

The Correlation between Epilepsy and Depression

by

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Abstract

The current literature review examines how living with epilepsy affects the quality of a person's life. It has been demonstrated by many researchers that epilepsy is associated with an increased the risk for depression, and this is not only due to living with a disease that interferes with one's ability to control their own body, but also because people with epilepsy may have atypical neurological structures or neurochemical function that could contribute to experiencing both epilepsy and depression. Previous literature has established that people with epilepsy struggle with hopelessness, fear, and suicidal ideation; even PTSD has been observed in people with epilepsy. This paper examines these topics along with ways to cope with these feelings because being put on an SSRI (Serotonin Reuptake Inhibitor) does not do enough to fight these feelings. CBT (Cognitive Behavioral Therapy) has been tested as a treatment approach—alone and in combination with an SSRI—and was shown to have a positive effect on most people with epilepsy.

The Correlation Between Epilepsy and Depression

Epilepsy is a chronic neurological disorder that affects the brain by disrupting the brain's normal electrical impulses (Mayo Foundation for Medical Education and Research, 2021).

Depression is a mental health condition that is caused by biological differences, such as atypical brain chemistry, hormones, and inherited traits (Mayo Foundation for Medical Education and Research, 2018). It has been reported that 81% of individuals with epilepsy have also been diagnosed with depression (Margrove et al., 2011). The current paper explores this link along with options for treating depression in individuals with epilepsy.

Research on Epilepsy, Depression, and Anxiety

Epilepsy is a chronic neurological disorder that occurs when electrical activity in the brain is abnormal. This electrical brain activity is known as a spike and wave pattern; the waves are the brain's typical pattern, while the spikes are the brain's bursts of electrical activity. If a burst of electrical activity lasts longer than normal or two spikes are very close to each other with one or two waves in between, this is known as seizure activity (Epilepsy Foundation, 2015) . Different kinds of epilepsy are diagnosed according to the spike and wave pattern. Epilepsy can be either minor or severe. Severe epilepsy involves having one or more tonic clonic seizures per month. A tonic clonic seizure involves a person being completely unconscious and convulsing for around a minute.

Severity of epilepsy factors into many things, such as a person's mental state, memory, and the way that the person acts overall. Margrove and colleagues (2011) noted that 81% of individuals with epilepsy were also diagnosed with comorbid depression. It is important to note that seizure frequency was correlated to the severity of depression in people with epilepsy

(Margrove et al., 2011). This link was established in a study by which patients completed the PHQ-2 (Patient Health Questionnaire 2) and the NDDI-E (Neurological Disorders Inventory for Epilepsy; Kroenke et al., 2003). Although this specific study demonstrated that the frequency of seizures was strongly associated with depression, it is unknown whether neural events associated with the seizures cause depression or if it is the hopelessness and many other factors that come along with having epilepsy that cause depression. It is known that people with epilepsy compared to the general population have a higher risk for committing suicide (Kevin et al., 2018, Espinosa et al., 2010), so treating depression in those with epilepsy is of crucial importance.

It is possible that fear of seizures may contribute to depression in those with epilepsy. Expecting a seizure every month may potentially lead to extreme anxiety. Having knowledge about SUDEP (sudden unexpected death in epilepsy) could also possibly cause patients with uncontrolled epilepsy to not only fear seizures, but also fear for their lives—something that can be extraordinarily damaging to mental health.

People with epilepsy also have higher rates of anxiety than the general population (Munger et al., 2018). It is necessary to acknowledge that epilepsy can be treated with certain anxiolytics such as Clonazepam (Koch-Weser & Browne, 1978). However, these medications cannot be used on their own to treat epilepsy due to the build-up of tolerance and constant need for more of the drug (Koch-Weser & Browne, 1978). Previous research has focused on which types of epilepsy are associated with higher anxiety levels. Munger and colleagues (2018) found that the two types of epilepsy most strongly correlated with anxiety were focal epilepsy and epilepsy of unknown origin. A possible reason for this may be because those two specific epilepsies strongly impact the amygdala and the limbic system, brain areas associated with emotional regulation and responses. This research conducted by Munger and colleagues is

essential as it may help epileptologists become more aware of the impacts that anxiety has on a person, as well as the fact that anxiety and stress are related, and stress may lower the seizure threshold (Gilboa et al., 2011, Haut et al., 2003, MacKenzie & Maguire, 2015). Future research could potentially determine whether it may be possible to reduce seizure frequency by treating anxiety. It is also important to note that depression and anxiety are related, and it is possible that treating anxiety may help lessen depression symptoms by reducing fear (Munger et al., 2018).

