Post-traumatic stress disorder (PTSD) symptoms in children with severe epilepsy

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ABSTRACT

Objectives: To assess symptoms of post-traumatic stress disorder (PTSD) in children with severe epilepsy and the associations of trauma symptoms across age, comorbid symptoms, epilepsy-specific factors, parental resources, and psychopathology.

Methods: Fifty children with severe epilepsy across three different age groups (0–5 yrs., 6–12 yrs., 13–18 yrs.) were assessed with developmental-sensitive and standardized PTSD assessment tools when hospitalized at the tertiary epilepsy center Filadelfia, Denmark. The Diagnostic Infant and Preschool Assessment (DIPA), the Darryl test, and the ITQ questionnaire were used to assess the three age groups, respectively.

Results: Twenty-two percent of the overall sample met the criteria for PTSD, with a prevalence of symptoms increasing with age (6%, 28%, and 40%). Comorbid psychiatric symptoms in preschoolers were present in 81% of the children witnessing a high level of distress in this group. Behavioral difficulties were elevated across all three age groups, and 40% of the children with trauma symptoms had a parent with concurrent psychopathology.

Conclusion: To the authors’ knowledge, this study is the first to assess trauma symptoms with standardized tests in children with more complicated epilepsies. Trauma symptoms in the group are high; however, there is a need for larger scale studies and research into trauma symptoms in children with more severe epilepsy than those assessable with the included assessment tools. The trauma perspective in severe childhood epilepsy might further clarify the complex associations of biological and contextual variables that affect the children's life quality and enable better preventative treatment options for this group.

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1. Introduction

Childhood-onset epilepsy is associated with psychiatric and medical comorbidity [1–7] and cognitive, behavioral, and psychosocial difficulties [8–11]. Scandinavian nationwide cohort studies have demonstrated that up to 80% of children with epilepsy have one or more comorbid disorders [12] and have elevated risks of developing psychiatric disorders in later life [13]. The quality of life in children with epilepsy has been shown to differ from that of healthy peers [14]. However, the comorbidity of childhood epilepsy seems to be a superior predictor of impaired life quality [15,16] compared to illness-specific factors.

Increasing awareness of the factors beyond biological causes of comorbidity and life quality in children has emerged over the past two decades. Studies have demonstrated the influence of family factors [17,18] and the social context [19,20] on the development of child psychopathology and point to a contextual understanding of impacted life quality in children with epilepsy [21]. Family resources [22,23] and socioeconomic status [24,25] influence how the child’s experience affects life quality alongside comorbidity factors. We further know that family resources are highly compromised by concerning levels of parental stress and psychopathology in caregivers of children with epilepsy [26–31].

Trauma studies have demonstrated that adversities in early childhood have a significant influence on a child’s developmental trajectory [32] and subsequent adult onset of psychiatric diagnoses [33], as well as diminished physical health [34,35]. It is further apparent that a child’s development is influenced by the care pro-
vided by their parents in times of distress and that this care might be compromised by parental stress and psychopathology [35–37].

In the recently updated DSM-5 post-traumatic stress disorder (PTSD) diagnosis [38], the criteria for traumatization include if a person is directly exposed to a traumatic event, is witnessing it, learning that a relative was exposed to it, or indirectly by exposure to distressing details of an event, such as repeatedly hearing details about it. The diagnostic criteria for PTSD in children and adolescents are comparable to that of adults. However, children experience and express the symptoms differently depending on age and developmental stage [39]. See Elklit et al. [40] for a thorough comparison across preschool children (age 0–6 years), school children (age 7–11 years), and adolescents (age 12–18 years).

Furthermore, the theory about and research into secondary traumatization [41] states that the consequences of trauma exposure are not limited to the person who has been exposed to it but can also affect close relatives, such as a child. The parent can transfer their psychological symptoms to their child directly, in the sense that the child develops the same symptoms, or indirectly, by the child getting affected by his/her parent’s moods, fears, behaviors, or narratives, which influences the child’s function and development [42].

