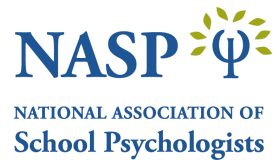


Communiqué

PEDIATRIC SCHOOL PSYCHOLOGY

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Epilepsy: What School Psychologists Should Know

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Epilepsy is one of the most common pediatric neurological disorders, with the prevalence rate in children being approximately 6.3 per 1,000 (Zack & Kobau, 2017). Infants and children, especially those under the age of 5, are at an increased risk of developing epilepsy due to their developing brain (Bennett, Davalos, Ho-Turner, & Banz, 2011). Epilepsy is a condition characterized by recurrent seizures. It is a symptom of brain dysfunction rather than a cause, and may arise from a variety of disorders, such as traumatic brain injury, cerebral infection, metabolic disorders, or be of an unknown origin (Anderson, Northam, & Wrannal, 2019). It is a disorder with well-documented cognitive, emotional, and behavioral difficulties, with at least half of all children with epilepsy, irrespective of ability, developing significant learning or behavioral issues during their time at school (Reilly & Ballantine, 2011; Reilly & Fenton, 2013).

Epilepsy and Seizures

The International League Against Epilepsy (Fisher et al., 2014) defines epilepsy as:

- At least two unprovoked (or reflex) seizures occurring more than 24 hours apart.
- One unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years.
- Diagnosis of an epilepsy syndrome (e.g., frontal lobe epilepsy; juvenile absence epilepsy; Landeau-Kleffner syndrome).
- Epilepsy is considered to be resolved for individuals who had age-dependent epilepsy syndrome but are not past the applicable age or those who have remained seizure free for the last 10 years and off antiseizure medicines for the last 5 years. (p. 475)

Usually diagnosed by a physician, seizures consist of many types classified by location and behavioral manifestation (Hagar, 2008). More significant and detrimental effects are thought to occur for those individuals who have had a seizure disorder from an early age, have poor seizure control, have had the disorder for a longer period of time, or who exhibit multiple seizure types (Bennett et al., 2011).

Epileptic seizures may be provoked (i.e., related to precipitating factors such as an illness or brain injury) or unprovoked (i.e., where no specific cause is identified; Anderson et al., 2019). Seizures are categorized as generalized, if the whole brain is affected, or focal, if the seizure only affects one hemisphere or area of the

brain.

Generalized seizures typically result in loss of consciousness, awareness, or responsiveness to the environment. They may also be categorized as motor or nonmotor in nature. Motor seizures may include tonic (i.e., stiffening of the muscles) and/or clonic (i.e., jerking of the muscles) events, such as in a tonic–clonic seizure, previously referred to as a grand mal seizure. Myoclonic seizures involve sudden and brief shock-like contractions, while atonic seizures are characterized by a sudden loss in muscle tone. Nonmotor seizures, also referred to as absence seizures and previously referred to as petit mal seizures, manifest subtly with symptoms such as staring or unresponsiveness, but do not typically result in major motor manifestations, such as falling. Absence seizures are often brief, lasting approximately 10 seconds, and the child may be able to resume their previous activity; however, when these occur multiple times a day, they often cause disruption (Anderson et al., 2019).

Focal seizures (previously termed complex partial seizures) are classified as focal impaired awareness and typified by impaired consciousness as well as a disruption of motor movement or sensation; or as focal aware (previously termed simple partial) if consciousness is not impaired, but other motor or sensory disruption is present (Anderson et al., 2019; Hagar, 2008). Symptoms may include disruptions in motor activity, such as twitching or jerking, or sensory disruption, such as somatosensory, visual, auditory, or olfactory sensations (Anderson et al., 2019). Focal seizures also have the capability of spreading to both hemispheres, characterized as a focal to bilateral tonic–clonic seizure (Anderson et al., 2019).

Seizure activity in an epilepsy disorder may not be the only source of dysfunction. Between-seizure epileptiform discharges (generalized spikes or bursts of activity) can also adversely affect brain function resulting in long-term negative developmental effects. Epileptic encephalopathy refers to “a condition in which the epileptic activity itself contributes to severe cognitive and behavioral impairments above and beyond what might be expected from the underlying pathology alone and may worsen over time” (Anderson et al., 2019, p. 356). These disturbances can be present and negatively impact a child with epilepsy, without the occurrence of an obvious seizure, or they might be effects that are unrecognized and therefore not considered when determining whether the child's needs are being met within an educational setting.