Both epilepsy and anxiety can be refractory, and both can be treated using certain antiepileptics. Both involve neurons firing improperly, more specifically, too quickly (Brodsky et al., 1983). It has become known over the years that certain anti-seizure medications are also used as mood stabilizers (Brodsky et al., 1983, Himmirech et al., 2013)). It is possible that the act of increasing GABA decreases the amount of abnormally fast spike and wave patterns found on an EEG (electroencephalogram). Abnormally fast neuron activity is what causes seizures; therefore, it is possible that the increase of GABA would decrease seizure activity. Brodsky and colleagues found that patients with epilepsy who had certain mood disorders that consisted of “highs” or anxiety responded to the medications Phenytoin and Clonazepam; both medications increase GABA and were previously used only as antiepileptics (Brodsky et al., 1983). Before the patients tried these medications, they had tried medications specifically meant for anxiety or whichever mood disorder they had. Once the patients were put on these medications, they were able to live much more of a normal life. It was also seen by Brodsky and colleagues that when these patients were sleep deprived, their EEGs (electroencephalograms’) did show abnormal brain activity in either the right or left temporal lobe, supporting the hypothesis that anxiety, mood disorders, and epilepsy could all be correlated, and certain types of anxieties may even be seizure related. These findings require more extensive follow-up research.

It is known that stress is associated with a multitude of serious issues such as high blood pressure, heart disease, and obesity. Stress can also induce seizures (Woods & Gruenthal, 2006). Previous research has focused on all the different types of emotional triggers that can set epileptic seizures off, such as reading, bathing, contact with hot water, chewing, music, and talking about past abuse (Woods & Gruenthal, 2006). When seizures are identified to have been set off by a specific event, it is known as reflex epilepsy. It was found that for many patients with epilepsy, more seizures occurred at times of higher stress (Haut et al., 2003, Hooper et al., 2018). It is known that certain hormones such as cortisol and norepinephrine are related to high levels of stress (Haut et al., 2003). These hormones cause excitement in the brain, which can lead to a stress-induced seizure (Haut et al., 2003). Another way of looking at this is by comparing these neurotransmitters to those mentioned above such as GABA. GABA is an inhibitory neurotransmitter that calms the brain down (Golan et al., 1996, Sepkuty et al., 2002); that is why many anti-seizure medications have GABA-inducing properties. On the other hand, glutamate, norepinephrine, and cortisol are excitatory neurotransmitters that increase electrical activity in the brain (Sepkuty et al., 2002). The best way to treat stress-induced epilepsy is to remove the stressor if the stressor can be clearly identified (Gilboa, 2011). This research is essential for obtaining a comprehensive understanding of what may be causing seizures and a clear cut treatment option if a recurrent stressor appears to be a trigger. However, it is still important to note that removing the stressful trigger in the person's life may not completely stop the seizures (Gilboa, 2011), as well as the fact that there may just be continuous stress in the person's life that cannot be completely removed and builds up at times leading to a seizure. This must all be taken into account when treating a person with uncontrolled epilepsy.

It has been demonstrated that just the act of talking about stressful events can trigger seizures as well (Woods & Gruenthal, 2006). This means that the seizures can be caused by a change in thought processes, which brings out such intense emotional reactions that there is a visible change in EEG (electroencephalogram) spike and wave patterns (Woods & Gruenthal, 2006). It was observed by Gruenthal and colleagues that the most seizures occurred when a patient spoke about her epilepsy, followed by childhood sexual abuse, and only a very small percentage of seizures occurred without any emotional trigger. This research is essential for improving the treatment of epilepsy, because when specific triggers can be identified, the primary focus becomes treating the triggers. Because these triggers are emotional, it is possible that treatment could consist of anti-depressants, anti-anxiety medication, and/or cognitive behavioral therapy (CBT). This research is extremely important for epileptologists to keep in mind when treating patients who don't have an easily identifiable sensory trigger, such as flashing lights.

