



Risk factors for adverse driving outcomes in Dutch adults with ADHD and controls

Tannetje I. Bron^{a,*}, Denise Bijlenga^a, Minda Breuk^a, Marieke Michielsen^a, Aartjan T.F. Beekman^b, J.J. Sandra Kooij^{a,b}

^a PsyQ Program and Expertise Center Adult ADHD, Carel Reinierszkade 197, 2593 HR The Hague, The Netherlands

^b Department of Psychiatry and EMGO+ Institute for Health and Care Research, VU University Medical Center, De Boelelaan 1117, 1081 HV Amsterdam, The Netherlands

ARTICLE INFO

Keywords:

Driver behavior
Safety
Alcohol
Distraction
Epidemiology
Risk taking

ABSTRACT

Objective: To identify risk factors for adverse driving outcomes and unsafe driving among adults with and without ADHD in a Dutch sample.

Methods: In this cross-sectional study, validated self-report questionnaires were used to compare driving history and current driving behavior between 330 adults diagnosed with ADHD and 330 controls.

Results: Adults with ADHD had significantly more adverse driving outcomes when compared to controls. Having an ADHD diagnosis significantly increased the odds for having had 3 or more vehicular crashes (OR = 2.72; $p = .001$). Driving frequency, male gender, age, high anxiety levels, high hostility levels, and alcohol use all significantly influenced the odds for unsafe driving behavior, for having had 12 or more traffic citations, and/or for having had 3 or more vehicular crashes.

Conclusions: Alcohol use, and high levels of anxiety and hostility are highly prevalent among adults with ADHD, and they mediate the risk for negative driving outcomes in this group.

1. Introduction

The neurodevelopmental disorder attention-deficit/hyperactivity disorder (ADHD) is characterized by

symptoms of poor sustained attention, distractibility, impaired impulse control, and hyperactivity (APA 2013). Many adults with ADHD have impaired neurocognitive functions leading to difficulties with selecting, registering, retaining, organizing and integrating relevant environmental information, and they often experience problems in decision-making (Boonstra et al. 2005, Classen et al. 2013). Impairment in any of these functions may compromise driving behavior (Barkley et al. 2002, Cox et al. 2011, Groom et al. 2015). Multiple studies link ADHD to risky driving behavior and, likewise, adults with ADHD have an increased rate of adverse driving outcomes, such as a greater number of traffic citations, more traffic accidents, greater likelihood of license suspension, more frequent severe vehicular crashes, and a higher likelihood of illegal driving when compared to persons without ADHD (Jerome et al. 2006, Barkley and Cox 2007). Driver inattention and impulsivity are considered the most common causes of adverse driving outcomes (Peden et al. 2004, Dahlen et al. 2005, Merkel et al. 2016).

Numerous risk factors for adverse driving outcomes are also common conditions in adults with ADHD (Fuernmaier et al. 2017). The behavioral characteristics anger and aggression are highly prevalent in adults with ADHD, and both correlate to loss of vehicle control, (near-) vehicular crashes, and aggressive driving (e.g. risk taking) (Deffenbacher et al. 2003, Schwebel et al. 2006), mostly by reduced concentration while driving (Dahlen et al. 2005, Barkley and Cox 2007). Low anxiety levels are associated with fearlessness and with an increased number of traffic citations in adults with ADHD (Barkley 2006, Jerome et al. 2006), while high anxiety is associated with driving in an angry or tense distressed state (Epstein 1997, Deffenbacher et al. 2003). Also, alcohol use increasingly reduces concentration behind the wheel as blood alcohol levels rise (Blomberg et al. 2005, Mathijssen and Houwing 2005, Barkley et al. 2006, Jerome et al. 2006), and induces aggressive driving habits (Jonah et al. 2001). Substance abuse is associated with risky driving, more traffic violations and causing traffic accidents (Sestan et al. 2017). Moreover, substance use disorder is thought to be featured by impulsivity and sensation seeking behavior, which is related to risky driving as well (Kaye et al. 2014, Caldeira et al. 2017). A study among young adults (18 to 30 years old) showed that

* Corresponding author.

