Psychogenic nonepileptic seizures treated with psychotherapy: Long-term outcome on seizures and healthcare utilization

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ABSTRACT

Psychogenic nonepileptic seizures (PNES) are known to be associated with significant costs of healthcare services. Here, we report the impact of psychotherapy on behavior surrounding healthcare utilization and the potential economic benefits associated with long-term seizure control.
Methods: This retrospective study describes patients seen between 2010 and 2016 at the epilepsy clinic at Glostrup University Hospital in Denmark and offered a psychotherapeutic treatment program for PNES. Forty-two patients were interviewed about seizure outcome 12–24 months after psychotherapy, and the annual changes in healthcare utilization and associated costs of services provided in a period of 24 months before and up to 24 months after treatment were compared.
Results: At 12-month follow-up, 83% of the patients had achieved above 50% reduction in seizures. The 24-month pretreatment costs compared with the 24-month posttreatment costs directly associated with seizures dropped by 95.8%, and total healthcare costs were reduced by 63%. Estimation of annual savings from the program comes to 1060 € per patient. An association was found between seizure rate and number of healthcare contacts.
Conclusion: This study adds to the evidence that psychotherapy is a cost-effective way of treating PNES. The economic benefits from this form of intervention appear not only to diminish costs directly associated with PNES, but also healthcare utilization in general.

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1. Introduction

Psychogenic nonepileptic seizures (PNES) are paroxysms of alteration in sensation, movement, and consciousness, where the semiology is highly similar to epileptic seizures (ES), but not associated with ictal epileptiform activity recorded by electorencephalography (EEG) activity [1]. Newer research suggests PNES as a biopsychosocial disorder, where no single nosology can account for the phenomena, and the range of expressions is assumed to be products of psychogenesis in interaction with biological factors [2–4]. Prevalence is estimated at 2 to 33 per 100,000 accounting for up to 10–20% of referrals to tertiary epilepsy centers, making the disease as common as Multiple Sclerosis [5]. Psychogenic nonepileptic seizures are associated with significant impairment of functioning often affecting individuals during early productive years [6]. As many patients suffering from PNES rely on welfare benefits, this diagnosis poses great costs to the individual and the

society [7]. The incidental nature of the disease makes diagnosis difficult and time between onset of seizures and correct diagnosis can be up to several years [8]. Video-EEG (vEEG) monitoring offers a valid diagnostic way of discerning PNES from ES, but access to epilepsy monitoring units (EMU) is often limited, and suspicion of improper diagnosis is necessary for referral to be made. In the meantime, medical expenses can be large as patients will often require frequent visits to outpatient clinics and emergency departments (EDs) following seizures [9].

