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Biopsychosocial predictors of psychogenic non-epileptic seizures

John O. Elliott[a,b,*], Christine Charyton[c]

[a] Ohio Health Riverside Methodist Hospital, 3535 Olentangy River Road, Columbus, OH 43214, United States
[b] Ohio State University, College of Social Work, 1947 Stillman Hall, Columbus, OH 43210, United States
[c] Department of Neurology, Ohio State University Wexner Medical Center, 395W, 12th Avenue, 7th Floor, Columbus, OH 43210, United States

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Summary
Background: Previous studies have identified numerous biological, psychological and social characteristics of persons with psychogenic non-epileptic seizures (PNES) however the strength of many of these factors have not been evaluated to determine which are predictive of the diagnosis compared to those that may only be stereotypes with limited clinical utility.
Method: A retrospective chart review of persons admitted to our epilepsy monitoring unit over a 6-year period was conducted to examine predictors of a video-EEG confirmed PNES diagnosis.
Results: A total of 689 patients had events leading to a diagnosis, 47% ($n = 324$) with PNES only, 12% ($n = 84$) with PNES & Epilepsy and 41% ($n = 281$) with Epilepsy only. Five biological predictors of a PNES only diagnosis were found; number of years with events (OR = 1.10), history of head injury (OR = 1.91), asthma (OR = 2.94), gastro-esophageal reflux disease (OR = 1.72) and pain (OR = 2.25). One psychological predictor; anxiety (OR = 1.72) and two social predictors; being married (OR = 1.81) and history of physical/sexual abuse (OR = 3.35). Two significant biological predictors of a PNES & Epilepsy diagnosis were found; migraine (OR = 1.83) and gastro-esophageal reflux disease (OR = 2.17).
Conclusions: Our findings support the importance of considering the biopsychosocial model for the diagnosis and treatment of PNES or PNES with concomitant epilepsy.

Introduction

Psychogenic non-epileptic seizures (PNES) are a common type of non-epileptic event that clinically resemble a seizure but are psychologically based. Prevalence of PNES has been estimated between 1 per 50,000 and 1 per 3000 (Benbadis and Allen Hauser, 2000) with estimated annual costs of PNES, misdiagnosed as epilepsy ranging between $650

* Corresponding author at: Ohio Health Riverside Methodist Hospital, 3535 Olentangy River Road, Columbus, OH 43214, United States. Tel.: +1 614 566 3643; fax: +1 614 566 1073.
E-mail addresses: elliott.327@osu.edu, john.elliott@ohiohealth.com (J.O. Elliott), charyton.1@osu.edu, christine.charyton@osumc.edu (C. Charyton).

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million and $4 billion (Nowack, 1997). In addition lifetime cost of diagnostic tests, procedures and medications for persons with PNES have been estimated at $100,000 (LaFrance and Benbadis, 2006). Of persons with epilepsy, between 5 and 20% are thought to have PNES (LaFrance and Benbadis, 2006).

Diagnosis and management is complicated by the difficulty in distinguishing PNES from epilepsy (Chung et al., 2006). The current gold standard is based on a lack of ictal electroencephalogram (EEG) activities during the event, via a continuous video-EEG study (LaFrance and Benbadis, 2006). Interest in clinical signs that distinguish PNES from epilepsy have primarily focused on physical signs during events such as motor features, closed eyes, tongue biting and urinary incontinence (Avbersek and Sisodiya, 2010) however a more comprehensive approach such as one proposed by the biopsychosocial model may help identify more robust predictors of a PNES diagnosis.

In conceptualizing the biopsychosocial model, George Engel sought to use General Systems theory to improve the understanding of the bi-directional relationship between the body and mind, as well as to reconcile the dualist concepts that separate health and disease (Engel, 1977). In General Systems theory no system exists in isolation and every system is influenced by its environmental configuration (Richter, 1999). In the medical domain, Engel felt General Systems theory provided a conceptual approach for studying the biopsychosocial approach but also for studying disease and medical care as interrelated processes (Engel, 1977).

