Epilepsy & Behavior 98 (2019) 117–123

Contents lists available at ScienceDirect

Epilepsy & Behavior

journal homepage: www.elsevier.com/locate/yebeh

The feasibility of a multidisciplinary group therapy clinic for the treatment of nonepileptic seizures

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ARTICLE INFO

Article history:
Received 3 April 2019
Revised 17 June 2019
Accepted 17 June 2019
Available online 29 July 2019

Keywords:
Psychogenic nonepileptic seizures (PNES)
Functional neurologic disorder
Conversion
Feasibility
Group therapy
Healthcare utilization

ABSTRACT

A high percentage of patients presenting to epilepsy centers have a functional neurological disorder with apparent seizures, ultimately diagnosed as nonepileptic seizures (NES). Meta-analyses suggest that psychological treatment is required, but this treatment is not reliably available, resulting in reentry of these patients to neurology clinics and urgent care settings, reducing access for these services to patients with epilepsy and resulting in inadequate psychological care for patients with NES. A sustainable, group therapy-focused treatment clinic for patients with NES was developed as a combined effort between the departments of neurology and psychiatry at the University of Colorado Hospital, consisting of a full psychiatric evaluation, a five-week psychoeducational group, a 12-week psychodynamic therapy group, individual therapy, medication management, and family assessment. One hundred and six patients were treated in this clinic between July 2016 and October 2018. Patient retention after referral for treatment was 89/136 (65.4%), and group therapy adherence was 89/106 (84.0%). Healthcare utilization, used as a proxy to demonstrate worth, decreased during and after treatment. Analysis of the 106 treated patients elucidates other clinical characteristics of this population, including psychiatric comorbidities and specific medication classes at time of NES diagnosis. We conclude that this clinic model is feasible for recruiting, retaining, and engaging patients in appropriate treatment for their NES.

1. Introduction

Historically, patients with nonepileptic seizures (NES) have been diagnosed by neurologists and treated by psychiatrists, yet it remains difficult to obtain adequate or targeted treatment for this population [1]. Analysis shows that patients with NES, once established in the neurology clinic, stay for ongoing treatment of their NES and other neurological comorbidities. This is typical in neurology practice settings where 69% of neurologists continue to follow their patients with NES [2]. Often, neurologists do not have access to referral sources for their patients with NES [3].

While there is no established best practice for treatment of NES, several studies point to psychotherapy as effective. In 2014, LaFrance published the results of a randomized clinical trial showing the superiority of cognitive behavioral therapy informed psychotherapy (CBT-ip) with or without adjunctive sertraline over sertraline alone [4]. A number of trials have investigated a group therapy mode of treatment [5–7], and these and others are summarized in Gates and Rowan, Nonepileptic Seizures [8]. Barry and colleagues conducted group psychodynamic psychotherapy to reveal unconscious drives fueling nonepileptic events. With a small sample size (N = 7 completing at least 75% of sessions), patients improved on metrics of depression and illness severity with a decrease in seizure frequency [5]. Two other studies investigated a group psychoeducational intervention, showing improvement of quality of life, coping, social adjustment scores, and a decrease in healthcare utilization in the intervention group [6,7]. These studies had sample size bias, yet point to group therapy as an effective treatment for NES.

There are therapeutic advantages to using group interventions that set it apart from individual treatment. Nonepileptic seizure is an isolating illness, and a group structure provides an emotionally safe place in which to begin the process of healing. Groups offer peer support, increased time with providers, and promote improvement through education. The group's synergy helps to focus and define goals, such as identifying triggers and increasing self-care management strategies and behaviors. The length of each session, number of sessions to be scheduled, and content of the therapy meetings will vary depending upon the goals for treatment, the types of patients attending, and the clinic's resources. In short-term groups, patients are encouraged to develop additional resources outside the group, which may include community resources such as NES support groups, religious supports, support from friends and family, and further behavioral health treatment, if indicated.

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https://doi.org/10.1016/j.yebeh.2019.06.032
1525-5050/

Group therapy allows for treatment of a large number of patients. The University of Colorado Hospital is a tertiary care facility with a National Association of Epilepsy Centers (NAEC) level 4 electrodiagnostic monitoring unit (EMU), where 25% of patients presenting to the epilepsy clinic ultimately receive a diagnosis of NES and 30 to 40% of patients who are referred to the EMU receive the diagnosis.

