



Regulation of emotions in psychogenic nonepileptic seizures



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ABSTRACT

Background: Despite the long history of psychogenic nonepileptic seizures (PNES), relatively little is known about the mechanisms that cause and maintain this condition. Emerging research evidence suggests that patients with PNES might have difficulties in regulating their emotions. However, much remains to be learned about the nature of these difficulties and the emotional responses of individuals with PNES. This study aimed to gain a detailed understanding of emotion regulation processes in patients with PNES by examining differences between patients with PNES and a healthy control group with regard to intensity of emotional reactions, understanding of one's emotional experience, beliefs about emotions, and managing emotions by controlling emotional expression.

Method: A cross-sectional design was used to compare the group with PNES ($n = 56$) and the healthy control group ($n = 88$) on a range of self-report measures.

Results: Participants with a diagnosis of PNES reported significantly poorer understanding of their emotions, more negative beliefs about emotions, and a greater tendency to control emotional expression compared to the control group. While intensity of emotions did not discriminate between the groups, poor understanding and negative beliefs about emotions were found to be significant predictors of PNES, even after controlling for age, education level, and emotional distress. Furthermore, the presence of some emotion regulation difficulties was associated with self-reported seizure severity.

Conclusions: The results of this study are largely consistent with previous literature and provide evidence for difficulties in emotion regulation in patients with PNES. However, this research goes further in bringing together different aspects of emotion regulation, including beliefs about emotions, which have not been examined before. As far as it is known, this is the first study to suggest that levels of alexithymia in a population with PNES are positively associated with self-reported seizure severity. The findings suggest a need for tailored psychological therapies addressing specific emotion regulation difficulties in individuals with PNES.

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1. Introduction

Psychogenic nonepileptic seizures (PNES) are episodes of sudden, involuntary, and time-limited alteration in movement, sensation, behavior, or consciousness, which superficially resemble epileptic seizures (ES) but are not associated with abnormal electrical discharges in the brain [1]. While most authors recognize that PNES are thought to represent an experiential or behavioral response to emotional distress [2], the psychological mechanisms underlying PNES remain poorly understood [3], which has negative implications for treatments and outcomes [4].

Emotion regulation is considered to be a psychological mechanism underlying various forms of mental and physical illness [5,6]. Although

there is no consensus with regard to the definition of emotion regulation (ER), a number of theories have been proposed [5,7–9], and ER has been described as conscious and unconscious [10] processes by which individuals influence, manage, experience, and express their emotions [11]. Mennin et al. [9], who developed an emotion dysregulation model of mood disorders, emphasized that the process of ER is dynamic and that regulation occurs at different points, namely generation, understanding, reactivity, and management of emotions.

While it is widely assumed that PNES are closely tied to emotions and even caused purely by emotions [12], only a handful of studies have examined emotion regulation (ER) difficulties, and little is known about specific ER processes involved in PNES. Some research has shown PNES to be associated with deficits in identifying and describing feelings [13–15]. Furthermore, certain aspects of emotional dysregulation such as autonomic hyperarousal, intrusive experiences, dissociation, and defensive avoidance have been found to be positively associated with alexithymia in patients with PNES [14]. It is worth noting that while patients with PNES tend to report higher levels of alexithymia than healthy

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controls, the differences between patients with PNES and ES have not always been found, particularly when anxiety and depression have been controlled for [13,15].

Increased threat vigilance [16] and avoidance behaviors [17] have been documented in patients with PNES and might be indicative of a particular type of emotional processing. Two studies to date provided some evidence of emotion regulation difficulties using the Difficulties in Emotion Regulation Scale (DERS [18]) [19,20]. The findings also showed that patients with PNES experienced greater emotional intensity when presented with neutral and pleasant pictures but not unpleasant pictures. They did not experience greater negativity than those without PNES [19].

Furthermore, a mixed picture has emerged with regard to the emotional expression in PNES. Roberts et al. [19] demonstrated a diminished expression of positive affect in patients with PNES. However, these findings were in contrast to the results of Stone, Binzer, and Sharpe [21], who failed to discover differences between patients with ES and PNES on difficulties expressing feelings, as measured by an affect inhibition subscale of the Illness Behavior Questionnaire (IBQ [22]). The inconsistency in findings could be due to methodological limitations of the studies or different methods used to measure emotional expression. It is also possible that the use of ER strategies varies, depending on specific emotions.

Research examining how patients with PNES process emotions is still in its infancy. The aim of the current research was to extend the previous findings and to provide a comprehensive understanding of ER processes in PNES using the conceptual framework developed by Mennin et al. [9]. The following aspects of ER were examined: intensity of emotional reactions, understanding of one's emotional states, beliefs about emotions, and the extent to which individuals with PNES used emotional control strategies. Based on previous findings regarding PNES as well as other psychosomatic conditions, it was predicted that, overall, patients with PNES would demonstrate poorer ER and report heightened intensity of emotions, poorer understanding of emotions, more negative beliefs about emotions, and a higher level of emotional control strategies compared to controls. Finally, it was hypothesized that ER difficulties would predict the presence or absence of PNES and that ER difficulties would be associated with a change in seizure characteristics (frequency, severity, bothersomeness).

