



Neurology residents' education in functional seizures

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ABSTRACT

We report a survey of neurology residency program directors (PDs) and recent neurology residency graduates about the education provided during residency on functional seizures (FS), a subtype of functional neurological disorder (FND). The purpose of our study was to assess the education gap for neurology residents about FS since patients with FS are frequently seen by neurologists, who typically conduct the evaluation and share the findings with the patient. A survey was sent to 93 Neurology residency program directors and 71 recent graduates. We obtained a low response rate of 17%. Results of the survey revealed that the most frequent settings for education on FS were within a clinical rotation in the Epilepsy Monitoring Unit (68.8% of PDs and 88.7% of recent graduate respondents) and via a single didactic lecture (81.3% of PDs and 80.3% of recent graduate respondents). The majority of programs did not provide a curriculum for training and feedback on best practices in communicating the diagnosis or on evidence-based treatments. Eighteen percent of neurology residents reported not learning how to communicate the diagnosis of FS to patients, while 77% responded that they were not taught about treatment. These results illustrate a curriculum gap in what neurology residents are taught about diagnosis and management of FS (and FND). We propose a standardized model that can be adapted in residencies.

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Introduction

Functional seizures (FS), also commonly known as psychogenic nonepileptic seizures (PNES), are events that resemble epileptic seizures but without concurrent epileptiform electroencephalogram (EEG) activity and are associated with psychological underpinnings and altered neural network connectivity [1,2]. It is a common condition, with a prevalence similar to that of multiple sclerosis, affecting 2–33/100,000 [3] and is a type of functional neurologic disorder which has an estimated incidence of at least 12 per 100,000 per year [4]. Up to 30 percent of people evaluated for intractable seizures actually have FS [5]. This is the diagnosis in 20–50 percent of epilepsy monitoring unit (EMU) patients at discharge [6–8]. The quality of life for patients with FS is as low or lower than that of patients with epilepsy [9,10] and mortality rates

are elevated among people with FS [11]. FS are part of a much broader problem of functional disorders in medicine, which are responsible for huge expenses for increased care utilization, for underemployment and disability payments, and for misdiagnosis and unnecessary and potentially iatrogenic treatments [12]. The diagnosis of FS is commonly confirmed and communicated by a neurologist [13] and in academic centers, the initial diagnosis likely comes from a neurology resident.

To prevent delayed diagnoses and facilitate treatment, FND should be proactively considered early in the diagnostic process by neurologists using positive diagnostic criteria rather than being treated as a diagnosis of exclusion. There is discomfort among many clinicians about confirming the diagnosis with certainty as well as when discussing it with patients and their families [14]. Many patients with FS and other FND subtypes describe negative experiences with the health care system and report that clinicians made them feel stigmatized and told them or implied that they were faking their illness [15]. Treatment adherence and patient outcomes are poor [16].

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Education is of critical importance to change clinician behaviors and has been shown to improve patient outcomes [17]. There are a lack of data examining the training of neurology residents in diagnosing and communicating the diagnosis of FS. The Accreditation Council for Graduate Medical Education (ACGME) neurology milestones are competency-based developmental outcomes structured so that all residents are expected to begin at a level 1 and obtain a level 4 prior to unsupervised practice. Neurology milestones include an expectation that neurology residents recognize when a patient's neurologic symptoms are functional in origin (Level 3) and effectively communicate using easy-to-understand language (Level 3) [18]. The principles in the care of individuals with FS involve: confirmation of diagnosis, avoidance of anti-seizure medications, clear communication, not abandoning patients, and educating patients about treatment including referral to skills based psychotherapy. Educating neurology residents, and other trainees and clinicians, may improve outcomes of patients with FS who are often lost to care between specialties. Currently, there are no evidence-based curricula for FND, including FS, despite being a common and debilitating disorder. We conducted a literature review and survey to understand how neurology residents are being educated about FS.

