# ASSESSMENT MAGNITUDE AND ASSOCIATED FACTORS OF PEDIATRICS SEIZURES, AT PEDIATRICS EMERGENCY UNIT, TIKUR ANBESSA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA, 2020: A RETROSPECTIVE, DESCRIPTIVE STUDY.

**BY:-ASAMINEW HABTAMU (BSC).**

**A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY ,COLLEGE OF HEALTH SCIENCES, DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE MASTERS DEGREE IN EMERGENCY MEDICINE AND CRITICAL CARE NURSING.**

**ADDIS ABABA, ETHIOPIA**

**JANUARY, 2020**

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| The Full Title Of The Research Project | Assessment Magnitude And Associated Factors Of Pediatrics Seizures, At Pediatrics Emergency Unit, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2020 |
| Duration Of Project | 6 Months |
| Study Area | Tikur Anbesa Specialized |
| Total Cost Of The Project | 26,580.00 Ethiopian Birr |
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I hereby declare that this msc thesis is my original work and has not been presented for a degree in any other university and all sources of material used for this thesis have been duly acknowledged.

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# ABSTRACT

**background**: - seizure is a transient occurrence of signs and symptoms resulting from abnormal excessive neuronal activity in the brain. It is an important cause for hospital admissions in children from developing countries. it accounts for about 1% of all emergency department visits, and about 2% of visits to children's hospital emergency department visits. It is a major factor for neurological and cognitive impairment in children living in sub-saharan africa. Limited studies have been conducted in ethiopia relating to the prevalence and associative factors of seizures in children.

**Objective:** - This study aims to assess the magnitude of seizure and its' associated factors among 1 month -12 years of age children admitted in tikur anbessa specialized hospital(tash), at the pediatric emergency unit from december 2016- december 2019.

**Result**: - Medical records review was done for 256 children with a 96% response rate. The prevalence of seizure was 4.52 %( 45/1000 people) . 155( 60.5%) were males and with a male to female ratio of (1.5:1). the mean age of patients was 3.7 years (with standard devation 2.8). The mean age for onset of a seizure in males and females was 1.3(sd 1.1-1.5 at 95% ci) and 2.0(sd1.6-2.5 at 95% ci) respectively. on logistic regression, fever (or 1.85,p=0.01), newborn distress (or 2.31,p=0.01), hypoxia brain injury (or 2.43,p=0.00), and home delivery (or 2.8,0.04) were found to be significant predictors seizure.head trauma was 1.3 times more likely to had an earlier onset of the pediatric seizure, (aor: 1.3,p=0.00) , birth asphyxia, (aor: 2.3,p=0.00) hypoxic brain ischemia, (aor, 2.2,p=0.02)developmental delay, (aor, 2.5,p=0.01),fever, (aor, 1.2,p=0.01),male (aor, 2.7,p=0.01) were significantly associated with pediatric seizure early onset at $p<0.05$ with 95% ci.

**Conclusion**:-:-this study has identified a considerable burden of seizure in younger children in this hospital. fever, perinatal insults and place of delivery were significantly associated with pediatric seizure .underlying the need to advocate the need of proper management of pregnancy and delivery

**Recommendation**; -Health professional at different levels and institution should work to reduce the occurrence of childbirth asphyxia that commonly show most associations with pediatric seizure. health facilities better to give health education and health promotion to improve, the awareness on the risk factors of a seizure.



**Key Words**: - Seizure, pediatric emergency, tikur anbessa specialized hospital.

# ACKNOWLEDGEMENTS

Firstly, my warmest respect and thanks go to  the son of holy of holies saint virgin mary,almighty god for every thing,who helped me to reach at this level despite challenged with severe pain, stress and suffering throughout my journey.

Following this i would like to express my special thanks to jimma university ,which sponsored me to continue my education and upgrade myself and addisabeba university ,college of health science for giving a chance of joining this postgraduate program and allow me to write this thesis as well.

Next,my specials thank goes to my respected advisorsdr.rahelargaw,drayalewmogesand mr. wagarituli (bsc, n, msc, emccn) for their continuous guidance and constructive comments in the conduct of this research paper.

Finally,my gratitude also goes to all my friends who were helping me by clarifying any ambiguities during the time of this thesis writing .

