



Are children with epilepsy at greater risk for bullying than their peers?

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ABSTRACT

The primary goal of this study was to determine the prevalence of bullying in children with epilepsy compared with their healthy peers and peers with chronic disease. Children with epilepsy were compared with healthy children and a cohort of children with chronic kidney disease (CKD). The following self-report questionnaires were completed: Revised Olweus Bully/Victim, Piers–Harris Self-Concept Scale, Revised Child Manifest Anxiety Scale, Child Depression Index, and Social Skills Rating System. Children with epilepsy were more frequently victims of bullying (42%) than were healthy controls (21%) or children with CKD (18%) ($P = 0.01$). Epilepsy factors such as early age at seizure onset, seizure type, and refractory epilepsy were not found to be predictors of victim status. Surprisingly, poor social skills, increased problem behaviors, poor self-concept, depression, and anxiety did not correlate with bully victim status. The relatively high prevalence of bullying behaviors in these children is concerning and, from a clinical standpoint, requires greater research specifically addressing peer relationships and consideration of the implementation of anti-bullying measures and coping strategies for children with epilepsy.

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1. Introduction

Bullying or peer harassment is an international phenomenon among elementary, middle, and high school students, often peaking in elementary school and declining with age [1]. Studies in Canada have reported the prevalence of being a victim of bullying in healthy children to range from 15 to 21% [2–5]. Although epilepsy is a common childhood condition [6], unlike many other chronic disorders, social stigma and neurobehavioral comorbidities are a concern for children and adolescents with seizures, potentially increasing their risk of being bullied. In otherwise healthy children, bullying has been associated with poor social skills and social relationships, poor self-concept, anxiety, and depression. Because of the greater prevalence of these psychosocial difficulties, if children with epilepsy show an increased prevalence compared with their peers, these may be of importance as either risk factors for or consequences of bullying.

A student is commonly defined as being bullied or victimized when “he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other students” [7]. Bullying is a negative action that is intentionally inflicted on the victim to cause

him or her harm or discomfort, and is characterized by an asymmetric power relationship between the victim and the perpetrator(s) [8,9]. The victim typically cannot defend him- or herself easily as he or she may be outnumbered, less physically strong, or less psychologically resilient than the perpetrators [10]. Bullying may take on a multitude of forms, but is typically categorized as being direct or indirect. Direct bullying involves face-to-face contact between the victim and her or his aggressor(s) and can include both physical and verbal attacks [3,11]. Conversely, indirect bullying or relational bullying is subtler and involves damaging social relationships by exclusion or threatening to withdraw friendship [3,11]. There is ample evidence that the many forms of bullying can have profound effects on the mental and physical health of their victims. Sometimes victims take their own lives as a consequence of bullying [10].

Peer harassment has been demonstrated in healthy children to have a negative effect on the development of positive self-esteem [8]. Bullied students have low self-esteem and negative feelings of self, and feel stupid, ashamed, and unattractive [12]. Victims of bullying experience increased rates of depression, suicidal ideation, and loneliness, and feel that they have a lack of control in comparison to those who are not bullied [1,9–11].

In a recent self-report study assessing health behavior in teens with epilepsy compared with healthy controls, we found that adolescents with epilepsy were more likely to be bullied [13]. However, this was not a primary objective of the study and not based

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on a complete validated bullying questionnaire, but rather relied on a small number of bullying items embedded in a more general health behavior questionnaire. Because children's relationships with their peers are associated with multiple aspects of development and social adjustment and play an important role in long-term psychosocial functioning [14–16], we felt it was important to undertake a study specifically evaluating bullying in children with epilepsy.

In this study our primary goal was to determine the prevalence of bullying behaviors in children and adolescents with epilepsy compared with healthy controls and children with a nonneurological chronic disease. In children with epilepsy, the secondary goals of the study were: (1) to explore possible epilepsy-related factors that may be predictors of bully/victim status, such as age at seizure onset, refractoriness, seizure type, and previous epilepsy surgery; and (2) to explore psychosocial consequences of being bullied including self-esteem, depression, and anxiety.

