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DEPARTMENT OF PEDIATRICS AND CHIDHEALTH

Prevalence of Behavioral Problems among Epileptic Children on Follow up at Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia

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List of Abbreviations

ADHD-attention-deficit hyperactivity disorder

CNS- central nervous system

CWE-children with epilepsy

EEG- electroencephalogram

SDQ-p-strength and difficulties questioner parent version

TASH-Tikur anbessa specialized hospital

U.K- united Kingdom

ABSTRACT

Background: Children with epilepsy are documented to have increased incidence of behavioral and psychiatric disorders. The reported prevalence range from 30%to 66% according to studies from developed and developing country's respectively. The magnitude of this co morbidity is not known in Ethiopia.

Objective: To assess the prevalence of behavioral abnormalities among children on follow up at Tikur anbessa specialized hospital pediatric seizure follow up clinic using SDQ-p form.

Method: a facility based cross sectional study was carried out in Addis Ababa from February 1-June 30,2014G.C.the source population was epileptic children who visited TASH pediatrics seizure follow up clinic, accordingly 384 children were included in the study.

Results: in this study 36.2% of the CWE have high or abnormal total difficulty score. In bivariate logistic regression model older children aged 11-14 were more likely to have abnormal result (p value<0.05).
On the subscales of the SDQ conduct problem and peer relationship problem were more likely in the age group 11-14 (OR=2.3, 95% CI: 1.4, 3.82) and (OR=1.97, 95%CI 1.12, 3.47) respectively. Abnormal emotional and prosocial problem scores were more likely in the age group 5-7(OR=2.35, 95%CI, 1.12-4.93) and (OR=3.59, 95%CI, 2.12-6.06) respectively.

1-Introduction

1.1 back ground

Epilepsy, one of the most common central nervous system disorders affecting children, is defined as the presence of two or more seizures occurring at least 24 hours apart. According to WHO 2012 estimate, 50 million people worldwide have epilepsy, of which 80% live in developing countries [1].

In general approximately 5% to 10% of children have a seizure during the first two decades of life and 1% develops epilepsy [2].

Based on International classification of epileptic seizures [3], the seizure types are classified as Partial- when the first clinical and electrographic changes indicate activation of neurons limited to part of one hemisphere and generalized seizure when the first clinical and electrographic changes indicate initial involvement of both hemispheres. Further subdivision on partial seizures is made depending of the level of consciousness during the attack.

Simple partial seizure- occur with intact consciousness, additional classification is based on the symptoms as (with motor symptom, somato sensory symptom, autonomic symptom, psychic symptom)

Complex partial seizure – is associated with loss of consciousness. Which could have simple partial onset or with impaired consciousness from onset.

Further classification for generalized seizures

Non convulsive---absence seizure (typical or atypical)

Convulsive----- (myoclonic, clonic, tonic, tonic-clonic, atonic)

Recently a system of categorizing childhood epilepsy in to syndromic category is becoming widely accepted .Children in the same syndromic category show similarity in terms of age of onset, the type of seizure activity, electroencephalogram (EEG) finding , response to treatment and the way epilepsy affects them. This categorization helps in predicting the course and outcome of the patients and helps in guiding treatment.

Around 70% of the epilepsy cases will respond to treatment. However due to the stigma and discrimination associated with the disease only 3/4th of the affected people in developing countries seek for medical help [1].

In Ethiopia an estimate of 400,000 people live with epilepsy of which 85% are children and only 3% of them get treatment due to associated stigma with the disease and due to other social and economical factors [4].

1.2 Statement of the problem

Epileptic children show increased frequency of associated behavioral problems. The prevalence of behavioral problems in children with epilepsy is said to be twice that seen in children with chronic illnesses not involving the CNS and four times that seen in healthy children [5]. Among the behavioral disorders, Symptoms of attention-deficit/hyperactivity disorder (ADHD) have been found in approximately a third of the children with epilepsy [6-9]. Mood disorders and anxiety are also observed in adolescent age group, with approximately one-fourth of them exhibit symptoms of depression [5].

The development of behavioral abnormalities in epileptic children is multifactorial. Central nervous system damage is one of the major risk factors identified. More than half of children with epilepsy and additional evidence of CNS dysfunction have significant behavioral problems. In different studies Early Age at onset was mainly associated with cognitive impairment rather than with behavioral abnormality. The seizure type and frequency were also studied to show that behavioral abnormalities to be more common in those with poorly controlled or intractable seizure and in those with new onset epilepsy.

The role of antiepileptic drugs in the development of behavioral problem as described in many studies is not significant .however the use of Phenobarbital and benzodiazepines have been associated with reports of hyperactivity [10].

Psychosocial factors may also contribute to the development of behavioral problems. Children living in stress full environment, presence of poor communication within the family and the child's negative attitude towards the illness especially in adolescents may predispose to development of behavioral abnormality [11].

The impact of Behavioral problems that appear in early childhood usually will extend in to adult life progressing in to a psychiatric disorder [12]. Identifying and addressing these problems early will have a significant positive effect on seizure control, school performance and social interaction as well as on reliving the stress on parents and also on preventing development of more severe form of psychiatric disorders.

The traditional approach to epilepsy care has been to focus on the seizures and their treatment. Which occupy only a small proportion of the patient's life, and fail to address many of the issues that have an adverse impact on the quality of life of the patient with epilepsy [13]?

In our country, care of these children is provided mainly by psychiatry specialized nurses, general practitioners, psychiatrists, pediatricians and neurologists without a strong established coordination and use of screening technique for this comorbidity.The follow up mainly focus on seizure control and seems to undermine the significant overlapping co morbid psychiatric problems these children may face.

