. Results: Of 208 patients, only 33 had scores compatible with the requirements of a driver's license, and 84% failed at least 1 of the required tests. Of patients with a driver's license who drive almost every day, 79.5% registered scores that would not allow obtaining or renewal of the license. None of the driving patients studied notified the traffic authorities that they had a psychiatric condition that may affect safe driving. No patient stopped driving, although 10% of them recognized that their ability to drive was somehow damaged. Conclusion: Guidance on how best to formulate and deliver recommendations on driving fitness in stable psychiatric patients is lacking and much needed.

Article:

**Abstract:**
Statement of context: Driving can be important for enabling community participation. Mental illness and its treatment may disrupt fitness to drive, or people’s opportunities for learning to drive. This paper reflects on practice improvements in an Australian mental health organization. Critical reflection on practice: Occupational therapists identified gaps in knowledge among the multidisciplinary workforce about service users’ driver status, how to identify and manage driving issues, and how to support their beginning or resuming driving during recovery. Implications for practice: The key initiatives: policy and practice guidelines, workforce training, driver assessment and consultation services, and service user information resources—have become embedded supports within the organization for promoting safe driving.

**Article:**

**Abstract:**
Objectives: There is no consensus yet on how to determine which patients with cognitive impairment are able to drive a car safely and which are not. Recently, a strategy was composed for the assessment of fitness to drive, consisting of clinical interviews, a neuropsychological assessment, and driving simulator rides, which was compared with the outcome of an expert evaluation of an on-road driving assessment. A selection of tests and parameters of the new approach revealed a predictive accuracy of 97.4% for the prediction of practical fitness to drive on an initial sample of patients with Alzheimer’s dementia. The aim of the present study was to explore whether the selected variables would be equally predictive (i.e., valid) for a closely related group of patients; that is, patients with mild cognitive impairment (MCI).Methods: Eighteen patients with mild cognitive impairment completed the proposed approach to the measurement of fitness to drive, including clinical interviews, a neuropsychological assessment, and driving simulator rides. The criterion fitness to drive was again assessed by means of an on-road driving evaluation. The predictive validity of the fitness to drive assessment strategy was evaluated by receiver operating characteristic (ROC) analyses. Results: Twelve patients with MCI (66.7%) passed and 6 patients (33.3%) failed the on-road driving assessment. The previously proposed approach to the measurement of fitness to drive achieved an overall predictive accuracy of 94.4% in these patients. The application of an optimal cutoff resulted in a diagnostic accuracy of 100% sensitivity toward unfit to drive and 83.3% specificity toward fit to drive. Further analyses revealed that the
neuropsychological assessment and the driving simulator rides produced rather stable prediction rates, whereas clinical interviews were not significantly predictive for practical fitness to drive in the MCI patient sample. Conclusions: The selected measures of the previously proposed approach revealed adequate accuracy in identifying fitness to drive in patients with MCI. Furthermore, a combination of neuropsychological test performance and simulated driving behavior proved to be the most valid predictor of practical fitness to drive.

Article:

Synopsis:
• Executive function deficits in relation to driving:
  o Driving is a complex learned activity, requiring:
    ▪ Sensorimotor processing
    ▪ Perceptual processing
    ▪ Cognitive skills
    ▪ Behavioral control
    ▪ High degree of information processing
• Executive function deficits connected to difficulties:
  o Making decisions while driving
  o Finding solutions in complex traffic situations (when to initiate a vehicle overtake or lane merge)
  o Affects ability to process road signs
  o Affects ability to recognize own's own driving errors
• Severe mental disorders affecting driving
• Schizophrenia and Schizoaffective disorder
  o Driving is frequently compromised
  o 24.7% reported to have lost their license
  o 32.7% involved in accidents
  o Signs of high risk for accidents seen in computer simulations
    ▪ Crossing over lanes
    ▪ Cross the center dividing line
    ▪ Get into a collision
    ▪ Driving slower
  o Rationale:
    ▪ Symptoms of the disorder
    ▪ Cognitive impairments
    ▪ Executive function deficits
• 27%-46% of patients with schizophrenia experience multiple executive function deficits
• 54%-90% have at least 1 deficit
• Deficits are stable over time
  ▪ Neuroleptic medications

