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RESEARCH ARTICLE

BEHAVIORAL PROBLEMS IN EPILEPTIC CHILDREN – A TERTIARY CARE EXPERIENCE.

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Keywords:-

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Abstract

Background: Psychiatric conditions such as attention-deficit/hyperactivity disorder (ADHD), autistic spectrum disorders (ASD), and affective, aggressive, and social disorders occur in children with epilepsy (CWE) and have a major influence on the quality of life of these children

Objective: To assess prevalence of behavioral problems in children with epilepsy.

Methods: This was a cross-sectional study of children with epilepsy, and normal controls enrolled. Child Behavior Checklist (CBCL) was used as a tool to assess the behavior based on parents reported observation.

Results: We had 93 children with epilepsy 2-5 years of age and 105 in 6-14 years of age, with 74 and 83 unaffected controls, respectively. Mean CBCL scores for most of the domains in children of both age groups were significantly higher than controls. We detected externalizing domain (23.3%) in 2-5 years, and in both internalizing (21.2%) and externalizing (45%) domains in children of 6-14 years. Younger age of onset, frequency of seizures and duration of disease had significant correlation with behavioral problems in both the age groups. Antiepileptic drug polytherapy was significantly associated with internalizing problems in older children.

Conclusion: Age at onset, frequency of seizures and duration of disease were found to be significantly associated with occurrence of behavioral problems.

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Introduction:-

Psychiatric conditions such as attention-deficit/hyperactivity disorder (ADHD), autistic spectrum disorders (ASD), and affective, aggressive, and social disorders occur in children with epilepsy (CWE) and have a major influence on the quality of life of these children^{1,2,3,4}. CWE exhibit substantially more behavioral problems, particularly those relating to social activity, attention, and problem solving^{5,6}, than do children with chronic non-neurological conditions such as diabetes, asthma, heart diseases, and rheumatoid arthritis.

Children with epilepsy suffer from symptoms of disease, effect of therapy, risk of recurrence, impairment of brain function and development of behavioral problems⁷. Psychopathology has been reported to be associated with

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epilepsy^{8,9}. Psychiatric disorders can occur in 50-60% of patients with epilepsy¹⁰, and behavioral co-morbidities to the tune of 43% of cases¹¹. Previous studies have reported that these children have problems of attention, hyperkinesias, thought, low self-esteem, anxiety and depression^{12,13,14,15,16}. Further, cognitive and behavioral impairments can even occur following a single seizure, and antiepileptic drugs may also alter behavior to some extent¹⁷.

Much remains to be understood concerning the etiology of behavioral problems in epilepsy. The literature is inconsistent, but suggests both biomedical and psychosocial risk factors for behavioral problems in CWE^{5,18}. Potential contributors to variability in outcome have included, type, severity, and duration of epilepsy¹⁹, parenting processes and family dynamics²⁰, and individual characteristics such as early temperament and cognitive performance levels^{21,22}. Associated risk factors that explain variability in outcome in resource-poor countries are yet to be explored.

Previous studies done in children with epilepsy have addressed a mixed age group (4-16 years) and shown variable results in different domains^{23,24}; using child behavior checklist (CBCL), a well standardized tool for detection of behavioral problems in epilepsy^{25,26}. In the present study, we have assessed behavioral problems in two separate age groups (2-5 and 6-14 years) using standard CBCL tool for each group and have tried to find out the differences in pattern of occurrence of behavioral problems. Additionally, factors associated with development of these problems were also analyzed in both younger and older age groups.

Methods:-

This was a cross-sectional study conducted on children with epilepsy who visiting Out Patient Department (OPD) of Department of Pediatrics, Government Medical College, Srinagar.

Purposive sampling method was used for the selection of cases. Informed consent was obtained from the parents or authorized representative of each child.

Children of 2-14 years age group of both gender having idiopathic epilepsy, defined as history of occurrence of 2 or more episodes of unprovoked focal or generalized seizures having normal cranial CT/MRI scan and normal/abnormal electroencephalogram (EEG)²⁷. Controls were recruited from the OPD of Pediatrics who came for their routine health check-up and were found healthy, and they belonged to similar age group as of patients with epilepsy. *Exclusion criteria:* Patients with the diagnosis of symptomatic epilepsy syndromes, epileptic encephalopathy, febrile seizures, cerebral palsy, developmental delay, mental retardation, neurodegenerative and metabolic disorders, neurotuberculosis, and neurocysticercosis were excluded from the study.