1.3 Rationale of the study

This research was intended to fill this gap and assess the children under follow up at TASH for behavioral problems using a standardized questioner developed and used for this purpose. This will help to recognize the magnitude of the co morbid psychiatric problem and will help to expand the care provided to epileptic children .furthermore since no other research on the topic is available in Ethiopia, the generated new data on the Comorbidities of behavioral problems in epileptic children may be used to strengthen the need to establish a coordinated management between the two specialties (psychiatry and neurology) for providing a better quality care for CWE.

2- Review of Literature

Children with epilepsy (CWE) are observed to have increased incidence of psychiatric disorders as compared to the normal population as well as with children having other chronic diseases not involving the CNS. Population based studies from developed countries confirm at least 30% of CWE have a concomitant psychiatric diagnosis. The usual behavioral abnormalities are particularly related to social activity, attention, and problem solving [5-15-17].

An Italian research by Andrea De Giacomo and his colleagues compared the incidence of behavioral abnormalities in 3 groups of patients (epileptic, oncology and endocrine) using SDQ-p (an Italian version) .which showed large portion of the abnormal score result was from epileptic children followed by oncology and endocrine patients. The result obtained on the study agrees with those reported in the literature [18].
Similar result was obtained in population-based study done in Norway by Kristin .A Alfstad and colleagues, using the Strengths and Difficulties Questionnaire-Parent report (SDQ-P). It was found that Children with epilepsy (CWE) had a significantly higher frequency of psychiatric symptoms (37.8% vs. 17.0%) as compared to controls. Gender differences were found in several subscales of the SDQ; girls having more emotional problems, where as boys had higher scores regarding peer relationship and hyperactivity/inattention problems. Male gender, low socioeconomic status (family income below poverty limit and living in single parent home), and other chronic disease (asthma/diabetes) were independent risk factors of developing psychiatric symptoms, along with epilepsy identified in the study [19].

On Japanese study conducted on 84 epileptic children on follow up at a pediatric neurology clinic using SDQ were assessed and result compared with the Japanese standard. The scores for inattention were significantly higher in epileptic children, the conduct problem and peer problem scores were also higher than the standard group. While the score for prosocial behavior fail to show no significant difference [20].

Studies from developing countries show even higher incidence of the problem. This difference is likely to be caused by the high level of untreated epilepsy. Indian and Thailand studies show a higher incidence of behavioral disorders in children with epilepsy 54% and 57% respectively [21-22].

A Nigerian study conducted on epileptic children having follow up at pediatric neurologic clinic of a university hospital using a Rutter scale questioner also showed a high prevalence of behavioral problems (46.6%) in these children. the prevalence was higher for the male gender as shown in the study.
Similarly community based case control study from Tanzania using a Rutter scale showed that behavioral disorders are prevalent in 66% of children with epilepsy and 19% of controls.

Among the behavioral disorders ADHD was present in 53% and was higher in males. Frequent seizure and poor scholastic attainments were associated with the condition. The study shows no association between behavioral disorders and the use of AEDs [24].

A study from Kenya compared prevalence of behavioral disorders in CWE and age matched children without epilepsy using a parent rated child behavioral questioner .Higher incidence of behavioral disorder was found in the epileptic group (49% vs. 26%).active epilepsy ,cognitive impairement,focal seizures were the most significant covariates of behavioral problems[25].

3- Objective of the study

3.1- General objective

To assess the prevalence of behavioral abnormalities in children with epilepsy on follow up at TASH

3.2 Specific objectives

1. To identify socio demographic and socio economic characters that affect prevalence of behavioral abnormality
2. To identify seizure parameters that affect prevalence of behavioral abnormality

3. To identify the subtypes of behavioral abnormalities present in the children.

4. Material and Method

4.1 Material

Strength and difficulties questioner parent version was used for screening. This questionnaire was developed by a U.K child psychiatrist Robert N. Goodman in and is translated to over 60 languages including Amharic by Atalay Alem (prof.), Daniel Fikadu W/Giorgis, souci Frisa, David Appleyad and is available on line. This short behavioral screening questionnaire is easy to use and can be completed in about five minutes. It is designed to be filled by parents and/or teachers of children aged 3-16 years and self-report in11-16 year olds. Its effectiveness in assessing childhood behavioral abnormalities and emotional difficulties is comparable with other widely accepted questioners like child behavioral check list.

The questionnaire consist 25 questions presented on a single sheet .Each can be answered as true, partially true or not true. The score for each question ranges from 0 to 2 points. The questions are divided into 5 subscales, each of which explores a different area of skill or difficulty, so being able to identify partial scores diversified for behavioral problems, emotional symptoms, hyperactivity, and problematic relationships with peers, prosocial behavior

The total score is obtained by summing the scores of all questions of subscales except those related to prosocial behavior and can vary from 0 to 40 points. The partial and total scores are compared to a normative scale that allows defining the cut-off for normal, borderline or abnormal results [26].

4.1.2 Method

The questionnaires were filled out by primary care givers who give consent to participate on the study. The collected data was checked for completeness and entered on SPSS version 21. The standard labeling and scoring system of the questionnaire was followed strictly .The

answer “not true” was labeled 0,”somewhat true” labled 1 and “certainly true” was labled 2.The responses was given same score as the response item that is 0- for “not true”, 1 for “somewhat true” and, 2 for “certainly true” except for questions 07, 11, 14, 21 and 25 which are scored in reverse. The summation score was calculated only if at least 3 or more of the questions in each category were answered.

$$Summary\,score = \left(\frac{Sum\,of\,(item\,scores)}{N\,of\,valid\,(completed)\,Items} \right) \times Number\,of\,Items$$

The total difficulties score was obtained by adding up the summary scores and the result was rounded to the nearest whole number.