Described here is a novel, six-month group-focused treatment model, which is a collaboration between the departments of neurology and psychiatry, utilizing multiple components, including a full psychiatric evaluation, a five-week psychoeducational group therapy, a 12-week psychodynamic group therapy, and, when indicated, individual therapy, medication management, and family assessment. This NES treatment model addresses the challenges of delivering appropriate care, the feasibility of enrollment and participation, engagement and completion of treatment, and uses data collection of patient-reported outcome metrics to optimize treatment. Healthcare utilization before, during, and after treatment is analyzed to demonstrate the value of this NES clinic treatment model.

2. Materials and methods

2.1. Clinic development and design

Development of the NES clinic began by creating a framework for building a sustainable and cogent clinical and business model. Key stakeholders, including department chairs and hospital management, approved the launch of a pilot clinic, providing financial data to support requests for full time equivalents in the departments of psychiatry and neurology. An assessment of the projected enrollment in the NES clinic informed its design and limited provider resources dictated a group therapy approach, a model we estimated would allow us to deliver care to the volume of patients diagnosed weekly in a 12-bed EMU. For synergy and proximity, the neurology department embedded a psychiatrist. Initially, the psychiatric intake evaluation was conducted with the patient during hospitalization in the EMU. For logistical reasons, this intake is now done as an outpatient. The psychiatrist also conducts any individual therapy, medication adjustment visits, and 12-week psychodynamic group therapy. The NES diagnosis is delivered in the EMU by neurology faculty.

Prior to the correct diagnosis, the volume of patients with NES cared for in an epilepsy practice leads to decreased access to clinic and the EMU for patients with epilepsy, producing unacceptable wait times for surgical treatment and utilizes epileptologists instead of psychiatrists in the care and management of the patient with NES. Analysis of the contribution margin generated by patients with epilepsy and understanding payer mix and reimbursement is essential for building a business rationale to justify the cost of running a clinic for patients with NES. An all-payer claims database (APCD) at this institution revealed excessive and inappropriate healthcare utilization in the population with NES at a high cost. With the assistance of the Institute for Healthcare Quality, Safety and Efficiency (IHQSE) at the University of Colorado, a contribution margin calculator was created to calculate revenue lost with wait times and expected savings with appropriate treatment of the population with NES. Increasing access to care for patients with epilepsy was shown to offset the cost of running the clinic for patients with NES.

Our clinical team (in addition to the clinic scheduler and project manager) meet weekly for 1 h focusing on care coordination and patient needs, including nonadherence to treatment, barriers to care, and plans for future treatment. We discuss challenges in maintaining patient engagement as well as complex clinical scenarios. Despite using a group model, treatment remains personalized through the psychiatric intake, three-month and six-month follow-ups. In the event that a patient cannot or is not willing to participate in group therapy, alternative treatment plans are discussed, such as individual therapy both within our department and in the community.

The group treatment model includes the key elements described by LaFrance et al.: full psychiatric evaluation, patient engagement, treatment of underlying mood disorders, manualized treatment, and family therapy [9]. These components are organized into two tiers: a five-week conversational group medical visit (CGMV) model using manualized psychoeducational tools and an approach to management, emphasizing patient engagement with homework and attendance, followed by the option for continued treatment in a 12-week psychodynamic group, when appropriate. The number of patients in each of the CGMV and psychodynamic groups range from 6 to 10 patients. Neurology and psychiatry faculty are paired with learners for CGMV and psychodynamic groups respectively, so that each group has at least two facilitators at all times. Occasionally, additional learners are included for the larger groups, utilizing a psychiatry resident or a psychosomatic fellow.

Many neurology clinics are not designed for chronic management of patients with NES. Training in the theory and practice of group therapy for existing neurology staff with integration of psychiatry staff is essential for smooth operation of this NES clinic model [10]. Accommodating clinic growth by pairing new group leaders with those previously trained increases efficiency. The clinic design lends itself to block time rotating the advanced practice provider (APP) staff, allowing for integration of their other duties. Incorporating a psychiatry resident or psychosomatic fellow in the psychodynamic groups led by an attending psychiatrist assures feasibility.