The incidence of traumatic experiences in childhood epilepsy is high and is likely experienced differently by the child depending on age and diagnosis. With a further mind on secondary traumatization, it seems important to examine if PTSD could be a possible outcome in children with severe epilepsy.

Hence, the primary aims of this study were to investigate trauma symptoms in children with severe epilepsy and compare the symptoms across different ages, other comorbidity measures, and epilepsy-specific factors. Secondly, we examine the associations between trauma symptoms and caregiver resources and symptoms of psychopathology. This study is the first to investigate the prevalence of PTSD in children with severe epilepsy to the authors’ knowledge.

2. Methods

2.1. Participants

Parents and their children (aged 0–18 years) were recruited during the child’s hospitalization at the pediatric department at the Danish Epilepsy Centre, Filadelphia. The Epilepsy Centre is a tertiary healthcare provider, and children submitted to hospitalization have a severity of epilepsy that demands specialist care. Informed consent was collected from parents for their own and their child’s participation in the study. Adolescents at the age of 15–18 years were informed about the study regarding PTSD symptomatology and were entitled to decline participation. Data handling guidelines from the Danish Data Protection Agency were followed. We excluded non-biological parents and caregivers as well as children who were not native Danish speakers. Parents of 140 children were enrolled in the survey; however, not all children could participate in the survey of PTSD symptomatology due to the severity of their epilepsy or cognitive disability. Children above the age of 6 years who were attending school activities at the hospital during their hospitalization or otherwise were evaluated to be able to read and write or understand verbal given messages sufficiently to answer the questionnaires were eligible to participate in the survey of child and adolescent PTSD. Parents of children below the age of seven were asked to complete an interview about their child if the parent stated that the child could communicate with the parent. In total, 50 children and caregivers were included in the study about child PTSD symptomatology. The remaining 90 parent–child dyads were included as a comparison group of child and parent characteristics.

2.2. Procedure

The caregivers provided information about sociodemographic factors, parental stress and psychopathology, child diagnostic factors, and child executive functioning and behavioral difficulties during their stay at the hospital. A trained clinician interviewed 16 parents of children aged 0–5 years to assess child psychopathology symptoms. The interview followed the semi-structured interview guide; Diagnostic Infant and Preschool Assessment (DIPA) [43]. Twenty-nine children aged 6–12 were asked to complete the cartoon-based Darryl test [44] when participating in school activities together with a teacher during hospitalization or with the guidance of a psychologist. Five adolescents aged 13–18 years were handed the ITQ questionnaire [45] to complete independently. A trained clinician was at the disposal if the adolescent needed help to fill out the questionnaire. The Darryl test and ITQ questionnaire assess symptoms of PTSD solely.

2.3. Measures

2.3.1. Child psychopathology

The DIPA is a clinical semi-structured interview administered to the caregiver of children under the age of seven [43]. The interview consists of 517 questions used to identify symptoms across 13 different psychiatric disorders. The interview is validated across different countries and has proved to be a sensitive tool when measuring psychiatric disorders in preschool children [46–48]. The PTSD section of the interview lists 11 possible traumatic events, which the parent answer on behalf of the child and, if more than one, rate the worst. Next, 55 questions related to re-experiencing, avoidance, and arousal behavior/reactions related to the worst event follow, and lastly, a section of the degree of functional impairment is assessed. The criterion of a PTSD diagnosis is met if the child has one symptom of re-experiencing, three avoidance symptoms, two arousal symptoms, and one functional impairment symptom. A validated Danish version of DIPA was used in this study [47]. Diagnostic symptoms are based on the DSM-IV [49].

Darryl’s cartoon test is a screening tool used to identify and measure PTSD symptoms in children and adolescents [44,50]. The test consists of 23 cartoons of a pre-adolescent boy named Darryl, accompanied by three empty, half-full, and full thermometers. A text about the psychological response specific to an illness-related experience is read to the child. The experience is illustrated in the feelings of Darryl depicted in the cartoon. The child then has to identify if he or she feels the same way as Darryl and circle the thermometer that best matches the child’s feelings. Nineteen cartoons are related to trauma symptoms, re-experiencing; 7, avoidance; 7, and arousal; 5. The symptom criteria are met if the child appoints a half-full or full thermometer. The cluster criteria are met for one symptom of re-experiencing, three symptoms of avoidance, and two arousal symptoms. If all three cluster criteria are met, the criterion of PTSD is fulfilled. A subthreshold of PTSD (sub-clinical level) requires two out of three cluster criteria.