Methods

Design

The senior author reviewed a representative sample of medicine, psychiatry, and neurology residency and fellowship websites for their educational curricula and mentions of FND, including FS, as part of the needs assessment outcomes of the Nonepileptic Seizures Taskforce Workshop sponsored by the American Epilepsy Society (AES), National Institute of Mental Health (NIMH), and National Institute of Neurological Disorders and Stroke (NINDS) Workshop in 2014. This review found that there were no formal curricula that included FS, only a few programs mentioned teaching about FS as a differential diagnosis in epilepsy training, and none mentioned training beyond the differential diagnosis. Results of an American Epilepsy Society (AES) survey to its membership (Q-Pulse) confirmed the gap in training [13].

Survey development and distribution

A brief survey was created by FS expert consensus from The AES Nonepileptic Seizures workgroup members (Fig. 1). An experienced survey developer edited questions for ease of administration. The survey was piloted among 5 neurology residents and edited for clarity. Ninety-three U.S. Neurology residency program directors (PDs) were identified through the ACGME website, and PDs were emailed the survey. Through an American Academy of Neurology (AAN) list serve, residency coordinators were asked to electronically forward the survey to their recent resident graduates (within 2 years of completing residency). The surveys asked both the PDs and recent graduates the same questions. The AAN also emailed a 3-item version to those residents who identified interest in subspecialty neurology fellowships related to FS (clinical neurophysiology, epilepsy). Individuals were able to respond only once. To maintain anonymity, only program size and location were collected. Participation was voluntary and responses were anonymous. Four email reminders were sent to participants over a 4-week period from 6/20/16–7/21/16 until the survey closed. Given that this survey was deemed minimal risk to participants, written informed consent was waived by the IRB. There were no financial incentives offered for completion or participation in this study.

1. In your residency program, have you had teaching devoted to functional neurologic disorders such as psychogenic nonepileptic spells/seizures? (choose all that apply)
 1. Yes, as part of a didactic lecture that addressed differential diagnosis from neurologic disease such as epilepsy
 2. Yes, there was at least one dedicated lecture on the topic
 3. Yes, as part of clinical supervision in the Epilepsy Monitoring Unit
 4. Yes, as part of clinical supervision in the outpatient setting
 5. Yes, as part of a medical simulation teaching exercise
 6. Yes, using a video library of different seizure types including both epileptic and non-epileptic seizures to learn differential diagnosis or an equivalent for other functional neurological syndromes
 7. Yes, as part of a formal journal club
 8. Yes, but only after requesting the topic
 9. No, I have not yet had teaching specifically about this topic
2. In your residency training program, what were you taught about conversion disorder (also known as functional neurologic symptom disorder)?
 1. How to distinguish neurological disease from functional disorder
 2. How to communicate the diagnosis to patients and/or their families
 3. How to collaborate with psychiatry to create comprehensive explanatory models
 4. How to treat conversion disorder
 5. There was no teaching in my residency about conversion disorder
3. How comfortable are you in knowing how to communicate a diagnosis of psychogenic nonepileptic seizure or other functional neurologic disorder to a patient who has been definitively diagnosed?
 1. Extremely comfortable
 2. Comfortable
 3. Neither comfortable, nor uncomfortable
 4. Uncomfortable
 5. Extremely uncomfortable

Fig. 1. Survey questions.

Data analysis

Descriptive statistics (frequencies and percentages) were used to examine the extent to which various aspects of education on FS were part of the neurology residency curriculum.

Results

Respondent demographics

Sixteen of the 93 Program Directors responded, for a response rate of 17.2%. All respondents were adult Neurology program directors and 43.7% (n = 7) had subspecialty training in epilepsy or EEG. Seventy-one recent neurology graduates responded. It was not clear how many residents received the survey, as it depended on the program coordinators sending it to recent graduates. Of these recent graduate respondents, 84.5% (n = 60) specialized in adult neurology, 14% (n = 10) in child neurology, and 1.4% (n = 1) in adult psychiatry and 31% (n = 22) were planning subspecialty fellowship training in epilepsy or EEG.