Several previous studies have demonstrated that proper administration of the PNES diagnosis poses a favorable short-term outcome, with a reduction in seizures and a drop in ED visits [7,10,11] The prognosis on long-term is, however, poor and a large proportion of patients will experience recurrence of seizures and resume contact to hospital departments and continue to be frequent users of healthcare services [4,7,12–14]. A subgroup of patients will also report new medically unexplained symptoms (MUS) following diagnosis [15]. Treatment with long-term effects is therefore paramount to the wellbeing of the patients and essential in reducing medical expenses associated with PNES. Psychotherapy is considered as the first choice of treatment, but today no sufficiently powered randomized controlled trials (RCTs) exists on the subject, favoring any specific method. [4,16–18]. The heterogeneity of the patients with PNES, often suffering from comorbid psychopathology makes a single protocol obsolete, and an
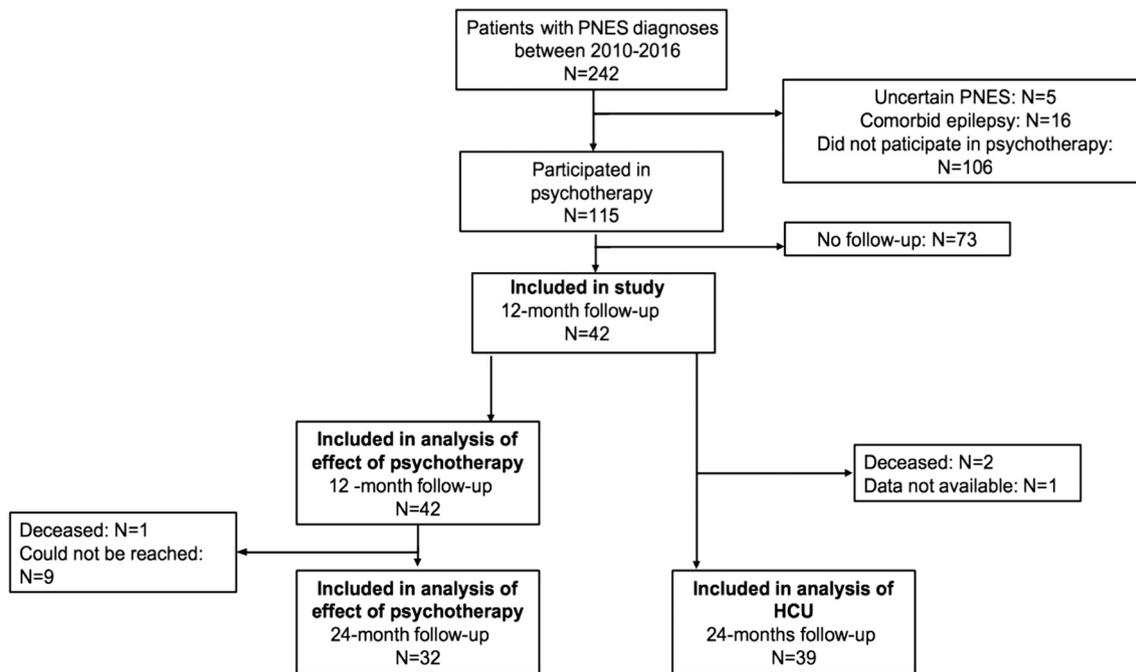
Fig. 1. Flowchart of patients included in study, subgrouped in analysis of the effect of psychotherapy on seizures and analysis of HCU.

individualized approach is necessary for addressing a number of factors pertaining to seizure behavior [3,4,19]. Only a few studies have examined long-term outcome of a psychotherapeutic intervention [2], and little is known about healthcare utilization (HCU) following such an intervention. To our knowledge, only two studies have documented HCU following psychotherapy. One of them based on a small sample of patients with no information on seizure outcome and the other study based on postal questionnaire with information from a limited time span [20,21].

2. Material and methods

2.1. Collection of patients and clinical data

2.1.1. Subjects

In this study, we describe patients with PNES who were offered psychotherapy by the specialized multidisciplinary team at the Epilepsy Clinic, Rigshosptalet-Glostrup in Denmark, between 2010 and 2016.

The diagnosis was made by a neurologist with experience in epilepsy and seizure disorders. All patients were clinically evaluated, and in cases where the history and seizure semiology were suggestive for PNES, further confirmation of diagnosis was achieved by vEEG monitoring. However, in some cases, the diagnosis was only confirmed by clinical observation or home-video registration.

After the diagnoses were ensured the patients were offered participation in the PNES treatment program and referred for neuropsychological assessment with one of the two neurospychologists working with our patients at the epilepsy clinic. As medical services in Denmark are founded by taxes, all services provided in the program, where free of charge.

In total, 242 patients with PNES were referred for treatment between 2010 and 2016. Only patients who had participated in at least one session and a 12-month follow-up (n = 42) were included in the outcome analysis. The remaining 200 patients were not included because of the following reasons: patients had uncertain PNES diagnosis (n = 5), comorbid epilepsy (n = 16), did not complete the 12-month follow-up (n = 73), or did not engage in psychotherapy (n = 106) (Fig. 1). The main reasons for not participating in psychotherapy were as follows: patients who did not agree on diagnosis, some experienced

spontaneous seizure freedom, some patients were already in psychotherapeutic program at other hospital, others feared stigmatization, and in some patients, severe psychic comorbid disease needed to be treated at other hospitals. At the time of analysis, data were not available for one patient, and two out of the included 42 patients were deceased. A total of 39 patients were included in analysis of HCU.

Thirty-two of the 42 subjects participated in a 24-month follow-up; one of them died, and the other nine patients could not be reached.