Overall, it is necessary to continue research on the link between stress, anxiety, and seizures. Would it be possible to stop a person's seizures if a stressor was completely removed? This is an important question because some people have seizures, but not epilepsy. If it was found that removing a specific stressor stopped a person's seizures, then the treatment for epilepsy may improve dramatically with the continuing development of new pharmaceuticals.

Epilepsy and Impulse Control

People with epilepsy are more likely to attempt or commit suicide than those without (Hara et al., 2009). Results have consistently shown that the biggest risk factor leading to suicide attempts in those with epilepsy is a sudden lack of impulse control (Hara et al., 2009). Hara and colleagues observed the emotional impact that type of seizure and seizure medication had on suicidality. However, there were not enough consistencies regarding type of seizure or

medications used to treat the seizure disorder to give a direct answer as to why the suicide attempt occurred. This research is essential not only for showing that people with epilepsy are at a higher risk for suicide, but also for making it clear that there is not enough care and time put into those who are suffering from epilepsy along with suicidal ideation.

Epilepsy, Fear, and PTSD

There are many different levels of consciousness that a person experiences during a seizure (Cavanna et al., 2008). What are the perceptions of people who are conscious during an epileptic seizure, and does this consciousness affect them? Unfortunately, there has not been much research done on this aspect of epilepsy, and it is extremely important that new research considers the consciousness of a person experiencing a seizure and how and if it affects them. The previous research that has been done, however, focused specifically on what the person witnessing the seizure observed or on only what the EEG (electroencephalogram) showed. Of course, these findings are extremely important to consider when learning about epilepsy, but they are not the only findings that should be considered. Cavanna and colleagues found, based on a questionnaire that they created to assess consciousness during seizures, that many people with epilepsy are aware on some level of what is going on during a seizure, although these findings were much higher for those with temporal lobe epilepsy than for those with Idiopathic Generalized Epilepsy. These findings are essential for many reasons. One reason is that one's level of consciousness may indicate what part of the brain the seizure is originating from, and this may change the treatment course. The other reason that these findings are important is because they can inform epileptologists that some people with epilepsy may be emotionally impacted by their level of consciousness during seizures, and this must be considered when deciding how to treat the individual.

It is extraordinarily terrifying for a person to lose control over his or her body or for a person to know something dangerous is going to happen to his or her body. Unfortunately, there has been almost no research done on the ictal fear aspect of epilepsy, which is fear that happens immediately before or during the beginning of a seizure (Strauss et al., 1982). An example of ictal fear is when a patient freezes or has myoclonic seizures which are sudden jerks of different body parts usually leading up to a tonic clonic seizure. It is possible that the fear aspect of the seizure can be more terrifying than even the seizure itself. The previous research that has been done focused primarily on the fear response in temporal lobe epilepsy comparing the two hemispheres of the brain. Along with this, this research also focused on interictal fear, which is the fear a person experiences between seizures (Strauss et al., 1982). Strauss and colleagues found, to their surprise, that there was no difference between ictal fear in the right temporal lobe epilepsy group and the left temporal lobe epilepsy group. Strauss and colleagues also found that interictal fear consisted most of fear about sexual situations and/or social situations. These findings help explain why some patients may take extra medication in desperation to prevent a seizure, or why patients with a VNS (Vagus nerve stimulator) may constantly use the magnet that sets the VNS off in an effort to prevent a seizure.