**Table Of Contents**

Contents Page

Abstract ........ I

Acknowledgements ........ II

Table Of Contents ........ III

List Of FIGUREand Tables ........ VI

List Of Tables ........ VI

List Of Figures ........ VI

Acronyms And Abbreviations. ........ VII

1.Introduction ........ 1

1.1 Background ........ 1

1.2 Statement Of The Problem ........ 3

1.3. Significance Of The Study ........ 5

2.Literature Review ........ 6

2.1. Magnitude Of Seizure ........ 6

2.2 Risk Factors Of Seizure Related To Family History, Socio Demographic Charactersitics And Perinatal History. ........ 7

2.3 Medical Related Assossiated Factors Age At On Set Ofseizure. ........ 9

2.4. Conceptual Framework ........ 11

3. Objective ........ 12

3.1 General Objective ........ 12

3.2 Specific Objective ........ 12

4.Methodology ........ 13

4.1 Study Area And Period ........ 13

4.1.1 Study Area ........ 13

4.1.2 Study Period ........ 13

4.2 Studydesign ........ 13

4.3 Populations ........ 13
4.3.1 Source Population ........ 13
4.3.2 Study Population ........ 13
4.4 Inclusion And Exclusion Criteria ........ 13
4.4.1 Inclusion Criteria ........ 13
4.4.2 Exclusion Criteria ........ 14
4.5 Sample Method ........ 14
4.5.1 Sample Size Determination ........ 14
4.5.2 Sampling Technique ........ 15
4.6 Variables ........ 16
4.6.1 Dependent Variables ........ 16
4.6.2 Independent Variables: ........ 16
4.7.1 Data Collection Tool Anddata Collectors ........ 16
4.7.2 Data Collection Procedure ........ 17
4.8 Data Quality Control ........ 17
4.8.1 At The Questionnaire Level ........ 17
4.8.3. At Data Processing Stage ........ 18
3.9. Method Of Data Processing And Analysis ........ 18
4.10. Ethical Consideration ........ 18
4.11. Dissemination Plan ........ 19
4.14. Operational Definitions ........ 19
5. Result ........ 20
6. Discussion ........ 31
7.Conclusion ........ 34
9. Recommendations ........ 36
Reference ........ 37
Annexes I:-Questionaries And Check- List (In English) ........ 40

I. Study Information Sheet For Interview ........ 40

Ii. Informed Consent Form ........ 41

Iii. Questionnaire ........ 43

List Of *FIGURE*and Tables

*List Of Tables*

Table 1:-Shows The Socio-Demographic Characteristics Of Pediatrics Seizure At Emergency Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-2019......................... 20

Tabale 2:Show The Clinical Parameter Of Of Pediatrics Seizure At Emergency Departments Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-2019. ……………………………………….22

Table 3:- Shows Medical And Perinatal Condition Of The Pediatrics Seizure At Emergency Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-2019. ............................... 24

Table 4:- Show The Clinical Sign And Symptom At Admission Of The Pediatrics Seizure At Emergency Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-201925

Table 5:- Describe The Association Factors Of Pediatric Seizures By Using Logistic Regression Of In Pediatrics Emergency Among 1 Month -12 Years Of Age Children Admitted In Tash, Pediatric Emergency Unit........................................................................................ 26

Table 6:- Describe The Association Factors Of Onset Of Pediatric Seizures By Using Linear Logistic Regression Of In Pediatrics Emergency Among 1 Month -12 Years Of Age Children Admitted In Tash, Pediatric Emergency Unit......................................................................... 29

**List Of Figures**

**Figure** 1:Conceptualframework, Summary Of The Relationship Between Independent And Dependent Variables…………………………………………………………………10

**Figure 2** : Shows Common Types Of Pediatrics Seizures Based On The Sex At Emergency Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-2019……………………………….25

# ACRONYMS AND ABBREVIATIONS.

*Aap*: America Academy Of Pediatrics

*Cns*: Central Nervous System

*Ct*: Computed Tomography Scan

Drpc: - Development Research And Projects Centre

Eegs: Electroencephalograph

*Fs*: Febrile Seizure

*Gtcs*: Generalized Tonic-Colonic Seizures

*Ich*: Intracranial Hemorrhage

*Mr*i: Magnetic Resonance Imaging

*Ncc*: Neurocysticercosis

*Or*: Odds Ratio

*Rpcs*: Resource-Poor Countries

*Sah*: Subarachnoid Hemorrhage

Se:- Status Epileptics

Smr: Standardized Mortality Rate

*Tash*: Tikur Anbessa Specialized Hospital

*Who*: World Health Organization

# 1.INTRODUCTION

## *1.1 BACKGROUND*

Dysfunctional Neuronal Activity That Ends With Behavioral, Sensorial , Perceptional Or Motor Activity Is Known as seizure.according to “the international league against epilepsy”, 2017 classification of seizure, childhood seizure is classified into four main categories based on site of onset :-these are focal onset, generalized onset, unknown onset and unclassified onset (1).