Clinical outcomes are measured with patient-reported metrics collected at three time points during treatment. Baseline metrics obtained at the time of psychiatric evaluation are followed by subsequent measurements at three and six months after treatment initiation. We use nine metrics including the Short Posttraumatic Stress Disorder Rating Interview (SPRINT) [11], the Quality of Life in Epilepsy Inventory (QOLIE) [12], the Family Assessment Device (FAD) [13], the Brief Cope [14], the Dissociative Experiences Scale (DES) [15], the Brief Illness Perception Questionnaire (B-IPQ) [16], the Chronic Pain Grade Scale (CPGS) [17], the Patient Health Questionnaire (PHQ-9), and the Generalized Anxiety Disorder Scale (GAD-7). These are routinely collected as part of standard clinical care with a Health Insurance Portability and Accountability Act (HIPAA) compliant, electronic interface and collated in Filemaker Pro© to support clinical analysis and the creation of patient dashboards. Patients are sent an email notification to complete online questionnaires at home, and this information is electronically received by the Filemaker Pro© database for further analysis. The web interface does not allow partial completion of questions, and each set of questionnaires is reported to patients and physicians in the form of a dashboard. Anomalies are detected when data are collated and reviewed by the NES program manager. These data are collected with an Institutional Review Board (IRB)-approved protocol for reporting in aggregate, obviating the need for consent. All patients received treatment based on current standard of care.

Seizure frequency and descriptions using seizure diaries also assess progress. Seizure diaries are collected on paper each week during group visits and reviewed in group for significant events. They are then collated by NES clinic staff.

2.2. Therapy components

2.2.1. Five-week group

The five-week group uses a psychoeducational CGMV model optimizing the number of patients seen, improving patient access and provider productivity, and decreasing a sense of isolation for the patients. Patients arrive for treatment in a variety of stages of readiness to participate, some with an internalized sense of shame and self-doubt, often having been told they are faking their seizures or that their events are not real. With previous minimal prior positive interaction with healthcare providers, they experience difficulty forming a therapeutic alliance and are in need of reliable education about their illness, understanding of the appropriate treatment, and guidance on how to proceed actively with self-advocacy. The CGMV setting levels the playing field

and provides a common treatment pathway, individualized as needed, to accommodate each patient. The sessions allow for sharing of medically induced trauma that occurs prior to diagnosis with NES. This includes mistreatment by medical professionals, for example, receiving sternal rub during an event, emotional trauma of being told that the events are purposefully faked, or being over-sedated with benzodiazepines. The CGMV group does not directly address other forms of trauma such as prior emotional, physical, or sexual abuse that are often comorbid. The CGMV adds a toolkit of mindfulness exercises, support network information, informational and instructional handouts, seizure diary training, and exercises aimed at challenging dichotomous approaches to problem solving.

Each CGMV is 2 h, and the series of five sessions is adequate treatment for some patients, defined clinically by the treating psychiatrist with a functional assessment and a discussion of seizure control. In this time limited model, the goal of treatment incorporates communication with a community psychiatrist and/or therapist for any treatment needs that are beyond the scope of the 6-month treatment period.

This intervention also prepares the patient, if needed and/or appropriate, for the 12-week psychodynamic group. Those who do not require further treatment are returned to their primary care provider (PCP) with a care plan, including a DVD of their typical event obtained from recordings during their stay in the EMU. When appropriate, they are given follow-up with both psychiatry and neurology to assure successful transition. See Appendix 1 for more information on the goals, challenges, tools, and homework for each individual session.

2.2.2. 12-Week group

The 12-week group uses a psychodynamic approach that is unstructured, enabling progression in real time through a range of common themes related to current and past life events. The sessions are in 12-week blocks and do not allow for rolling admission because of disruption of the group dynamic. The sessions are 80 min long. The nature of patients' NES events is explored for the role they play as a coping mechanism for emotional distress and/or reactivated traumatic memories. Coping mechanisms of dissociation and avoidance are related to trauma in patients who lack communication skills that would allow for a more sophisticated interpersonal exchange, and group work focuses on articulating traumatic experiences to change dissociative and avoidant communication patterns. Family communication styles are also explored to elucidate how NES can take the place of the healthy expression of distress. Relationships within the group often shed light on relationships in personal life and afford opportunity to practice new skills, providing a therapeutic environment in which to do this work.