This study was approved by the Danish Data Protection Agency (2018-304 – 6551) and the Danish Patient Safety Authority (3-3013-2709/1). No experiments and procedures were done that conflict with the Helsinki Declaration of 1975 (revised 2000).

2.1.2. PNES treatment protocol

During the psychological treatment, the antiepileptic drugs (AEDs) were discontinued, if they were used for treating the seizures. Follow-up consultations ascertained patient's health status as part of maintenance therapy [4] (Table 1). Based on a clinical evaluation, 50% of the patients were also evaluated by a psychiatrist in order to recognize potential underlying psychopathology and, if present, the need for medical treatment.

2.1.3. Psychological assessment

Initially the neuropsychologist performed a 1- to 2-hour semistructured assessment interview with the purpose of determining the course of further treatment. Inquiry was done into patient's current life circumstances in order to explore predisposing, precipitating, and perpetuating factors of seizures. Through an acknowledging approach toward patient's experience of illness, presuppositions about seizures were determined. Having discerned individual needs for psychoeducation, the therapist offered tentative hypothesis of how maintaining factors in the present could be linked to seizures. These were suggestions and could be rejected if they were regarded as not relevant for the patients but served the purpose of establishing an internal psychological focus as the cause of seizures and promoting reconciliation of contention to this. With adequate psychoeducation on dissociation and how this can be manifested in seizures, the patients gradually recognize a psychological predicament. Although seizure control was the implicit goal of treatment, patients were encouraged to formulate

Table 1
PNES treatment protocol.

Clinical assessment

- Neuropsychologist
  ○ Assessment interview
    - Psychoeducation
    - Problem formulation

  ○ Objective measurements using SCL-90-R[a], PTSD-8, and seizure diary and ORS[b].

- Psychiatrist
  ○ Screening for psychopathology
  ○ Referral to relevant psychiatric treatment if needed.

Psychotherapy

  ○ Focus on problem in the present
  ○ CBT- or ACT-based[c,d] interventions determined by predominant factors maintaining problem.
  ○ ORS.
  ○ Termination of the psychotherapy.

Maintenance therapy

- 6 months follow-up by the neurologist
- Follow-up telephone interview, by the neuropsychologist
- 12 months
- 24 months

Termination

- Final telephone interview by the psychologist
- Final consultation with neurologist.

Treatment protocol of psychogenic nonepileptic seizures (PNES).
[a] Symptom checklist 90 revised (SCL-90-R).
[b] Outcome rating scale (ORS).
[c] Cognitive behavioral therapy (CBT).
[d] Acceptance and commitment therapy (ACT).

what psychological problem was to be the focus of following sessions. This process constitutes an effective locus of control and enables the patient to feel a sense of agency in recovery.

At the beginning of every session, the Outcome Rating Scale [22] was used to assess state of patients mental, social, and general wellbeing. The Session Rating Scale [22] was used at the end of each session to assess the strength of therapeutic alliance and optimize this through the course of therapy.

During the psychological assessment, demographic data of patients were registered (Table 2). The Symptom checklist 90 revised (SCL-90-R) and a short Posttraumatic Stress Disorder (PTSD) Inventory - 8 items questionnaire was given to the patients to be filled in at home, to be used for outcome measures, and as screening for anxiety, somatization, and PTSD symptoms [23,24].

A self-report seizure diary was used for registration of seizures according to frequency and type. The diary was used for evaluation of treatment efficacy and in subsequent sessions for determining precipitating factors.

The course of the psychotherapy was initially planned for 10–15 one-hour sessions, adjusted to the individual need.

After the neuropsychologist assessment, a psychiatric interview was conducted in order to determine comorbid psychopathology. In case a patient was suffering from active psychosis or suicidal ideation, they were referred to relevant treatment and were regarded not eligible for participating in our treatment program.

2.1.4. Psychotherapy

The therapy sessions were structured around the problem formulated in the assessment interview. Seizure triggers, whether external or internal was determined by exploring examples of the patient's

problem in the present or through circumstances abstracted from the seizure diary. In this process, patients were encouraged to be mindful of contextual emotions being roused in the session. This allowed for uncovering unconscious responses to situations of distress and enabling patients to realize how these prerequisites could be linked to the triggering of seizures. These maintaining factors of seizures would be the main focus of the therapy, and depending on the quality of these, the direction of the interventions would be adapted from moment to moment, by the following approaches:

When self-destructive or maladaptive behaviors predominated, cognitive-behavioral-based interventions were used to form more adaptive behaviors, such as training expression of personal boundaries or needs in order for patients to act in a self-assertive manner.