2. Methods

2.1. Participants

Patients with PNES were recruited via outpatient clinics in the neuropsychiatry services of two NHS trusts in South East England, and each had been diagnosed by a consultant neurologist with a special interest in epilepsy and consultant neuropsychiatrist on the basis of clinical assessment and investigations including EEG and/or video EEG as necessary. Patients attending the outpatient clinics were invited to participate in the study if they (1) had a diagnosis of PNES, (2) were experiencing at least occasional nonepileptic seizures at the time of the study, and (3) had the capacity to give informed consent. Participants were excluded if they (1) were less than 18 years of age or (2) had a concurrent diagnosis of learning disability, autism, dementia, or acquired brain injury. While 181 patients with PNES were invited to take part in this research, a total of 56 comprised the final sample, yielding a response rate of 31%.

The healthy control (HC) group was recruited through a university and a social networking site. Participants were included if they (1) had no history or evidence of seizure activity. They were excluded if they (1) were less than 18 years of age; (2) had a long-term neurological or health condition (e.g., fibromyalgia, chronic fatigue syndrome, brain tumor, head injury, or stroke); or (3) had a severe psychiatric disorder (e.g., schizophrenia, bipolar disorder, or personality disorder) or a history of self-harm. A total of 88 participants comprised the final sample.

2.2. Measures

2.2.1. Affect intensity

The Affect Intensity Measure (AIM) was used to examine the intensity of emotional reactions. The AIM is a widely used 40-item self-report questionnaire, which assesses the intensity of emotional responses to both negative and positive emotionally salient life events. The items are rated on a 6-point scale, ranging from "never" to "always". Adequate internal consistency and convergent and discriminant validity have been established for this measure [23]. Test-retest reliability of 0.81 after three months has also been demonstrated [23]. The AIM had a good internal consistency in the present study ($\alpha = .85$).

2.2.2. Alexithymia

The Toronto Alexithymia Scale–20 (TAS-20) was used as a measure of understanding one's own emotions. It is a well-established and widely used self-report scale, consisting of 20 items, rated on a 5-point scale, ranging from "strongly agree" to "strongly disagree". A total score greater than 60 represents alexithymia [24]. The TAS-20 has shown good internal consistency (Cronbach's alpha = .81 [25] and .85 [9]). Furthermore, the TAS-20 demonstrated adequate test-retest reliability ($r = .77$, $p < .01$) and adequate levels of convergent validity and concurrent validity [24]. In our sample, internal consistency of the TAS-20 was very good ($\alpha = .91$).

2.2.3. Beliefs about emotions

The Beliefs about Emotions Questionnaire (BAEQ) was used to measure a range of specific beliefs about feelings. The subscales examine beliefs about emotions as overwhelming and uncontrollable, shameful and irrational, invalid and meaningless, useless, damaging, and contagious. The scale is composed of 43 items that are rated on a 5-point scale, ranging from "strongly disagree" to "strongly agree". The BAEQ demonstrated good internal consistency (0.69–0.88) and adequate test-retest reliability. Adequate convergent validity and divergent validity were also reported [26]. In the present sample, the Cronbach's alpha reliability was good ($\alpha = .90$).

2.2.4. Control of emotional reactions

The Courtauld Emotional Control Scale (CECS) was used to measure a tendency to control emotional reactions. The CECS consists of 21 items, scored on a 4-point scale, ranging from "almost never" to "almost always". An important aspect of this scale is that it has three subscales, indicating control of different affective states, namely anger, anxiety, and depressed mood. The CECS demonstrated good internal consistency of 0.86 (anger subscale) to 0.88 (anxiety and depressed mood subscales) and good test-retest reliability (0.84–0.95) [27]. The CECS showed very good internal consistency in the present study ($\alpha = .93$).

2.2.5. Anxiety and depression

The Hospital Anxiety and Depression Scale (HADS [28]) is a 14-item screening tool for anxiety and depression. Items are scored on a 4-point scale and assess feelings and behaviors during the previous week. Total scores can fall into four categories: normal (0–7), mild (8–10), moderate (11–15), and severe (16–21). The scale has been widely used in research and has demonstrated good validity and reliability [29,30]. The sensitivity and specificity for both anxiety and depression scales were reported to be sufficient to detect caseness and symptom severity within a wide range of psychosomatic, psychiatric, and healthy populations [29]. In our sample, reliability for the HADS total score was $\alpha = .88$.

2.2.6. Seizure characteristics

Self-report data with regard to seizure characteristics in three domains, i.e., frequency, severity, and the degree to which seizures interfered with one's life (bothersomeness), were collected. Participants were asked about the longest time that they have had between seizures in the past 12 months and the number of seizures that they experienced

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