There are many well-defined benefits of utilizing a group therapy approach in an integrated care setting [18]. Taking advantage of a model that maximizes efficient patient contact and using a psychodynamic group therapy approach, we capitalize on providing hope of recovery, the universality of shared similar experience, a sense of belonging created in a cohesive group environment, and interpersonal learning. The group focuses on the mind and body's reaction to stress and trauma, providing patients with insight into the meaning their NES have in the context of their lives. Common interventions include clarification, confrontation, interpretation, recognition of transference and countertransference, observation of disconnect between content of speech and corresponding affect, as well as in the moment processing of emotions on an individual basis or between group members.

During group sessions, patients may have a NES. Given this eventuality, the group discusses and agrees upon what will be individually helpful for patients in the event of a seizure. Safety is paramount, so leaders facilitate repositioning to prevent falls or other injuries when needed. Respecting the wishes of the patient models appropriate responsiveness and reaction to the seizure. As most NES duration in group are brief, therapy can continue for others, once the patient's physical safety is ensured. Occasionally, a nurse or medical assistant will assist if the event is prolonged.

Patient contact outside group therapy is allowed with the understanding that this communication is shared with all members so as not to create subgroup dynamics. This decision allows patients to support one another and practice healthy ways of getting support from others. Many of the patients discuss keeping in contact with one another after the group has ended.

2.2.3. Additional treatment components

Entrance into the clinic involves an initial psychiatric intake to determine suitability for group therapy and to identify if underlying psychiatric comorbidities are adequately treated. When needed, medications are changed or initiated in conjunction with the patient's primary behavioral health provider. A social work referral identifies and addresses barriers to care and directs proper resources to overcome them. These steps are essential to ensure that the patient has a smooth transition into therapy and, once complete, back to the community setting. The NES clinic is not a chronic care treatment program and as such, each patient is encouraged and assisted to find an individual therapist in the community to continue the therapeutic work started in the NES clinic. Patients are encouraged to help their therapist understand NES and the treatment they have received. This gives patients practice in communicating and asking for help. When needed, the psychiatrist offers each patient a release of information to newly and previously established therapists to further clarify the NES diagnosis and appropriate treatment.

A follow-up with psychiatry is provided to all patients at three and six months after diagnosis with NES, irrespective of treatment in the groups. If needed, the patient is seen sooner or more frequently for short-term medication management of comorbid conditions during progression through the groups. Additional treatment plans and patient progress are tracked through follow-up psychiatry visits. Family conflict, unhealthy communication, or other family system factors may play a large role as a barrier to clinical progress in this patient population. Many patients choose to have family members present for individual appointments. Based upon the psychiatrist's clinical judgment of family impact on the etiology and maintenance of NES, formal family assessment, using the McMaster model, may be recommended. Once this is accomplished, further family treatment is at the discretion of the treating psychiatrist. The NES intake and access coordinator facilitates all components of treatment, including group and individual appointments as well as family meetings.

Facilitated transition of care back to the patients' PCP for continued management is an important goal of the NES clinic. Sharing of progress notes, sent directly to providers, phone calls as described above, and the exchange of electronic medical records are the main methods of communication. Outside providers are given a description of NES clinic treatment, the extent to which patients participated, initiation or change of any related medication, and further explanation of the NES diagnosis.

When patients have other comorbid neurological conditions, this transition includes further care with a neurologist, especially when the patient has comorbid epilepsy. When continued individual psychiatric care is needed, this often requires direct communication between the psychiatrist in the NES clinic and other providers, particularly the therapist, to assist the patient's continued clinical progress in the understanding and management of their NES diagnosis. Patients are encouraged to participate in disseminating their understanding of NES to family members and other significant relationships to stop the unhelpful cycle in which NES events precipitate inappropriate utilization of healthcare. Each patient receives a DVD of their typical event to facilitate this teaching.

2.3. Feasibility metrics

Healthcare utilization is reported here as a proxy to demonstrate the worth of this clinic for patients. As shown in Kerr's work, the number of comorbidities is predictive of a diagnosis of NES [19]. Excessive healthcare utilization comes at a high cost and is demonstrated as

persistent in patients with high numbers of comorbid conditions [20]. Reduction of inappropriate healthcare resources is valuable, as it reduces system cost and decreases patient exposure to unneeded and unhelpful treatment.

