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Psychogenic Non-Epileptic Seizures (PNES)

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## HONORS CAPSTONE ABSTRACT

Psychogenic non-epileptic seizures are a sub-type of seizures that are typically associated with trauma and dissociative disorders. This paper explores the overall nature of these seizures. The presentation of the actual seizures is discussed along with who typically develops this condition. The factors and potential causes of the onset of this condition and prognosis of this condition are examined. Overall, there is a consensus that this condition is the result of underlying psychological conditions and best treated through cognitive behavioral therapy. There is evidence to suggest that without treatment, the outcome for people with this condition remains relatively poor. This paper highlights how there is a high proportion of people with seizures presenting with this disorder and how lack of awareness and understanding hinders the safety and treatment for people with PNES.

When there is lack of concrete evidence to explain a disorder or illness there is often stigma and misunderstanding that surrounds it. Psychogenic non-epileptic seizures (PNES) are a category of seizures that remain under researched. Despite this, there is a consensus that the condition known as PNES stems from underlying psychological conditions and emotional dissociation. There are specific patterns that these seizures follow along with numerous factors that potentially lead to the onset of this disorder. The prognosis and treatment of this disorder can be positive or negative, depending on time of intervention.

### **Seizures**

Normal and healthy brain activity is defined as when neurons communicate with other neurons in rhythmic patterns. When neurons send out signals incorrectly or at the wrong time it may result in what is known as a seizure (MedlinePlus, 2018). Some well-known features associated with seizures include jerking body movements and loss of consciousness. However, some seizures may simply consist of someone staring blankly for several seconds or confusion. While there are common features that are presented during seizures, no two seizures are the same. Along with physical presentation, the intensity and duration of the seizures vary within a person having seizures, as well as between seizure patients. Any seizure can temporarily disrupt or delay any function the brain carries out (Epilepsy Foundation, 2014). There are varying types of seizures along with many sub-types. There are three main types of seizures: focal seizures, generalized seizures, and non-epileptic (Mayo Clinic, 2018). Non-epileptic seizures are further categorized into non-epileptic seizures and pseudoseizures. Non-epileptic seizures are often related to head injuries, migraines, hypoglycemia, cataplexy or cardiogenic illnesses. Pseudoseizures are not caused by an underlying medical condition and may be attributed to psychological factors (Harden, 1997).

**Epilepsy**

Epilepsy is a chronic disorder that occurs when someone has recurrent unprovoked seizures. To consider the diagnosis of epilepsy, two or more seizures need to occur, or frequent seizures need to be experienced (Epilepsy Foundation, 2014). Diagnosing epilepsy can be done through medical tests such as electroencephalogram (EEG), computed tomography (CT), magnetic resonance imaging (MRI), and actual presentation of seizures themselves (MedlinePlus, 2018). The seizures experienced in epilepsy are usually caused by unknown sources but typically there is family history of epilepsy or a brain injury (Epilepsy Foundation, 2014). Anyone can develop epilepsy, including across all genders, races, ethnicities, and ages. While there is no known cure for epilepsy it can be managed through medications and sometimes various surgeries to minimize seizure activity (MedlinePlus, 2018).

**Psychogenic Non-Epileptic Seizures**

Psychogenic non-epileptic seizures can have an outward presentation that is nearly identical to epileptic seizures. However, psychogenic non-epileptic seizures are not the product of abnormal electrical firings in the brain. While research varies, the most popular and accepted consensus is that psychogenic non-epileptic seizures are the result of psychological disorders and/or symptoms. Most people with psychogenic non-epileptic seizures are misdiagnosed first with epilepsy. The nearly identical presentation and symptoms with epilepsy and lack of awareness of PNES is the primary reason most patients receive an incorrect diagnosis first (D'Alessio et al., 2005). Nearly 30% of patients who have potential refractory seizures are further referred to treatment of psychogenic non-epileptic episodes (Romano et al. 2014). The final diagnosis of psychogenic non-epileptic seizures typically occurs when patients are not responding to typical seizure and/or epileptic medications and treatments (D'Alessio et al.,