When ambiguity or avoidance toward emotions predominated, acceptance and commitment therapy-based approaches were used to form awareness and tolerance of distressing bodily states, in turn, leading to a higher threshold for seizures.

Both approaches would be used dynamically in sessions, depending on what behavior was most prominent. Through this process, patients deepen their understanding of own responses to distress and, in effect, acquire greater seizure control.

Termination of psychotherapy was agreed upon by mutual consensus, between neuropsychologist and patient. After termination of the psychotherapy, 12- and 24-month follow-ups were done by structured telephone interview concerning seizure management. If no severe relapses had occurred, the treatment course was finally closed at the clinic after 2 years of follow-up.

2.1.5. Data acquisition

Monthly seizure frequency for the last 3 months prior to psychotherapy was obtained during the first session, and at the end of the psychotherapy, monthly seizure frequency for the past 3 months was registered.

Demographic and clinical data on employment status, civil status, current use of AED and psychopharmacological drugs (PPD), prior psychiatric diagnosis, and age of seizure onset were attained by the therapist at the assessment interview. Global severity index (GSI) was calculated from the SCL-90-R. Demographic results are shown in Table 2.

Data on HCU of all patients were extracted from the regional medical record system, allowing for the capture of all regional hospital contacts and inpatient visits of each patient included in the study. Medical records were thoroughly reviewed two years prior to initiation of psychotherapy and two years after the end of psychotherapy. All contacts were registered according to primary reason for visit, services provided during visit, the department providing service, and length of inpatient hospitalizations. Records where patients were not in direct contact with healthcare provider were not included. Two patients had died at time of data acquisition and were not included; data on one patient were

Table 2
Demographic data.

Gender (F/M)	36/6
Age (mean ± SD)	36 ± 18
Years with seizures at time of inclusion	6 ± 7
Number of educational years	12 ± 4
Employment status (employed/unemployed)	19/23
Patients living with partner	25
Patients with diagnosed psychopathology[a]	21
Patients using AEDs (at inclusion/at end of treatment.)	12/5
Patients in psychopharmacological treatment (at inclusion/at end of treatment.)	9/6
Global Severity index (Mean (SD): Before/After)	0.92 (0.66)/0.67 (0.55)

Demographic status of patients with PNES included in study.
[a] Psychopathology other than diagnosis referring to PNES (Schizophrenia, Periodic depression, Single depressive episode, Bipolar disorder, Social anxiety disorder, General anxiety disorder, Panic Attacks, Obsessive Compulsive disorder, PTSD, Personality disorder.)

unavailable two years prior, and this patient was also excluded. Data on HCU were compiled for months 1–12 and 13–24 following end-of-psychotherapy and compared to the same time intervals preceding start-of-psychotherapy (months: −1–12; −13–24). To simplify analysis, results for each 12-month interval were pooled for primary reason of contact, into the following categories: ED visits (subcategorized in: Seizures, Pain, Other) neurology, psychiatry, and other causes.

Direct healthcare costs of hospital admissions and outpatient services provided to patients in the study period were estimated from the diagnosis-related group tariffs from the Danish Ministry of Health [25]. The system provides data on average costs of healthcare services in Denmark, in Danish Krones (DKK). Every service provided during admission and outpatient visits during the study period was matched to an average tariff and pooled for a total price of each visit and categorized by main reason for contact. Following calculation, relevant costs were converted to Euros (€) at a rate of 7.4454 DKK/€.

2.1.6. Statistics

Statistical analyses were performed using GraphPad Prism 5.0 for Mac (GraphPad Software, CA, USA). Normality of variance within measures of monthly seizure frequency and healthcare contacts was tested with D'Agostino's K^2 test.

The significance level of outcome measures was tested by the Student t-test or Wilcoxon signed rank test, for paired values. Spearman's rank correlation coefficient was calculated between outcome and possible demographic explanatory factors to check for association. Group differences were examined with the Chi-squared test for dichotomous variables. Mann–Whitney test was used for continuous variables.