The test assesses PTSD symptoms in a developmentally appropriate manner [50] and is validated for a Danish population with good internal consistency for the overall scale (α = 0.88) [51]. Since the test has yet to be systematically validated for the DSM-5, the DSM-IV is referenced in the current study.

The International Trauma Questionnaire (ITQ) [52,53] is a 12 item self-report measure for the assessment of the ICD-11 [54] criteria for PTSD and complex PTSD (CPTSD) [55]. Six items are included in the clusters of re-experiencing, avoidance, and sense
of threat (two items in each cluster). For a probable diagnosis of PTSD, one symptom is required in each of the clusters for re-experiencing, avoidance, and sense of threat, as well as a score of two or more on one of the three questions assessing associated functional impairment. A threshold of PTSD (sub-clinical level) requires two out of three cluster symptoms present. Items assessing functional impairment were unavailable for the current sample; hence, results are referred to as symptoms of PTSD. In this current study, measures of CPTSD were not included for the adolescents. The scale has been under several revisions since the initial version of the ITQ [45], and items consistent with the final version of the ITQ were used for the current analyses. A version for children and adolescents has been proposed (ITQ-CA) [56]; however, the version has yet to be validated in Denmark. The construct validity of the ITQ scale has been validated in child and adolescent populations aged 10–18 years [57,58].

2.3.2. Child characteristics

The Strength and Difficulties Questionnaire for Parents (SDQ-P) [59] measured the child’s level of behavioral difficulties and prosocial behavior. The parent completes the questionnaire. The SDQ is a widely used and reviewed 25-item questionnaire [60-62] and is validated for a Danish population [63].

The Comprehensive Executive Function Inventory (CEFI) [64] is a behavior rating scale of executive-function strengths and weaknesses. The rating scale contains 100 items, with 90 items covering ten different executive skills. The total scale was used as a proxy measure for the child’s level of cognitive functioning in this study. Parents completed the rating scale for children above the age of 6. The scale has strong psychometric properties and is valued within research and clinical practice [65].

2.3.3. Parental stress

The caregiver’s level of perceived stress was measured with the 10-item Perceived Stress Scale (PSS-10) [66]. The scale is a self-reported questionnaire that evaluates the degree to which individuals have experienced their lives as stressful during the previous month. It has shown acceptable psychometric properties across various cultures and countries [67].

2.3.4. Parental psychopathology

Two unidimensional subscales of the Hopkins Symptom Checklist-90 (SCL-90) [68] were used to measure symptoms of depression (HAM-D9) and anxiety (SCL-ASS90). The subscales are validated for a Danish population [69,70].

The International Trauma Questionnaire (ITQ) scale equivalent to that of the one used for the adolescents [52,53,55] was used to assess symptoms of PTSD in parents.

Epilepsy-related factors included the type of epilepsy, frequency of seizures, the child’s age at seizure onset, and years with epilepsy.

Demographic information included gender and age (caregiver and child), caregiver education, job situation, and marital status.

2.4. Analysis

Results were analyzed using IBM SPSS version 24. A PTSD symptom algorithm, based on DSM-IV, was used to determine how often preschool- and schoolchildren experienced symptoms within the last month. This algorithm requires at least one symptom from the re-experiencing cluster, three (or more) symptoms from the avoidance cluster, and two (or more symptoms) from the arousal cluster. Further symptoms of psychopathology for preschool children were summarized based on DSM-IV. An algorithm based on ICD-11 was used to assess PTSD symptoms within the last month for the adolescents. The algorithm requires at least one of two symptoms from the re-experiencing, avoidance, and threat clusters. Bivariate analyses were performed to assess associations between child symptomatology and caregiver/epilepsy-related variables, respectively. The Danish National Committee on Health Research Ethics, the Committee Act, section 14(2), was followed for data collection and handling.