2005). Some researchers and doctors consider PNES when the seizure patterns are unchanging and have some correlation with emotional distress (Marchetti et al., 2007). While PNES can be the final diagnosis, there is speculation that psychogenic non-epileptic seizures may not be an independent entity. There is evidence to suggest that the seizures can be a potential symptom of PTSD, personality disorders, dissociative disorders, or even made up entirely (Reuber & Brown, 2017). Patients who have a high number of non-epileptic seizures may be experiencing a conversion disorder (Romano et al., 2014). Conversion disorder clients have nervous system disturbances such as paralysis, blindness, tingling sensations, hallucinations, and so forth, which cannot be explained to any physical injury or illness. Symptoms and episodes related to conversion disorder are thought to follow stressful situations and/or emotions. Conversion disorder is considered a rare psychological disorder (National Institutes of Health, 2017). Furthermore, nearly 75% of patients with psychogenic non-epileptic seizures have experienced one or more types of trauma in their lifetime (Myers et al, 2016). One hypothesis surrounding PNES is that the seizure-like activity serves the purpose of obtaining unconsciousness or attention to remove the stressful and anxiety provoking emotions out of awareness (Harden, 1997). Other potential ideas for causes of psychogenic non-epileptic seizures include head injuries, intellectual disabilities and comorbid epilepsy (Baslet, 2010).

### **Presentation**

While psychogenic non-epileptic seizures are not a result of abnormal electrical changes in the brain, the seizures typically are sudden and result in involuntary sensations. Also, they can produce unconsciousness and involuntary body movements. This is often triggered by overwhelming psychological stress and/or social settings (Baslet, 2010). Patients with PNES have reported experiences of anxiety, headaches, tingling sensations, along with confusion

before they experienced a seizure (Reuber & Brown, 2017). Many patients with PNES may find it difficult to recall what was occurring before the seizure occurred (Gillig, 2013). During the seizure some common attributes include onset during the day, long duration, random movements, side-to-side movements, closed eyes, crying, and pelvic thrusting. Other commonly reported symptoms during the episodes include anxiety and panic (Reuber & Brown, 2017). Psychogenic non-epileptic seizures have been reported to last thirty seconds to ten minutes or more. After the seizure is over, many report disorientation, confusion, and problems with perception (Harden, 1997). However, many PNES patients have decent memory recall and a shorter duration of confusion after the seizure, as compared to epileptic seizures (Reuber & Brown, 2017). Also varying from epileptic seizures, individuals experiencing a psychogenic non-epileptic seizure may be able to respond during their episode, while this is rare in epileptic seizures (D'Alessio et al., 2005).

Nearly 20% of patients first referred to epileptic clinics are eventually correctly, or further diagnosed, with psychogenic non-epileptic seizures. About 10% of PNES patients also have epilepsy (Reuber & Brown, 2017). About 75% of patients with PNES are female (Say et al., 2015). Looking at demographics of treated patients, psychogenic non-epileptic seizures are more commonly present in late adolescence or early adulthood (Reuber & Brown, 2017). Despite this there have been reports of children with PNES, along with evidence to suggest that PNES may increase with age, especially with the elderly (Kotsopoulos et al., 2005).

Patients with epilepsy tend to accept their disorder and will refer to their seizures directly, while patients with psychogenic non-epileptic seizures tend to avoid the term “seizure” and labels all together (Reuber & Brown, 2017). Stress and anger prior to the seizure activity has been linked to the onset of a psychogenic non-epileptic seizure (Harden, 1997). With

observations and self-reports, some suggest that patients with PNES utilize avoidant coping mechanisms (Reuber & Brown, 2017). With there being a high comorbidity with trauma and psychological disorders it has been thought that psychogenic non-epileptic seizures may be entirely anxiety based. It has also been commonly thought that the seizure like activity is a conditioned reflex. This has been suggested to be linked to patients with PNES having higher personal knowledge of seizures or witnessing seizures prior to their first episode (Reuber & Brown, 2017).