By contrast in the traditional biological—biomedical approach, the causes, diagnosis, prognosis, treatment and outcomes of disease are largely based on physical or somatic components (McCollum and Pincus, 2009) where the focus is on etiologic agents, pathological processes and biological, physiological or clinical outcomes (Wilson and Cleary, 1995). Furthermore, the biological—biomedical approach separates the mind and body in the causation of disease and this has lead to health outcomes that are primarily driven by health professionals and the medical system with little input from the individual patient (McCollum and Pincus, 2009). Overall, this focus on pathology, to the exclusion of processes of health and recovery, has resulted in a fragmented and incomplete understanding of the person and their disease (Davidson and Strauss, 1995).

In the present PNES literature many disparate factors have been examined, oftentimes in isolation from interacting biological, psychological or social domains. The biological—biomedical factors previously established include female predominance (Duncan and Oto, 2008), antecedent mild head injuries (Barry et al., 1998; Westbrook et al., 1998; Mökleby et al., 2002) and a later onset of events (Brown et al., 1991). Studies have shown that an early diagnosis of PNES results in a better prognosis (Walczak et al., 1995), yet a delay of more than seven years is often found before an official diagnosis is made by video-EEG (Reuber et al., 2002).

Persons with PNES also present with a large number of somatic comorbidities. For example previous research found chronic pain (Fleisher et al., 2002), headaches (Ettinger et al., 1999a), sleep disturbances (Benbadis, 2005; Zhang et al., 2009), asthma (de Wet et al., 2003) and obesity (Marquez et al., 2004) are more common in persons with PNES. Investigations examining other somatic comorbidities (hypertension, heart disease, lung disease and ulcers) suggest additional comorbidities, but these studies have been limited by very small sample sizes (Tojek et al., 2000) or have only examined the association between PNES and one condition (de Wet et al., 2003; Marquez et al., 2004).

In terms of the psychological domain, persons with PNES often present with significant psychological comorbidities in comparison to populations with or without epilepsy (Goldstein et al., 2000; Binzer et al., 2004). Previous studies report higher rates of post-traumatic stress disorder (PTSD), a higher prevalence of somatoform disorders and anxiety in persons with PNES (as well as those with both PNES and concomitant epilepsy), compared to those with epilepsy only (Kuyk et al., 2003; Owczarek, 2003).

In terms of the social domain, a history of physical or sexual abuse has been reported in 11—84% of cases (Bowman and Markand, 1996; Dikel et al., 2003; LaFrance and Syc, 2009). In addition, up to 50% of persons with PNES are disabled — a level equal to those with epilepsy (Krawetz et al., 2001) which highlights the severity of the condition on overall well-being.

A continued focus on the biological—biomedical aspects of disease (including a purely ''psychiatric'' view of poor mental health rooted solely in the use of psychotropic medications for symptomatic treatment) works to further perpetuate psychosocial disparities in persons with epilepsy and/or PNES. The more recent literature has suggested epilepsy treatment focus on broad strategies that addresses the needs of the whole person (Kramer, 2003) by taking into account social, vocational and psychological function (Sander, 2005) however this approach has not been examined in persons with PNES.

In many clinical populations the biopsychosocial model has mostly remained an unmet challenge for research (understanding the etiology and development of disease or disorder) and practice (diagnosis and treatment) (Kiesler, 1999). The current PNES literature highlights many unique characteristics however these factors have not been incorporated in a larger understanding of the whole person. The purpose of this research was to gain a better understanding of the unique biological, psychological and social factors associated with a continuous video-EEG confirmed diagnosis of PNES.

Materials and methods

A retrospective chart review was conducted of patients admitted to the Ohio State University Wexner Medical Center epilepsy monitoring unit (EMU) data over a 6-year period (2002—2007). Participants were identified via administrative billing records using the current procedural terminology (CPT) code 95951 for video-EEG monitoring. Data were obtained via a review of electronic medical records (demographic data used for billing purposes, inpatient history and physical exam assessments completed as part of the EMU admission, visit notes and hospital discharge summaries), as well as outpatient medical records (history and physical, EEG reports and correspondence with referring physicians).

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