Section: Pediatrics

Original Research Article

ASSESSMENT OF BEHAVIOURAL PROBLEMS IN CHILDREN WITH EPILEPSY

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ABSTRACT

Background: Epilepsy represents a prevalent neurological condition, exhibiting a lifetime prevalence of 1% among children. The occurrence of emotional and behavioral issues, such as attention deficit/hyperactivity disorder, autistic spectrum disorders, aggression, and atypical social behavior, is notably higher in children with epilepsy, significantly impacting their quality of life. This study was undertaken to evaluate the prevalence of emotional and behavioral issues among children with epilepsy who are receiving care at a tertiary hospital in Sangareddy.

Materials and Methods: Ninety-four children with history of two or more unprovoked generalized or focal seizures with abnormal EEG findings between 6 to 12 years of age were included. Child Behaviour Checklist (CBCL) scoring formats were used to assess the behavioural problems in children.

Results: Behavioral changes were observed in 53.06% of boys and 48.90% of girls and the cumulative behavioral alterations was seen in 51.06%. The observed behavioral changes demonstrate a significant correlation with anti-seizure therapy and seizure control, EEG findings and CT/MRI findings and with seizure type. The common behavioural problem observed in 18.08% of participants was anxiety and depression, followed by internalization in 18.08%, externalization in 14.90%, rule breaking in 10.63%, aggression in 6.38%, strange social behavior in 5.31%, physical problems in 5.31%, sleep problems in 4.25%, and withdrawal in 2.12%.

Conclusion: Children with epilepsy are more likely to exhibit behavioral abnormalities if their seizures are uncontrolled, last for a long time, or are of a certain kind. This emphasizes the need of screening for these issues in children receiving epilepsy therapy in order to identify them early and then manage them to enhance the result.

Keywords: Epilepsy, children, Behavioral problems, Child Behaviour Checklist (CBCL) scoring.

INTRODUCTION

Epilepsy is typically characterized as a sudden and temporary disruption in brain functions, which arises abruptly, resolves on its own, and shows a notable propensity for recurrence.[1] This condition stands as the most prevalent chronic neurological disorder among both the general population and children, impacting approximately 50 million individuals globally. A seizure represents a temporary and sudden disturbance in cerebral function, resulting from the spontaneous and excessive discharge of neurons.[2] The World Health Organization (WHO) describes epilepsy as a neurological disorder marked by the occurrence of two or more unprovoked seizures. In the context of epidemiological classification, epilepsy is defined as occurring when an individual experiences two or more unprovoked seizures within a timeframe exceeding 24 hours.[3]

A significant number of children will experience impacts during their second decade of life. The cumulative incidence of epilepsy stands at 1%.[4] Children diagnosed with epilepsy experience a

range of challenges, including disease symptoms, side effects from treatment, the potential for recurrence, the development of behavioral issues, risk of accidents, and social stigma. The cognitive effects may arise as a result of the damaging impact of seizures on the brain. Behavioral disturbances occur with a frequency five times greater in children with epilepsy compared to the general population. The observed behavioral changes encompass anxiety, impulsivity, hyperactivity, thought issues, social difficulties, and depression.[5,6]

The occurrence of these behavioral problems can be attributed to the disease itself, the side effects of the medications administered, or the malformations present in the central nervous system.[7] This study was conducted to assess the prevalence of emotional and behavioral issues in children with epilepsy receiving care at a tertiary hospital in Sangareddy.

