

Murray Johns and Lynda Martyn

Epworth Sleep Centre, Epworth Hospital, Melbourne, Vic, 3121.

Drivers who suffer from obstructive sleep apnea (OSA) or narcolepsy have an increased risk of a car crash (1, 2,3). We investigated the frequency of dozing at the wheel, whether or not a crash occurred, in consecutive patients referred to Epworth Sleep Centre. We sought to relate their self-reported dozing at the wheel to their daytime sleepiness, measured by the Epworth Sleepiness Scale (ESS), and to their sleep disorders and other characteristics.

**Subjects:** 200 consecutive patients (155 men, 45 women) referred to Epworth Sleep Centre for investigation and treatment of the whole range of adult sleep disorders. Ages ranged from 18 to 82 years (mean  $51.5 \pm 13.2$  SD).

**Methods:** Before their first interview patients answered a 49-item sleep questionnaire, including the ESS. One question asked whether they had experienced "dozing at the wheel" while driving during the past few months. Answers were chosen from "often", "occasionally", "not at all" or "not relevant". All patients had full overnight polysomnography, regardless of their suspected diagnosis. Relationships between the frequency of drivers' dozing at the wheel, their ESS scores, age, sex, BMI and polysomnographic results were analysed by Spearman's rho or  $\chi^2$ .

**Results:** Of all 200 patients, 48.5% had ESS scores  $> 10$ , taken as a measure of excessive daytime sleepiness (EDS). Ten patients had given up driving or were never drivers. Of the 190 drivers, 16 dozed at the wheel "often" and another 56 "occasionally", a total of 37.9%. Their frequency of dozing was related significantly to their ESS scores ( $\rho = 0.45$ ,  $p < 0.001$ ). Among the sleepiest 28 drivers, with ESS scores 16-22, 28.6% dozed at the wheel "often" and another 42.9% "occasionally", a total of 71.5%. Yet they continued to drive. Even in drivers with mild to moderate levels of EDS (ESS scores 11-15), 9.5% dozed at the wheel "often" and another 42.9% "occasionally", a total of 52.4%. By contrast, 10.2% of drivers with ESS scores 0-5 dozed at the wheel "occasionally", none "often". The majority of all patients (62.9%) had more than one sleep disorder. Overall, the most common diagnosis was OSA (56.5%), with periodic limb movement disorder (31.0%) and restless legs syndrome (30.5%) next most common. Diagnoses did not differ significantly between patients who dozed at the wheel, those that did not doze, and those that did not drive ( $p > 0.1$ ). However, there was a tendency for OSA ( $RDI > 5$ ) to be more severe in those who dozed at the wheel, as reflected in the minimum  $SaO_2$  overnight ( $\rho = -0.15$ ,  $P = 0.04$ ), but this was not reflected in the frequency of apneas and hypopneas ( $\rho = 0.11$ ,  $p > 0.1$ ). Nor was dozing at the wheel related to age, sex, body mass index, the usual times of going to bed or getting up, or to muscular fatigue. Only one patient had narcolepsy and did not drive. Only 5 patients were  $< 25$  years old, of whom 4 were drivers.

**Discussion:** The percentage of patients with ESS scores  $> 10$  is higher than in the general community (11-25%), but is typical of patients at Epworth Sleep Centre. The frequency of dozing at the wheel is similar to that reported for narcoleptics, all of whom have chronic EDS, of whom 66% dozed at the wheel at least occasionally, compared with 6% of controls (3). We did not assess car crashes, the distances driven, or whether drivers had modified their driving because of safety concerns. Nevertheless, the results have serious implications for road safety for all drivers with chronic EDS. Drivers  $< 25$  years old were poorly represented here and may doze at the wheel for other reasons, notably acute intermittent sleep deprivation.

**Conclusion:** Among patients at a sleep centre, dozing at the wheel while driving is common and is related to their average level of daytime sleepiness (as measured by their ESS scores) rather than their diagnosis, age, sex or obesity. This has serious implications for the safety of driving.

1. Lyznicki JM et al. Sleepiness, driving and motor vehicle crashes. *JAMA* 1998, 279: 1908-13.
2. Barbé F et al. Automobile accidents in patients with sleep apnea syndrome. *J Respir Crit Care Med* 1998; 158: 12.
3. Broughton R et al. Life effects of narcolepsy in 180 patients from North America, Asia and Europe compared to matched controls. *Can J Neurol Sci* 1981; 8: 299-304.