

Driving Performance Deficits in Chronic Insomnia: Evidence from a Multi-Scenario Simulator Study

Angeliki Konsta^{1*}, Eva Michelaraki², Anastasios Bonakis^{1,3}, George Yannis²,
Dimitris Dikeos¹

¹ *First Department of Psychiatry, Athens University Medical School,
National and Kapodistrian University of Athens, Greece*

² *Department of Transportation Planning and Engineering, School of Civil Engineering, National
Technical University of Athens, Greece*

³ *Second Department of Neurology, Athens University Medical School,
National and Kapodistrian University of Athens, Greece*

* Corresponding author: akonsta@med.uoa.gr

Abstract

Introduction

Chronic insomnia is a prevalent sleep disorder characterized by difficulty initiating or maintaining sleep, often leading to daytime cognitive deficits and functional impairments. The objective of this study was to examine the driving performance in patients with chronic insomnia across four simulated driving conditions that varied in cognitive load and environmental complexity.

Methods

Towards that end, a driving simulator experiment was conducted and 25 individuals with insomnia aged 27-72, participated in the study. Driving performance was assessed using objective metrics including reaction time, speed, speed variability, lane-keeping stability (SDLP), steering variability, lane departures, steering deviations and driving errors. Statistical analyses, including repeated-measures models and regression techniques, were applied to identify scenario-related changes and psychological predictors of driving performance.

Results

Results demonstrated that participants exhibited notable impairments, including increased lateral deviation, slower reaction times and a high incidence of crash events, particularly under distraction. These impairments were further influenced by insomnia severity, poor sleep quality and psychological symptoms such as anxiety and depression, highlighting that driving risk in chronic insomnia is multifactorial. Moreover, day-to-day sleep variability, as reflected in sleep diaries, was meaningfully associated with next-day driving performance, indicating the relevance of sleep continuity and fatigue as real-time predictors of driving safety.

Conclusions

Policy measures to mitigate insomnia-related driving risks include public awareness campaigns, routine sleep screening for drivers, occupational sleep-health education and the broader implementation of driver-monitoring technologies.

Keywords: insomnia; patients; driving behaviour; road safety; simulator experiment.