### **Causes & Factors Leading to PNES**

There is a wide range of factors and correlations that can help explain the presentation and onset of psychogenic non-epileptic seizures. PNES patients tend to explain their lives as more stressful as compared to non-PNES patients (Novokova et al., 2015). In an empirical study, people with PNES compared to control participants were tasked to respond to a variety of pictures displaying emotional expressions. They were to respond by moving their arm towards stimuli they considered non-threatening or pulling their arm in towards their body in avoidance, in response to threatening stimuli. It was found that neutral pictures presented to the patients with PNES resulted in a significantly higher avoidance-based behavior responses in comparison to the control participants (Bakvis et al., 2011). This suggests that people experiencing PNES tend to use strong avoidant based behavior even without overwhelming situations and/or emotions. It can also suggest that the seizure episodes may provide an escape when faced with overly stressful or threatening situations (Bakvis et al., 2011). With case studies it has been shown that people with psychogenic non-epileptic seizures may struggle with processing, understanding, and/or expressing emotions (Gillig, 2013). This is related to dissociative

tendencies that may prove to be beneficial to defend and protect the individual (Novokova et al., 2015).

Generally psychogenic non-epileptic seizures are described and understood from a biopsychosocial perspective. Utilizing the Demographic and Emotional Processing Scale (EPS-25) along with other collected data, there has been some common factors associated with PNES. Some of these findings suggest deficits in all five categories of emotional processing: suppression, unprocessed emotion, unregulated emotion, avoidance, and impoverished emotional experience (Novakova et al., 2015). Therefore, PNES patients tend to have more trouble with emotional processing and regulation. This suggests that many patients experiencing psychogenic non-epileptic seizures will avoid stressful emotional situations or may repress emotional provoking situations altogether (Novokova et al., 2015). With self-report cases it has been shown that these deficits could be in relationship to dysfunctional family relationships, childhood disturbances, other traumatic experiences, along with a genetic predisposition to certain psychological disorders commonly associated with PNES (Harden, 1997). From self-report data and inferences from researchers the earlier in life that challenges and disturbances are experienced, the higher the probability that one will have emotional processing issues (Novakova, 2015). Emotional processing can be measured through how an individual processes and handles issues related to adverse events in their life (Novakova, 2015). Troubles with emotional processing has been linked to several disorders and health issues typically comorbid with psychogenic non-epileptic seizures. Some of these conditions include post-traumatic stress disorder, panic, depression, anxiety, fibromyalgia, chronic pain, and chronic fatigue (Novokova et al., 2015). People experiencing panic symptoms were also found to be more likely to develop psychogenic non-epileptic seizures rather than epilepsy (Reuber & Brown, 2017).

During and after the seizure like activity, individuals with PNES may alter the state of awareness. This may be a defensive and protective measure for the individual experiencing a stressful event or memory (Bakvis et al, 2011). The learned pattern may now be a way for the patient to deal with stressors (Novokova et al., 2015). The dissociative state allows an individual to separate themselves from the stressful adversity they may be facing and allow them to separate from labeling what they are facing as anxiety (Reuber & Brown, 2017). Research has also found that PNES patients have lower verbal memory recall as compared to patients with PTSD and trauma (Meyers et al., 2014). People with psychogenic non-epileptic seizures also tend to have poor problem-solving skills as compared to people without PNES (Meyers et al., 2013). It is also common for people who develop PNES to have poor impulse control abilities (Harden, 1997). Research has suggested that PNES symptoms and seizure episodes can be exacerbated by stressors, many times related to jobs and interpersonal relationships (Gillig, 2013). However, patients with PNES diagnoses rarely accept that negative life experiences or stressors could be cause of their seizure episodes (Gillig, 2013).

