

Effects of Low Sleep Efficiency and Sleep Deprivation on Driver Physical Fatigue

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Abstract : Background: Driving drowsiness related to insufficient or disordered sleep accounts for a major percentage of vehicular accidents. Sleep deprivation is the primary reason related to low sleep efficiency. Nevertheless, the mechanism of sleep deprivation induces driving fatigue to remain unclear. Objective: The objective of this study is to associate the relationship between insufficient sleep efficiency and driving fatigue. Methodologies: The physical condition while driving was obtained from the questionnaires to classify the state of driving fatigue. Sleep efficiency was quantified as the polysomnography (PSG), and the sleep stages were sentenced by the reregistered Technologist during examination in a hospital in New Taipei City (Taiwan). The independent T-test was used to investigate the correlation between sleep efficiency, sleep stages ratio, and driving drowsiness. Results: There were 880 subjects recruited in this study, who had been done polysomnography for evaluating severity for obstructive sleep apnea syndrome (OSAS) as well as completed the driver condition questionnaire. Four-hundred-eighty-four subjects (55%) were classified as fatigue group, and 396 subjects (45%) were served as the control group. The ratio of stage three sleep (N3) (0.032 ± 0.056) in fatigue group were significantly lower than the control group ($p < 0.01$). The significantly higher value of snoring index (242.14 ± 205.51 /hours) was observed in the fatigue group ($p < 0.01$). Conclusion: We observe the considerable correlation between deep sleep reduce and driving drowsiness. To avoid drowsy driving, the sleep deprivation, and the snoring events during the sleeping time should be monitored and alleviated.

Keywords : driving drowsiness, sleep deprivation, stage three sleep, snoring index

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