Frequency of seizure was defined as per Sabbagh, *et al.*²⁸. All patients were receiving antiepileptic drugs (phenytoin sodium/sodium valproate/carbamazepine/ clobazam) either as monotherapy or in combinations of two or three. Children who were admitted for acute control of seizures were assessed once it was controlled and they were discharged from the hospital. Controlled seizure was defined as cases who were seizure free for at least 6 months before assessment and those who had recurrence of seizures despite antiepileptic medications were considered as uncontrolled seizure. Revised Kuppaswamy scale was²⁹ was used for the assessment of socio-economic status.

Assessment for behavioral problems was done by a clinical psychologist. The native language of the study population was Kashmiri and the questions were translated from English in Kashmir,

Counseling was provided to children and families having clinical range abnormalities, and non-responders were referred to psychiatrist for pharmacotherapy.

Statistical analysis Data obtained was entered into Microsoft Excel and was analysed in Statistical Package for Social Sciences (SPSS Ver. 20). Student's 't' test was used to compare the observations of patients with controls. Chi-square test was applied for comparisons of data of proportions. A *P* value of <0.05 was considered as statistically significant.

Results:-

A total of 70 children with epilepsy and 70 healthy controls in a similar age group were enrolled, and were further sub-divided into two age-groups: 2-5 years (32 epilepsy and 29 controls) and 6-14 years (38 epilepsy and 41

controls). Mean and standard deviation of age of onset of disease was 2.4 ± 1.73 years and 4.3 ± 2.32 years in 2-5 and 6-14 years age-group, respectively. We had 41 males in 2-5 years and 51 in 6-14 years age-groups in cases with epilepsy. In 2-5 years age group, 31 (51.7%) received sodium valproate, 10 (16.7%) phenytoin sodium and 19 (31.7%) cases drugs in combinations (levetiracetam, carbamazepine/oxcarbamazepine, clobazam); The corresponding figures in 6-14 years age-group were 45 (56.2%), 10 (12.5%) and 25 (31.3%), respectively.

No significant differences in total behavioral problems between children on monotherapy as compared to polytherapy in both younger (10.5% vs 17.1%, $P=0.35$) as well as older age groups (35% vs 41.5%, $P=0.41$), respectively. A relatively higher percentage of children with below average IQ had total behavioral problems in comparison to those who had average IQ in both younger (18.6% vs 13.6%, $P=0.96$, relative prevalence (RP) 1.15, confidence interval (CI) 0.25- 5.30) as well as older age group (49% vs 34%, $P=0.15$, RP 1.03, CI 0.39-2.75), but the differences were found to be insignificant. Thirty nine (65%) children in 2- 5 years group and 44 (55%) in 6-14 years had controlled seizures and the rest had uncontrolled seizures at the time of assessment. In younger age-group, there was no significant difference in the occurrence of behavior problems between children with controlled and uncontrolled seizures (2.5% vs 9.5%, $P=0.25$, RP 0.18, CI 0.48-12.37). However, in the older age group, children with uncontrolled seizures had higher incidence of behavior problems than children with controlled seizures (50% vs 18.1%, $P=0.003$; RP 2.44, CI 0.07-0.50). None of the parents of cases had any history of psychological problems. No significant differences in mean values of different domains were found in children on monotherapy versus polytherapy in both age groups. However, in the 6-14 years age-group, uncontrolled seizures were significantly ($P<0.05$) associated with internalizing behavioural problems.

Mean values of behavioral scores in patients with epilepsy aged 2-5 years were significantly higher as compared to control in the CBCL domains of emotional reactivity ($P=0.021$), withdrawn ($P=0.004$), attention problems ($P<0.001$), aggressive behavior ($P<0.001$), externalizing ($P<0.001$) and total behavior problems ($P<0.001$). In the 6-14 years age group, all the domains showed significantly higher scores in patients than controls, except somatic complaints and thought problems. Further, 23.3% children with epilepsy of 2-5 years had externalizing behavior scores, and 21.2% and 45% of 6-14 years had internalizing and externalizing behavior scores in the clinical range, respectively.

Age of onset of seizure had negative correlations with total behavior problems ($r= -0.289$, $P<0.05$) in 2- 5 years, and with internalizing ($r= -0.230$, $P<0.05$), externalizing ($r= -0.243$, $P<0.05$) and total behavior problems ($r= -0.339$, $P<0.01$) in 6-14 age groups. Frequency of seizure had positive correlations with externalizing ($r=0.41$) and total behavior problems ($r=0.37$) in younger age-group, and also in older age-group older ($r= 0.251$ and 0.410 , respectively). Duration of disease had positive correlations with internalizing behavior problems in both younger ($r= 0.307$) and older age groups ($r= 0.251$). Further, in older children, significant positive correlations were found for antiepileptic drug polytherapy ($r= 0.293$) with internalizing behavior problems.

