

Functional seizures associated with stroke, psychiatric disorders in study

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Lea Davis, PhD, left, Slavina Goleva and colleagues are using electronic health records to study the comorbidities associated with functional seizures. Credit: photo by Donn Jones

In a large-scale study of electronic health records, Vanderbilt University Medical Center investigators have determined the prevalence of functional seizures and characterized comorbidities associated with them.

Functional seizures are sudden attacks or spasms that look like epileptic seizures but do not have the aberrant brain electrical patterns of epilepsy.

The research team, headed by Lea Davis, Ph.D., associate professor of Medicine and an investigator in the Vanderbilt Genetics Institute, confirmed associations between functional seizures and psychiatric disorders including [posttraumatic stress disorder](#), anxiety and depression as well as sexual assault trauma. They also discovered a novel association between functional seizures and cerebrovascular disease, including stroke.

The findings were reported in the journal *JAMA Network Open*.

Also known as [psychogenic nonepileptic seizures](#), functional seizures have been historically understudied. Patients often experience a long delay—on average seven years—before they receive an accurate diagnosis.

About 80% of patients experiencing functional seizures are initially misdiagnosed with epilepsy and treated with anti-epileptic drugs, said Slavina Goleva, a [graduate student](#) in Molecular Physiology and Biophysics and first author of the study. An accurate diagnosis requires assessment with video electroencephalogram (EEG).

Davis got interested in functional seizures after hearing an NPR story several years ago.

"The story gave the patient perspective on these seizures—the stigma that patients felt and the difficulties they experienced in the medical system," Davis recalled. "I felt like studies within electronic health records could potentially be really impactful for this community."

Working with Kevin Haas, MD, Ph.D., associate professor of

Neurology, the researchers developed an algorithm to identify people with functional seizures in the VUMC-EHR system.

"We initially recognized that finding these patients within the EHR would be a challenge because the ICD (International Classification of Diseases) codes are not as specific as they are for a lot of diseases," Goleva said. In addition to ICD codes, the researchers included Current Procedural Terminology (CPT) codes and used natural language processing to search within the records for a list of keywords.

Goleva and Haas manually reviewed charts to confirm that the algorithm correctly identified patients with functional seizures.

The study included more than 2.3 million patients 18 or older in the VUMC-EHR system from 1989 to 2018. The researchers identified 3,341 patients with functional seizures, 74% of whom were women. They calculated a prevalence of 0.14% (140 cases per 100,000 people); previous estimates ranged from 2 to 33 cases per 100,000 people.

"Our report is the first direct calculation of the prevalence of functional seizures," Goleva said. She noted that the epilepsy monitoring unit at VUMC may result in a higher prevalence of functional seizures in patients in the VUMC-EHR compared to the general population.

Among the patients with functional seizures, the researchers validated comorbidities including [psychiatric disorders](#) and sexual assault trauma and discovered a novel association with cerebrovascular disease. They also found that sexual assault trauma explained about a quarter of the increased rate of functional seizures among women, Goleva said.

"Functional seizures are not occurring in isolation; patients who are experiencing these seizures are also experiencing a higher burden of additional health care issues," Davis said.

"If there is a suspicion that someone presenting with seizures could have functional seizures rather than [epileptic seizures](#), it's critical to refer those patients to an epilepsy monitoring unit for accurate diagnosis and appropriate treatment," Haas said. "Historically, even once diagnosed, care of these patients has often fallen through the cracks between neurology and psychiatry, but we are now actively developing a more integrated approach to care for this patient population."

The researchers recommended that patients experiencing seizures who have psychiatric comorbidities or a history of sexual assault trauma be referred for video-EEG assessment. Patients who develop seizures after a stroke and do not initially respond to treatment with medications should also be considered for early video-EEG assessment.

Up to 30% of patients referred for video-EEG are eventually diagnosed with functional seizures, they noted.

"It's frustrating that there is no ICD code for functional seizures, given how common the diagnosis is and the fact that codes exist for strange things like alligator bite, second occurrence," Davis said. "It really emphasizes how little attention this population of [patients](#) has gotten."

The investigators are currently exploring the genetics of functional seizures using genome-wide association studies of biobanks including Vanderbilt's BioVU.

More information: Slavina B. Goleva et al, Epidemiology of Functional Seizures Among Adults Treated at a University Hospital, *JAMA Network Open* (2020). [DOI: 10.1001/jamanetworkopen.2020.27920](#)

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