

Cognitive Performance Post Stroke Is Affected by the Timing of Evaluation

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Abstract : Stroke survivors commonly report persistent fatigue and sleep disruptions during rehabilitation and post-recovery. While limited research has explored the impact of stroke on a patient's chronotype, there is a gap in understanding the differences in cognitive performance based on treatment timing. Study objectives: (a) To characterize the sleep chronotype in sub-acute post-stroke individuals. (b) Explore cognitive task performance differences during preferred and non-preferred hours. (c) Examine the relationships between sleep quality and cognitive performance. For this intra-subject study, twenty participants (mean age 60.2 ± 8.6) post-first stroke (6-12 weeks post stroke) underwent assessments at preferred and non-preferred chronotypic times. The assessment included demographic surveys, the Munich Chronotype Questionnaire, Montreal Cognitive Assessment (MoCA), Rivermead Behavioral Memory Test (RBMT), a fatigue questionnaire, and 4-5 days of actigraphy (wrist-worn wGT3X-BT, ActiGraph) to record sleep characteristics. Four sleep quality indices were extracted from actigraphy wristwatch recordings: The average of total sleep time per day (minutes), the average number of awakenings during the sleep period per day, the efficiency of sleep (total hours of sleep per day divided by hours spent in bed per day, averaged across the days and presented as percentage), and the Wake after Sleep Onset (WASO) index, indicating the average number of minutes elapsed from the onset of sleep to the first awakening. Stroke survivors exhibited an earlier sleep chronotype post-injury compared to pre-injury. Enhanced attention, as indicated by higher RBMT scores, occurred during preferred hours. Specifically, 30% of the study participants demonstrated an elevation in their final scores during their preferred hours, transitioning from the category of "mild memory impairment" to "normal memory." However, no significant differences emerged in executive functions, attention tasks, and MoCA scores between preferred and non-preferred hours. The Wake After Sleep Onset (WASO) index correlated with MoCA/RBMT scores during preferred hours ($r=0.53/0.51$, $p=0.021/0.027$, respectively). The number of awakenings correlated with MoCA letter task performance during non-preferred hours ($r=0.45$, $p=0.044$). Enhanced attention during preferred hours suggests a potential relationship between chronotype and cognitive performance, highlighting the importance of personalized rehabilitation strategies in stroke care. Further exploration of these relationships could contribute to optimizing the timing of cognitive interventions for stroke survivors.

Keywords : sleep chronotype, chronobiology, circadian rhythm, rehabilitation timing

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