3. Results

The study participants were a subsample of a previously described sample from a cross-sectional study, including 140 children with severe epilepsy and 162 caregivers [27,71]. The fifty included children in the PTSD analyses had a mean age of 10.3 years (0–18 years; SD 2.8) and a mean duration of epilepsy of 4.2 years (SD 3.4) (Table 1). Data on the non-included children (n = 90) are described in Table 1 for comparison.

3.1. Symptoms of PTSD

The overall prevalence of PTSD symptomatology across the three age groups was 22%. The prevalence was increasing with age, with 6% in preschoolers (0–5 yrs.), 28% in schoolchildren (6–12 yrs.), and 40% in adolescents (13–18 yrs.) (Table 2 and 3). Table 2 shows the distribution of re-experience, avoidance, and arousal symptoms for schoolchildren and adolescents. Symptoms are endorsed in schoolchildren if they have answered ‘some of the time’ or ‘a lot of the time’ and for adolescents, if they have answered ‘moderately’, ‘very often’, or ‘extremely often’ for each question within the last month. The table also shows the prevalence of subclinical PTSD symptoms, where two of three symptom clusters are present. Collectively, 69% of schoolchildren and 80% of adolescents have PTSD symptoms or subclinical symptoms of PTSD. Characteristics of school children meeting 0–3 cluster symptoms are presented in Table 5.

### Table 1

| Group characteristics                      | Included | Not included |
|--------------------------------------------|----------|--------------|
| **Child characteristics**                  |          |              |
| Number of patients (girls %)               | 50 (54)  | 90 (41)      |
| Age, M (SD)                                | 10.3 (2.8)| 8.9 (5.0)   |
| Years with epilepsy, M (SD)                | 4.2 (3.4)| 4.1 (4.0)   |
| Epileptic diagnosis, n (%)                 | 5 (10)   | 21 (23)      |
| Epileptic encephalopathy                   | 26 (52)  | 47 (52)      |
| Focal/multifocal epilepsy                  | 10 (20)  | 10 (11)      |
| Idiopathic generalized epilepsy            | 9 (18)   | 12 (13)      |
| Seizure frequency, n (%)                   | 16 (32)  | 21 (23)      |
| Daily seizures                             | 16 (32)  | 26 (29)      |
| Weekly or less often seizures              | 12 (24)  | 32 (36)      |
| Attended school later than expected, n (%) | 13* (33) | 29** (45)   |
| School for children with special needs, n (%) | 13* (33) | 36** (55) |
| Psychiatric diagnosis, n (%)               | 3* (8)   | 13** (20)   |
| Executive function, M (SD)                 | 85.2 (12.2)| 79.5 (17.1) |
| Behavioral difficulties total score, M (SD)| 15.3 (6.1)| 16.4 (7.7)  |

**Caregiver characteristics**

| Number of parents (women), n (%)           | 50 (76)  | 90 (82)      |
| Both parents living together, n (%)       | 34 (68)  | 63 (72)      |
| Employed, n (%)                            | 36 (75)  | 54 (60)      |
| Perceived Stress, M (SD)                   | 20.1 (7.7)| 20.8 (8.6)  |
| PTSD, n (%)                                | 11 (28)  | 36 (40)      |
| Depression, moderate, n (%)                | 10 (25)  | 14 (16)      |
| Depression, severe, n (%)                  | 3 (8)    | 17 (19)      |
| Anxiety, n (%)                             | 6 (15)   | 13 (14)      |

* n = 40, ** n = 65, age >5.