Total Score = Emotional Scale + Conduct Scale + Hyperactivity Scale + Peer Problem Scale

For impact score which identifies whether the child has difficulty at home, school or with friends as perceived by his/her parents was scored for children whose primary caregiver answered “yes” to question number 26. The responses to question number 28,29,30,31 & 32 were scored accordingly. The score for each question was added and interpretation was done based on the result. To minimize false positivity, children having only high score were considered as abnormal in this study and children with normal and borderline score are added together with the normal .Analysis and distribution of those with only high score was made.(see annex 1 how to interpret SDQ score)

4.1.1 Study Area

The study was conducted in Addis Ababa the capital city of Ethiopia at Tikur Anbessa specialized hospital (TASH) pediatrics seizure follow up clinic. TASH is the largest referral hospital in Ethiopia providing service for referred patients from every corner of the country. It is also a training center for health sciences in both undergraduate and post graduate programmes. The pediatrics department of the hospital provides both inpatient and outpatient services including regular follow up clinics. Seizure follow up clinic which is held throughout the working days is one of the clinics with high attendance of patients a minimum of 50 patient visits per week.

4.2 Study design

A facility based cross sectional study design was used

4.3 Study population

The source population for the study was epileptic children who visited TASH pediatric seizure follow up clinic during the study period.

4.4 Eligibility criteria

- Inclusion criteria- all epileptic children above 5yrs of age
- Exclusion criteria
    - Children with hearing or visual impairment, and those with global developmental delay including language and motor
    - Children not attended by a primary care giver

4.5 Sampling procedure

Systematic sampling technique was used taking the average visit of epileptic children at seizure clinic being a minimum of 50 per week and minimum of 200 per month the sampling frame would be 1200
(i) Total Sample Size (SS) = N = 384
(Ii) Sampling frame (p) =1200
(iii) Sampling interval (SI) = P/N =384/1200=0.32
I.e. taking arbitrarily the first patient every 3rd patient coming to follow up will be asked to fill out the questioner

4.6 sample size and sampling technique

Since no similar study is available in our country the proportion of children with epilepsy and having behavioral problems is taken to be 50%
Assumption: P taken as (X% or 50%).
Margin of error (d) = 0.05
With 95% confidence level □ = 0.05
Formula used to determine the sample size
N= (z□/2) 2 * P (1-P) = (1.96) 2 * P (1-P)
d2 (0.05) 2
Based on the above assumption and using the following formula the sample size is calculated as:

$$n = \frac{(z^* \alpha/2)2 * P (1-P)}{d2}$$

n= (1.96)2 * 0.50 (1-0.50 = 384
(0.05) 2
Considering that 10% of the caregivers may not provide complete information, 10% of the calculated sample size would be added to the final sample size figure.
Thus, the final sample size would be: calculated sample size + 10% of the calculated data collected will be ----422

4.7 Data collection

The Amharic version of SDQ was discussed with the data collector and the purpose of the study as well as the inclusion and exclusion criterion were discussed .The working residents at the clinic were also informed about the research and were willing to assist if difficulty raised during the data collection .The questionnaires were distributed to the clinic and after obtaining a verbal consent from the caregivers of the children, the first part of the questioner (1st page) only was filled by the data collector ,and the remaining sections were filled by the main care giver of the child. The chart numbers were registered in a separate paper to avoid repeation and for checking any missed or incomplete data.

4 .8 Data quality control

During the supervision, quality and completeness of gathered information by the data collector was checked periodically by the investigator and timely corrections and few amendments of the questionnaire (1st page) were made.

4.9 Data management

After manual cleaning, data entry and analysis was done using SPSS version 21.0 statistical soft ware. During analysis the variables were defined, categorized and recoded then frequencies of the different variables were determined, cross- tabulations and chi-square test were used to test presence of relationship between two variables. With bi-variate analysis, crude odds ratio with 95% CI was calculated for selected explanatory variables.

4.10 Ethical considerations

Ethical clearance was obtained from Addis Ababa University, Department of Pediatrics and child health Research and publication committee (DRPC). Efforts were made to maintain the confidentiality of the data. All the study participants were reassured that they would be anonymous. Respondents were clearly told about the study and the variety of information needed from them and the service would not be withheld if they refuse to participate. They were given the chance to ask anything about the study and made free to refuse or stop the interview at any moment they want.
The issue of informed consent, privacy and confidentiality was given emphasis and discussed with the data collector. Informed verbal consent was sought from all study participants at all levels.

4.11 Variables

4.11.1. Independent variables

- Socio demographic and socioeconomic variables-Age, Marital status of parent, Educational status, monthly Income, Religion,
- Disease related variables - seizure type, age at onset, duration of treatment, and control of seizure

4.11.2. Outcome variable

- Behavioral problems

4.12 Operational definitions

The Scoring system of SDQ used in the study

	Normal	Abnormal
Total difficulty score	0-16	17-40
Emotional problem score	0-4	5-10
Conduct problem score	0-3	4-10
Hyperactivity score	0-6	7-10
Peer relationship problem score	0-3	4-10
Prosocial behavior problem score	5-10	0-4

Result

Primary care givers of 384 epileptic children who give consent to participate in the study were interviewed and filled the SDQ-p questioner. Analysis of the data was made on questioners with no non response rate.

206 of the participants were boys and 178 were girls' making 53.6% and 46.4% respectively socio-demographic characteristics of the study participants is shown on (table1). The mean age of the participants was 8.7yr (+/- 2.5yrs). 30.2% came from Oromiya region, 28.1% from Amhara, 11.5% from A.A .The educational status of the parents 79.9% were primary school completes, 9.9% completed secondary school and 6% have higher education level, 3.9% illiterate.