Through chart review, healthcare utilization was determined one year prior, during, and 10 months after treatment. Categories of utilization in these timeframes include neurological imaging, EMU visits, emergency department (ED) or urgent care center (UCC) visits (categorized with a chief complaint of seizures versus other), and total inpatient stays. Rates for each category of healthcare utilization by patients during and after treatment were compared with before treatment using generalized estimating equation (GEE) negative binomial rate models with a log link function. The negative binomial distribution was used because the outcomes were counts, and standard errors were calculated with robust methods. A longitudinal covariance matrix accounted for within-patient correlation across repeated measures. Variable exposure times were accounted for, and rates of healthcare usage were modeled. Gender and age of patient (at the midpoint) were adjusted for as additive covariates. Linear combinations of the parameters, and back transforming from the log scale, determined the rate ratios for during and after treatment compared with before, along with 95% confidence intervals and p values for the null hypothesis of no difference. The score test was used for the p values when possible. All statistical computations were performed in Statistical Analysis System (SAS) 9.4, and univariate alpha was set to 0.05.

Other determinations of feasibility include financial sustainability with institution specific calculations, described in Section 2.1, and clinic attendance, reported in Section 3.2. This study is approved by the Colorado IRB.

3. Results

3.1. Patient recruitment, demographics, and characteristics

The majority of the population was accrued with convenience sampling of 225 consecutive patients admitted to the EMU and diagnosed with NES from July 2016 to October 2018. Additionally, 50 patients who were diagnosed before this time period were added to the database, for a total 276 patients diagnosed. Of these, 200 were referred to treatment. Seventy-six patients were not referred because of system error (Fig. 1). We utilized video-electroencephalography (EEG) as the gold standard diagnosis, capturing patients' typical events to assure an accurate diagnosis of NES [21]. Patients excluded were those outside the age range of 18 to 89 years, prisoners, factitious or malingering diagnoses, and those undergoing an active epilepsy surgical workup.

Included in the treated sample are patients with both NES and epilepsy as well as patients with NES alone (Table 1). We excluded patients with an inconclusive diagnosis. Our treated population demographics (N = 106) show an average age of 40 years at time of diagnosis. Of note, the majority of this population (73.6%) had government insurance, including Medicaid, Medicare, and Tricare. Most patients enrolled in our treatment program reside in urban regions, but approximately 14% had to travel more than 1 h for treatment.

Using both individual chart review and Compass, a University of Colorado service that queries an APCD, an analysis of all 106 treated patients elucidates other clinical characteristics, including psychiatric comorbidities and specific medication classes patients were on at the time of diagnosis, including antidepressants, benzodiazepines, antipsychotics, antiepileptics, and opiates (Table 1).

3.2. Clinic utilization

Previous to our treatment model, a clinical pathway did not exist for the evaluation and treatment of our population with NES. Of 200 referred, 165 (82.5%) received a psychiatric evaluation (Fig. 1). To obtain retention rates, we took the number referred to the clinic (N = 200) and subtracted those patients who were scheduled but not yet undergoing treatment, those deemed inappropriate for group, those who lived too far away to attend group, and those who had already had an established therapist, totaling 64 excluded for an N of 136. Seven patients were found to be inappropriate for group treatment after a full psychiatric evaluation for a variety of reasons, including group would be too triggering, patients who were too disorganized to participate, and untreated psychiatric illness that required medication management prior to group. Adherence to treatment requires that a patient receives an adequate dose of treatment, defined as attendance to ≥50% of at least one group series, a previously validated metric of good outcome for NES treatment [22]. Of the 106 patients assigned group treatment before October 1, 2018, 84.0% (N = 89) were adherent. Retention is thus defined as the number receiving an adequate treatment dose (N = 89) divided by the number deemed appropriate for treatment (N = 136), resulting in a retention rate of 65.4%.

The use of other clinic components varied among patients. Treatment occurs over a six-month period and includes initial psychiatric evaluation, five- and 12-week groups, three- and six-month psychiatry follow-up visits, medication management, and family evaluation