2. Methods

This is a convenience cohort comparison study of children and adolescents with epilepsy, children with chronic kidney disease (CKD), and healthy controls. Cases with epilepsy were identified through the Neurology Clinic visits, the Neurology Clinic database, and also the Neurophysiology Lab at Alberta Children's Hospital. Healthy controls were identified through the Emergency Department, the Orthopedic Clinic at Alberta Children's Hospital, and the University of Calgary Family Medicine Clinic. Chronic disease controls were identified through the Nephrology Clinic and the Nephrology Clinic Database at Alberta Children's Hospital. Both control groups were age matched to the patients with epilepsy. For this study we chose two control groups not only to determine if children with epilepsy were more likely to be bullied than their healthy peers, but also to assess if they were more likely to be bullied or to bully than their peers with other chronic disease. All children and adolescents fulfilling the inclusion criteria were asked to participate. The University of Calgary Conjoint Ethics Committee approved the study. All parents or legal guardians provided written informed consent to participate in the study. Children provided verbal assent to participate in the study.

2.1. Inclusion criteria

All children included in the study were between ages 8 and 16, and all had an estimated or measured IQ greater than or equal to 70. We restricted the age range of participants for scientific and practical reasons. From a developmental perspective, middle childhood and early adolescence provide a critical window on social relationships, because of the growing importance of peer relationships and friendship at that age [17,18]. The exclusion of younger children helps to ensure that participants will be capable of self-report, and the inclusion of teens allows us to study bullying in a larger number of children with epilepsy.

2.1.1. Epilepsy cohort

Children and adolescents with epilepsy were included in the study if they were (1) on an antiepileptic therapy or (2) had greater than two seizures with at least one in the preceding year, and (3) had been diagnosed with epilepsy for at least 1 year. Children were excluded from the study if they had another active nonneurological chronic disease.

2.1.2. Healthy controls

Healthy controls were included in the study if they had no history of active chronic disease (such as asthma, diabetes, cardiac

disease, etc.) or neurological symptoms (headaches, syncope, ADHD, tics).

Families identified as fulfilling the inclusion criteria through the Family Medicine Clinic were contacted by phone to request participation in the study. If they agreed, a consent form, instruction sheet outlining the study, and questionnaires were sent to the family along with a prepaid, pre-addressed envelope. Families recruited through the Emergency Department and the Orthopedic Clinic were provided a letter by the nurse outlining the study. If the family elected to participate, the research assistant was notified and approached the family for consent and administered the questionnaires.

2.1.3. Chronic renal disease cohort

Children and adolescents with CKD were included in the study if they (1) had a reduced glomerular filtration rate <80 ml/min/1.73 m² or had evidence of CKD that required medication therapy and/or regular nephrology clinic follow-up, and (2) had been diagnosed with CKD for at least 1 year. Children were excluded from the study if they had another active chronic illness or associated neurological symptoms.

2.2. Questionnaires

The following questionnaires were administered as part of the study. They were completed at the time of the clinic visit or were returned using a postage-paid envelope.

2.2.1. Child-completed questionnaires

2.2.1.1. Revised Olweus Bully/Victim Questionnaire. The questionnaire is a 39-item self-report survey used to assess bully/victim status that provides a clear explanation of bullying and a time frame to refer to when completing the questions [9]. The form of bullying that the child or teen has experienced (verbal, physical, indirect, sexual, and racial), where the subject had been bullied, by whom he or she was bullied, how often teachers and other children try to stop the bullying, and also the subject's attitude toward bullying are reported. Two versions of the questionnaire are available: Junior for children in grades 3–5 and Senior for those in grades 6–10. The questionnaire is divided into two sections. The first portion pertains to the initiation of an act of bullying against the child who is answering the questionnaire, whereas the second refers to the expression of bullying behavior against others by the child [8]. There are seven specific items on both parts of the questionnaire that inquire about the different forms of bullying that have occurred. Selection of the "2 or 3 times a month" response category for having been bullied/having bullied other students on any of the seven items was used to classify a student as a victim/nonvictim or a bully/nonbully. The "2 or 3 times a month" cutoff point is widely used, recommended by the authors of the questionnaire, and reflects the repetitive nature of bullying [9]. Based on the manner in which students answered the items, they were classified as being a victim, a bully, or both a bully and a victim (bully victim). The psychometric properties of this questionnaire are reliable with an internal consistency of 0.80–0.90 [8].

2.2.1.2. Piers–Harris Self-Concept Scale II. The questionnaire is a 60-item self-report survey commonly used to measure self-concept in children and teens aged 7–18 [19]. The Piers–Harris II total score is a general measure of the respondent's overall self-concept in six domains including Behavioral Adjustment, Intellectual and School Status, Physical Appearance and Attributes, Freedom from Anxiety, Popularity, and Happiness and Satisfaction [19]. The items are written at a third grade reading level, and the test requires 10–15 minutes to complete. Students with a total *T* score below 40 were classified as having poor self-concept as described in the

scoring manual [19]. The Piers–Harris II has acceptable reliability (internal consistency $\alpha = 0.91$) and validity [19].