The monthly family income was below 150 birr for 2.3% of them. 29.2% have income in the range of 651-1400 birr, 42.9% between 1400-3500 and 25.3% were above 3500.

On the living arrangement of the children 84.9% have parents who are living together while 13.5% of the children are living with single parent including (widowed and divorced) the remaining 1.6% are living with other relatives.

Table 1: Socio-demographic and socio-economic characteristics of the study participants'. TASH, seizures follow up clinic February 1 - June 30, 2014, Addis Ababa.

Characteristics	Number	Percent
Age group		
5-7	147	38.3
8-10	129	33.6
11-14	108	28.1
Sex		
Male	206	53.6
Female	178	46.4
Region		
Oromiya	117	30.5
Amhara	111	28.9
Addis Ababa	44	11.5
Tigray	42	10.9
SNNPR	29	7.6
Others	41	10.7
Religion of parents		
Orthodox	213	55.5
Muslim	85	22.1
Protestant	66	17.2
Others	20	5.2
Living condition		
With married parents	326	84.9
Single	15	3.9
Divorced	13	3.4
Widowed	24	6.3

With relatives	6	1.6
Educational status of care givers		
Illiterate	15	3.9
Primary school	307	79.9
Secondary school	38	9.9
Higher education	23	6
Monthly income of caregivers		
<651 birr	40	10.4
651-1400 birr	82	21.4
>1400 birr	262	68.2

With regard to the onset of epilepsy ,32 patients(8.3%) have duration of illness less than a year while in 352(91.7%) it has been longer than a year.39 patients (10.2%) have onset in the first year of life. 339(88.3%) of the children seek treatment at the onset of illness and 45(11.7%) after a lag time of 3month on average. 211 (54.9%) of the children are being followed with a diagnosis of generalized tonic clonic seizure and 7(1.8%) children with a diagnosis of myoclonic seizure.(Table 2)

Table 2: Type of seizure prevalent in the study participants', TASH pediatric seizure clinic from February 1-June 30, 2014, Addis Ababa

Type	number	percent
Atonic	8	2.1
Myoclonic	7	1.8
Absence	10	2.6
Complex partal	14	3.6
Partial	31	8.1
Mixed	31	8.1
Unclassified seizure disorder	72	18.8
Generalized tonic clonic seizure	211	54.9

Table 3: Selected seizure variables of the study participants'. TASH February 1-June 30, 2014, Addis Ababa

	Number n=384	percent
Illness duration		
>1 year	352	91.7
<1 year	32	8.3
Onset in the first year of life		
yes	16	4.2
no	368	95.8

Seizure frequency		
>/= once in a day	183	47.7
No seizure for >3months	201	52.3

183 (47.6%) children report seizure at least once in a day while 104(27.1%) have seizure 2-4 times in a month and 97(25.3%) patients are seizure free for at least the past 3 months. Among 384 study participants 139 has obtained a high total SDQ-p score making 36.2% of all the participants these 73 (52.5%) were boys and 66(47.5%) were girls. Prosocial behavior score was abnormal in 102 boys (49.5%) and 83(46.6%) of the girls. Similarly the peer relationship score was abnormal in 265 children (69% of the total) of which 136 are boys and 129 were girls. (Figure 1)

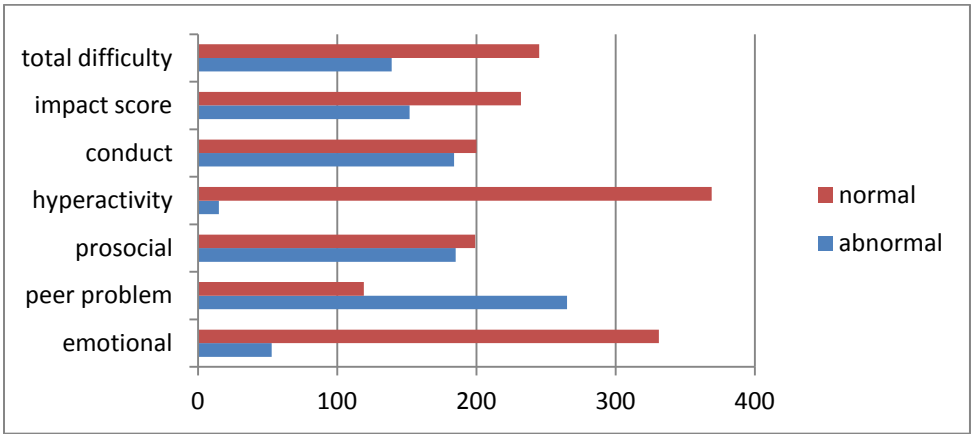

Figure 1: Distribution strength and difficulties questionnaire score among the study participants .TASH pediatric seizure clinic from February 1-June 30, 2014, Addis Ababa

The score for hyperactivity/inattentive behavior was abnormal in 15(3.9%) of the participants (table 4).Caregivers of 152 participants answered yes to the question “do you think the problem the child is having affect him/her in one of the following home life, school life, relationship with friends or leisure activity?” Making 39.6% of the care givers.