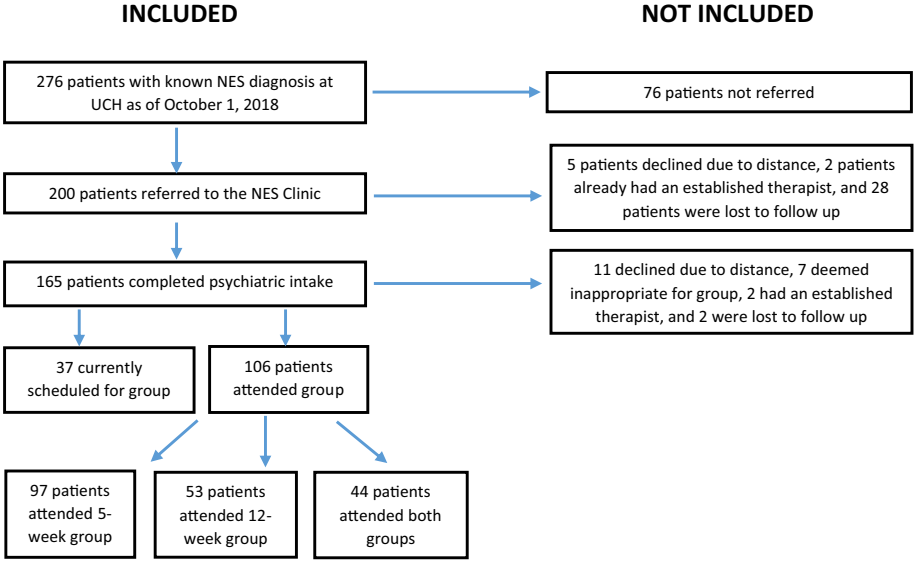

Fig. 1. Patient retention flowsheet.

Table 1
Demographics and characteristics of treated population (N = 106).

	N (%)
Sex	
Male	28 (26.4)
Female	78 (73.6)
Mean age	40 years
Comorbid epilepsy	
NES alone	81 (76.4)
NES + ES	25 (23.6)
Insurance carrier	
Medicare/Medicaid/VA	78 (73.6)
Commercial	27 (25.5)
Self-pay	1 (0.94)
Medications	
Antidepressant	62 (58.5)
Benzodiazepine	48 (45.3)
Antipsychotic	13 (12.3)
Antiepileptic	73 (68.9)
Opiate	21 (19.8)
Psychiatric comorbidities	
Mood disorders	58 (54.7)
Trauma- and stressor-related disorders	60 (56.6)
Anxiety disorders	75 (70.8)
Substance abuse	42 (39.6)
Personality disorders	1 (0.94)
Sleep disorders	57 (53.8)
Psychotic disorders	1 (0.94)

totaling 21 visits, including all treatment modalities, available to any patients who are appropriate for all aspects of the NES clinic (Table 2). The five-week group average number of visits was 3.9 out of five visits assigned, with an adherence rate of 84%. In the 12-week group, the average number of visits was 7.6 out of 12 with an adherence rate of 73%. Forty-four patients attended some amount of both groups. Individual therapy is available but is the exception. Five patients underwent a family assessment. Few patients utilized all treatments available. Very few patients were not appropriate for group treatment. Forty-two percent of patients utilized more than 50% of all available treatment visits.

3.3. Healthcare utilization

We illustrate healthcare utilization for the treated population (N = 106) with rate ratio estimates comparing utilization during and after treatment to the year before treatment (Table 3). These results are adjusted for age, sex, and exposure time. Neurological imaging and total EMU visits show a statistically significant reduction in utilization during and after treatment compared with before treatment. Also, reduction in emergency and urgent care visits with the chief complaint of seizures is statistically significant while emergency visits for all other causes are not. The decrease in inpatient stays is not statistically significant.

4. Discussion

This is a novel clinic model utilizing a mixed intervention design, integrated across disciplines of psychiatry and neurology, demonstrating the feasibility of the comprehensive treatment of NES and other functional neurological disorders [23]. The feasibility of this model depends upon patient engagement with treatment [24]. After diagnosis, an immediate referral to the NES clinic is made by the clinician and a designated patient liaison is deployed to explain the clinic, answer outstanding questions, and schedule the patient for initial intake. This invites the patient into the care model with a personalized approach, instituting trust, and providing a pathway to include psychiatric care.

Table 2
Treatment utilization (N = 106).