2.2.1.3. Revised Children's Manifest Anxiety Scale (RCMAS). This self-report screening instrument (reliability 0.94) is used to measure anxiety in children 6–19 years of age, and consists of 37 items, each of which requires a yes or no answer [20]. It generates a Total Anxiety Score, as well as three anxiety subscales: Physiological Anxiety, Worry/Oversensitivity, and Social Concerns/Concentration. A Lie scale is used to measure inaccurate self-report by assessing inflated/ideal behavior that is rarely reported in normal subjects.

A Total Anxiety *T* score greater than 60 was considered indicative of clinically significant levels of anxiety [20].

2.2.1.4. Child Depression Inventory (CDI). This self-report screening tool (reliability 0.87) is used to measure depressive symptoms. It consists of 27 statements, and for each, the child is asked to select the response that describes his or her feelings in the preceding 2 weeks [22]. It has been validated in children 7–17 years and is the most widely used screening tool for depression in children. The CDI measures Total Depression, along with Negative Mood, Interpersonal Problems, Ineffectiveness, Anhedonia, and Negative Self-Esteem [22]. Children and adolescents with a *T* score ≥ 65 for Total Depression were classified as experiencing clinically relevant levels of depression [22].

2.2.2. Parent-completed questionnaire: The Social Skills Rating System

This questionnaire consists of three versions dependent on the age of the child or adolescent. The Elementary (grades K–6) and Secondary (grades 7–12) Social Skills Rating System forms were employed in this study. Both forms measure Cooperation, Responsibility, Assertion, and Self-Control, which make up Total Social Skills. The behavior levels for each of the four subscales are ranked as fewer, average, or more according to the age-specific standard tables provided in the scoring manual [23]. A student earning a behavior level of “fewer” on the Social Skills Scale was regarded as exhibiting fewer social skills than average for a standardized group [23]. The Elementary form also examines and ranks Externalizing, Internalizing, and Hyperactivity problem behaviors, as well as Total Problem Behaviors as fewer, average, or more [23]. The Secondary form examines and ranks only Externalizing and Internalizing problem behaviors and Total Problem Behaviors as fewer, average, or more [23]. A student earning a behavior level of “more” on the Problem Behaviors Scale was thought of as exhibiting more negative behaviors than average for the standardized group [23]. Students categorized as having “fewer” Cooperation, Responsibility, Assertion, Self-Control behaviors, or Total Social Skills were classified as having poor social skills [23]. Alternatively, students shown to exhibit “more” Externalizing, Internalizing, or Hyperactivity problem behaviors were classified as having poor social skills [23]. The questionnaire has an internal consistency of 0.87–0.90 and test–retest reliability of 0.87 for the social skills parent form and an internal consistency of 0.73–0.87 and test–retest reliability of 0.65 for the problem behaviors parent form [23].

2.3. Data collected

Age, gender, height, weight, and family factors including parent or caregiver level of education (graduation from college or university, some college or university or technical school, high school graduation, or less than high school graduation), residence (urban or rural), and postal code for families residing in the City of Calgary were documented for children with epilepsy. Height, weight, age and gender were used to calculate body mass index (BMI) as per the BMI Percentile Calculator for Child and Teen [24], as high

BMI is hypothesized to be an independent risk factor for bullying [25,26]. Individuals with a BMI >85 th percentile for age and gender were considered overweight. Low socioeconomic status has been associated as a risk factor for bullying [27]. To address this, residence was documented as neighborhood was felt to be a reasonable reflection of socioeconomic status. Residence was considered urban if within the Calgary city limits or an area with a population of greater than 50,000; otherwise, residence was classified as rural. Collected postal codes were matched to their corresponding communities in the City of Calgary, and the specific median property tax assessment value was obtained through the City of Calgary website. Mean property assessment values for all communities in Calgary were compiled and placed into quartiles. Participants were classified as being high socioeconomic status (SES) if they were in the top quartile, low if they were in the bottom quartile, and average if in the interquartile range.