Seizure is described as one of the common causes of hospital admission in young children particularly in developing countries.it contribute 5% to the global burden of disease.It also known to affect individuals throughout the world, irrespective of age, ethnicity, socioeconomic class or geographical location(2). in 2002,world health organization (who) study group placed seizure as top priority for control especially in developing countries where seizure often result in dire consequences.(3).

In fact, it was estimated that 10.5 million children less than 15 years of age have seizure disorder, representing about 25% of the global seizure population. from the annual 5 million cases who develop seizure ,the majority (80%) live in developing country and about 40 % are younger than 15 years. Besides, only one-third of patients’ with newly diagnosed seizures receive an etiological diagnosis. Etiological factors for childhood seizures are different from those for seizures occurring later in life. in young children perinatal insults, central nervous system(cns) malformations , genetic factors, high fever are predominantly mentioned as causes of seizure. whereas, cerebrovascular and degenerative are recognized as possible causes in older age groups. cns's infectionlike malaria ,meningitis and head trauma may occur at any age group (4).

Moreover, it accounts for 1% of all emergency department visits, and about 2% of visits to children's hospital emergency department visits. 4%-10% of children suffer at least one episode of seizure in the first 16 years of life. The occurance of seizure is highest in children less than 3 years of age, with a decreasing frequency in older children.the incidence of seizure in children and adolescents seems relatively consistent across all populations studied, ranging from 50 to 100/l00, 000 person per year, to 9 per 1000 in japan, a developed country. therefore, the degree of development of a country is not the only determinant of seizure incidence(5).

the population prevalence of seizure has been estimated to be 0.5% to 0.9% worldwide, with the highest incidence rate found in very early childhood. it starts in childhood in 60% of cases and most of the clinically significant aspects of the disease occur at the time of childhood. The cumulative lifetime incidence of seizure is 3% and more than half of the cases begin in childhood (6).febrile seizures were the most common type seen in

the pediatric population especially in children younger than 5 years of age after one seizure, the chance of experiencing a second one is about 50%(7).

On the other hand, different seizure types can have diverse impacts on a child’s quality of life. for instance, a child’s memory may be adversely affected by a generalized tonic-clonic seizure or a complex partial seizure. Absence seizures, which have a brief loss of consciousness, may impair the child’s ability to attentively participate in class.children may also fall behind from missing school for doctor’s appointments, tests, or while recovering from a major seizure this loss of contact with their surroundings can impede their learning (8).

The real cause of seizure in children may not always be readily obvious .ct scan and mri play an important role in the etiological diagnosis of seizures. Generally, neuroimaging is not necessary for well-appearing children after a first, unprovoked non febrile seizure. But ,it may be necessary for children with a focal seizure ,a persistent seizure activity ,a focal neurologic deficit, aneurocutaneousdisorder,signs of elevated intracranial pressure, and trauma (9).

Furthermore,studies indicate that geographical difference determines the common causes of seizure in a particular region. This is mostly associated with the presence of infectious agents resulting in seizure.seizures are common in children with meningitis, viral encephalitis, and neurocysticercosis indeed. in most cases, itis related with high mortality and morbidity like subsequent epilepsy. The standardized mortality rate (smr) is highest in the youngest patients, and in those with symptomatic seizures (10).

## *1.2 STATEMENT OF THE PROBLEM*

Seizure is caused by an abnormal and excessive discharge of neurons, usually accompanied by behavioral or sensorimotor manifestations.It is one of the common causes of childhood hospitalization with significant mortality and morbidity. globally, it is estimated that five million people are diagnosed with seizures each year and from this, around 120,000 are children with newly diagnosed seizures. in high-income countries, there are estimated to be 49 per 100, 000 people diagnosed with seizures each year(9). In the united states, an estimated 1.6 million peoplevisits emergency department,and the real cause of seizure in children may not always be readily obvious .ct scan and mri play an important role in the etiological diagnosis of seizures. generally, neuroimaging is not necessary for well-appearing children after a first, unprovoked non febrile seizure. But ,it may be necessary for children with a focal seizure ,a persistent seizure activity ,a focal neurologic deficit, aneurocutaneousdisorder,signs of elevated intracranial pressure, and trauma (11).