Medication

Most often, epilepsy is managed via antiepileptic medications/drugs. Using one type of medication is often optimal and successful in most cases; however, in some cases, polytherapy may be required to manage seizures (Hagar, 2008). All antiepileptic drugs have the potential for adverse side effects. Furthermore, there is increasing evidence that antiepileptic medication may be a major contributor to the poor cognitive outcomes seen in individuals diagnosed with seizure activity, rather than seizures alone (Bennett et al., 2011). Adverse effects of antiepileptic medication may include physical effects such as weight gain or weight loss, changes in appetite, excessive hair growth, gum hypertrophy, dizziness, fatigue, or visual disturbances; cognitive effects such as ataxia, slowed psychomotor speed, poorer verbal learning, memory difficulties, or attention difficulties; and/or behavioral effects such as aggression, depression, anxiety, hostility, irritability, or hyperexcitability (Anderson et al., 2019; Reilly & Ballantine, 2011; Roberts & Whiting-MacKinnon, 2012). It is important to take into account the specific medication a student is on, as some antiepileptic drugs are associated with greater adverse effects than others. Levetiracetam (Keppra and generics) and Topiramate (Topamax) have been found to have the most negative and adverse effects out of the commonly used anti-epileptic drugs (Anderson et al., 2019). Additionally, learning can be disrupted due to these adverse effects, and families have expressed a need for schools to communicate and assist with monitoring a student's

response to medications (Roberts & Whiting, 2011). Knowing about medication side effects, changes to medication regimen, and general effects of medication is important in helping the child succeed in the classroom and supporting their learning.

Neuropsychological Sequelae

Epilepsy has significant cognitive and neuropsychological sequelae. Although children with epilepsy often present with average intellectual skills, research suggests that these may be disproportionately skewed toward the lower end of the average range (Bennett et al., 2011). However, intellectual disabilities and learning problems are present in this population. Reilly et al. (2015) found that 40% of children with epilepsy had an intellectual disability, with 59% of those children having an intelligence quotient below 50. As mentioned previously, early onset of seizures, use of multiple seizure medications, poor seizure control, longer duration of active seizures, and epileptic encephalopathy put children at risk for greater negative outcomes. Specifically, deficits in attention, learning and memory, and executive functions are prevalent in children with epilepsy.

Attention and concentration. Poorer performance on attentional measures as well as increased teacher and parent or caregiver ratings for inattentiveness and poor concentration occurs in this population, regardless of an attention deficit hyperactivity disorder (ADHD) diagnosis (Bennett et al., 2011; Roberts & Whiting-MacKinnon, 2012). Additionally, seizure type may be associated with more specific attentional deficits. Sustained attention was found to be impaired more in children with generalized seizures, as these types of seizures more often affect subcortical structures responsible for maintaining attention (Bennett et al., 2011).

Learning and memory. It has been noted for many years that children with epilepsy experience deficits in the ability to learn and remember information. However, there is debate in the field about whether these memory deficits are related to an underlying core function of attentional problems (Bennett et al., 2011) or actual disruption of neurological circuits or networks regulating memory functions. Nevertheless, these children do experience memory difficulties in a variety of ways. They may have difficulty encoding and retaining information in short-term memory as well as poor working memory (Reilly & Fenton, 2013; Roberts & Whiting-MacKinnon, 2012). Children with temporal lobe epilepsy often experience the most pronounced memory deficits due to the critical role of the hippocampus and temporal lobe in memory formation and consolidation (Bennett et al., 2011; Reilly & Ballantine, 2011; Reilly & Fenton, 2013). Memory impairments may also be present following a seizure, which may manifest as difficulty with retention afterwards or loss of memories created before the seizure (Roberts & Whiting-MacKinnon, 2012).

Executive functions. Executive functioning deficits are a newer area of research where deficits have been noted in children with epilepsy (Hagar, 2008). Reasoning, planning, flexibility of thinking, and self-monitoring are areas of executive dysfunction associated with epilepsy (Bennett et al., 2011). Executive functioning problems, specifically difficulty with shifting and inhibition, were found to be associated with later emotional and behavioral problems (Healy, Im-Bolter, & Olds, 2018). Children with epilepsy who also exhibit attention problems and poor memory, or otherwise experience a multitude of deficits in a variety of areas, have been found to be more susceptible to executive function deficits (Bennett et al., 2011).

Other areas of deficit. Slowed psychomotor speed, processing speed, and decreased reaction time are also common in children with epilepsy (Bennett et al., 2011; Reilly et al., 2015). Motor skill deficits may also be a confounding factor in processing speed tasks, as a significant association between coding delays and

developmental coordination disorder has been found in this population (Reilly et al., 2015). Perceptual-motor and visual-spatial difficulties have also been found, specifically with regard to facial recognition and spatial judgment (Bennett et al., 2011). Expressive and receptive language may also be affected (Reilly & Ballantine, 2011).