Visit number	Number of patients	Percent
≤5 visits	23	21.7
6–10 visits	38	35.8
11–15 visits	16	15.1
16–20 visits	20	18.9
≥21 visits	9	8.5

Reimbursement for behavioral healthcare personnel is at the crux of the case for financial feasibility. In spite of provisions made under the Affordable Care Act to increase coverage for behavioral health conditions, access to mental health intervention remains a problem [25,26]. One approach is to save money for the healthcare delivery system and another is to increase throughput for more appropriate healthcare. In the case of the EMU, giving timely care to the patient with NES accomplishes both tasks by decreasing inappropriate care for these patients, freeing the neurologist to care for the patients with epilepsy. A simple contribution margin calculator, as described in Section 2.1, provides the rationale that seeing patients with epilepsy in the EMU is a more suitable care delivery model for this resource which, when adequately reimbursed, can pay for the behavioral healthcare that is needed for patients with NES. It is well recognized that untreated behavioral health problems drive up physical healthcare costs [27]. The model can be made further sustainable when supplemental federal healthcare dollars are available for behavioral healthcare treatment. The Department of Health Care Policy & Financing in Colorado (HCPF), for example, gives supplemental payments to support programs which will benefit Medicaid patients.

We found through modeling that a time limited, rather than chronic care design, is feasible. This necessitates a short-term treatment plan, utilizing residents and fellows, allowing the billing provider to see a larger number of patients with the volume sustaining the model financially. Although not always generalizable to a community-based practice, the use of learners, including psychiatry residents and fellows and psychology graduates, fulfills the teaching mission as well as allocating needed providers for a group model. In all cases, learners are paired with neurology faculty in the five-week psychoeducational group and faculty psychiatrists in the 12-week group. This provides faculty expertise, a teaching model for the learners and needed assistance to facilitate the group, especially when NES events occur during treatment. Utilizing group therapy met our goal of providing increased capacity to treat more patients in a timely manner with limited provider resources. The design is for a six-month treatment period with a prompt repatriation of the patient with the PCP, supplying resources for continued patient care.

Group models utilizing psychoeducation and psychotherapy in the treatment of NES showed some efficacy in small pilot studies with a posttreatment decrease of healthcare utilization trending toward fewer emergency department visits and hospitalizations as well as showing trends toward improved quality of life [5–7]. These small pilot studies demonstrated the need for larger trials of group therapy. We diagnosed, enrolled, and ultimately treated 106 patients in the clinic, retaining 65.4% of patients with an adherence rate of 84.0%. Allowing for differences in definitions of retention and adherence, our number of patients treated and the period of time of treatment exceed that of the smaller studies cited. This model employs methodology and provides further proof of concept for a group intervention for the treatment of NES, underscoring the feasibility of delivering this care. This begins to address the access issues created by the volume of patients diagnosed with NES in the EMU, the goal of which was to increase capacity for patients with epilepsy and to create a pathway to treatment for patients with NES.

Important limitations to date include a lack of analysis for efficacy of the group treatment model. The model is not a randomized control study and therefore, is not designed to evaluate efficacy. Loss to follow-up was larger than expected. An ongoing analysis will be necessary to determine if issues of distance, lack of access to transportation, lack of acceptance of the diagnosis, or some system error was responsible. This may have introduced some selection bias into the treated sample. We

Table 3
Healthcare utilization (N = 106).

Healthcare utilization category	Rate ratio estimate (% decrease)	95% confidence interval		p-Value
Neuro imaging total				
During vs before	0.34 (66)	0.18 (82)	0.63 (37)	0.0014
After vs before	0.088 (91.2)	0.034 (96.6)	0.22 (88)	<0.0001
EMU total				
During vs before	0.18 (0.82)	0.093 (90.7)	0.33 (67)	<0.0001
After vs before	0.046 (95.4)	0.012 (98.8)	0.18 (82)	<0.0001
ED/UCC seizure				
During vs before	0.42 (58)	0.21 (79)	0.82 (18)	0.0031
After vs before	0.25 (75)	0.12 (88)	0.53 (47)	0.0002
ED/UCC other				
During vs before	0.79 (21)	0.49 (51)	1.27 (−27)	0.32
After vs before	0.84 (16)	0.51 (49)	1.39 (−39)	0.51
Inpatient total				
During vs before	0.48 (52)	0.20 (80)	1.15 (−15)	0.021
After vs before	0.44 (66)	0.15 (85)	1.29 (−29)	0.26

Note: mean exposure times - before treatment: 8.6 months (standard deviation (SD): 4.9 mo.), during treatment: 6.0 mo. (SD: 4.8 mo.), after treatment: 10.0 mo. (SD: 7.5mo.).

are conducting a needs assessment to improve our loss to follow-up rates while collecting patient-reported barriers to care. This model may not be generalizable to a community-based practice as it is carried out in a tertiary care facility with dedicated providers and staff to treat this population. Lack of a similar level of interdepartment collaboration or necessary infrastructure in a community environment may make replication of our treatment model difficult. In the future, the components of the clinic could be manualized to allow for use at other centers that may have some of the above limitations. A major limitation of this study and this clinic is the lack of adequately documenting and clinically monitoring seizure frequency. As a primary outcome measure, seizure frequency tracking will need to be addressed to evaluate potential clinical impact of this model, used in future randomized clinical trials.