Many patients with PNES will try to over control their emotions, however the anxiety of having a potential seizure may result in an increase in anxiety and overwhelming emotions. With this it may trigger an increase in repression and dissociative states (Novakova et al., 2014). In experiments it has been demonstrated that PNES patients have a greater emotional response to neutral stimuli and less emotional response to positive stimuli as compared to only trauma patients without PNES (Reuber & Brown, 2017). This may suggest that people with PNES may have trouble separating threatening stimuli from non-threatening stimuli, along with attentional deficits relating to emotions of others.

People who develop psychogenic non-epileptic seizures tend to use ineffective strategies to manage stress such as fantasizing, self-blame, and anger (Meyers et al, 2013). Other tactics utilized by people demonstrating psychogenic non-epileptic seizures include distraction and social avoidance (Meyers et al., 2015). Most researchers agree that seizure episodes presented are a form a maladaptive coping strategy to escape (Meyers et al., 2013). For more positive outcomes for people experiencing psychogenic non-epileptic seizures it is important to identify social threat avoidance behavior present in patients with PNES (Bakvis et al., 2011).

### **The Brain & Body**

With psychogenic non-epileptic seizures, tests such as magnetic resonance imaging (MRI) and electroencephalogram (EEG) are typically normal (Harden, 1997). Despite some suggestions, there is no evidence to directly point to a specific brain structure or area responsible for PNES (Reuber & Brown, 2017). Despite this some have suggested that patients with PNES have less connections among the frontal, sensorimotor, and occipital cortices, as well as among the cingulate gyrus and insula (Reuber & Brown, 2017). A common comorbid disorder with PNES, conversion disorder, has been studied and there is evidence to suggest that patients with conversion disorder have stronger connections between the right amygdala and the supplementary motor area (Gillig, 2013). These neurological findings suggest that psychogenic non-epileptic seizures could be the result of lack of integration of executive functioning, emotional control, and motor control within the brain (Reuber & Brown, 2017). Also, there are high rates of hypertension, cardiovascular disease, and head trauma along in conjunction with a PNES diagnosis (Kotsopoulos et al., 2005).

Psychogenic non-epileptic seizures may serve a protection function for the person experiencing them (Novokova et al., 2015). It has been suggested that PNES may occur when the person is going through the fight-or-flight response. During this response the seizures are a defensive mechanism which produce dissociation and unconsciousness, in relationship to the fight or flight mechanism (Meyers et al., 2017). With various research studies conducted it has been found that patients with PNES have a lower parasympathetic reaction and higher sympathetic reaction during the seizure activity than at rest (Reuber & Brown, 2017). This may suggest that the seizure episode provides a release or calming effect in relationship to stimuli causing anxiety or higher levels of arousal (Reuber & Brown, 2017). Once this reaction happens, the body may learn this response and utilize it in future similar situations, thus triggering the recurrent psychogenic non-epileptic seizures and dissociative states (Meyers et al., 2017).

High cortisol levels have been associated with avoidance tendencies across disorders. Patients experiencing psychogenic non-epileptic seizures have been shown to have higher levels of cortisol compared to non-PNES patients (Bakvis et al., 2011). Similarly, higher levels of cortisol were also found to be positively correlated with higher levels of threat vigilance tendencies (Reuber & Brown, 2017). Experimental research related to this, showed that PNES patients had a higher attentional bias when looking at angry facial expression as compared to happy faces (Bakvis et al., 2010). These findings suggest that patients with psychogenic non-epileptic seizures may be utilizing the seizure activity as a defensive and protective mechanism.