Why is it that fear is so common in epilepsy, and moreover, how often is fear directly related to a seizure or an aura precipitating the seizure with the patient being fully conscious? There has not been much research done on fear and epilepsy. Prior to this research done by Macrae and colleagues, it had been known that fear and seizures occurred simultaneously; however, it was unbeknownst to most epilepsy patients as well as their caregivers that the two were related. This research has focused primarily on the correspondence between epilepsy and fear by looking at when a patient experienced an aura. An aura is a sensation that many epileptics

experience before a seizure and is determined by strange senses, such as *déjà vu* or feeling like something happened previously, though it can be any sensation, which some patients are not even able to describe (Macrae et al., 1954). Auras are adequate signals of an impending seizure, as they let the patient get to a safe space such as a bed before they experience the seizure, although not every epileptic experiences auras. By studying an EEG (electroencephalogram), Macrae and colleagues found that fear was strongly correlated to auras, both corresponding to certain patterns of temporal lobe discharges. Even though this research was done over 50 years ago, these findings are essential as they give epileptologists knowledge that epilepsy is directly correlated to fear, which can potentially increase anxiety and possibly depression.

What is it that causes some people with epilepsy to develop PTSD from a seizure they experienced? In a study done looking specifically into PTSD in people with epilepsy, 120 people participated and each identified the worst seizure that they had experienced. Of these, 78 participants associated their worst seizure with intense fear and horror, while 42 did not. Moving on with the 78 participants, they were then asked if their worst seizure included re-experiencing, fear, and hyperarousal. Fifty of these participants said yes, but only 6 of these fifty were clinically diagnosed with postepileptic PTSD (Labudda et al., 2017). There has not been an extensive amount of research done on the development of PTSD from experiencing a seizure. However, the limited research that has been done on this topic has focused distinctly on the impact that a loss of control over one's body can have on that person emotionally. Labudda and colleagues (2017) found that it is much more common for people with epilepsy to develop postepileptic PTSD if they have already experienced other traumatic events, such as being in a severe car accident. This is understandable as these people already have a heightened, more fragile emotional state. However, it is still possible to develop PTSD from a seizure by itself.

Labudda and colleagues were able to conclude that the root cause of the development of postepileptic PTSD consisted of three intense feelings: fear, helplessness, and loss of control. Labudda and colleagues reported that the emotional response to the seizure the person identified as the worst one did not necessarily stem from losing consciousness, but the severity of the emotional response had to do with the fact that they had zero control over their bodies. This research is essential not only for showing how it is possible for epilepsy to lead to such a debilitating mental disorder without the involvement of any other factors, but also to get doctors, caregivers, and even friends to understand the purely emotional toll that epilepsy can have on a person explicitly from losing control over one's body.

Overall, there has been a small amount of research done on epilepsy and fear/PTSD, but the research that has been done should be enough for doctors, caregivers, and friends to not judge a person with epilepsy for simply being terrified of when the next seizure may occur or judge the person for not wanting to go out in risky situations. When someone with epilepsy develops PTSD from a seizure, the person is aware that a seizure may occur again at any moment while they are trying to work through just the PTSD.

The role of caregivers

Why is it that parent psychopathology is so important when it comes to treating children and adolescents with intractable epilepsy? It is important to be mindful of the impact that having a child with epilepsy has on his or her caregiver. The fear that caregivers experience can be so extreme that there have been cases in which the parents of children with epilepsy develop PTSD from witnessing a generalized tonic clonic seizure (Puka et al., 2017). Previous research has focused on how psychopathology of parents can affect children vs adolescents, and boys vs girls, as well as if depression or anxiety is a more common result of the parents' psychopathology.

Puka and colleagues found that parent psychopathology is related to mental health in both children and adolescents with epilepsy; however, both anxiety and depression were more prevalent in adolescents than in children. Depression was more commonly seen in girls than boys, and anxiety levels were equal between the two. These findings are essential because depression and anxiety can worsen seizures, so if it is known that a caregiver of a patient with refractory epilepsy has an underlying psychopathology, that caregiver must receive treatment in order to help his or her child's epilepsy.