To determine possible epilepsy-associated predictors of bullying, factors including age at seizure onset, seizure type (partial/generalized), frequency, and current and previous number of anti-convulsant medications were also recorded. Patients were classified as having refractory epilepsy if they had had epilepsy for at least 2 years, had failed greater than two antiepileptic drugs, and had a seizure frequency of at least one seizure every 6 months. The epilepsy-associated predictors were chosen based on those previously described in publications addressing social skills and social competence in children with epilepsy [28,29].

Children with clinically significant total scores on the Depression or Anxiety scale were referred to a clinical psychologist or the mood disorders clinic for further assessment.

2.4. Sample size

The sample size required to achieve statistical significance when examining the likelihood that children and teens with epilepsy are bullied more often than controls and children with CKD was established using a Sample Size Calculation program. The calculation was based on the usage of dichotomous variables. Based on previous reported data that the previous incidence of bullying in Canada is ~ 10 –20%, $\alpha = 0.05$ and power = 80%. With these data we estimated a total sample size of 143 children.

2.5. Data analysis

The data were entered into STATA 10 for statistical analysis. The groups were characterized according to age, gender, BMI, parental/caregiver education level, residence, and socioeconomic status. Group equivalence on the aforementioned variables was determined by comparing the cohorts on these variables using χ^2 or Fischer's exact analysis for all categorical variables (gender, parental/caregiver education level, BMI category, residence, and SES), and a *T* test was employed to compare the groups in terms of age.

2.6. Primary outcome

To determine the prevalence of bullying behaviors in children and adolescents with epilepsy and to ascertain if children and teens with epilepsy are more likely to be bullied than healthy controls, children and adolescents from the epilepsy and healthy control cohorts were stratified in terms of bully/victim status based on the Revised Olweus Bully/Victim questionnaire. The cutoff criteria of “2 or 3 times a month” was applied to any of the seven bully/victim items [9]. Students were classified as bullies, victims, or bully victims. Prevalence of peer victimization, being victimized, and both victimizing and being a victim was expressed as a percentage. A χ^2 analysis was used to determine if there were

between-group differences in the prevalence of being a victim, bully, or bully victim.

2.7. Secondary outcomes

1. To explore epilepsy factors as predictors of bully/victim status, children with epilepsy were characterized in terms of age at seizure onset, refractory seizures versus controlled, and seizure type. A logistic regression analysis was used, with bullied and not bullied as the dependent variables and the epilepsy factors as independent variables.
2. To explore psychosocial consequences of being bullied including self-esteem, social skills, depression and anxiety, for the analysis, bullied and not bullied were the dependent variables and self-esteem, social skills, depression, and anxiety were the independent variables.

3. Results

Ninety-nine children with epilepsy agreed to participate in the study, 59 (60%) of whom completed and returned the questionnaires. Forty (60%) children with CKD and 42 (58%) healthy children completed the study. The demographic data are summarized in Table 1. Participant recruitment is illustrated in Fig. 1.

The cohorts did not differ significantly in terms of gender, BMI, or residence (rural versus urban); however, significant differences were found for parental/caregiver education status ($P = 0.003$) and socioeconomic status ($P = 0.02$). Parents of children with epilepsy were less likely to have completed or have some college/university education than parents of controls, and urban families of children with epilepsy were of lower average socioeconomic status (Table 1). Urban families with epilepsy had significantly lower socioeconomic status when compared with those with CKD ($P = 0.01$).

3.1. Prevalence of bullying

Forty-two percent of children with epilepsy were victims of bullying, 15% were bullies, and 9% were both the victims and the bullies. They were more frequently the victim of bullying than children with CKD or healthy children ($P = 0.01$) (Table 2).

Table 1
Demographic data.

Demographic variable	Epilepsy cases ($n = 59$)	CKD cases ($n = 40$)	Healthy controls ($n = 42$)	Significance (P value)
Mean age (years)	11.8	12	11.9	
<i>Gender</i>				
Male	3 (53%)	21 (53%)	21 (50%)	0.96
Female	28 (47%)	19 (47%)	21 (50%)	
<i>Body mass index</i>				
Normal	50 (85%)	34 (85%)	40 (95%)	0.20
Abnormal	9 (15%)	6 (15%)	2 (5%)	
<i>Parental/caregiver education</i>				
Graduation from postsecondary	30 (51%)	16 (40%)	28 (67%)	0.003
Some postsecondary	24 (41%)	11 (28%)	6 (14%)	
Graduation from high school	2 (3%)	7 (18%)	7 (17%)	
Less than high school	3 (5%)	5 (14%)	1 (2%)	
<i>Residence</i>				
Urban	35 (59%)	21 (52%)	32 (76%)	0.07
Rural	24 (41%)	19 (48%)	10 (24%)	
<i>Socioeconomic status (urban)</i>				
Low	12 (34%)	2 (10%)	5 (16%)	0.02
Average	21 (60%)	11 (52%)	19 (59%)	
High	2 (6%)	8 (38%)	8 (25%)	