Social, Emotional, and Behavioral Impacts

Children with epilepsy present with significant social, emotional, and behavioral issues in addition to the many neuropsychological sequelae. Research has shown that children with chronic medical conditions, such as epilepsy, are at an increased risk of adjustment difficulties and comorbid psychiatric and behavioral disorders (Hagar, 2008). These concerns can go unnoticed or be overshadowed when the focus is on maintaining seizure control (Reilly & Fenton, 2013). Children with epilepsy present with social, emotional, and behavioral problems four times more than typically developing children and this population exhibits more aggressive, disobedient, and risk-taking behaviors, including alcohol and drug use (Healy et al., 2018).

Social, emotional, and behavioral problems often follow these children into adulthood impacting their quality of life, academic achievement, and employment, even when seizure control is maintained (Healy et al., 2018; Loisel, Ramsey, Rausch, & Modi, 2016). Reduced quality of life can be found both directly and indirectly. Direct influences may include the impact of cognitive deficits, such as attention, on daily life, while indirect influence may include reduced opportunities for engagement in preferred activities. Loss of physical control during a seizure may elevate frustration, anger, anxiety, and embarrassment and have effects on social interactions and self-esteem. Loss of autonomy, due to restrictions of privacy and higher monitoring to ensure safety, may also contribute to lower quality of life (Roberts & Whiting-MacKinnon, 2012).

Even further, fear of seizures is associated with increased psychological distress, which may lead to the development of comorbid psychological disorders, such as anxiety or depression, as well as social isolation and withdrawal from peers (Roberts & Whiting-MacKinnon, 2012). Children with epilepsy experience bullying and teasing more frequently than those in the general population, which may be due to lack of knowledge about epilepsy and uncertainty about the individual having a seizure (Roberts & Whiting-MacKinnon, 2012).

Comorbid disorders. ADHD, autism spectrum disorder (ASD), anxiety, and depression are the most common comorbid disorders found in children and adolescents with epilepsy. Research suggests that these disorders may be present at or even prior to the onset of epilepsy, suggesting that both epilepsy and comorbid disorders result from similar abnormal brain networks (Anderson et al., 2019). Research also suggests that the co-occurrence of ADHD and ASD characteristics are not primarily due to recurrent seizures or active seizures, but rather due to developmental predispositions, or common mechanisms between epilepsy and these disorders (Oguni, 2013). Given the high rates of attentional difficulties in children with epilepsy, it is reasonable that this population is at a higher risk of being diagnosed with ADHD because inattention symptoms often are present before the onset of epilepsy and persist after seizures have been managed (Reilly & Ballantine, 2011; Reilly & Fenton, 2013). Oguni (2013) reported that 80% of individuals with epilepsy were first diagnosed with ADHD. ASD may be diagnosed at an older age for children with epilepsy because theory of mind and social competence difficulties have been reported in children with epilepsy, but these may not be readily apparent until children reach a higher developmental level (Reilly & Fenton, 2013; Stewart et al., 2019).

Higher risks of anxiety and depression may be due to reduced quality of life compared to typically developing peers, as children often have learning issues, may have activities restricted due to safety concerns, or less interaction with peers due to stigma (Reilly & Renton, 2013). Polytherapy has been related to increased anxiety in this population because greater medication use often (a) results from greater difficulty with seizure control and (b) has the potential for more adverse side effects (Hagar, 2008). Psychological therapies such as cognitive behavioral therapy, relaxation therapy, and biofeedback have been shown to be helpful in managing stress and lifestyle factors that may trigger seizures and helpful as well in addressing comorbid psychological problems (Anderson et al., 2019; Loiselle et al., 2016).

Educational Impact

Given the significant cognitive, neuropsychological, social, emotional, and behavioral problems children with epilepsy experience, it is not surprising that they also experience negative outcomes in the educational setting. Although some children experience minimal to no impacts on their social and cognitive development, the vast majority of children with epilepsy will have significant school and academic difficulties (Reilly & Ballantine, 2011).

Seizures may disrupt classroom learning as well as affect the child's memory and alertness, and this may not be immediately obvious, especially in the case of absence seizures, although generalized seizures and those with loss of consciousness present clear ways in which seizures interrupt the learning environment for both the student and their peers (Reilly & Ballantine, 2011). Absenteeism may be present due to increased doctor visits or not feeling well (Loiselle et al., 2016). Fatigue and sleep disturbances can result in daytime sleepiness, which impacts attention and vigilance in the classroom (Reilly & Ballantine, 2011).