Side effects of epilepsy medication

A major challenge when it comes to assessing mood disorders and personality characteristics in those with epilepsy is that it is quite difficult to distinguish whether it is the epilepsy causing these issues or if it is the antiepileptic drugs (AEDs). Prior research has attempted to evaluate the possible effects of antiepileptic drugs on mood. However, these in-depth studies have still had difficulty in clearly discerning if an AED is causing mood problems, or if the struggle and fear of living with epilepsy is to blame. Due to this overlap, results have been inconclusive regarding the causal factor(s). However, there has been enough evidence showing the negative effects of AEDS on mood that the FDA requires black box warnings for certain AEDS (Toledo et al., 2019). Toledo and colleagues observed the effect that one particular AED called Brivaracetam has on mood, particularly aggression. Brivaracetam is an AED used to treat partial onset seizures. Brivaracetam is a "newer" version of the AED Keppra, which had significantly negative effects on mood but worked wonders for certain types of seizures (Toledo et al., 2019). Because of this, it became necessary to create a drug that had almost the same type of effect on seizures as Keppra but not the negative mood impacts. Their results showed that Brivaracetam did not worsen mood, and that when patients' moods increased it was due to better

seizure control. Results also showed that the switch from Keppra to Brivaracetam resulted in better mood overall (Toledo et al., 2019). This leads to the overarching question: if Brivaracetam does not significantly worsen mood, then why is there an FDA Blackbox warning on it stating, “may cause suicidal thoughts or behaviors?” However, this research is essential because it is one of the few studies done that makes it clear that the more uncontrolled a person’s seizures are, the worse their mood will be in the majority of the population and that it is not as easy as it may seem to place blame on AEDS for worsening mood.

Why is it that all anti-seizure medications require an FDA warning for suicidality (Mittal et al., 2014), and how necessary is it that prescribing physicians still put patients on specific anti-seizure medications even if the physician is concerned about suicidality? Yes, uncontrolled seizures are dangerous and put patients at risk for SUDEP (Sudden unexpected death in epilepsy); but at what point does suicidal ideation become just as dangerous as SUDEP? The FDA now requires every anti-seizure medication to have a warning for suicidal ideation (Mittal et al., 2014), which is quite interesting because multiple anti-seizure drugs are also mood stabilizers (Hughes & Keele, 2006). Previous research has focused on whether or not an FDA warning on anti-seizure medications would decrease the use of these drugs by the patients prescribing physician. Mittal and colleagues found that once this FDA warning was put into use, it did impact the rate at which physicians were prescribing AEDs, declining over time. It is unknown how severe these patients’ epilepsy was. It is also extremely important to consider that patients with epilepsy who also had a comorbid psychiatric condition steadily had prescription claims increase overtime (Mittal et al. 2014). This may be due to the fact that patients with both epilepsy and a comorbid psychiatric condition are at a higher risk for SUDEP than patients with epilepsy and no psychiatric condition (Haut et al., 2003; Woods & Gruenthal, 2006).

This research is essential, as it shows that physicians must weigh the risks and benefits when prescribing AEDS.

Why do people with epilepsy have an increased risk of depression, and is there any way to help treat it? Epilepsy and depression tend to correlate with each-other at such a high rate, that people with depression are more at risk for developing epilepsy (Charyton et al., 2010). Previous research has focused intensely on the use of SSRI's (selective serotonin reuptake inhibitors) in the treatment of seizures (Faingold et al., 2011), finding that certain SSRI's reduce seizure frequency due to the change in serotonin transmission. These findings point to a possible role of serotonin in mediating seizure activity as well as depression levels in people with epilepsy.

Overall, depression and epilepsy have an extremely strong correlation; however, when does this become a problem? Is it possible to tell if depression came first or if epilepsy came first, and does that change the route of treatment? It is imperative that doctors weigh the pros and cons of anti-seizure medications if they are being prescribed to a person who already has a psychiatry comorbidity. The sad truth about having this disorder is that it is quite likely either way the person will either get more depressed being on a medication that causes suicidal thoughts unless the medication completely stops the seizures, and that is rare.