• The benefits of driving:
  o Driving as an intervention for life:
    ▪ Driving allows a person to participate in everyday activities.
  o Driving can be an enjoyable activity in and of itself.
  o Driving is significant for community involvement.
  o Driving contributes to a person’s self-image and sense of independence.
  o Driving provides access to employment opportunities.
  o Driving gives better independence in life.

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**Article:**
https://doi.org/10.1155/2019/3169679

**Synopsis:**
*Parkinson’s*
  • Motor and nonmotor symptoms; difficulty controlling motor vehicle smoothly and cautiously while keeping up with the flow of traffic
  • Make more critical driving errors (red light violations and difficulty maintaining lane position)
  • Higher rate of failure with on-road assessments

*Mental disorders associated with aging*
  • Primarily cognitive and decision-making difficulties
    o Alzheimer’s disease
    o Dementia

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**Article:**
https://doi.org/10.1111/ap.12132

**Synopsis:**
The dilemma:
  • If the individual is cleared to drive and he/ she is unfit, the consequences can be catastrophic.
  • If the individual is restricted from driving and he/ she is unfit, there can be serious health and social functioning consequences – including a substantially increased mortality rate.
Assessing driving can be difficult.
Clinicians are often forced to choose between two undesirable consequences.

Article:

Synopsis:
Safe driving relies on efficient visuo-perceptual processing:
- Form constancy
- Visual discrimination
- Figure-ground perception
- Visual closure
- Visual memory
- Visual sequential memory i.e. – *spelling skills for writing*

Safe driving relies on praxis:
- Ability to accomplish normal voluntary actions
- Requires both planning and coordination
- Made up of sequences of individual movements combined to accomplish the desired action
- More than just physical muscle ability; requires the ability to chain movements together for the goal
- Dyspraxia can exist in the presence of intact reflexes, strong muscles, and adequate range of motion
- Carrying out a planned goal-directed action is separate from spontaneously acting (such as sneezing or reaching for a desired object)

Safe driving relies on executive function skills:
- Cognitive processes, meaning that they are primarily located in the prefrontal regions of the brain.
- Cognitive control of behavior
- Selecting and successfully monitoring goal-driven behaviors
- Attentional control
- Cognitive inhibition
- Working memory
- Cognitive flexibility
- Higher order functions utilize these processes simultaneously, to accomplish planning and fluid intelligence (such as reasoning and problem solving)

Article:
Abstract:
Objective—In Switzerland, as in some other European countries, medical doctors may breach patient confidentiality and report to police authorities any patient who seems prone to automobile accidents or traffic violations. The aim of this study was to see if those patients reported to authorities actually represent a higher risk than drivers not reported to the police. Design—This study was designed following a case-control study comparing the characteristics of a group of psychiatric patients who were reported to authorities for preventive purposes, with the characteristics of another group of people who had disorders that were noticed at the time of an accident or traffic violation. Results—The results show that medical doctors tended to report male patients, patients with a low level of education, and patients with a severe psychiatric background. The subjects of the control group, who had often been involved in accidents or committed traffic violations in the past, did not possess these characteristics. Conclusions—The breach of medical confidentiality by doctors in reporting to authorities patients who are allegedly at risk is ethically questionable as long as the evaluation of driving performance does not rely on objective bases.