### **High Comorbidity Rates**

Researchers differ on opinions on whether psychogenic non-epileptic seizures are a presentation of another disorder or its own separate entity. The consensus remains that the onset

of psychogenic non-epileptic seizures can be either (Myers et al., 2017). Since PNES is challenging to diagnosis it becomes even more problematic when epilepsy can lead to the development of psychogenic non-epileptic seizures (D'Alessio et al., 2005). Patients with PNES typically have experienced some sort of trauma in their lifetime, with 50 to 75% reporting exposure to any type of trauma. The highest reported trauma reported by patients with PNES was sexual in nature followed by physical abuse, suffered loss or death, psychological abuse, or a combination, respectively (Myers et al., 2017). Similarly, patients with dissociative disorders also report a high rate of trauma and/or abuse in their life (Plioplys, 2016). Many suggest that psychogenic non-epileptic seizures may be a type of a dissociative state, as a symptom of a dissociative disorder (Harden, 1997). A dissociative disorder causes disruption of consciousness, identity and perception, which is also the same function the psychogenic non-epileptic seizures serve (Harden, 1997). Furthermore, post-traumatic stress disorder is also frequently reported with PNES (Meyers et al., 2017). Other disorders commonly comorbid with psychogenic non-epileptic seizures include depression and anxiety (Novokova et al., 2015). People who have intellectual disabilities or have any type of head injury may have a higher risk of having a psychogenic non-epileptic seizure (Reuber & Brown, 2017). People who have PNES typically have higher scores of hysteria, hypochondria, and schizophrenia tendencies, on the psychological test the Minnesota Multiphasic Personality Inventory, in comparison to epileptic patients (Harden, 1997). Research has shown that patients with psychogenic non-epileptic seizures have a lower emotional processing capability, however, it may be in association with other psychological tendencies and symptoms that they may be experiencing from other disorders outside of the PNES diagnosis (Novokova et al., 2015).

### **Overall Treatment & Prognosis**

To properly diagnosis psychogenic non-epileptic seizures it can take an average of seven years (Meyers et al., 2014). Upwards of 75% of patients with PNES have been prescribed anti-epileptic drugs and undergone unnecessary medical procedures (Meyers et al., 2013). Some of the various unnecessary procedures include automated external defibrillators (AEDs), intubation, intravenous procedures, and high doses of incorrect medications (Marchetti et al. 2007). It is estimated that 100 to 900 million dollars is spent on unneeded procedures for people with psychogenic non-epileptic seizures (Marchetti et al., 2007). Diagnosing psychogenic non-epileptic seizures early on will significantly reduce these unnecessary procedures and costs.

Rather than treating PNES like epilepsy, approaching it as a psychological disorder has been beneficial in over fifty percent of patients presenting with the disorder (Duncan et al., 2015). The gold standard therapy for treatment of psychogenic non-epileptic seizures is cognitive behavioral therapy (Gillig, 2013). Some techniques utilized to help treat PNES include psychoeducation, relaxation, exposure therapy, insight-orientated approaches, cognitive restructuring, and a strong understanding of the disorder itself (Gillig, 2013). Treatment specifically for PNES is limited, however with similarities with PTSD, patients with PNES could benefit from PTSD specific treatment (Meyers et al., 2017). Approaching PNES as an emotional processing problem may be useful in treating the seizure like activity (Novokova et al., 2015). An important step in getting the patient on board with the treatment is getting them to accept the diagnosis (Duncan et al., 2015). One common tactic to do this is by filming the seizure episodes and showing them to the patient. Another useful method is to explain how psychogenic non-epileptic seizures can be treated and phased out with treatment. It is commonly presented in a positive manner explaining how they do not have the chronic epilepsy condition (Gillig, 2013). After this communication is had with the patient, seizure medications and epileptic medications

should be discontinued for the patient (Harden, 1997). These types of treatments may be challenging because some patients have comorbid epilepsy, which makes PNES challenging to target directly (Marchetti et al., 2007). Targeting PNES is also challenging because PNES directed treatment is not always available at epilepsy clinics, where most patients first are referred (Meyers et al., 2017). While treating PNES is very much trial and error, identifying specific parts of PNES can help therapists and practitioners find the best combination of treatment for the patient with PNES (Myers et al., 2017). While there may be comorbid health related issues within patients with PNES, the most commonly referred and carried out treatment is psychotherapy, even though the success of it has not been studied thoroughly (Meyers et al., 2014).