Beliefs and attitudes in PWE

It is not as simple as "people with epilepsy have depression." There are other things that come into play as well. Why is it that people with epilepsy (PWE) have less confidence in their mental capabilities (Fisher & Noble, 2017), and what damage does this lack of confidence do to their overall mental health? Past studies have examined, in depth, the damage that having negative beliefs in one's ability to perform activities as well as constant negative thoughts can do

to a person. Results have consistently shown that those with epilepsy experience higher rates of depression, and this depression is also linked to negative metacognitive beliefs (Fisher & Noble, 2017). Fisher and Noble (2017) observed the impact of metacognitive beliefs in PWE on depression and anxiety by having participants fill out self-report questionnaires. Metacognitive beliefs are beliefs that one has about his or her cognition. They found that the metacognitive beliefs that contributed most to depression and anxiety were constant worry, the uncontrollable effect that seizures have on a person's body, and lastly the people with epilepsy's constant worry about their cognitive function. This goes hand in hand with metacognitive beliefs contributing to depression, as people with epilepsy may believe that they are lacking in cognitive function and therefore feel as though they are not as capable. This would give them reason to believe that they do not have control over the worry that they constantly feel. This research is essential as it provides knowledge on the impact that epilepsy has on a person's thought processes.

When people have negative feelings about their cognition, it may result in many other emotional issues, so what is it that causes people with epilepsy, especially youth, to develop such a strong sense of hopelessness even when these children do not have clinical depression? Past research has examined the effects that daily seizure activity has on the everyday lives of children as well as their families. Results have consistently shown that the leading cause of this learned hopelessness is the fact that epilepsy is a chronic disease, as well as the fact that epilepsy takes away the independence that children should have from parents (Wagner et al., 2008). Wagner and colleagues observed the impact that hopelessness had on children's depressive symptoms in epilepsy. They found that children who experienced strong feelings of hopelessness regarding their epilepsy diagnosis experienced intense feelings of depression. This research is essential not only for showing the impact that epilepsy has on feelings of hopelessness, but also for showing

how young children are when they begin to have these feelings of lost hope regarding their epilepsy diagnosis, which may lead them to develop depression.

Why is it that some people with epilepsy face such an extreme sense of hopelessness (Wagner et al., 2008), and is the hopelessness that is associated with epilepsy also associated with the higher rates of suicide seen in PWE? Past research has focused on which types of epilepsy are more strongly correlated with suicidal ideation, as it has been demonstrated that seizures affecting either the left or right hemisphere lead to different impacts on a person's mood. Ciuffini and colleagues found that multiple factors play a role in PWE's hopelessness levels, and that clinical and sociodemographic factors relate to how hopeless a person with epilepsy may feel. Clinical factors are those involving where the seizures originate from, which is why certain types of epilepsies have more of an impact on a person's mood than others. One surprising finding, however, was that highly intelligent people seemed to report a stronger sense of hopelessness than those with lower intellectual levels. Ciuffini and colleagues presume that the cause for this is because those with a higher level of intelligence have a better understanding of their disease. This means that they are more aware of the long term impact that epilepsy has on the brain, as well as the possibility of SUDEP (sudden unexpected death in epilepsy). This research is essential for showing how harmful it is to have a hopeless mindset when dealing with epilepsy, as well as for showing that this mindset becomes harder and harder to defeat which then begins to lead to suicidal ideation and behaviors.

Managing epilepsy and cultivating coping mechanisms

What makes it so difficult for people to accept the diagnosis of epilepsy; what impact does this refusal to accept this diagnosis have on a person, and what coping strategies can people use to make their lifelong epilepsy journey "happier" and more manageable? Previous research

has focused on the positive impact that accepting the diagnosis of epilepsy has on a person's life, more specifically focusing on the "comforting" factors of resilience (Pembroke et al., 2017). It is quite likely that people with epilepsy feel significantly different from their peers as they begin to believe epilepsy defines them. Focusing on how to cope with epilepsy and the adversities it brings to everyday life rather than focusing on how different people with epilepsy feel from their peers could be notably pivotal in living a reasonably "enjoyable" life. Pembroke and colleagues observed the effect that resilience, as well as knowledge about epilepsy, had on becoming comfortable with an epilepsy diagnosis, and if this comfort level helped people with epilepsy enjoy life more. They found that what resulted in the most comfort for people with epilepsy was viewing epilepsy as normal. There were three techniques involved in this change of perspective: not letting epilepsy define them, not viewing themselves as a victim, and having an optimistic mindset (Pembroke et al., 2017). This research is essential for showing people with epilepsy that there are strategies that they have control over to help them enjoy life as much as they did before the diagnosis. It is difficult for people with epilepsy to feel as though they have any sense of control over their bodies. However, this research demonstrates that they still have control over how they handle their feelings and that this is an important mentality to maintain.