Table 4: Age distribution of abnormal SDQ score among the study participants’. TASH from February 1 -June 30, 2014

n=total abnormal SDQ-p score	Age category in year, Number of cases, (percent from the total)		
	5-7 years	8-10years	11-14years
Emotional problems(n=53)	31(58.4)	11(20.8)	11(20.8)
Conduct problems(n=184)	55(29.9)	66(35.9)	63(34.2)
Hyperactivity problems(n=15)	5(33.3)	6(40)	4(26.7)
Peer problems(n=265)	94(35.5)	87(32.8)	84(31.7)
Prosocial problems(n=185)	93(50.3)	57(30.8)	35(18.9)
Total difficulty	44(31.7)	49(35.2)	46(33.1)

problems(n=139)			
Impact problems(152)	67(44.1)	44(28.9)	41(27)

In the bivariate analysis the effect of gender on the total difficulty score as well as on the impact and the summary scores of SDQ-p was not statistically significant.
Binary Logistic regression was used to measure the prediction of behavioral problems in CWE by each covariate. The age categories 11-14 yrs were 1.7 times more likely to have a high SDQ-p score with 95% CI. While children who have onset of seizure in the first year of life were less likely to have high total difficulty score (OR-0.177 with 95%CI) .On multivariate analysis seizure onset in the first year of life have only a statistically significant association (AOR=0.187 95%CI). (Table 5)

Table 5 results of bivariate and multivariate logistic regression analysis of background covariates of behavioral problems of the study participants' .TASH pediatric seizure clinic from February1 – June 30, 2014 G.C

covariates		Crude Odds ratio(95% CI)	P value	Adjusted OR	p value
Socio demographic characters					
Age	5-7	1			
	8-10	1.43(.869-2.368)	0.159		
	11-14	1.737(1.033-2.920)	<0.037*		
Sex	Male	0.931(0.614-1.414)	0.739		
	Female	1			
Marital status of parents					
	married	1			
	Single parent	0.988(0.538-1.815)	0.970		
Illness duration					
	<1year	1			
	>1year	1.765(0.770-4.043)	0.179		
Onset	in 1st year of life				
	yes	0.177(0.610-0.508)	<0.001*	0.187(0.065-0.541)	0.002
	no	1			
Income					
	<651birr	0.833(0.415-1.673)	0.608		
	>651birr	1			
Seizure control					
	>/=once in a day	0.991(0.587-1.673)	0.973		
	Seizure free for>3months	1.675(0.944-2.970)	0.078		

On the summary scores of the SDQ, children with age category of 5-7 yrs were more likely to have high emotional problem score and abnormal prosocial score with (odds ratio2.357 with 95%CI) and (odds ratio3.59 with 95%CI) respectively while the older age group 11-14 were

more likely to have abnormal peer relationship score (odds ratio1.97with 95%CI) and conduct problem score (odds ratio2.3 with 95%CI). (table 6)

Table 6: Results of bivariate linear regression analysis of age category as predictor of having abnormal score on the subscales of SDQ

subscales	5-7 yr		8-10 yr		11-14yr	
	Odds ratio(95%CI)	p-value	Odds ratio(95%CI)	p-value	Odds ratio(95%CI)	p-value
emotional	2.35(1.12-4.93)	0.037	0.82(0.34-1.97)	0.662	1	
conduct	1		1.71(1.08-2.83)	0.020	2.3(1.4-3.82)	0.001
hyperactivity	0.91(0.24-3.49)	0.897	1.26(0.35-4.62)	0.718	1	
Peer relation problem	1		1.16(0.71-1.92)	0.542	1.97(1.12-3.47)	0.018
Prosocial problem	3.59(2.12-6.06)	0.001	1.65(0.97-2.81)	0.065	1	
impact	1		0.61(0.38-1.01)	0.053	0.73(0.44-1.21)	0.225

Discussion

In this study, 36.2% of CWE aged between 5-14yrs were found to have abnormal total score of SDQ .This finding was similar with the psychiatric symptom that was reported in epileptic children from other studies done in the developed countries [18-20]. The rate was 37.8% in a Norwegian study using the same questioner on epileptic children aged 8-13 yrs[19].The finding also agree with the prevalence of psychopathology identified among children with epilepsy from population based study done in U.K by David which report 37% [26].
However, the finding is lower than the prevalence reported from other studies done in developing countries [24-25]. A study done on epileptic children residing in a rural area of Kenya using a child behavior questioners for parents produced a prevalence of 49%[25].The population based study from Tanzania also reported behavioral abnormality in 66% of the study participants[24].While a Nigerian study reported a prevalence of 46.6% using Rutter scale,India-54%,and Thailand (57%)[21-23].In the study from Kenya which compare their high report of behavioral abnormality with the relatively lower reports from the developing country(49% vs. 37%) entertain the possible effect of high level of untreated epilepsy in the study population, and the high incidence of symptomatic causes of epilepsy to have impact on producing a higher prevalence of behavioral abnormalities .

The participants of our study may are brought by primary caregivers who (339 or 88.3%) seek for treatment at the initial onset of the illness .The delay in treatment was seen in 45(11.7%) only. Majority of the caregivers are primary school completes and above. These socio demographic and socio economic differences may have contributed to the dissimilarity of results from the studies of otherwise comparable region.

In the previous studies the role of gender on the prevalence of behavioral abnormality and the types is conflicting. In the Norwegian study male gender was associated with increased risk of abnormal score with (OR=1.44 95%CI).However the Kenyan study didn't identify sex as a risk factor. In our study the abnormal total difficulty score is higher in boys than girls (52.5% vs. 47.5%).However in Bivariate linear regression model it was not statistically significant. On the other subscales of SDQ and impact score the risk was not statistically significant for neither of the sexes also.
In this study highest abnormal score was identified in the peer relationship subscale (265, 69%) to be followed by prosocial (185, 48.2%), and conduct problem (184, 47.9%). These finding agree with the study conducted in Italy using the same questioner which have also identified conduct problem and peer relationship problem to be the subscales with high abnormal result (49% and 42%)respectively[18]. The higher prevalence in this study could be the result of cultural difference where discussion with children about their illness and encouraging them to ask questions is poor in the family as well as on their clinic visit.