MATERIALS AND METHODS

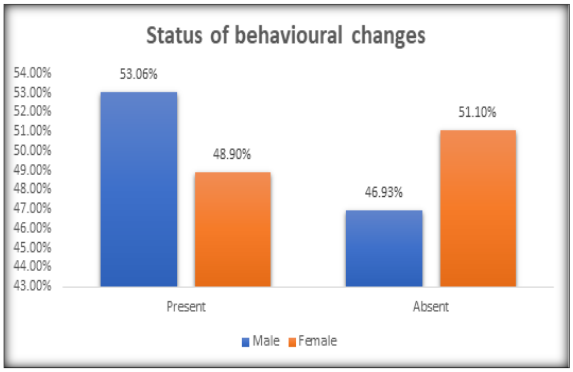
The present study was conducted in the department of Pediatrics in association with Speciality Clinic, Neurology at MNR Medical College at Sangareddy from January 2023 to December 2024. A total of 94 children with history of two or more unprovoked generalized or focal seizures with abnormal EEG findings between 6 to 12 years of age attending Pediatrics OPD and speciality clinic of neurology were included. Cases with mental retardation, developmental delay, febrile seizures, congenital neural tube defects, cerebral palsy, neurodegenerative disorders and cases not willing to participate were excluded. Written informed consent was obtained from parent or guardian and study protocol was approved by institutional ethics committee.

The detailed clinical information and seizure history was obtained from case records. The seizure history including duration of illness, AED medication, age of onset of seizures, type of seizures (controlled/uncontrolled), EEG findings, and abnormal imaging findings were collected. Child Behaviour Checklist (CBCL) scoring formats were used to assess the behavioural problems in children. The initial pages of contains demographic information and ratings of positive behaviours, academic functioning and social competence. Preceding pages consists of common behaviour issues, each depict a statement about the children behaviour. The CBCL scoring formats are different for different age groups and gender. according to which behavioural problems are classified into internalization and externalization problems. Internalization problems are mainly seen in school going children and it mainly includes anxious problems, social problems and depression. Externalization problems are seen in both younger age as well as in school going children. These behavioural problems include impaired attention, anxiety, depression, hyperkinetic, impulsivity and thought problems.

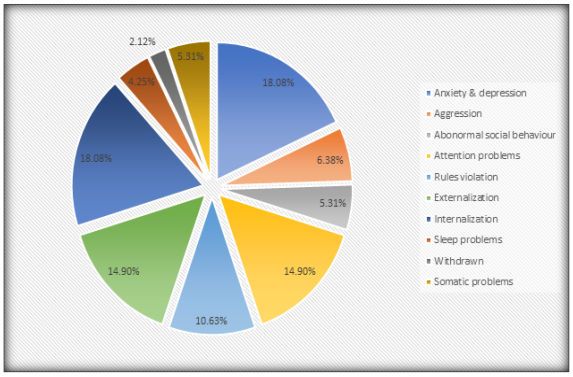
The collected information was analysed by using SPSS 23.0. Demographic information was represented in frequency and percentages. Comparison between various drug groups was conducted by using Chi square test. P<0.05 was considered as statistically significant outcome.

RESULTS

A total of 94 children between age group 6-14 years were selected. Majority participants were females (52.12%) compared to males (47.88%). The mean age of onset of seizures was 6.34 years in females and 6.65 years in males. The mean difference was statistically significant. (p<0.05).



Graph 1: Status of behavioural problems in the study participants



Graph 2: Details of behavioural problems among study participants

Table 1: Sociodemographic details of study participants

Parameters	Male	Female	P value
	Mean±SD	Mean±SD	
Age	10.63±1.67	10.84±3.78	0.184
Onset of seizures	6.34±3.05	6.65±2.46	0.039
Gender	49 (52.12%)	45 (47.88%)	-

Table 2: Therapeutic management and seizure control among study participants

Parameter	Total participants (n=94)	
	Frequency	Percentage
Therapeutic management		
Monotherapy		
Sodium valproate	47	50%
Carbamazepine	12	12.76%
Phenytoin	09	9.57%
Polytherapy	26	27.65%
Status of seizure control		
Controlled	85	90.42%
Not controlled	09	9.57%

Table 3: Correlation of behavioural changes with AED therapy and seizure control among study participants