3. Results

3.1. Demographics

The patients included were predominantly females 36/42 (86%) in their thirties and had a mean disease duration of 6 years at time of inclusion (Table 2). Patients had received a mean 12 years of schooling. At inclusion, 50% of patients were unemployed. The employment status "employed" was determined as full- or part-time, full-time student, or retirement after age of 68 years. No difference between employment status at entry and that at the end of psychotherapy was observed. In the excluded group of 127 patients not fulfilling 12 months of follow-up, there was a lower status of employment (24%).

3.2. Effect of psychotherapy on PNES

The patients received a mean of 12 sessions of psychotherapy (Standard deviation: 5.7) and were conducted over a mean period of 15 months (Standard deviation: 9.2). The cost of psychotherapy was an average of 1982 € per client.

At the time of last session, 45% (19/42) (p < 0.0001) of the patients reported being seizure-free for the past three months; 36% (15/42) (p < 0.0001) had experienced >50% drop in seizures; 12% (5/42) remained <50% drop or unchanged, and 7% (3/42) experienced an increase in seizure frequency.

At 12 months of follow-up, three patients had further attained seizure freedom, and initial reductions were sustained both at 1 and 2 years of follow-up (Table 3).

Monthly seizure rates were significantly higher among unemployed at baseline. The mean difference was 4.8 seizures/month (±2.28), (p = 0.042), and at the end of psychotherapy, the mean difference was 4.9 seizures/month (±2.16), (p = 0.039). An association was found between seizure rate at the 12-months follow-up and the employment status of being employed (rho = −0.38, p = 0.013).

Seizure rate reduction >50% or seizure freedom was not associated with age, duration of the disease, gender, level of education, employment status, and use of AED or PPD. Mean reduction in GSI score was

Table 3
Seizure outcome.

	Inclusion	End of treatment	Follow-up	
			12 months	24 months
Number of participants	42	42	42	32
Number of seizures/month	4 (1.25–11.5)	0.75 (0–2.75)*	0 (0–1)*	0.04 (0–2.75)*
Number of patients without seizures	0	19	22	16
>50% reduction in number of seizures	–	15	13	10
<50% reduction in number of seizures or unchanged	–	5	4	4
Number of patients with increased number of seizures	–	3	3	2

Data (seizure frequency) are expressed as median with interquartile range.
* Indicates levels of significance compared with number of seizures at inclusion (p < 0.0001).

0.29 (standard deviation [SD] ±0.35) (p < 0.001) following psychotherapy. The reduction rate in GSI or GSI score at initiation was not predictive for efficacy of psychotherapy.

3.3. Reduction in PNES reduces healthcare utilization

In the 12-month period before initiation of psychotherapy, the mean number of HCU increased from a mean of 3.9 to 7.9 contacts (p < 0.0001) when compared to the period of 24–13 months before initiation (Table 4). This increase was mainly due to visits at neurological departments (1.85 to 3.90, p < 0.0004) whereas seizure-related ED visits were somewhat lower (0.15 to 1.10, p < 0.0001). In the 12 months following psychotherapy, total HCU was at a mean of 6.26 contacts. Seizure-related ED visits dropped from 1.10 to 0.05 (p < 0.0001), and neurology department visits dropped from 3.90 to 1.05 (p < 0.0001). There was a nonsignificant rise in visits to psychiatric departments and other departments at 12 months after psychotherapy (Table 4). At 24 months postpsychotherapy, all HCUs were reduced to a mean 2.97 contacts per year (Fig. 2).

Healthcare contacts at all time points were examined for association with change in seizure rate, number of sessions, time of psychotherapy, status of employment, age, education, years of seizures, AED or PPD use, and GSI score. A significant correlation was found between the seizure reduction rate and number of healthcare contacts during the 12 months following psychotherapy (rho = −0.49, p < 0.003). A significant association was also observed between the seizure rate at the end of psychotherapy and the HCU in the following year (rho = 0.47, p < 0.002). The other examined variables did not show any association.