When living with a chronic health condition such as epilepsy, it is understandably difficult to believe that there is any way to manage or treat the depression and anxiety that comes with it. Epilepsy is a disorder that affects the brain, which complicates the ways in which the brain may respond to first line treatments for depression and anxiety such as SSRI's; this is when it becomes necessary to rely more heavily on a cognitive approach to manage intractable depression and anxiety. Previous research has focused on how CBT (cognitive behavioral therapy) can be a potentially "life-saving" way to cope with the anxiety and depression that

coincides with living with epilepsy (Macrodimitis et al., 2011). Macrodimitis and colleagues found that CBT widely improved the depression and anxiety symptoms that coincide with epilepsy, although it cannot be relied on to be the sole treatment for depression and anxiety in people with epilepsy. One reason CBT can be so helpful for those living with anxiety induced by the fear of having another seizure is because it teaches people how to live in the present instead of worrying about what will happen or getting stuck in a cycle of what did happen, such as previous seizures (Macrodimitis et al., 2017). This research is essential for showing both patients and caregivers that there are other treatment options for depression and anxiety other than SSRI's, even when the depression and anxiety may be induced by the epilepsy.

What happens and what are the coping strategies when a person who loves sports such as running, swimming, etc. is diagnosed with epilepsy? These sports carry many dangers if someone becomes unconscious while doing them. Instead of direct research, this journal article takes a different approach as it is a short autobiography (also including facts from prior research) done by a runner who got diagnosed with epilepsy. This girl had been a runner for as long as she could remember, but, once she got her epilepsy diagnosis, everything changed for her. The fear of running and losing consciousness due to a seizure encompassed her; however, she did not want to take on the identity of an epileptic unable to run. Previous research looking at the correlation between epilepsy and physical activity has actually shown that it may be a way of attaining better seizure control (Wong & Wirrell 2009). Even after searching for research on this topic, she was not satisfied with the research she did find, as it was all quantitative (Nakkan 1999, Erikson et al., 2002, Sirven 2009, Arida et al., 2013). Therefore she felt completely alone, which inspired her to do her own qualitative research, using herself as the test subject. Previous research has shown how when a person gets a diagnosis of any major disease, many of these

people begin defining themselves as a person who is sick, and nothing else (Corbin, 2003; Charmaz, 1983). This takes a major mental toll on the person, as they begin to lose their concept of who they truly are. One major concept with many chronic diseases is that most of the time they are invisible (Dickson et al., 2008; Rhodes et al., 2008). Within the categories of chronic invisible diseases lays epilepsy, which most of the time is completely unseen unless a seizure is witnessed.

To conduct this qualitative research, Scarfe and Marlow (2015) used personal experience (it is unknown as to which of these people had the epilepsy). The girl went back to her running but experienced a seizure and described it as one of the scariest moments of her life, as she did not know where she was or what happened (the most common symptom after a seizure). It seemed as though this girl was unable to identify herself as an athlete and an epileptic, and this majorly played a role in how she went about her running; as her mother had told her to wear her epilepsy medic alert bracelet before going on a run, and she refused, which caused major regret.

After doing so much research, this girl realized that she had been in denial of actually having epilepsy for the past 8 years, and that she had to find a safe balance between running and managing her epilepsy. She finally began to learn that epilepsy was part of who she was, but it in no way took away her athletic identity. A person can be more than one thing.

This case study demonstrates that living with a chronic health condition takes a major mental toll on a person. This case shows the “black and white” thinking as the girl mentions how she either would not run due to the fear of having a seizure, or she would constantly run. It also shows that there is a middle ground; not running for a few days because of fear of a seizure doesn’t take away a person’s athletic identity, and until a person with epilepsy is able to fully

accept his or her diagnosis and admit to themselves that it is a part of who they are, they will struggle on a daily basis with their identity.

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