The presence of vulnerable age group to develop psychiatric disorder more than others and the dominance of one or other forms of behavioral abnormalities in different age groups was forwarded in different literatures[. In a study of 55 children from a tertiary epilepsy center, age was found to be a determining factor regarding the type of behavioral abnormality identified, adolescents having more of depressive disorders and predominantly younger children having hyperactivity and inattentiveness [32]. In our study age group11-14 were found to have high total difficulty score (OR= 1.7 with 95%CI and p value of 0.037). While on the sub scales, children with age category of 5-7 were found to have high score of emotional problem and prosocial behavior. The older children on the age range of 11-14 have higher abnormal peer relationship score. (Table 6)

The effect of socioeconomic status on psychopathology in CWE has been controversial, living with a single parent and low family income are known from studies in the general population to be risk factors of psychopathology [27]. In the Norwegian study living with a single parent and low family income were associated strongly with having high total score of SDQ(OR=1.75 95%CI p value of <0.001 and odds ratio of 1.95 with 95%CI and p value <0.001) respectively. In this study the effect of living with a single parent or coming from a family with low income didn't result in statistically significant difference in having abnormal SDQ score. The study from Kenya hasn't also identified this two as a risk for developing having abnormal behavior [25].

The seizure variables, control and type have been inconsistently associated with the presence of behavioral abnormalities. In this study 47.7% of the participants report to have seizure episode daily while 25.3% have no episode for at least 3months or longer. When comparing the prevalence of abnormal score of SDQ among these two groups there was no statistically significant difference. However a study done on children with absence seizure identified that a high seizure frequency to be a risk factor of psychiatric comorbidity [28]. This conclusion was contradictory from the finding from a cohort study done in Nova Scotia on subjects recruited from the general epilepsy population which found that a high percentage of subjects were getting treatment for psychiatric disorder including those who were seizure-free for a long period [29] signifying that having or not having a good seizure control may not be the only factor for developing behavioral disorder in epileptic patients. Similarly patients with childhood epilepsy with full seizure remission and no longer on antiepileptic drugs were found to have a poor psychosocial outcome in adulthood[30].In any case the underlying cause for psychiatric disorder in epileptic children is not clearly identified but thought to be a complex interaction of several factors, including epilepsy-related variables(control of seizure, type) as well as psychosocial/family characteristics and is not solely dependent on the presence or absence of one factor[33].

In this study, having disease onset in the first year of life was related with having abnormal total SDQ score (AOR=0.187 95%CI) this result was not seen in other studies and could be due to the larger portion of the participants are children who have onset beyond their first year of life (366 Vs 18) or a methodological error.

In this study the impact score was high for 39.6% of the participants implying that the caregivers of these children have noticed that they are having a difficulty on their home life, school and leisure activity due to their illness. It is possible that the burden of having epilepsy is making the children more psychologically vulnerable and less able to cope with difficulties and to have poor social interaction. These groups of children need special attention and early intervention.

The sample size and sampling technique of this study is comparable with the others and the high response rate of the questionnaires makes the results of the research to be of a strong value. The material used (SDQ) has also a good profile in predicting psychiatric diagnoses. Robert Goodman has compared the SDQ predictions with independent psychiatric diagnosis in a large community sample of 5-15 year olds. It was found that SDQ identify individuals with a psychiatric diagnosis with a specificity of 94.6 %(95%CI 94.1-95.1%) and a sensitivity of 63.3%.The questioner also identifies over70% of individuals with conduct hyperactivity and depressive disorder. Its sensitivity is higher in picking up sever forms of psychiatric disorders as compared to the milder forms [34]. Another study conducted on a population of primary school children with chronic illness using the SDQ, and a subsample of children having abnormal score with the questionnaire was given a clinical psychiatric diagnostic evaluation according to the Development and Well-Being Assessment (DAWBA) [34]. The compared results confirmed that the sensitivity and specificity of the SDQ to be high in predicting a psychiatric diagnosis [31].

Limitation of the study

The study population selected may be less representative of majority of children having epilepsy, who are not yet brought to health care because of the misconception prevalent about the disease.

The lack of experience on the SDQ and not having our population normative SDQ value may result in over or under diagnosis of the problem in these children.

On the follow up clinics the presences of unsettled diagnosis on the seizure type have also resulted in modifying the analysis by not assessing the effect of seizure type on having high score.

Conclusion

This study have find out that significant number of CWE under our care also have a co morbid behavioral disorders. If untreated, these problems will affect the quality of life as well as their productivity as an adult. It also will disrupt the harmony of their family and result in tremendous social and economic crisis. This can easily be minimized by regular assessment and addressing the problem early.

Recommendation

Children with epilepsy as shown in the study are at significant risk for co morbid psychiatric problems. Regular screening of the children and linking them to psychiatric services would be of paramount importance in improving their future.

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Annex I: Questioner

Instructions I- after reading the question to the parent or primary care giver please fill their response.

