MedicalXpress

Recovery from brain injury and better sleep go hand in hand

December 21 2016

After a traumatic brain injury (TBI), people also experience major sleep problems, including changes in their sleep-wake cycle. A new study shows that recovering from these two conditions occurs in parallel. The study is published in the December 21, 2016, online issue of *Neurology*, the medical journal of the American Academy of Neurology.

"These results suggest that monitoring a person's sleep-wake cycle may be a useful tool for assessing their recovery after TBI," said study author Nadia Gosselin, PhD, of the University of Montréal in Québec, Canada. "We found that when someone sustained a brain injury and had not recovered a certain level of consciousness to keep them awake and aware of their surroundings, they were not able to generate a good sleep-wake cycle. But as they recovered, their quality of sleep improved."

A good sleep-wake cycle was defined as being alert and active during the day and getting uninterrupted sleep at night.

The study involved 30 people, ages 17 to 58, who had been hospitalized for moderate to severe TBI. Most of the patients were in a coma when they were admitted to the hospital and all initially received care in an intensive care unit. The injuries were caused by motor vehicle accidents for 20 people, falls for seven people, recreational or sports injuries for two people and a blow to the head for one person. They were hospitalized for an average of 45 days with monitoring for the study beginning an average of 21 days into a person's stay.

Each person was monitored daily for an average of 11 days for level of consciousness and thinking abilities using the Rancho Los Amigos scale, which ranges from 1 to 8. Each person also wore an activity monitor on their wrist so researchers could measure their sleep.

Researchers found that consciousness and thinking abilities improved hand-in-hand with measures of quality of sleep, showing a linear relationship.

One measure, the daytime activity ratio, shows percentage of activity that occurs during the day. Immediately after the injury, activity occurs throughout the day and night. The study showed that participants reached an acceptable sleep-wake cycle, with a daytime activity ratio of at least 80 percent, at the same point when they emerged from a minimally conscious state.

The participants still had inadequate sleep-wake cycles at a score of 5 on the Rancho Los Amigos scale, where people are confused and give inappropriate responses to stimuli but are able to follow simple commands. Sleep-wake cycles reached adequate levels at the same time that people reached a score of 6 on the Rancho Los Amigos scale, which is when people can give appropriate responses while still depending on outside input for direction. At that level, they can remember relearned tasks, but cannot remember new tasks.

The results were the same when researchers adjusted for the amount of time that had passed since the injury and the amount of medications they had received while they were in the ICU.

"It's possible that there are common underlying brain mechanisms involved in both recovery from TBI and improvement in sleep," said Gosselin. "Still, more study needs to be done and future research may want to examine how hospital lighting and noise also affect quality of

sleep for those with TBI."

Provided by American Academy of Neurology