Article:

Abstract:
Objectives: To review the empirical evidence on approaches used by Primary Care Physicians (PCPs) in fitness to drive (FtD) consultations with people living with cognitive impairment. Design: Scoping review of empirical literature focused on primary studies of any design. Setting: Primary care practice. Participants: PCPs or their equivalent and/ or individuals with cognitive impairment across the spectrum of mild cognitive impairment to dementia. Measurements: Systematic search of Medline, Cinahl, PsychINFO, Academic Search Complete, Psychological and Behavioural Sciences Collection, SocIndex and Social Sciences FT were conducted. Records screened by two reviewers against agreed inclusion criteria. Mixed studies (qualitative and quantitative) were synthesized within overarching themes. Results: Eighteen studies met our inclusion criteria. Synthesized data showed PCPs have mixed feelings on the appropriateness of their role in FtD assessments, with many feeling particularly uncomfortable and lacking confidence in the context of possible cognitive impairment. Reasons include lack of familiarity with legal requirements and local resources; fear of damaging the doctor-patient relationship; and impact on the patient’s quality of life. Patients voiced their desire to maintain agency in planning their driving cessation. Studies evaluating pragmatic educational programmes suggest these can improve physician confidence in FtD consultations. Conclusion: The increasing number of older people affected by cognitive
impairment, for whom driving may be a concern, has implications for primary care practice. Addressing the reasons for PCPs lack of comfort in dealing with this issue is essential in order for them to better engage in, collaborative discussion with patients on plans and preferences for driving cessation.

Article:

Abstract:
Demographic changes increase the need for fair and valid fitness-to-drive assessment in older drivers. In a self-report survey, 473 older drivers stratified by age (55-64, 65-74, >74 years) were asked about their driving habits, crash history, compensatory driver behaviour, and attitude towards age-based reassessment. The results showed an increase in the proportions of subjects reporting crash involvement and the subjects reporting full legal responsibility for the latest crash in older age groups. The reported use of different compensatory strategies and adaptation techniques was also higher in the older age groups. Medical fitness-to-drive screenings are not able to deal with the complexity of this paradoxical finding, because medical diagnoses do not take into account adaptation and compensation in older drivers. Age-based reassessments limited to medical screenings therefore carry an increased likelihood of false positive classifications that would unnecessarily reduce the quality of life of sufficiently safe older drivers. This risk could, however, be reduced by a client-centred approach focused on practical fitness-to-drive, providing older drivers with the opportunity to show whether they are able to cope with functional deficits in more realistic driving settings. Such an approach is in line with theoretical occupational therapy foundations.

Article:

Synopsis:
Driving with a mental disorder can bring:
- Reduced attention
- Poor visual spatial functioning
- Poor impulse control
• Compromised judgement  
• Compromised information processing ability  
• Slowed psychomotor reaction times  

Fluctuating nature of the disorder, in terms of:  
• Impairments  
• Skills  
• Behaviors  

Major depression has been linked to a higher number of accidents  
• (Even apart from effects of medication) causes higher levels of sleepiness when driving.  
  o Sleepiness has been shown to affect driving speed  
  o Sleepiness has been shown to affect steering reaction time  
  o Sleepiness has been shown to affect, and a greater number of crashes, as compared  
• Major depression linked to impaired executive function  
• Slowed reactions not proportional to level of severity of symptoms.  

Bipolar disorder  
• Impairments in problem-solving  
• Impairments in cognitive flexibility  
• Impairments in alertness  
• Impairments in visual scanning/reaction time.  
• Conditions may be from the disorder or from the medicine being taken.  
• Manic and hypomanic states  
  o Speeding  
  o Making poor decisions  
  o Loss of feeling of control  
  o Decreased concentration  
  o Decreased judgment  
  o Impulsivity.  
  o Feelings of grandeur and lack of insight cause a lack of recognition of behavioral risks or respect for others.  