1. Age -

2. Sex
    A. Male
    B. female
3. Region
    A. Oromiya
    B. SNNPR
    C. Amhara
    D. Tigray
    E. Addis Ababa
    F.other(specify)
4. Religion
    A. Orthodox
    B. Protestant
    C. Muslim
    D. Other(specify)

5. Parent's or caregiver education level
    A. illiterate
    B. Read and write
    C. Primary(1-8)
    D. Secondary(9-12)
    E. Certificate, technical/college diploma or equivalents
    F. College diploma/degree

6. Parent's or caregiver monthly income/estimate
    A. <150 birr
    B. 151-650
    C. 651-1400
    D. 1441-2350
    E. 2351-3550
    F. 3551-5000
    G. >5000
    H. No income
7. Status of parents
    A. Married
    B. Single
    C. Divorced
    D. Widowed
E. Other(specify)
8. Duration of illness--------

9. Duration of treatment----------

10. Type of seizure (to be filled by the data collecting nurse from the follow up chart)

11. How frequently does the child has seizures
    A. Once in a day
    B. More than once in a day
    C. Not more than twice in a month
    D. Rarely*
If the answer is rarely when was the last episode----------

ወ4-16

የጠንካራና ደካማ ጎኖች መጠይቅ

እባክዎን ለእያንዳንዱ መዘርዝር እውነት አይደለም፣ በከፊል እውነት ወይም በእርግጥ እውነት ነው ከሚለው ትይዩ ሳጥን አንዱን ምልክት ያድርጉ። ምንም እንኳን በፍጹም እርግጠኛ ባይሆኑ ወይም መዘርዝሩ ስሜት የማይሰጥ ቢመስልም፣ ለሁሉም መዘርዝሮች በሚችሉት አቅም መልስ ቢሰጡን ይረዳናል። እባክዎን የሚሰጡት መልስ ልጅዎ ባለፉት ስድስት ወራት ወይም በዘንድሮው የትምህርት ዘመን ያሳየውን ባህሪ ተመርኩዘው ይሁን።

		እውነት አይደለም	በከፊል እውነት ነው	በእርግጥ እውነት ነው
1.	ስለሌሎች ሰዎች ስሜት ይጠነቀቃል	☐	☐	☐
2.	ይንቀገጥቀጣል፣ እረፍት የለሽ ነው፣ አንድ ቦታ አርፎ መቆየት አይችልም	☐	☐	☐
3.	ብዙ ጊዜ ራሴን ፣ሆዴን አመመኝ ወይም አቅለሸለሸኝ ይላል	☐	☐	☐
4.	ለሌሎች ልጆች ያለውን ነገር በቀላሉ ያጋራል (የሚበላ፣ መጫወቻ ፣እርሳስ ወዘተ)	☐	☐	☐
5.	ብዙ ጊዜ በጣም ተናዳጅና ግልፍተኛ ነው (ይንፈራፈራል፣ይማታል፣ይጮሃል፣ይወራወራል)	☐	☐	☐
6.	አይደባለቅም፣ገለል ይላል ፣ለብቻው የመጫወት አዝማሚያ አለው	☐	☐	☐
7.	በጥቅሉ ታዛዥ ነው፣ ብዙ ጊዜ አዋቂዎች የጠየቁትን ያደርጋል	☐	☐	☐
8.	ስለ ብዙ ነገር ይሰጋል፣ ብዙ ጊዜ ትንሽ ትልቁ ያሳስበዋል	☐	☐	☐
9.	ሰው ተጎድቶ፣ከፍቶት ወይም አሞት ካየ ይረዳል	☐	☐	☐
10.	ያለማቋረጥ ከተቀመጠበት ይቁነጠነጣል ፣ይንቆራጠጣል ፣ይጠማዘዛል	☐	☐	☐
11.	ቢያንስ አንድ ጥሩ ጓደኛ አለው	☐	☐	☐
12.	ብዙ ጊዜ ከሌሎች ልጆች ጋር ይደባደባል ወይም ጉልበተኝነቱን ያሳያል	☐	☐	☐
13.	ብዙ ጊዜ ደስተኛ አይደለም፣ይከፋዋል ወይም እንባው ይመጣል	☐	☐	☐
14.	በጥቅሉ በሌሎች ልጆች ተወዳጅነት አለው	☐	☐	☐
15.	በቀላሉ ሃሳቡ ይበታተናል፣ትኩረቱም አንድ ቦታ ላይ አይቆይም	☐	☐	☐
16.	አዲስ ሁኔታዎች ሲገጥሙት ይረበሻል፣ ወላጆቹ ላይ ጥብቅ ይላል፣ ወይም አልለቅም ይላል፣ በቀላሉ በራሱ መተማመን ያጣል	☐	☐	☐
17.	ከእርሱ ለሚያንሱ ልጆች ደግ ነው	☐	☐	☐
18.	ብዙ ጊዜ ይዋሻል ወይም ያጭበረብራል	☐	☐	☐
19.	ሌሎች ልጆች ይተናከሱታል፣ያበሽቁታል ወይም ጉልበተኝነታቸውን ያሳዩታል	☐	☐	☐
20.	ብዙ ጊዜ ሌሎችን ለመርዳት ፈቃደኛ ነው(ወላጆች፣ መምህራን፣ ሌሎች ልጆች)	☐	☐	☐
21.	ነገሮችን ከማድረጉ በፊት አስቀድሞ ያስተውላል	☐	☐	☐
22.	ከቤት፣ ከትምህርት ቤት ወይም ከሌላ ቦታ ይሰርቃል	☐	☐	☐
23.	ከሌሎች ልጆች ይልቅ ከአዋቂዎች ጋር በቀላሉ ይግባባል	☐	☐	☐
24.	ብዙ ነገሮች ይፈራል፣ በቀላሉ ድንግጥ ይላል	☐	☐	☐
25.	የጀመራቸውን ነገሮች እስከመጨረሻቸው ድረስ ያከናውናል፣ ጥሩ የትኩረት ስፋት አለው	☐	☐	☐

እባክዎን ይገልብጡት— ከጀርባው ጥቂት ተጨማሪ ጥያቄዎች አሉ

26. በአጠቃላይ ልጅዎ ከዚህ በታች ከተዘረዘሩት አንድ ወይም ከዚያ በላይ ችግሮች ያሉበት ይመስሎታል (በስሜቶቹ፣ በማተኮር ችሎታው፣ በባህሪው ወይም ከሌሎች ሰዎች ጋር ባለው አግባብ)?