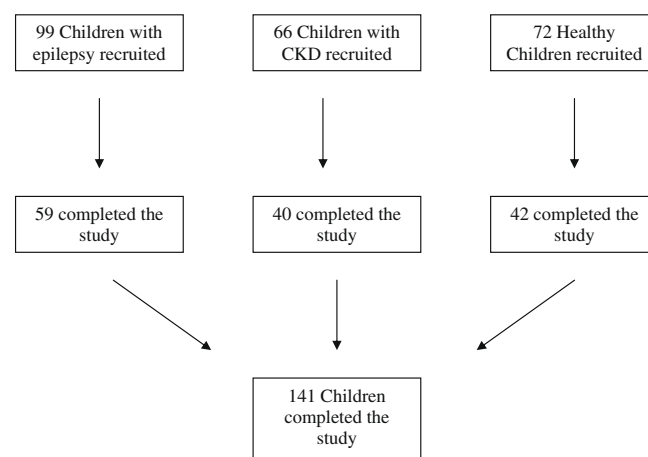


Fig. 1. Participant recruitment.

3.2. Epilepsy factors as predictors of victim status in children with epilepsy

Among those children with epilepsy, age at seizure onset, seizure type (generalized or partial), or having medically refractory epilepsy was not found to be predictive of victim status in the exploratory analysis (Table 3).

3.3. Psychosocial consequences of victim status within the cohort

An exploratory comparison of victimized children with epilepsy and nonvictimized children with epilepsy did not find the two groups to be significantly different in terms of their social skills, problem behaviors, anxiety, depression, and self-concept (Table 4).

4. Discussion

Previous studies in children with epilepsy have addressed social skills and social competence among children with epilepsy. Our study is the first, to our knowledge, to specifically assess peer relationships by assessing bullying through self-report questionnaires.

Table 2
Prevalence of bullying in children with epilepsy compared with their peers.

Bully/victim status	n (%)			Significance (P value)
	Epilepsy (59)	CKD (40)	Healthy controls (42)	
Victim	25 (42)	7 (18)	9 (21)	0.01
Bully	9 (15)	4 (10)	2 (4.8)	0.24
Bully victim	5 (9)	2 (5)	0	0.13

Table 3
Epilepsy predictors of victim status.

Predictor	Odds ratio	Significance (P value)	Confidence interval
Age at onset	1.20	0.78	0.33–4.3
Seizure type	0.80	0.69	0.36–3.03
Refractoriness	1.03	0.95	0.28–2.34

According to Sharp, there are two main areas of bullying research [30]. First, there are studies that examine the features of students who are frequently bullied as opposed to those who are not [30]. Second, there are studies pertaining to resilience and vulnerability to bullying-related stress that may inform clinicians seeking to develop interventions that aid in bullying prevention and the development of coping strategies for victims [30]. Our study constitutes the first type of study. This study pioneered the examination of bullying in children with epilepsy and sought to describe features of victims affected by both epilepsy and bullying. The description of characteristics of this population provides the basis for the second type of research so that targeted interventions to reduce the prevalence and impact of bullying on pediatric patients with epilepsy may be developed.

We found children with epilepsy to be at increased risk of being a victim of bullying compared with those with CKD and those who are free of chronic disease. Forty-two percent of children with epilepsy reported being bullied compared with 21.4% of healthy controls and 18% of children with CKD. Fifteen percent of children with epilepsy reported bullying others compared with 4.8% of healthy controls and 10% of those with CKD, and 8.5% reported both compared with none of the healthy controls and 5% of the children with CKD. The prevalence of bullying behaviors in the healthy controls is relatively consistent with other Canadian studies, which found 21.3 and 11.6% of students report being bullied and 9.2 and 5.2% report bullying others [2,5]. These findings would suggest children with epilepsy experience a significantly increased risk of being the victim of bullying not only compared with those who are healthy but also compared with other children with chronic disease, implicating factors specific to having epilepsy rather than simply just having chronic disease.