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Besides, only one-third of patients' with newly diagnosed seizures receive an etiological diagnosis. Etiological factors for childhood seizures are different from those for seizures occurring later in life. In young children perinatal insults, central nervous system(cns) malformations , genetic factors, high fever are predominantly mentioned as causes of seizure. whereas, cerebrovascular and degenerative are recognized as possible causes in older age groups. cns's infectionlikemalaria ,meningitis and head trauma may occur at any age group (4).at approximately one quarter of these visits were for new-onset seizures. In asian countries, the prevalence of seizure was 2.3 % and it mostly common among low socioeconomic standard children(9).

In sub-saharan africa,seizure is one of the common causes of childhood hospitalization with significant mortality and morbidity. a greater proportion of children are affected by generalized tonic clonic seizures (60–70%), which increases the risk of behavioral and emotional problems in affected children. Children are vulnerable to seizure disorder, which seriously affects the child normal development and reduces their capability to perform their future career. Many children in the sub-saharan country suffer from neurological damage due to seizure. Unfortunality,there is limited data regarding pediatric seizures episodes from developing countries like ours(12).

In our country, the prevalence of seizure was 5/1000 in general population, 5.8% for males, and 4.6% for females. Children with seizures often experience the double burden of learning disability, cognitive impairment, and poor scholastic performance. in our context, generalized tonic-clonic seizure was described as the most common seizure type occurring in 69 - 81% of those with seizure and it is the culprit for neurological damage. Thus many children face difficulty of learning and are victims of poor school performance (13). At tikur anbessa specialized hospital more than two hundred and twenty children with pediatric seizure visit the the emergency department each year for convulsion.Nevertheless, little is known about the burden of the disease in the emergency department and its associated factors.hence , my study aims to explore the frequency of occurrence of seizure disorder in children visiting the pediatric emergency unit ,the sociodemographic pattern ,and possible associated risk factors which can guide us for future interventions.

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## *1.3. SIGNIFICANCE OF THE STUDY*

It is known that convulsion in children is a common occurrence resulting in neurodevelopmental delay in chidren. Thus understanding the factors which interplay for its existencemay guide us to design successful inetrventions. furthermore , it would add knowledge for understanding seizure disorder in ethiopia and be a preliminary data for further research on the field. Eventually,the analyzed data will be usuefulfor improving the quality of delivered health service in managing childhood seizure disorder in the emergency department.

Since there are limited studies in ethiopia in line with pattern of pediatric seizure these might be important for health workers and managers to show the gap related with pediatric seizure and its health burden and provide a direction on how to prevent seizure in the country.

# 2.LITERATURE REVIEW

## *2.1. MAGNITUDE OF SEIZURE*

About 1.6 million emergency department visits in united states were secondary to seizure disorders and about a quarter of a million cases are for new onset seizures. A similar study done in india indicate 2.6% seizure prevalence which mostly occurred in children with low socioeconomic standard of living(2,5).

According to a study done in assiut university, egypt, the magnitude of seizure among school children was found to be high ( 8/1000) and it was commonly described in middle and low socioeconomic class children.(4).

Another study done in nepal to describe the clinical and demographic patterns of children with seizure showed a higher prevalence of seizure in young children below 4 years of age compared to adolescents of 13 to 16 years of age. male predominace with male/female ratio of 1.6:1 was also seen(7) .On the other hand,female dominance was noted in another neplaese study in the age group more than ten years(5) .The presence of comorbidities on top of social and economical disadvantages in children with seizure poses a great barrier in providng optimal care(9).

In an african study done in rural kenya, the total number of children with confirmed seizure was 110 of whom 35 (31.8%) had seizure disorders. the prevalence was 11 and 41 per 1000 there was no significant differences in prevalence between age groups or gender(14).