የለም	አዎን አነስተኛ ችግሮች	አዎን ግልፅ ችግሮች	አዎን ከባድ ችግሮች
☐	☐	☐	☐

«አዎን» ብለው ከመለሱ፣ እባክዎን ስለችግሮቹ የሚከተሉትን ጥያቄዎች ይመልሱ

27.
- እነዚህ ችግሮች ምን ያህል ጊዜ ሆናቸው?

ከወር ያነሰ	1-5 ወራት	6-12 ወራት	ከአመት በላይ
☐	☐	☐	☐

28.
- ችግሮቹ ልጅዎን ያበሳጩታል ወይም ይረብሹታል?

በምንም ዓይነት	በትንሹ ብቻ	በከፍተኛ ደረጃ	በጣም በከፍተኛ ደረጃ
☐	☐	☐	☐

- ችግሮቹ በሚከተሉት ሁኔታዎች ዙሪያ የልጅዎን የእለት ተእለት ኑሮ ያውካሉ?

	በምንም ዓይነት	በትንሹ ብቻ	በከፍተኛ ደረጃ	በጣም በከፍተኛ ደረጃ
29. የቤት ኑሮ	☐	☐	☐	☐
30. ጓደኞች	☐	☐	☐	☐
31. የክፍል ትምህርት	☐	☐	☐	☐
32. ትርፍ ጊዜ ወይም መዝናኛ	☐	☐	☐	☐

33
- ችግሮቹ በእርስዎ ወይም በአጠቃላይ በቤተሰብዎ ላይ ጫና ፈጥረዋል ወይ?

በምንም ዓይነት	በትንሹ ብቻ	በከፍተኛ ደረጃ	በጣም በከፍተኛ ደረጃ
☐	☐	☐	☐

እናት/አባት/ሌላ/ እባክዎን ይግለፁ _____

ስለትብብርዎ በጣም እናመሰግናለን

Annex II-The individual SDQ items and the total score derived from them

Not True		**Some-what True**		**Certainly True**
Standard Values for Data Entry ========	**0**	**1**		**2**
Data element	**SDQ Item number and description**	**Item Score**		**Summary Score**
Emotional Symptoms Scale		0-10		
Item 03	Often complains of headaches, ….	0	1	2
Item 08	Many worries or often seems worried	0	1	2
Item 13	Often unhappy, depressed or tearful	0	1	2
Item 16	Nervous or clingy in new situations ….	0	1	2
Item 24	Many fears, easily scared	0	1	2
Conduct Problem Scale		0-10		
Item 05	Often loses temper ….	0	1	2
Item 07	**Generally well behaved …...**	**2**	**1**	**0**
Item 12	Often fights with other children ….	0	1	2
Item 18	Often lies or cheats	0	1	2
Item 22	Steals from home, school…….	0	1	2
Hyperactivity Scale		0-10		
Item 02	Restless, overactive….	0	1	2
Item 10	Constantly fidgeting …	0	1	2
Item 15	Easily distracted ….	0	1	2
Item 21	**Thinks things out before acting**	**2**	**1**	**0**
Item 25	**Good attention span, …**	**2**	**1**	**0**
Peer Problem Scale		0-10		
Item 06	Rather solitary, prefers to play alone	0	1	2
Item 11	**Has at least one good friend**	**2**	**1**	**0**

Item 14	**Generally liked by other children**	**2**	**1**	**0**
Item 19	Picked on or bullied….	0	1	2
Item 23	Gets along better with adults …	0	1	2
Prosocial Scale		0-10		
Item 01	Considerate of other people"s feelings	0	1	2
Item 04	Shares readily with other children, …	0	1	2
Item 09	Helpful if someone is hurt….	0	1	2
Item 17	Kind to younger children	0	1	2
Item 20	Often volunteers to help others …	0	1	2
SDQ Total Difficulties Score = Sum of Scales below		0-40		
Emotional Symptoms Scale		0-10		
Conduct Problem Scale		0-10		
Hyperactivity Scale		0-10		
Peer Problem Scale		0-10		

NB. Bold items indicate reverse scoring

Item Responses for the impact score					
Not at all		A little	A medium amount		A great deal
Standard Value for Data Entry ========	**0**	**1**	**2**		**3**
Data element	**SDQ Item number and description**		**Item Score**		**Summary score**
Item 28	Difficulties upset or distress child	0	0	1	2
Item 29	Interfere with HOME LIFE	0	0	1	2
Item 30	Interfere with FRIENDSHIP	0	0	1	2
Item 31	Interfere with CLASSROOM LEARNING	0	0	1	2
Item 32	Interfere with LEISURE ACTIVITIES	0	0	1	2
SDQ IMPACT SCORE			0-10		

Annex –III Interpreting SDQ scores

	'This score is close to average - clinically significant problems in this area are unlikely'	'This score is slightly raised, which may reflect clinically significant problems'	'This score is high - there is a substantial risk of clinically significant problems in this area'
Total Difficulties Score	0-13	14-16	17-40
Emotional Symptoms Score	0-3	4	5-10
Conduct Problem Score	0-2	3	4-10
Hyperactivity Score	0-5	6	7-10
Peer Problem Score	0-2	3	4-10

'This score is close to average – clinically significant problems in this area are unlikely'	'This score is slightly low, which may reflect clinically significant problems'	'This score is low - there is a substantial risk of clinically significant problems in this area'
Prosocial Behavior Score	6-10	5	0-4

N.B- The SDQ tables and scoring system are directly copied without modification from the original website[http://www.sdqinfo.org/]