Children with epilepsy are at a higher risk for academic underachievement that may manifest as “lower grades, lower achievement test scores, more repeated grades, greater number of placements in special education classrooms, and more frequent diagnoses of learning disabilities” (Lah & Smith, 2014, p.113). Children are at risk for literacy difficulties, such as in reading comprehension, work identification, and spelling accuracy deficits when semantic memory impairments are present (Lah & Smith, 2014). However, all areas of achievement (e.g., reading, writing, mathematics) have been reported to be impacted in children with epilepsy, as they often perform lower than expected based on their cognitive abilities (Reilly & Fenton, 2013). Lowered academic achievement may be due to absenteeism, seizure effects, antiepileptic medication, cognitive or neuropsychological difficulties, teacher understanding and expectations, familial stress, and peer relationships (Reilly & Ballantine, 2011).

Loiselle et al. (2016) found that half of students with epilepsy experience significant and persistent school difficulties, which were exacerbated by increased antiepileptic drug side effects and additional behavioral problems. Families of children with epilepsy report that their children have significant learning gaps, and often feel frustration due to the school being ill-prepared to handle their child's epilepsy and lost opportunities to learn prior to seizure control (Roberts & Whiting, 2011). Families also reported the most secure and more positive perceptions of their child's educational experience when schools were flexible and willing to listen to their concerns. Roberts and Whiting (2011) found that communication between school, home, and medical staff was essential to children receiving a positive school experience, especially when students were able to participate in this conversation.

School supports such as Individualized Education Programs (IEP) or accommodations through Section 504 can be incredibly helpful for those students experiencing problems due to their epilepsy in the school setting (Roberts & Whiting, 2011). Appropriate assessment and intervention recommendations provide opportunities and supports that will lessen the impact of the cognitive, neuropsychological, social, emotional, and behavioral impacts experiences by students with epilepsy (Loiselle et al., 2016; Reilly & Fenton, 2013).

Assessment Considerations

Providing appropriate assessment of children with epilepsy is essential in helping determine their needs in a school setting. Assessment recommendations include obtaining a thorough background history and detail on seizure history and medication; observations; comprehensive cognitive and academic assessment; social–emotional and behavioral assessments; obtaining information from the student, parent, and teachers; and assessment or referral to an appropriate neuropsychologist for comprehensive assessment of executive function, attention, and memory (Reilly & Fenton, 2013). Conducting a risk assessment and social–emotional assessment is essential, especially due to the high comorbidity of psychological disorders. When choosing an appropriate assessment battery, it is important to consider if the assessments have been normed on a population of children with epilepsy, and how a seizure might impact the tasks given. Thorough behavioral observations are important to determine if active seizure activity is affecting the evaluation. A referral to a neuropsychologist or school neuropsychologist should be made if in-depth evaluations of memory, attention, processing speed, and other known deficits related to epilepsy are not able to be assessed appropriately. Additionally, frequency of assessment and progress monitoring should be increased if seizure control has not been maintained to determine if the child has had any regression of skills.

Intervention Considerations

Intervention and supports to help address the myriad difficulties that children with epilepsy experience is essential, especially with early intervention (Reilly et al., 2015). School psychologists have a unique role in that they can help provide a link between the medical system and the school system so that there is optimal communication and intervention across the medical, home, and school settings. Research shows that school-based supports focused on epilepsy and seizure management, learning and behavioral difficulties, and psychosocial impact have the most benefit to the student (Reilly & Ballantine, 2011). It is important for every child with seizures to have a health/medical management plan in addition to Section 504 accommodations or an IEP so that should a seizure occur, the appropriate plan is in place to help manage the effects and determine appropriate actions.

Although little research is present about specific interventions for children with epilepsy, it is noted that interventions that work with related behaviors and difficulties, such as behavioral issues like aggression or social–emotional issues like anxiety, likely will be effective with children who have epilepsy (Reilly & Fenton, 2013). Specific strategies such as mnemonics, handouts of class materials, reduced verbal instructions, visual supports, preferential seating, scheduled breaks, and extra time may be beneficial to address the common cognitive and neuropsychological difficulties seen in this population. Additionally, a seizure journal may be helpful in monitoring side effects at school as well as active seizures. School psychologists also have the ability to help provide teacher and peer education, which can reduce stigma, help others understand what to do in the case of a seizure, and normalize this disease. Finally, it is important to note that it is always necessary to monitor the progress of these children to determine if their needs are being adequately met in the school setting.

It is important to consider and address the psychological impacts that epilepsy have on a child, especially

Conclusion

how a variety of problems can manifest themselves and cause significant problems in the school setting. School psychologists have a unique position where they can help bridge the needs of the child medically and educationally, support teachers and parents in feeling more confident in their ability to understand epilepsy and their unique child, and provide support for the student (Reilly & Fenton, 2013).

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