A study, among 4962 admitted children in department of pediatrics, universal college of medical sciences, united kingdom, seizures was present in 3.4% of children, with male preponderance. The majority of children (n=138 ,82.1%) had generalized tonic-clonic seizures (gtcs).gtcs was more common than partial seizures in both sexes (male = 82.7%; female = 81.2%) and age groups. there was no statistical significance in the distribution of seizures (gtcs and partial seizures) with sexes and age groups (15).

A brazilian cross sectional study done to describe childhood seizure disorders and its associated factors , identified high prevalence of seizure in pediatric with 53.3 per 10,000 population and it also showed that generalized seizure (63%) was dominant type of seizure (8).

The study ,done in our country, showed that theincidence of seizure was 5.2/1000 inhabitants at risk, 5.8/1000 for males, and 4.6 /1000 for females. the highest age-specific prevalence was found for ages 10-19 years. the annual incidence of seizure was 64 in 100,000 inhabitants at risk, 72 for males, and 57 for females. a generalized tonic-colonic seizure was the most common seizure type and occurred in 69 - 81%. on clinical

grounds, partial seizures occurred in 18 - 20% and in one - third of these secondary generalizations followed, unclassifiable seizures occurred in 11%. seizures occurred daily in 10 - 31% and weekly in another 12-43%; 33 - 84% had monthly seizures(13).

As the study done on prevalence of seizures and associated factors in children southern brazil shows the prevalence of seizure was 4.52%. it was prevalent in boys, and it was more common in the children from poor community and other study done on link between seizure and malnutrition indicate there was more prevalent seizure in cases than in controls: 22.1% of the cases were malnourished versus 9.2% of the controls (p = 0.006).(11).

## *2.2 Risk Factors Of Seizure Related To Family History, Socio Demographic Charactersitics And Perinatal History.*

In the united states in 2013, the most important risk factors for seizure in the pediatrics were febrile convulsions, consanguinity and family history of seizure, birth injuries(15).

A study in assiut university, egypt ,indicated that the percentage of consanguineous marriage in parents of childrenwith seizure was 19.4%. In a third (28.2%) of children assessed family history of seizure waspresent(4).

A case control study done in irbid,jordan ,to identify the risk factors for seizure disorders in 200 children found that perinatal insults increase risk of seizure 3.2 folds. though higher number of family history of seizure was seen in seizure group compared to the control group , it was not statiscally significant. It was also noted that both genetics and other multifactorial causes play a role in development of seizure in children. in this study, perinatal insult ,fever, head trauma were significantly associated with convulsions in children(16).

Another study found that birth weight, gestational age, apgar score, family history of seizure or neurodevelopment disorders, parental age, and parental socioeconomic status, including paternal income and maternal level of education have high association in the child to develop the seizure disorders(11).

In a case-control retrospective study done in the pediatric neurology outpatient service of the trivandrum medical college,kerala,indiahead trauma (p=0.001), delayed developmental milestones(p=0.00), newborn distress,(p=0.00), and family history (p=0.001), were significantly associated with seizure(17).

Another study carried out in nepal showedthe coexistence of seizure with fever in 53.5 % of cases. a higher incidence of generalized tonic-clonic(gtc) was noticed among febrile children and the majority of

genetically influenced seizuresare multi-factorial where the family history reflected on the familial aggregation .(5).

In a study done in turkey ,history of febrile seizure and head trauma increased the risk of seizure 10.9 and 6.4 folds respectively.perinatal insults and positive history of maternal illness during pregnancy also increased the risk of developing seizure(19).

A study done on prevalence, incidence and risk factors of epilepsy in children in a rural district of kenya, the univariate logistic regression analysis identified the adjusted prevalence pediatric seizure were 41/1000 (95% ci=31-51) and 11/1000 (95% ci =5-15) respectively. overall two thirds of children had either generalized tonic-clonic and/or secondary generalized seizures. A Positive history of fever (or=2.75; 95% ci: 1.240-6.09) and family history of seizure (or=4.12**;** 95% ci= 2.00-8.49) were important risk factors for children seizure (14).

Children with seizures had higher reported prevalence's of mental or developmental co-occurring conditions, including learning disabilities (43.7% compared with 8.2%) other types of developmental delay (32.3% compared with 4.3%)intellectual disability (22.9% compared with 1.0%)and attention deficit hyperactivity disorder/attention deficit disorder (19.3% compared with 10.3%) than did children without seizures. (15)

A Case control study designed to identify some risk factors in children with epilepsy compared to their controls found that ,history of seizure in first, second or third-degree relatives increases the risk of developing seizure 6.42, 3.09 and 2.66 fold respectively.The same holds true for presence of maternal hypertension (4.31-fold) and neonatal jaundice (3.12-fold)(17).

