

The relationship between sleep patterns and the experience of simulator sickness and motion sickness

O. S. Fagbemi K. Pfeffer

*University of Lincoln, UK
email: sfagbemi@lincoln.ac.uk*

Abstract

Driving simulators are increasingly being used in training and research. Among the complications of driving simulator use is simulator sickness. This study focuses on individual differences in experience of simulator sickness. Twenty-five healthy participants (14 women and 11 men) with a valid driving licence were tested. The mean age of participants was 41.36 years (range 21-59 years, $SD = 11.59$). After giving written consent to participate, participants were asked to complete a set of questionnaires regarding their age, general health, experience of motion sickness and sleeping patterns. Sleep questions were concerned with sleeping problems (e.g., daytime sleepiness, difficulty falling asleep, difficulty staying asleep and too little sleep), as well as sleeping and waking times. Simulator sickness criteria were experience of nausea and general discomfort, fatigue, headache, blurred vision, dizziness and disorientation. All participants drove a fixed-base driving simulator (STISIM PC-based interactive driving simulator model 100) for about 20 minutes. Nine participants reported severe headache, dizziness, disorientation and general eye strain to the extent that all declined to continue with subsequent experimental trials. These nine participants (simulator sickness group) were compared with the remaining sixteen participants that did not experience simulator sickness (non-sickness group).

The simulator sickness group were significantly older (49.2 ± 2.2 years) than the non-sickness group (36.9 ± 2.9 years). There was no significant difference in the number of males and females in the two groups. Six of the nine in the simulator sickness group reported a history of motion sickness while only two of the non-sickness group reported having had motion sickness. The simulator sickness group reported significantly more difficulty staying asleep, fewer hours of sleep, and described themselves as lighter sleepers than the non-sickness group. These results were not correlated with age. Participants who currently experienced motion sickness also reported significantly more difficulty staying asleep, fewer hours of sleep and described themselves as lighter sleepers than those who do not experience motion sickness. In addition, this group reported a significantly earlier waking-up time on non-working days. The results of this study highlight the need to include sleep patterns among the simulator sickness screening criteria.

Keywords – Simulator sickness, sleep patterns, driver behaviour

1. Introduction

Driving simulators are increasingly being used in training and research. Among the complications of driving simulator use is simulator sickness experienced by some users. Although simulator sickness has some symptoms similar to motion sickness (general discomfort, dizziness, drowsiness, nausea and occasional vomiting), other symptoms are more prevalent with simulator use. These include pallor, sweating, salivation, stomach awareness, headache, postural