Discussion:-

In the present study, most of the behavior domains in children with epilepsy had higher mean scores than controls, but below the cut-off levels. Externalizing behavioral problems appeared to affect patients of both the age-groups, but internalizing behavior such as depression and anxiety were mostly limited to school-age children.

Table 1:- Cbct T Scores In Controls And Children With Epilepsy In 2-5 Years Age-Group

Domains	Controls [n=29]		Epilepsy [n=32]		P-value
	Mean	SD	Mean	SD	
Emotionally reactive	52.6	4.72	54.9	5.73	0.031*
Anxious/depressed	53.1	4.23	52.6	3.51	0.522
Somatic complaints	51.8	5.13	50.2	4.72	0.107
Withdrawn	50.7	2.83	53.1	4.15	0.001*
Sleep problems	51.2	2.15	51.7	3.27	0.369
Attention problems	53.9	4.12	62.2	5.18	<0.001*
Aggressive behavior	53.8	3.79	58.7	4.65	<0.001*
Internalizing problems	47.3	6.84	49.5	5.82	0.086
Externalizing problems	51.6	5.82	60.7	6.13	<0.001*
Total behavior problems	51.7	4.26	54.8	5.13	0.002*

Table 2:- CBCT T scores in controls and children with epilepsy in 6-14 years age-group

Domains	Controls [n=41]		Epilepsy [n=38]		P-value
	Mean	SD	Mean	SD	
Anxious/depressed	51.4	3.56	54.8	4.12	<0.001*
Withdrawn/depressed	56.2	2.89	59.5	3.15	<0.001*
Somatic complaints	57.1	4.14	56.2	3.16	0.227
Social Problems	52.6	3.52	57.7	4.29	<0.001*
Thought Problems	50.5	3.19	50.8	2.78	0.617
Attention problems	52.6	2.89	58.2	3.14	<0.001*
Rule breaking behavior	52.2	4.16	55.8	3.21	<0.001*
Internalizing problems	49.5	5.12	54.7	4.58	<0.001*
Externalizing problems	53.5	4.56	62.8	3.71	<0.001*
Total behavior problems	52.8	5.82	56.7	4.62	<0.001*

Impaired attention, anxiety, depression, hyperkinetic, impulsivity, low self-esteem and thought problems are some of the co-morbidities reported earlier, mostly in mixed age-group of children^{11,12,13,15}. In addition, educational underachievement has been also observed in these children²⁹. Behavior problems may not only occur following idiopathic epilepsy but also due to secondary causes like neurocysticercosis³⁰. Abnormal excitability and disrupted synaptic plasticity in the developing brain can result in epilepsy and subsequently behavior problems in these patients³¹.

We did not observe any difference in the incidence of behavioral problems in children with below average IQ in comparison to cases with average IQ in both the age groups. It may be possible that effect of IQ was not distinctly seen because of lesser number of cases in the sub-groups. In contrast, Buelow, *et al.*³² observed a higher risk of occurrence and mean problem scores increase with low IQ as compared to patients having middle or high IQ groups, and all types of problems were found in children with low IQ. Similar to our findings, Powell, *et al.*³³ also observed no significant difference in behavior between children with epilepsy having decreased seizure-frequency as compared to those with good seizure-control.

A significant effect of age of onset, frequency of seizures and number of antiepileptic drugs in relation to behavioral problems have been reported earlier^{11,16,28}. We found younger age of onset, and frequency of seizures were significantly associated with behavioral problems. In addition, duration of disease in both age groups and anti-epileptic drugs in older children also affected the internalizing problems. However, no difference in behavioural problems was observed between mono and polytherapy. In contrast, effect of polytherapy over behavioural problems was found by Datta, *et al.*³⁴ in their patients with epilepsy. It appears that multiple factors affect the behavioral domains in children with epilepsy. Further, it is likely that the child's psychological perception of the disease situation, especially in older children, could be another contributing factor to the patient's behavior during the course of illness. Thus, use of minimum number of antiepileptic drugs for seizure-control should be aimed, to minimize the occurrence of behavioral impairment in these children.

The strength of the present study is the use of a standardized validated measurement tool, applied in two age-groups of population to observe the different behavioral pattern. However, it has certain limitations as findings are based only on parent-reported observations. We did not observe the effect of parental educational level and teacher-report of school-going children, which may limit the generalizability of the results up to some extent. Further, it would be also be pertinent to carry out follow-up assessments to document resolution of problems after discontinuation of treatment.

In conclusion, due attention should be given for recognition of behavioral co-morbidities in children with epilepsy. They need periodic assessment during epilepsy treatment and if abnormalities are detected, may need counseling and also adjustment on behalf of parents.

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