Behavioural changes	Anti-seizure therapy		Seizure control	
	Monotherapy (n=68)	Polytherapy (n=26)	Controlled (n=85)	Not controlled (n=9)
Absent (n=48)	39 (81.25%)	09 (18.75%)	43 (89.58%)	05 (10.42%)
Present (n=46)	29 (42.64%)	17 (36.95%)	42 (91.30%)	04 (8.70%)
p-value	0.014*		0.031*	

Table 4: Correlation of behavioural changes with EEG and imaging studies among study participants

Behavioural changes	EEG		CT/MRI	
	Normal	Abnormal	Normal	Abnormal
Absent (n=48)	34 (70.83%)	14 (29.16%)	42 (87.5%)	06 (12.5%)
Present (n=46)	33 (71.73%)	13 (28.26%)	41 (89.13%)	05 (10.86%)
p-value	0.001*		0.001*	

Table 5: Correlation of behavioural changes with seizure type among study participants

Behavioural changes	Seizure type		p-value
	GTCS & Others	Non-epileptic	
Absent (n=48)	45 (93.75%)	03 (6.25%)	0.001*
Present (n=46)	36 (78.26%)	10 (21.73%)	

Table 6: T score for different behavioural problems among study participants

Behavioural problems	Mean±SD	p-value
Anxiety & depression	65.92±4.68	0.001
Aggression	63.02±3.90	0.963
Abnormal social behaviour	67.25±3.75	0.024
Attention problems	62.88±4.42	0.036
Rules violation	64.36±3.81	0.016
Thought problems	59.53±5.99	1.032
Sleep problems	59.67±4.70	2.071
Withdrawn & depression	65.84±6.67	0.001
Somatic problems	60.45±3.52	1.578

DISCUSSIONS

The average age was 10.63 years for boys and 10.84 years for girls. The average age at which seizures began was 6.34 years for boys and 6.65 years for girls. The average difference in the onset of seizures was found to be statistically significant ($p<0.05$). The percentage of male participants was 52.12%, surpassing the percentage of female participants at 47.88% (Table 1). Behavioral changes were observed in 53.06% of male participants and 48.90% of female participants. The current investigation demonstrated behavioral alterations in 51.06% of the participants (Graph 1). Sodium valproate was administered to 50% of participants, while carbamazepine was given to 12.76%, phenytoin to 9.57%, and polytherapy to 27.65% of participants. Following the administration of AED medication, a notable 90.42% of participants indicated effective seizure control (refer to Table 2).

The study found that 36.95% of cases treated with polytherapy and 42.64% of cases treated with monotherapy experienced behavioral changes. There was a significant correlation ($p<0.05$) between behavioral changes in 42 cases (91.30%) of people with controlled seizures and 4 cases (8.70%) of people with uncontrolled seizures in the study. Behavioral changes were noted in 29 participants (42.64%) undergoing AED monotherapy and in 17 cases (36.95%) receiving AED polytherapy. Out of the participants, 42 (91.30%) with controlled seizures and 4 (8.70%) with uncontrolled seizures experienced behavioral changes. The observed behavioral changes demonstrate a significant correlation with anti-seizure therapy and seizure control ($p<0.05$) (Table 3).

A total of 71.73% of participants exhibiting normal EEG findings and 28.26% of those with abnormal EEG findings demonstrated behavioral changes. Among the participants, 89.13% had normal CT and

MRI results and 10.86% had abnormal findings, which meant they had behavioral changes. There is a strong correlation ($p<0.05$) between changes in behavior and the results of EEG, CT/MRI, and GTCS, as well as other types of seizures, even ones that aren't epileptic. The common behavioural problem observed in 18.08% of participants was anxiety and depression, followed by internalization in 18.08%, externalization in 14.90%, rule breaking in 10.63%, aggression in 6.38%, strange social behavior in 5.31%, physical problems in 5.31%, sleep problems in 4.25%, and withdrawal in 2.12% (Graph 2).

