OBJECTIVE: Goal of the present research was to explore the predictive value of brief neuropsychological tests in driving behavior of PD individuals under low and high traffic conditions on a rural driving environment. METHODS: Nineteen PD individuals (Age:63±11.1 years) and forty-two cognitively intact individuals (Age:59.5±8.7 years) participated in the study. Participants completed neuropsychological tests, including Montreal Cognitive Examination (MoCA), Clock Drawing Test (CDT), Frontal Assessment Battery (FAB), Trail Making Test- Trails A & B (TMT A & B), assessing general cognitive ability and executive functions. All individuals underwent a driving simulator experiment, where parameters of driving behavior were measured: average speed, lateral position (LP), average reaction time (RT), and headway distance (HD). RESULTS: By applying t-test for independent samples, significant differences were found between PD patients and the control group in average speed (p<0.01) and in average reaction time (p=0.002) under high traffic conditions on rural road. A regression model using PD individuals, with the neuropsychological tests as predictors, explained 38% of the variance in headway distance under high traffic conditions and thus identified the predictive value of CDT, TMT A and TMT B. CONCLUSION: The results of the present study indicate that the driving behavior of PD individuals differed significantly from those of healthy individuals. Neuropsychological tests may have a predictive value. Future studies should include a larger sample size and additional assessments of executive functions.

INTRODUCTION

Driving is a multi-domain task that engages various aspects of cognition and motor functioning. Parkinson’s Disease not only impairs one’s ability but also cognitive skills, especially executive functions (Bott et al., 2014, Chan et al., 2018). These motor and cognitive symptoms have an impact on driving performance in many ways (Rancet et al., 2011, Beratis et al., 2015, Pavlou et al., 2016).

METHODS

The participants had a valid driver’s license, car driving on a regular basis, a Clinical Dementia Rating (CDR) score ≤ 0.5 and between 1 and 3 in the scale of Hoehn & Yahr. Nineteen PD individuals (Age:63±11.1 years) and forty-two cognitively intact individuals (Age:59.5±8.7 years) participated in the study. Patients with PD were in Hoehn & Yahr stages 1-2. Participants completed a series of brief neuropsychological tests, assessing general cognitive ability and executive functions. All individuals underwent a driving simulator experiment where parameters of driving behavior were measured: average speed (AS- km/h), lateral position (LP- average vehicle distance from the central road axis in meters), average reaction time (RT- in milliseconds) and headway distance (HD- average distance from other vehicles in meters). Driving was assessed with a Foerst FPF driving simulator and a practice session (5-10 min.) and a 20- minute driving session (driving on a two-lane rural road, under low and high traffic conditions).

OBJECTIVE

Goal of the present research was to explore the predictive value of brief neuropsychological tests in driving behavior of PD individuals under low and high traffic conditions on a rural driving environment.

DISCUSSION/CONCLUSION

- Significant differences were observed between the control and the PD group on average speed and on average reaction time under high traffic conditions, as far as PD individuals are concerned.
- The predictor model was able to account for 38% of the variance in headway distance under high traffic conditions, as far as PD individuals are concerned.
- Three variables- CDT, TMT A & TMT B- added statistically significantly to the prediction, p<0.05.
- Future studies should include a larger sample size and additional assessments of executive functions.

REFERENCES