Survey results

Rotation in an Epilepsy Monitoring Unit (EMU) is identified as part of the residency curriculum by 68.8% (n = 11) of PDs and

88.7% (n = 63) of recent graduate respondents. Residents have an outpatient rotation, but do not rotate on an EMU in 12.5% (n = 2) of programs (per their PDs). 6.3% of PDs (n = 1), and 5.6% of junior members (n = 4) reported that residents can do an elective in an EMU, but that it is not a required rotation. Respondents were asked about the training they provided (PDs) or received (recent graduates). A didactic lecture about FS was reported to be part of the residency curriculum by 81.3% (n = 13) of PDs and 80.3% (n = 57) of recent graduates.

When asked about bedside teaching on the topic of FS, 18.7% of PDs (n = 3) and 19.7% (n = 14) of recent graduates reported it was not part of the residency experience. No required epilepsy rotation was reported by 30% (n = 5) of PDs and they were unaware whether neurology residents provide information to patients about their FS diagnosis. A lack of any teaching whatsoever on FS during neurology residency was reported by 12.6% (n = 9) of recent graduates. Eighteen (n = 13) percent of residents reported not learning how to communicate the diagnosis to patients, 77% (n = 55) responded they were not taught about treatments, and 54.9% (n = 39) were not told that collaboration with behavioral health specialists was an essential part of treatment planning.

Seventy-five percent (n = 12) of PDs and 91.6% (n = 65) of recent graduates reported that their program taught how to diagnose FS without consulting a mental health clinician. Thirty percent of PDs were unaware whether residents provide information to patients about their diagnosis of FS.

Discussion

Our survey assessed PD and recent neurology residency graduates' perspectives on FS training during neurology residency. Responses indicated a notable education gap in this commonly encountered neuropsychiatric disorder. While diagnosis and communication of FS is widely taught to neurology residents with 82% of residents reporting some instruction on these topics, there is little training relating to treatment, with 77% of residents reporting no instruction on this specific aspect of FS, and 54% reporting no training on the use of an interdisciplinary team. Thirteen percent of residents reported no training at all relating to FS. Given how prevalent FS and other FND are in neurology practice, and the availability of a growing wide-range of evidence-based treatments for patients with FS, these results appear to demonstrate a prominent gap in the curriculum in neurology residency training. More explicit training and further cross-disciplinary teaching and collaboration with mental health clinicians may help improve diagnosis and communication with patients, which could lead to better outcomes for patients with FS.

As part of the ACGME training program accreditation, residents are trained in practice-based learning and improving patient outcomes. Patient outcomes of residency graduates have been shown to correlate with quality of care of the training program in obstetrics and gynecology [19] and internal medicine residency graduates reported that curriculum can have important enduring effects on their practice [20].

Table 1
Proposed educational curriculum for Functional Seizures/PNES and Enduring Materials.

Topic	Learning Objectives/ Information	Resource
Curriculum Outline	<ul style="list-style-type: none"> • <i>ILAE Curriculum</i> 1.0 Diagnosis 1.8 Recognize common nonepileptic paroxysmal events Learning Objectives: 1.8.1 Describe the epidemiology, psychiatric and experiential risk factors of PNES (L1) • 1.8.2 Recognize the semiology of PNES and the use of video-EEG procedures and suggestion techniques in the diagnosis of suspected PNES (L2) • 1.8.3 Describe formulation of diagnosis of PNES at different level as suggested by the ILAE PNES task force (L2) • 1.8.4 Recognize the typical semiology and risk profile associated with syncope (L1) • 2.0 Counseling 2.10 Provide counseling and information in relation to PNES to patients and families Learning Objectives: 2.10.1 Understand and address the culturally appropriate aspects and consequences of the diagnosis of PNES (L1) • 2.10.2 Communicate information about the causes and consequences of PNES and the potential of psychological treatment (L2) • 2.10.3 Counsel patients about tapering inappropriate antiepileptic drugs and the role of other medications (anxiolytics, antidepressants) in PNES (L2) 	https://www.ilae.org/education/ilae-curriculum
Educational Content Videos	YouTube: Basic Training Series: Psychogenic Nonepileptic Seizures video FNDS Lectures	https://www.epilepsy.va.gov/Patient_Education.asp https://www.fndsociety.org/fnd-education/past-webinar-topics
Resources for Patient/Family	Patient Informational Brochure Patient Treatment Workbook	VA ECOE PNES Brochure Reiter JM, Andrews D, Reiter C, LaFrance Jr WC. <i>Taking Control of Your Seizures: Workbook</i> . New York: Oxford University Press; 2015.
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Trainee/Clinician	AES Clinical Practice Tools Clinician Therapist Guide	https://www.aesnet.org/clinical-care/running-your-practice/practice-tools LaFrance Jr WC, Wincze JP. <i>Treating Nonepileptic Seizures: Therapist Guide</i> . New York, NY: Oxford University Press; 2015.