Personality disorders  
• Individuals with personality disorders are statistically in more traffic accidents*  
  o Possible rationale:  
    ▪ Overly aggressive tendencies  
    ▪ Lack of empathy  
    ▪ Patterns of impulsive behavior  
    ▪ High incidences of suicidality  
    ▪ High incidences of homicidality  
    ▪ Perceptual disturbances  
    ▪ Low insight for the consequences of their actions  
    ▪ Depersonalization  
    ▪ Derealization  

Law and Policies  
• International Guidelines:
Driver and Vehicle Licensing Agency (UK)
New Zealand Transport Agency
Irish Road Safety Authority
Austroads (Australia)
Driver Fitness Medical Guidelines (USA)

- National Norms
- State Laws/ Regulations

Article:

Abstract:
The authors mentioned the use of alcohol, co-morbid medical conditions (diabetes mellitus, Parkinson's disease, Alzheimer's disease, epilepsy), and adverse drug reactions among the risk factors for road traffic accidents. Psychiatric illnesses are also an important risk factor for road traffic accidents. It is well known that many psychiatric disorders can lead to impairment in the level of cognitive and executive functioning required for safe driving, and medications used to treat them can also potentially cause disruption in perception, information processing, and overall psychomotor activity. Moreover, studies have suggested that drivers with mental health conditions have a higher risk of being involved in a crash. A recent systematic review tried to identify what is known about driving for people with mental health conditions, and critically appraise studies that empirically investigated assessment of fitness-to-drive among people with mental health conditions revealed many interesting findings. Among patients with schizophrenia, even when stabilized with antipsychotic medication, great proportion of the patients were reported not fit-to-drive. Among patients with major depressive disorder higher levels of sleepiness were found when driving, irrespective of medication use. Moreover, depressive patients were also found to have slower steering reaction times and a greater number of car crashes when compared with controls. Statistically higher crash rates were also identified in personality disorder group and in the psychoneurotic group when compared with controls. However, the authors concluded that the overall quality of studies examining fitness-to-drive is low and large-scale longitudinal studies with age-matched controls are urgently needed in order to determine the effects of different conditions on fitness-to-drive.

Article:
Abstract:
(No abstract provided)
Websites

URL:

Synopsis:
Mental Fitness: Defined
• American Association of Motor Vehicle Administrators’ Driver Fitness Medical Guidelines:
  • “It is understood that drivers should be allowed to continue to drive as long as possible provided there is a reasonable expectation that they can safely operate a vehicle. Only when an individual poses an imminent threat to public safety should their driving privilege be withdrawn or restricted.”
  • “Any medical condition that affects physical or mental functioning may affect driving fitness. When the physical or mental effects of the condition are progressive in nature, periodic evaluations are required.”
    • Medical conditions that affect driving fall into 3 categories:
    • “Conditions that engender functional limitations (chronic compromise);”
    • “Conditions that involve an associated risk of compromise of consciousness (acute compromise); and”
    • “Use of substances (alcohol, drugs, medications) judged to be incompatible with safe driving.”

URL:
https://www.apa.org/research/action/drive

Synopsis:
Psychology of Distraction
American Psychological Association:
• Cell phone users are 4 times more likely to be involved in an accident.
• Talking on a cell phone causes more impairment than having a blood alcohol level of .08.
• Many types of distractions exist:
  o Navigational displays
  o Internet browsers
• Inattention blindness is result of having to divide one’s attention. The human attention has its limits.
• Drivers have significantly slower reactions to operations such as stopping at a traffic light or decelerating when they are talking on a cell phone
• Cell phone users are more likely to miss traffic signals and often fail to see billboards or other signs.
• When eye-tracking technology was used –
  o Drivers’ eyes were “looking” at objects, but they couldn’t actually “see” them
  o Attention is somewhere else.
• There is a conflict between the mental image created in the phone call and the actual image in front of the person.
• Multitasking in a misnomer. The brain actually divides attention and limits working memory.
• Radio and audio books are ok.
• Conversations are what take from the the brain’s processing – that should be dedicated to the driving environment.
• Involved phone conversations have been shown to reduce a person’s ability to discriminate among and respond to visual targets by as high as 30%.
• There is no notable difference between hands-free phone calls, live conversations with a passenger, or handheld phone calls
• “What happens in the head happens regardless of what happens with the hands.”