3.4. Reduction in PNES reduces healthcare costs

Healthcare costs at 2 years prior to initiation of psychotherapy was a total of 90,648 € (mean 2324 € SD ±4214) for all the included patients (n = 39), and it was even higher, 226,480 € (mean: 5807 € ±SD: 6401) at 1 year prior to psychotherapy. Following psychotherapy, the total costs were as follows: 68,773 € (mean 1763 € SD ±4285) in the first year and even lower 49,304 € (mean 1264 € SD ±3393) 2 years after terminated psychotherapy. Mean costs at 2-year follow-up were highly skewed, as one patient accounted for 39% of the total costs. Median costs (25th–75th) at 2-year follow-up was 64€ (0–575€).

Costs directly related to visits due to seizures were 42,454 € 2 years before and 163,063 € 1 year before the therapy. These direct costs were markedly reduced after psychotherapy to 6315 € at 1 year, and 2220 € at 2 years after therapy. The total costs of diagnostic procedures (EEG, magnetic resonance imaging [MRI], computed tomography [CT], vEEG, and EMU) were also increasing from 29,252 € 2 years before to 125,720 € at 1 year before the treatment; however, a clear reduction

Table 4
HCU before and after treatment.

	Before 24–13	Before 12–0	After 0–12	After 13–24
All visits	3.9	7.9	6.26	2.97
Median (IQR)	2 (1–6)	5 (4–9)	2 (1–8)	1 (0–3)
ED All causes	0.41 ± 0.79	01.51 ± 1.8	0.44 ± 0.64	0.36 ± 0.67
ED Seizures	0.15 ± 0.49	1.1 ± 1.64	0.05 ± 0.22	0.05 ± 0.32
ED Pain	0.18 ± 0.51	0.26 ± 0.55	0.28 ± 0.51	0.28 ± 0.56
ED Other	0.08 ± 0.35	0.15 ± 0.49	0.1 ± 0.31	0.08 ± 0.35
Department of Neurology	1.85 ± 2.77	3.9 ± 4.24	1.05 ± 1.73	0.54 ± 1.12
Department of Psychiatry	0.05 ± 0.22	1.18 ± 6.08	2.77 ± 10.4	0.79 ± 3.78
Other departments	1.67 ± 2.85	1.51 ± 2.27	2.54 ± 4.65	1.26 ± 2.07
Total hospital admission days (range)	60 (0–24)	119 (0–36)	97 (0–88)	28 (0–14)

Number of healthcare contacts expressed as mean ± SD, in parentheses, before and after psychotherapeutic intervention. All visits shown with mean and median IQR = interquartile range, 25th and 75th percentile. Healthcare utilization of all patients was acquired from the regional medical record system.
ED = Emergency Department

of these costs was seen at 1 year after, 1081 € and further reductions to 475 € at 2 years after the treatment.

Total costs of seizure-related HCUs 24 months before psychotherapy was 20,517 €, while it was only 8535 € at 24 months after the therapy.

4. Discussion

This study demonstrates that psychotherapy is effective in reducing seizures in patients with PNES, and this has economic implications of benefit for society.