E-mail addresses: annet.bron4@psyq.nl (T.I. Bron), d.bijlenga@psyq.nl (D. Bijlenga), m.breuk@psyq.nl (M. Breuk), m.michielsen@psyq.nl (M. Michielsen), a.beekman@ggzingest.nl (A.T.F. Beekman), s.kooij@psyq.nl (J.J.S. Kooij).

<https://doi.org/10.1016/j.aap.2017.12.011>

Received 5 July 2017; Received in revised form 21 November 2017; Accepted 13 December 2017

0001-4575/ © 2017 Elsevier Ltd. All rights reserved.

sensation seeking, reckless driving, and driving under influence were interrelated, and likely presented different facets of impulsivity (Luk et al. 2017). Conversely, the use of stimulant medication has shown to improve driving in adults with ADHD in studies using self-reports, driving simulators, and driving performance on the road (Jerome and Segal 2001, Barkley et al. 2005, Cox et al. 2006, Verster et al. 2008, Cox et al. 2012, Chang et al. 2014a, 2017). However, in another study methylphenidate only reduced the risk of serious transport accidents in males (Chang et al. 2014b), possibly because males have worse driving outcomes (Jerome et al. 2006, Barkley and Cox 2007) and may thus benefit more from ADHD medication.

As a result of the extensive research relating adverse driving outcomes to adult ADHD, a concern has arisen around people with ADHD as generally being unsafe drivers (Fuermaier et al. 2015), although the magnitude of the association between ADHD and driving in relationship to other factors remains unclear. Earlier studies on identifying risk profiles for unsafe driving did not include ADHD (Martinussen et al. 2017). This cross-sectional study therefore aimed at identifying characteristics that comprise an increased risk for unsafe driving and adverse driving outcomes in a group of adults with ADHD and controls. The following hypotheses were formulated:

Hypothesis 1: The ADHD group reports more unsafe driving behavior and had more adverse driving outcomes.

Hypothesis 2: ADHD diagnosis is a significant predictor for unsafe driving and adverse driving outcomes. No expectations were formulated with regards to ADHD in relationship to the other predictors used in our regression models.

2. Materials and methods

2.1. Participants

All participants were between 18 and 65 years of age, and licensed to drive a car. The group with ADHD consisted of 330 adults, who were diagnosed with ADHD by a trained psychologist at one of 14 participating outpatient adult ADHD clinics of PsyQ in The Netherlands. ADHD diagnoses were based on having at least six out of nine DSM-IV-TR symptoms of inattention and/or hyperactivity/impulsivity in childhood, persistence of symptoms and impairments into adulthood, and at least six out of nine current DSM-IV symptoms of inattention and/or hyperactivity/impulsivity (APA 2013), using the semi-structured Diagnostic Interview for ADHD in adults, second edition (DIVA 2.0) (Kooij 2013). The age- and gender matched control group consisted of 330 adult civilians who were recruited at the central municipal office in The Hague, The Netherlands, while waiting in line for arrangements concerning civil affairs, to request assistance and/or legal advice on social affairs or employment. Participation to this study was voluntary, anonymous, and without incentive. No medical ethical approval was needed for this study, following the Dutch Medical Research Involving Human Subjects Act.

2.2. Measures

All participants filled out the self-reported Driving Questionnaire (DQ), that included the validated Driving Behavior Questionnaire (DBQ) (Barkley and Murphy 2006) and the Anxiety and Hostility symptom subscales of the validated Symptom Checklist (SCL-90) (Arrindell and Ettema 1986). The DBQ consists of three parts: Part 1 concerns the 12-item Driving History Survey (DHS) that investigates the frequency of adverse driving outcomes in the past (e.g. 'How many times...were you involved in a vehicular crash?'). Part 2 comprises the 26-item Driving Behavior Survey (DBS), assessing current safe driving behaviors and skills on a 4-point Likert scale, ranging from 'not at all' to 'very often' (score range 26–104; e.g. 'I drive at a rate of speed that is within the posted speed limits'). The DBS is quite comparable to the widely-used Driver Behavior Questionnaire (Reason et al. 1990), as

