

# Daily and weekly cycles of epileptic seizures more common than previously thought

September 13 2018

---

The timing of seizures may be linked to natural rhythms in around 80% of people with epilepsy, according to the largest study of individual patients' seizure cycles including more than 1,000 people, published in *The Lancet Neurology* journal.

Most people's seizures occurred in a circadian (ie, 24-hour) rhythm, but some people experienced weekly and 3-weekly cycles in their seizures, and some had a combination of daily, weekly or longer cycles associated with their seizures.

While [seizure](#) patterns are known to vary over days, months and years, previous studies have been short-term or in small groups. The new study gives robust evidence of seizure cycles, showing that they are patient-specific and more common than previously thought.

"Understanding the cyclic nature of diseases is vital for treating diseases like epilepsy that continuously fluctuate in their severity," says senior author Professor Mark Cook, The University of Melbourne, Australia. "The human body is a collection of thousands of clocks, each cycling in accordance with their own pacemaker. For example, some cells can track time with millisecond accuracy, while hormonal cycles might have longer periods of hours, days or more. Combined in the body, the presence of all of these cycles has a fundamental effect on our health."

The link between [epileptic seizures](#) and other [natural cycles](#) has been studied for hundreds of years, and some now-disproven historical

hypotheses suggested a link between the phases of the moon and seizure rates. More recently, the possible links have included associations with stress levels, seasonal variations in sleep quality, and other biological processes involved in sleep, menstruation and hibernation.

The new study used data from a seizure tracking website and mobile phone app with which 1118 patients with epilepsy recorded and tracked their seizures, and from a small study in which 12 people with epilepsy had a device fitted that recorded the electrical activity in their brain. The authors looked at the data for seizure frequency between six hours and three months, using statistical analysis to identify trends in individual patients' seizure cycles. The study only included people who had frequent seizures.

80% (891/1118) of people using the website and mobile app and 92% (11/12) of people whose brain activity was recorded showed circadian rhythms in their seizures. Additionally, 7-21% (77-233/1118) of people using the website and mobile app showed weekly rhythms, and 14-22% (151-247/1118) of people had cycles that were longer than three weeks.

In addition, around two-thirds of people in the study (64%, 720/1118) had more than one type of cycle associated with their seizures. The authors say that the weekly cycle in seizures is particularly interesting, as the physiological cause of a weekly cycle is not as well established as a circadian rhythm, and it is debated whether this is natural or environmental.

For people with a circadian cycle to their seizures, peak time of seizures varied across the day, but more seizures occurred at about 8am and 8pm. Weekly cycles did not favour any day of the week, but more people had seizures on Tuesdays and Wednesdays.

The results were similar for men and women, and for people with

different forms of epilepsy. The authors believe that the cycles drive the likelihood of the seizures, rather than epilepsy driving the cycles.

They also say that the findings could have important implications for patients by helping them to predict and manage their seizures. They note that, after further research, the findings could help guide treatment.

"The ubiquity of seizure cycles indicates that this is an important clinical phenomenon that affects most patients. This means it could be an important way to improve treatment for many people with epilepsy. Even without fully understanding the mechanisms of seizure cycles, temporal patterns can be incorporated into patient management plans, through chronotherapy—the process of scheduling medication so that drug concentrations match to times when seizures are more likely. However, the daily cycles might also be caused by peaks and troughs in drug effectiveness due to how the drug is metabolised in the body, so altering this could just alter the timings of a person's seizures. Adapting drug timings to suit weekly or monthly cycles has also not yet been explored." Explains Professor Cook.

The authors note some limitations, including that the majority of the data from the study are self-reported and could be therefore biased. However, the authors note that inaccuracy would not invalidate the cycles detected if the majority of seizures reported were real, and the inaccurate ones were distributed evenly across the day.

They also note that they could only study the trends up to three months and so could not consider yearly or seasonal variations, nor the effect of holidays or daylight savings time.

Writing in a linked Comment, Professor Andreas Schulze-Bonhage, University Hospital Freiburg, Germany, says: "Ultraslow oscillations in brain excitability are so far barely understood. There is evidence

emerging that such slow cycles below well-known [circadian rhythms](#) influence both, physiological functioning and disease states. It is remarkable that the group of Mark Cook found such long-lasting cycling alterations in seizure propensity over several weeks, which have also been reported in chronic psychiatric diseases."

**More information:** *The Lancet Neurology* (2018).  
[www.thelancet.com/journals/lan ... \(18\)30274-6/fulltext](http://www.thelancet.com/journals/lan... (18)30274-6/fulltext)

Provided by Lancet

Citation: Daily and weekly cycles of epileptic seizures more common than previously thought (2018, September 13) retrieved 2 May 2024 from <https://medicalxpress.com/news/2018-09-daily-weekly-epileptic-seizures-common.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.