Following psychotherapy, a dramatic drop in seizure-related contacts was observed. Healthcare costs directly associated with these visits were reduced by 95.8% when comparing the 24 months following psychotherapy with the 24 months preceding psychotherapy. Total healthcare costs were 63% lower in the 24 months following psychotherapy compared with that in the 24 months preceding. In the 12 months before psychotherapy, the total expenses were highest. This was partly because of the inclusion of diagnostic procedures that accounted for 56% of expenses this year. An approximation of annual savings from the psychotherapy can be estimated from comparing mean healthcare costs, 24–13 months prior to psychotherapy and the 13–24 months after. These periods are chronologically separated from the procedures establishing diagnosis and representative of baseline costs. The mean difference comes to 1060 € per patient per year. The psychotherapy costs a mean of 1982 € per client. With this approximation the expenses of psychotherapy will have been compensated by direct savings of healthcare expenses, in less than two years.
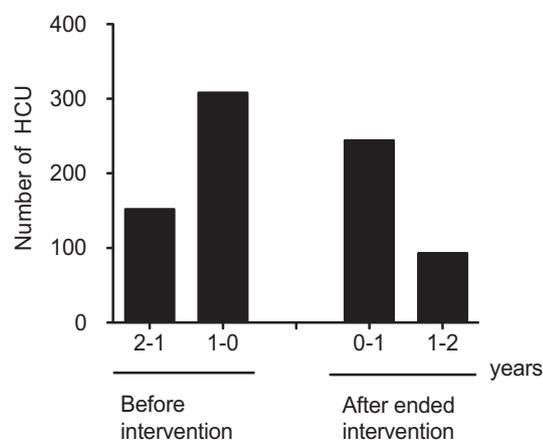
Despite of the observed drop in seizure-related contacts after intervention, the total HCU remained high in the 12 months following psychotherapy. This was mainly because of the increased contacts to psychiatric and other departments. No specific pattern was observed in contacts to other departments. The increased visits to psychiatric departments could be explained by a greater understanding, among the patients, of the psychological nature of their problems and symptoms. Although total HCU remained high in this period, the median number of contacts within the group was low (=2). Higher number of contacts was associated with persistence of seizures. To our knowledge, no study has previously found reduced seizure rate to be associated with general decrease in HCU. Two previous studies examining HCU after EMU discharge have observed a similar tendency of overall HCU to increase prior to diagnosis and then remain high in the following year [12,13]. In contrast to these, we observed, that two years postpsychotherapy total contacts dropped to a level below that of two years prior to entry. Reuber et al. have previously shown that somatization is high in patients with PNES, and severity of somatization in patients with PNES predicts hospital utilization [26]. The persistence of somatization following PNES diagnosis could explain the persistence of medical demands among patients with PNES diagnoses, as observed in other studies [12,13,26,27]. We speculate that the psychotherapy in our study was effective in treating not only seizures, but also the behavior motivating somatization and thus decreasing the need for medical attention in general.

Following our psychotherapeutic intervention, 45% of our patients had experienced seizure freedom. In total, 81% of patients had experienced a >50% reduction in seizures. These effects were sustained at 2-year follow-up.

The effect of our intervention on seizures was comparable to that seen in a recent meta-analysis [17], which demonstrated that the effect of psychotherapy was sustained at one- and two-year follow-up and seemed to be solid, opposed to that seen in studies without any intervention [7,14]. The psychotherapy was effective in mitigating previous predictors of outcome, as other studies have reported a poor outcome to be associated with duration of disease, employment status, comorbid psychopathology, educational level, and gender [7,28,29]. In our study, none of these factors have been found to be associated with lack of seizure freedom or improvement of seizure rates, although status of unemployment seems associated with highest seizure rate at the start and end of psychotherapy.

Our study has several limitations. The study was conducted in a single center, and results may lack external validity. Of the 242 patients who had their diagnoses at our clinic, 106 patients declined participation in our program. As no data on this group were available, a selection bias toward the patients who were willing to engage in psychotherapy is probably present. In addition, it is well-known that a large proportion of patients will experience spontaneous seizure freedom when receiving the diagnosis [10,30], and this group presumably did not enter

Fig. 2. Total number of healthcare contacts, shown in years before psychotherapy and after ended psychotherapy.

into the offered psychotherapy. The patients included appeared to have a higher employment status (45% employed) compared with those who were not included in study (24% employed), which could reflect a selection bias, although employment status was not found to be related to outcome in this study.

The seizure rates reported in follow-up interview may have been subject to recall bias and might be untruthful, as studies show that patients with PNES tend to underreport their seizures [27]. Finally, we did not include data from general practitioners, private clinics, or from other counties, which might have revealed a different behavior pertaining to HCU.

In conclusion, despite the limitations, this study adds to the evidence that psychotherapy is a cost-effective way of treating PNES. The economic benefits from this form of intervention appear not only to diminish costs directly associated with PNES but also HCU in general. Additional studies with larger populations and randomized controlled studies are however needed to validate our data.

Declaration of Competing Interest

Mads Deleuran has no conflicting interests.

Karin Nørgaard has received lecture fee from UCB Nordic.

Noemi Becser Andersen received consultancy or lecture fees from Eisai Denmark and UCB Nordic.

Anne Sabers received consultancy or lecture fees from Eisai Denmark and UCB Nordic.

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