M = mean. SD = standard deviation. ESES = Electrical status epilepticus during slow-wave sleep. PTSD = post-traumatic stress disorder.
The age at which the child was diagnosed with epilepsy was significantly associated ($t(42) = -2.56$, $p = 0.01$) with PTSD symptomatology (Table 4). Children with PTSD symptoms had a later onset of epilepsy (mean age 7.4 years) than children with no symptoms. No other child or parent-related variables were significantly associated with symptoms of PTSD; however, some qualitative differences are worth noticing. Children with PTSD symptoms had a level of executive functioning within the normal range, whereas children with no symptoms had a level below the normal range. On the contrary, children with PTSD symptoms had more behavioral difficulties than children with no symptoms. Children with focal or multifocal seizures and seizures weekly or less often (not seizure-free) had three to four times higher occurrence of PTSD symptomatology than children with other types of epilepsy or seizure frequency. On further notice, however not statistically significant, 40% of children with PTSD symptomatology lived with a parent with symptoms of psychopathology (Table 4).

### 3.2. Child behavior difficulties

The mean level of child behavior difficulties across all three age groups for the entire sample ($n = 124$) was elevated compared to Danish norms (Table 6). The hyperactivity score and prosocial behavior were problematic across all three age groups, with more significant difficulties regarding hyperactivity and lower prosocial behavior levels than the norms. Except for the preschoolers, the children included in the PTSD analyses had marginal, however not significantly, lower behavioral difficulties than those not included.

#### 3.3. Symptoms of psychopathology in preschool children

Except for bipolar disorder, symptoms of all other measured psychiatric disorders by the DIPA interview were present in the preschool sample ($n = 16$) (Table 3). Of notice are the prevalence of attention-deficit disorder (38%), hyperactive disorder (31%), specific phobia (25%), and sleep onset disorder (31%). In total, 81% of the preschool children had symptoms of one or more psychiatric comorbidity.

### 4. Discussion

The results indicate that children with severe epilepsy experience elevated trauma symptoms and that trauma symptoms increase with age in this group. Despite lower levels of PTSD symptoms in preschoolers, comorbid psychiatric symptoms are as high as 81% for one or more psychiatric comorbidity symptoms. A further significant number of children and adolescents come out with symptoms equivalent to subclinical symptoms of PTSD (41% and 40%, respectively). These children are important to recognize since they do not differ significantly in terms of impairment or distress from children who meet full criteria for PTSD [72]. In comparison to a population study including children who had experienced low-magnitude stressors (events not qualifying as a traumatic event), the prevalence of subclinical PTSD was found in <1% [73]. In this perspective, our findings are concerning irrespective of the magnitude of stressors the included children in our study have been exposed to. Additionally, behavioral difficulties are elevated across all ages, with hyperactivity difficulties and prosocial behavior as the areas of concern in all three age groups.
Trauma studies hypothesize that preschoolers are more susceptible to distress and developmental problems following traumatic exposure, resultant in their limited cognitive capabilities when faced with a traumatic event [32,35,74]. Our results differ from these findings regarding PTSD symptomatology; however, the high prevalence of other psychiatric commodities witnesses some degree of distress. The trauma literature demonstrates high levels of comorbid psychopathology in children with PTSD and in children who have been exposed to traumatic events without developing PTSD compared to children with no exposure [75]. Although children with epilepsy may experience multiple adverse events during childhood, the associations between childhood-onset epilepsy and psychopathology are complex [6,7].

Additionally, the methodological approach to the preschool group should be considered. PTSD and comorbid psychiatric diagnoses were assessed by interviewing the parent, and parental proxy measures of child difficulties might be challenged on its noses. The methodological approach to the preschool group should be considered. PTSD and comorbid psychiatric diagnoses were assessed by interviewing the parent, and parental proxy measures of child difficulties might be challenged on its noses. Parents of children with epilepsy and psychopathology are complex [6,7].

Furthermore, it could be argued that limited cognitive abilities of preschoolers and children with more severe epilepsy, in general, can contribute to a lower level of PTSD symptoms since the children may not perceive the consequences of a situation that is perceived as potentially dangerous or can convey their symptoms [79]. Children with early-onset epilepsy tend to have more severe types of epilepsy and with greater risk of cognitive difficulties. In our study, children with PTSD symptomatology had a mean age of 7 years when diagnosed with epilepsy, whereas children with no symptoms had a mean age of 4. They had higher overall executive functioning, a shorter duration of epilepsy, and one out of three had focal or multifocal epilepsies. These results indicate that the children with symptoms of PTSD were better cognitively functioning and with less severe epilepsy than the children with no symptoms. However, children with PTSD symptoms did have more significant overall behavioral difficulties than children with no symptoms.