Karanja SW et al. study of 177 children with epilepsy revealed mean age of 8.9 years, mean age at commencement of seizures of 4.5 years, 48% had first seizure under 2 years old, 76% had generalized tonic-clonic seizures, and 58% were on antiepileptic medicines. 46% of people had emotional and behavioral issues, with attention, aggressive conduct, social problems, and withdrawal/depression being the most common. Children who used several AEDs had higher rates of emotional and behavioral issues. Infrequent seizure and no seizure in the last year lowered the risk of emotional and behavioral issues.[8] A study conducted by Solanki R et al. involving 111 children aged 6 to 14 years revealed that the overall prevalence of emotional and behavioral problems in this population was 38.7%. The four predominant syndromes identified were attention problems (13.5%), aggressive behavior (10.8%), social problems (8.1%), and withdrawal/depression (6.3%). The occurrence of emotional and behavioral issues showed a significant correlation with the age at which epilepsy began, the specific type of epilepsy, the frequency of seizures, and the antiepileptic medication administered to the child.[9]

A comprehensive analysis conducted by Choi HY et al. examined 92 In children and adolescents with epilepsy aged 6 to 17, an increase in social behavioral problems and delinquent behavior was linked to a decline in health-related quality of life. Reduced maternal education levels and the quantity of antiepileptic medications were linked to a decrease in health-related quality of life. Furthermore, health-related quality of life and social behavioral issues continued to show a significant correlation even after controlling for maternal education, the number of antiepileptic drugs, and non-social behavioral problems.[10] A study conducted by Josias KS et al. involving 300 children with epilepsy revealed that 108 (36%) exhibited behavioral problems, with a higher prevalence of internalizing behaviors (28%) compared to externalizing behaviors (21%). The likelihood of behavioral issues rises when co-occurring neurodevelopmental disorders or childhood disabilities are present.[11]

A study conducted by Om P Mishra and colleagues revealed that an earlier age of onset, the frequency of seizures, and the duration of the disease were significantly correlated with behavioral issues. The use of multiple antiepileptic drugs was notably linked to internalizing issues in older children.[12] A study conducted by Shanmuganathan H et al. indicated that behavioral co-morbidities vary among children with epilepsy across different age groups, showing externalizing behavior in younger children and both internalizing and externalizing behavior in older children.[13] A study conducted by Sudhakar Banothu and colleagues, which involved 112 children with epilepsy, revealed that 41 (36.6%) of these children exhibited behavioral problems. Attention-deficit/hyperactivity issues were found to be the most prevalent. In 32% of children exhibiting behavioral issues, normal brain imaging findings were observed.[14]

A study conducted by Datta Soumitra Shankar and colleagues found that 53.8% of children with seizure disorder exhibited significant psychopathology. Children experiencing seizures for over three years and receiving treatment with multiple anti-epileptic medications were independently associated with psychopathology.[15] A study conducted by Singh Rashmi et al. investigated 65 children with epilepsy alongside 65 control subjects, revealing that behavioral problems were present in 44.6% of the epilepsy group compared to 12% in the control group. A notable difference was observed in the domains of hyperactivity and prosocial behavior in children with epilepsy when compared to the control group. However, emotional, conduct, peer problems, and total difficulty scores did not show significant differences between the two groups. Academic challenges were more pronounced in CWE, although absenteeism was not observed in either group.[16]

Consistent with previous research, this study found that epileptic children were more likely to have behavioral issues compared to children without the disorder. The small sample size and exclusive focus on parental data on children are limitations of this research. We did not take into account the educational level of the parents or the opinions from their teachers. Therefore, in order to evaluate the behavioral changes in children with epilepsy, more large-scale research is necessary.

CONCLUSION

Behavioral issues are more common in individuals with uncontrolled seizures. Observed behavioral alterations are more common in patients whose illnesses last longer. The seizure type also has a role in determining behavioral issues. As a result of improved emotional regulation skills in older children compared to younger ones, the most prevalent alterations in school-aged children's behavior were anxiety and depression, social issues, aggressiveness, and attention deficit hyperactivity disorder.

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