Future directions for our clinic include analysis of patient-reported outcome metrics and seizure frequency with descriptions to determine clinical outcomes of the measures described above. The metrics that are being collected will continue to inform personalized care for the patients in order to better tailor treatment. Approximately 14% of our patients live at least an hour away from treatment. This is an underestimate of this particular barrier to care as some live in an urban environment outside the metro region. As a result, telemental health is a goal to treat a wider range of patients that are not able to participate in our program because of distance from the clinic.

5. Conclusion

Development of an integrated clinic between psychiatry and neurology is a feasible and successful way to engage patients with NES in appropriate treatment. Decrease in healthcare utilization after treatment demonstrates that the NES clinic was worthwhile. Characterization of the treatment population shows a high burden of comorbid psychiatric disease. Analyzing the outcome data will further our knowledge about patient variables and treatment outcomes, allowing more tailored treatment and improving our understanding of which aspects of treatment are providing the most benefit.

Declaration of Competing Interest

No authors have any conflicts of interest or disclosures.

Acknowledgments

We would like to thank the following advanced practice providers for their tremendous help in the design and daily functioning of the NES clinic: Taylor Bashore, Kelly Morrissey, Rajee Krause, and Stacey Wilson. We would also like to thank Travis Beckstead and Kevin Traylor for their tireless work as intake and access coordinators. This study is supported by the Health Data Compass Data Warehouse project (healthdatacompass.org).

Appendix 1. 5-Week conversational group medical visit summary

Group session	Session goals	Challenges	Tools	Homework
Getting started — level the playing field	Establish group rules Explain confidentiality Distribute group materials Establish group & individual goals Introduce mindfulness-based practice Give outcome metrics	Patients need some catharsis about how they have been treated/names they have been called Practical matters about using a NES diary in patients with amnesia	Storytelling may be group led Create a safe environment for sharing Explain mind–body connection	Practice mindfulness (every session) Fill out diary (every session) Complete outcome metrics Review and use resources
Stressor & triggers — taking control	Collect seizure logs (every session) Review previous weeks homework (every session) Identify stressors and triggers Discuss locus of control Expand knowledge of PNES Discuss support networks	Promoting awareness of internal and external locus of control and fostering acceptance	Use a Punnett square device to organize control	Complete a personal list of stressors and triggers Fill out Punnett square using personal example of trigger/stressor
Balancing acceptance and responsibility	Introduce concept of blaming vs being a victim Balancing self-acceptance and being overly responsible	Fostering appropriate ownership in a population who are often dissociative and/or amnestic for events	List life responsibilities and identify ownership, use group storytelling to illustrate Consider ways to accept	Complete personal list of responsibilities and identify ownership

Appendix (*continued*)

Group session	Session goals	Challenges	Tools	Homework
	Discuss coping skills Teach current and other uses of antiepileptic drugs Expand knowledge of NES and discuss comorbidities		responsibility List coping skills which facilitate acceptance	
The mindful pause — reaction & response	Identify stressful situations & inquire into strategies and styles of coping Teach difference between responding and reacting Practice what it means to take a mindful pause Expand knowledge of PNES with statistics, reduce feelings of isolation	Patients resist notion that they can take a minute to reflect, their lives are out of control	Draw on mindfulness exercises from previous session Storytelling about examples of how this has worked in situations Hearken back to balancing acceptance and responsibility Acknowledge that these situations are stressors and triggers for events	Inventory of current support structure Identify obstacles inhibiting new support and way to overcome practice responding mindfulness
Where do we go from here	Summarize contents of groups 1–4 Construct a plan for prevention based on tools Review coping skills and family dynamics that are healthy/unhealthy Review avenues of support	Patients are frightened about next steps	Review any tools and strategies Review support resources Discuss family session as a way to bring in family members to support Discuss next steps	

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