Our overall results for the group we could assess for PTSD symptomatology are somewhat adverse to the general findings on psychiatric comorbidity and behavioral difficulties in children with epilepsy [12,80,81]. Children with more complicated epilepsies are known to have higher levels of both compared to children with less complicated epilepsies. One reason for the adverse results for the PTSD group could be that the study includes children with more severe epilepsies only. A comprehensive comparison with children with uncomplicated epilepsies was not possible. However, the results could indicate that higher functioning children with severe epilepsy might better reflect on and express trauma symptoms.

Additionally, 40% of the children with symptoms of PTSD had a parent with psychopathology. Parental psychopathology could contribute to the high concurrency of trauma symptoms in children in the sense of secondary traumatization. Often, it is the parent and not the child that experiences their child's seizures, evidently if it is generalized seizures and could be characterized as a traumatic event by its nature. The caregiver's emotional reaction to a seizure immediately related to the seizure or talking about the event in the distance to the seizure could result in a transference of distress to the child. Furthermore, many diverse events are related to severe childhood epilepsy than seizures characterized as traumatic and jointly experienced by the child and

### Table 5
Post-traumatic stress disorder (PTSD) cluster symptoms for schoolchildren (6–12 yrs.), n = 29.

| Number of cluster (re-experiencing, avoidance, arousal) | 0     | 1    | 2    | 3    |
|--------------------------------------------------------|-------|------|------|------|
| Girls, n (%)                                            | 3 (75) | 2 (40) | 7 (58) | 3 (38) |
| Years with epilepsy, M (SD)                             | 4.8 (3.9) | 3.2 (2.8) | 4.6 (3.0) | 1.43 (0.8) |
| Executive function, M (SD)                              | 84.5 (11.6) | 91.3 (16.0) | 86.2 (6.0) | 84.7 (16.0) |
| Behavioral difficulties, M (SD)                         | 13.5 (5.2) | 11.2 (8.4) | 16.4 (4.0) | 19.3 (6.9) |
| Epileptic encephalopathy, n (%)                         | 0 (0) | 0 (0) | 1 (100) | 0 (0) |
| Focal/multifocal epilepsy, n (%)                        | 2 (13) | 4 (25) | 3 (19) | 7 (44) |
| Idiopathic generalized epilepsy, n (%)                  | 2 (33) | 1 (17) | 3 (50) | 0 (0) |
| ESES, n (%)                                             | 0 (0) | 0 (0) | 5 (100) | 1 (0) |
| Seizure-free, n (%)                                     | 2 (20) | 2 (20) | 5 (50) | 1 (10) |
| Daily seizures, n (%)                                   | 1 (17) | 1 (17) | 3 (43) | 1 (17) |
| Weekly or less often seizures, n (%)                    | 1 (11) | 2 (22) | 2 (22) | 4 (44) |
| Parental psychopathology, n (%)                         | 1 (8) | 1 (8) | 7 (54) | 4 (31) |
| Perceived parental stress, M (SD)                       | 17.3 (2.2) | 13.2 (7.4) | 24.7 (5.4) | 19.4 (7.6) |

M = mean. SD = standard deviation. n = number.
their parents. The parental emotional reactions to the collectively experienced traumatic events could further intensify the child’s experience and emotional reactions. However, further research is needed to clarify how the child’s experiences differ from the experience of their parents to distinguish between secondary traumatization and trauma reactions from direct exposure.

The children in the group that were not included in the PTSD assessment had overall lower levels of functioning. Although the applied measurement tools in this study could not access the more severely impacted children, awareness about trauma exposure and symptoms thereof should be of importance in the assessment of these children, too, as psychiatric comorbidities have shown to be strongly associated with long-term life quality for all levels of epilepsy severity [1].