both questionnaires present items concerning unintentional straying (slips, lapses) and intentional driving mistakes. Differences between these questionnaires are that the DBS investigates safe driving behavior, whereas the Driver Behavior Questionnaire focuses on deviant behavior. Also, the DQ in our study splits up any violations into the DHS, it does not investigate specific hostile and aggressive driving behaviors, and it poses additional questions about adjusted speed in special weather conditions, use of signaling when switching lanes, use of mirrors when reversing, and use of safety belts while driving. Nevertheless, in earlier research, the DBS showed significant correlations with adverse driving outcomes and other-reports of the participant's driving using the same scale (Barkley et al. 1993, 1996). Part 3 includes the 15-item Alcohol/Drugs Survey (ADS) asking about the frequency of alcohol use in the past week and substance use in the past month. One item was added to the DHS, asking if the respondent currently uses manual transmission. The 10-item Anxiety and 6-item Hostility subscales of the SCL-90 were scored on 5-point Likert scales (subscale scores range 10–50 and 6–30, respectively). Additionally, controls filled out the 23-item ADHD Rating Scale ((ADHD-RS)) (DuPaul et al. 1998), a validated self-report questionnaire investigating the presence of the DSM-IV inattention and/or hyperactivity/impulsivity symptoms on a 4-point Likert scale, ranging from 0 'never' to 3 'very often' (total score range 0–54). For the ADHD group, the (ADHD-RS) total score and their medication history were derived from their medical records. The Driving Questionnaire was completed in 15 min.

2.3. Driving outcomes

Current safe driving behavior was assessed with the DBS, where higher scores indicated safer driving. The cut-off for unsafe driving was set at 76, following Barkley and Murphy (2006). Adverse driving outcomes in the past were derived from the DHS. Five adverse driving outcomes were adopted from Barkley et al. (2002), including having ever driven illegally, having had a license suspension or revocation, having had 12 or more traffic citations, having had five or more speeding citations, having had three or more vehicular crashes while driving, or having had three or more vehicular crashes at fault.

2.4. Statistical analyses

First, general characteristics were compared between the ADHD group and the control group, using multiple one-way analyses of variance (ANOVAs), Pearson chi-square tests and Fisher exact tests. Second, differences in and relative risks of adverse driving outcomes and unsafe driving behavior were analyzed between the ADHD group and the control group, using ANOVAs, Pearson chi-square tests and Fisher exact tests. Third, logistic regression models were used to investigate which factors influenced the odds for unsafe driving, and for two important adverse driving outcomes: having had 12 or more traffic citations and having had three or more vehicular crashes. Driving experience, as examined by driving frequency – the number of driven kilometers per week – and/or licensed driving years – the number of years licensed to drive – were considered important confounders of driving outcomes (Jerome et al. 2006, Eberhard 2008). Considering the collinearity between age and licensed driving years, only driving frequency was used as a confounder in the regression analyses. The independent variables were added to the model using a forward stepwise method: model 1 contained ADHD diagnosis (no/yes) and driving frequency (≤ 125 km/week; > 125 km/week, based on average mileage of the total sample), in model 2 gender, age, and educational level ($\leq$ higher educational school; $>$ higher educational school) were added, and model 3 was corrected for the covariates anxiety level (low: ≤ 14 ; high: > 14), hostility level (low: ≤ 8 ; high: > 8), weekly number of alcohol consumptions (females: ≤ 7 and > 7 ; males ≤ 14 and > 14) (Nichols et al. 2012), substance abuse in the past month (all: no/yes; including the use of cannabis, cocaine, LSD, other drugs, and illegal use

Download English Version:

<https://daneshyari.com/en/article/6965276>

Download Persian Version:

<https://daneshyari.com/article/6965276>

[Daneshyari.com](https://daneshyari.com)