Although not statistically significant, children with epilepsy also showed a higher incidence of being a bully and being both a bully and a victim. It is reported in the literature that victims themselves are more likely to be bullies and bully victims [31]. There is a lack of detailed analysis of these groups [31]. Our results are in

Table 4
Comparison of psychosocial risk factors for bully victim status within the epilepsy group.

Measure	χ^2	Significance (P value)
Social skills	0.370	0.543
Anxiety	0.093	0.760
Depression	1.569	0.210
Self-concept	0.102	0.749

keeping with these published data in that about 10–20% of those who are victims are also a bully victim [31].

To create effective anti-bullying measures and coping strategies for children with epilepsy, it is important to further elucidate the relationship between epilepsy and the high prevalence of bullying behaviors. In our study we attempted to control for potential confounders including obesity, socioeconomic status, and parental education that may influence bully victim status. Families with epilepsy did have a significantly lower average socioeconomic status than healthy control families and significantly lower parental education than both families with chronic renal disease and healthy control families. Thus, it cannot be ruled out that group differences in the prevalence of bully victims may be due to differences in socioeconomic status and parental education. It has been demonstrated that children from low socioeconomic status families are at a greater risk for aggression and other behavioral issues [32]. However, there is some disagreement in the literature as to whether familial socioeconomic status is a predictor of bullying. In a recent study, Ma et al. demonstrated a link between bullying and school location and school average socioeconomic status, but not familial socioeconomic status [33]. On the other hand, Veenstra et al. indicate that socioeconomic status is inversely related to bullying and victimization [34]. Parental education as a demographic variable, however, may be significant as a possible confounding predictor of bullying. High parental education has been shown to have a positive impact on bullying [35].

In this study we could not determine an association between specific epilepsy factors and risk for bully/victim status. We could also not determine an association between potential consequences of bullying, such as depressive symptoms, increased anxiety, social difficulties, and poor self-esteem, and bully/victim status. A previous publication that assessed peer difficulties in children with epilepsy found a relationship between early age at seizure onset and poor neuropsychological functioning to be a predictor of greater peer difficulties [28]. It may be that our measures were not sensitive enough or that in our study this part of the analysis was exploratory and did not have enough power to show a difference. Because of our limited sample size, we did not include a subscale analysis for the self-report questionnaires. Subscale analysis may have shown specific areas where differences may exist between those who are victims of bullying and those who are not. It may also be that self-report alone is not a sensitive enough measure to detect a difference and that multiple sources of data are required, including parental report, teacher report, and classroom data.

Although the results of our study are significant, it does have limitations. The most significant limitation of our study is the low recruitment of children that may have resulted in underreporting of bullying in our population. It is known that bullying tends to be a hidden activity, and both bullies and victims are usually reluctant to disclose to adults that it is taking place [36]. Children are often too embarrassed and frightened to disclose to an adult [37]. It has been reported that only about 20% of children disclose bullying [38]. Given these data we suspect that bullying may be underrepresented in our population and the children with epilepsy may actually be at an even greater risk for bullying. We were also not able to compare the groups for differences between those who did participate and those who did not. This may have helped in determining specific differences between these groups. Second, our recruitment was conducted primarily at a single tertiary care center, and therefore, our results are specific to our regional population and may not generalize to other settings. It is, however, encouraging that the prevalence among health controls is consistent with that published in Canadian studies. Third, although our study was controlled with healthy children and a chronic disease cohort, we are unable to say with confidence that having epilepsy

as opposed to having a neurological disease is clearly a risk factor for bully/victim status because of the lack of a neurological disease control. Fourth, our groups had different demographic parameters with respect to parental education and socioeconomic status that may have also influence our results. Lastly, we did study a wide age range in this study, and thus, we cannot determine whether children are at greater risk for bullying in childhood or during their teens or if the risk is similar.

In summary, our study sets the groundwork in the evaluation of bullying and peer relationships in children with epilepsy. Further studies are necessary to look more specifically at those at risk with respect to more detailed epilepsy factors that may be predictive of bullying, such as where and when seizures occur, and to determine the potential impact or association of environmental factors such as stigma/perceived stigma, parenting, seizure education of children in the school, and family function. The study of the relationship between other comorbidities including cognitive and attentional difficulties also needs to be addressed. The use of recent models of social functioning in children addressing social information processing and classroom/peer data collection should be considered in future research. The relatively high prevalence of bullying behaviors in these children is concerning and, from a clinical standpoint, requires greater research specifically addressing peer relationships and consideration of the implementation of anti-bullying measures and coping strategies for children with epilepsy.

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