With varying understandings of psychogenic non-epileptic seizures and access to treatment there is a varying prognosis for PNES patients. However, psychogenic non-epileptic seizures have been often associated with chronic disability, high medical costs, and poor life outcomes (Meyers et al., 2017). Similarly, patients with PNES often experience high levels of social and psychological limitations, including stigma, poor school performance, employment, lack of/poor interpersonal relationships, and poor socialization (Marchetti et al., 2007). The more emotionally impaired a patient is the more likely they are to have higher rates of psychological distress and more recurrent seizure episodes (Novokova et al., 2015). Similarly, patients with higher avoidance tendencies are positively correlated to poorer qualities of health and quality of life overall. This has been studied and patients with PNES tend to report emotional factors as more problematic than physical factors relating to their quality of life (Novokova et al., 2015). Most PNES patients have poorer outcomes when they do not undergo or have access to treatment (Reuber & Brown, 2017). This is problematic because diagnosing and treating psychogenic non-

epileptic seizures can have high costs, which makes access for all patients challenging (Gillig, 2013). However, with more research and understanding, newer hypothesis-driven models of PNES causes and factors are allowing for better treatment and better prognoses overall (Reuber & Brown, 2017).

### **Debate on Reality of Disorder**

With similar presentation to epilepsy and being a rarer condition, psychogenic non-epileptic seizures are easily misdiagnosed and confused with epilepsy often (Romano et al., 2014). However, this lack of knowledge or awareness of the disorder is extremely dangerous especially when antiseizure medications are prescribed. These unnecessary health care procedures ultimately increase the risk of death and/or other complications (Romano et al., 2014). Even though psychogenic non-epileptic seizures have been thought to be a symptom of dissociative disorders or other psychological disorders it still has not been widely accepted or understood by neurologists and other health care professionals (Harden, 1997). This poses an issue when the patient's prognosis depends on the classification between epileptic and non-epileptic seizures.

However, there have been documented cases where patients have acted out psychogenic non-epileptic seizures for medical attention (Romano et al., 2014) Patients may go to extreme lengths to perform these seizures. Furthermore, it has been seen that patients experiencing psychogenic non-epileptic seizures were six times as likely to have seen someone experience a seizure or been aware of seizures in general (Reuber & Brown, 2017). These cases of factitious episodes and findings muddy the clarity of whether PNES is a reality or simply factitious. (Romano et al., 2014). However, with certain comorbid psychological disorders patients may

have a desire for attention, problems with separation, yearning to be cared for, and tendencies of deceiving others (Romano et al., 2014). In both conversion and dissociation disorders, the patients do not have voluntary control over their episodes (Harden, 1997). Even though the person experiencing psychogenic non-epileptic seizures may have a lack of insight there is still doubt among research around the conscious intent surrounding the seizure like episodes (Romano et al., 2014). However, much research suggests that people with PNES cannot control when an episode occurs. This unpredictability can result in high anxiety levels from fear of potentially having a seizure episode (Gillig, 2013). The earlier the presentation of the diagnosis of psychogenic non-epileptic seizures is given to the client, the more likely better treatment plans can be implemented and can decrease factitious cases of PNES (Gillig, 2013). However, this proves challenging because many patients with PNES often refuse or do not have access to proper treatment (Romano et al., 2014). With the false claims of the condition and the avoidant tendencies surrounding treatments for it, debate continues the on whether psychogenic non-epileptic seizures are real or potentially factitious.

Overall, psychogenic non-epileptic seizures are beginning to gain recognition and empirical attention. While there is still debate on whether it is an independent disorder or symptom of another, there is much research and knowledge surrounding the factors that lead to onset along with beneficial treatment. With further research more positive prognosis for patients diagnosed with this disorder should be on the rise.

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