5. Limitations

Our study has several limitations. The low sample size compromises the power of the study results, and combining three different age groups, yet using different measures of PTSD across the groups, further compromises this. The DIPA and Darryl interviews are based on measuring PTSD according to DSM-IV, and the ITQ questionnaire is based on ICD-11. Although the assessment tools are developmentally sensitive, which is a great strength, the different methodological approaches make it difficult to determine whether the differences across the age groups are due to the age differences or the differences in measurement tools. However, despite some evidence that ICD-11 may reduce diagnostic rates in trauma-exposed populations relative to DSM-5 [82,83], cohort studies find the same prevalence of PTSD across the DSM-IV/5 and ICD-11 when measuring the general population [84]. Future studies could benefit from measuring by the DSM-5 or ICD-11 PTSD across all three age groups.

A further concern could be the questions of the arousal cluster in the Darryl and DIPA interviews. Three out of five areas are related to problems falling asleep, irritability, and hyperactivity. All three symptoms are known side effects of antiepileptic drugs or sequelae to seizure activity. However, the three symptoms are not included in the ITQ questionnaire, which could point to the benefit of the ICD-11 PTSD diagnosis as a future measure of PTSD symptoms in children with epilepsy.

The limitations of the parent-proxy measure of child difficulties and psychopathology in preschoolers have been mentioned above. However, in this study, the possible misinterpretation of the caregivers concerning trauma symptoms in their child might have contributed to a lower rate of trauma symptoms and not the reverse. The prevalence of trauma symptoms in older children is high, and children with early-onset epilepsies are most likely at even higher risk of being exposed to traumatic events during their childhood than children with later-onset epilepsies. Furthermore, the school children were asked about symptoms directly related to their epilepsy and not adverse events associated with epilepsy, such as accidents or bullying. This could have affected the prevalence rate in this age group.

Due to the self-report measure of trauma symptoms in schoolchildren and adolescents, only children with the capabilities to understand and answer the questionnaires were included in the study of PTSD symptomatology. This group of children is solely representative of the better functioning children within more complicated and severe epilepsies. Research on trauma exposure and reactions to exposure in children with more severe epilepsy and lower levels of cognitive functioning might be beneficial. However, it would demand a cautious approach acknowledging the complexity of the condition.

Lastly, we did not include the measure of functional impairment in the Darryl or ITQ tests, and as such, the tests cannot be used as definitive diagnostic tools. Therefore, symptoms of PTSD have been described as symptomatology and not a diagnosis of PTSD.

6. Conclusion

Trauma exposure in severe childhood epilepsy is high; however, to the authors’ knowledge, trauma symptoms in children with more complicated epilepsies have not previously been assessed with standardized tests. This present cross-sectional study assessed 50 children with severe epilepsy in three different age groups (0–5 yrs., 6–12 yrs., and 13–18 yrs.). We found a high number of PTSD symptoms and subclinical symptoms in schoolchildren and adolescents. Twenty-two percent of the overall sample met the criteria for PTSD. The prevalence of symptoms increased with age (6%, 28%, and 40%, respectively). Despite a lower level of PTSD symptoms in the preschoolers, we found comorbid psychiatric symptoms in 81% of the children witnessing a high level of distress in this group. All three age groups had elevated behavioral difficulties, and 40% of the children with trauma symptoms had a parent with concurrent psychopathology. Although the sample size is limited and our methodology is weakened by comparing across age groups and measurement tools, these findings highlight the importance of assessing trauma exposure in children with more complicated epilepsies and how the child experience is affected thereof. The limitations emphasize the need for further studies with larger sample sizes and research into trauma symptoms in children with more severe epilepsy than those assessable with the included assessment tools. The trauma perspective in severe childhood epilepsy might shed further light on the complicated associations between the well-studied biological and contextual variables that affect the quality of life in children with epilepsy and enable better preventative treatment options for this group.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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We confirm that we have read the Journal’s position on issues in ethical publication and affirm that this report is consistent with those guidelines.

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