ILAE, International League Against Epilepsy; FNDS, Functional Neurological Disorder Society; VA ECOE, Veterans Administration Epilepsy Centers of Excellence; AES, American Epilepsy Society.

Our study has several limitations. The response rate from program directors and recent graduates was low, consistent with other clinician surveys which demonstrate 20–30% response rates [21,22]. There may also be some degree of selection bias, since those likely to respond to this survey may be most attuned to the topic of FS, FND or training in general. We were only able to survey PDs and recent graduates from neurology which is also a limitation, as it would be important to obtain similar information from psychiatry PD and recent graduates to understand the gap more fully in training in the diagnosis and communication of this neuropsychiatric condition. This survey was developed by consensus among experts in FS, but it had not previously been utilized and is therefore not externally validated.

To improve patient care in this challenging disorder, education of clinicians as well as patients is critical. Improving residency curricula with respect to specific conditions can improve patient care and healthcare delivery [17]. Currently, there is no American Board of Psychiatry and Neurology standard for residency curricula for diagnosis and treatment of FS or FND. Reviewing current medical-school and residency programs and improving curricula to incorporate training in FS diagnosis and treatment may improve FS patient care, healthcare delivery, and outcomes.

An integrative, evidence-based, and multispecialty curriculum in FNDs is needed and would be of use to all health care practitioners. This likely would increase practitioner comfort level with addressing such diagnoses and potentially reduce the stigma surrounding them. Many principles in the management of unexplained medical symptoms may overlap with principles in the management of FS, but explicit training in this area in medicine is also limited. Care integration, particularly for those with complex medical and psychosocial situations, could be helpful as has already been demonstrated with substance use disorders. Interprofessional simulation can be used to improve neurology resident training on presenting the diagnosis of FND [23].

Numerous resources already exist on the diagnosis and treatment of patients with FS, and are readily available online. These resources could be used to 1. Establish the curriculum outline, 2. Provide content for the lectures, and 3. Give resources to patients, families, trainees and clinicians. See Table 1 for resources and enduring materials. Moreover, the Functional Neurologic Disorders Society (FNDS), an international interdisciplinary society aimed at increasing awareness and education for clinicians who treat FNDs, is effectively promoting further collaboration, education, and training in this area through webinars (<https://www.fndsociety.org/fnd-education>).

Without a formal educational curriculum in neurology residency, the care of patients with FS and FND continues to be negatively impacted by the informal or hidden curricula, which may perpetuate stigma from medical professionals. Motivational interviewing techniques and a trauma-informed care approach can be important tools to incorporate in patient encounters and may be particularly important in patients with FS [16]. Future research could validate an educational curriculum, such as the International League Against Epilepsy curriculum outlined in Table 1, that will not only increase neurology resident knowledge and skills to manage these patients, but also improve critical communication skills with many vulnerable patients.

Conclusion

Education on the topic of FS and FND is limited in neurology residency programs despite neurology milestone requirements, with particular lacunae in training relating to treatment and the use of an interdisciplinary team. Interdisciplinary education is

required, and educational materials and standardized curriculum may improve diagnosis and communication for patients with functional seizures and other FND.

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Conflict of interest

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