Age over 12 months was described a risk for seizure in a brazilian study done by presented increased risks for seizure. (8).As a study done gondar referral hospital head injury and sleep deprivations wereassociated with an increased incidence of seizure.(18) and as the study done in south africa on clinical features, proximate causes, and consequence of the seizure the median age at seizure onset was 2.0 years.(20)

According to study was done in ethiopia, twenty-two percent had a family history of seizure and seizures occurred in 4.8% of siblings. Mental retardation was the most commonly associated disorder, found in 7.9 - 21% of the person with seizure.They were experienced seizure attacks with a minimum of one and a maximum of seventeen times attacks(13).

## 2.3 *Medical Related Assossiated Factors Age At On Set Of*seizure.

Seizure is mostly caused by cns infection (meningitis, encephalitis) , trauma, metabolic abnormality (abnormal levels of glucose, sodium) , toxic exposure (drugs, alcohol) and fever(23).

According to a study done in egypt, history of febrile convulsions was seen in 16.4% of children, with a significant history of head trauma which had a 5.27 fold risk of developing seizure and history of central nervous system infection in 7% of seizure patient's. similarly , study done in the jordon showed , that children with a significant history of head trauma had 4.6 times the risk of having early onset of seizure, as well as patients' with history of central nervous system infection(4,16).

According to study done in the united states, head trauma and cns infection were significantly associated with pediatric seizures similarly in ethiopia, a history of head trauma was ascertained in 5.7% and was the most common possible associated factor identified followed by cns infection.(13,15

Literatres describe that seizure often starts at a young age. this is well captured in the ghanian study ,where the median age of onset of seizures was 8.0 years (interquartile range, 2.8-15.0) , and that median duration of seizures was 10.2 (interquartile range, 4.7-16.1) years(26).the year onset of seizures were significantly associated with hypoxic-ischemic encephalopathy (hie; $p = 0.007$) (21).

Study done on, prevalence, incidence and risk factors of epilepsy in older children in rural kenya, all the children had convulsive seizures, in whom about a third of children had generalized tonic-clonic and a further third had secondary generalized seizures.their dominant type of seizures and other identified seizure types were complex partial, tonic attacks and absences and in 24 (69%) of the active cases and 56 (75%) of the inactive cases. The onsets of seizures were within the first two years of life. then also, electroencephalograms could be performed on 80 children of whom 16 (20%) had abnormal tracings, and six were found to have interictalepileptiform activity. two children with general tonic-clonic seizures had evidence of focal features on their eeg.(14)

In the brazil, the children living in houses without piped water had a prevalence ratio 2.5 times higher for seizure than the reference group, showing a significant association(8). as the finding from seizures in a pediatric intensive care unit, the most common factors were, head trauma (craniotomy), infection (meningitis and encephalitis), family history and due to the toxicity of different antibiotics.(22).

As Study done on associated factors for seizure disorders in nigerians, head trauma risk to developing seizure andfactor rural dwellings with no access to health facility also conferred a significant twofold risk of developing seizure when compared to urban settlers with access to health facilities.(23)

Seizures in this indian study done in kerala ,it was noticed that poor family were significantly associated with seizure development .(17)

As study done on prevalence of pediatric seizure in sub-saharan africa and associated risk factors,shows for children (aged <18 years), factors related to their hie(or=3.45) and home delivery (or=2.7) were associated with the greatest relative increase in pediatric seizure occurrence ,also seizures in the family, maternal seizures, and head injuries were significantly associated median for age onset of seizureas study in kenya were two years (14,26).

In china, profile and clinical characterization of seizures in hospitalized children, they found out that febrile seizure (fs) was the main etiology of seizures below five years and overall (87.5%), other seizures in their finding were seizure disorder which accounts 5.5% and cns infections were the least, with only 1.5% of all children with seizures(28).

### *2.4. Conceptual Framework*

Independent variables such as family history, childhood history, and medical history of the child, nutritional status, social-demographic characteristics and immunization status enhance the development of different seizure disorder in the pediatrics seizure (dependent variables). The relationships between the various variable are summarized in figure 1.

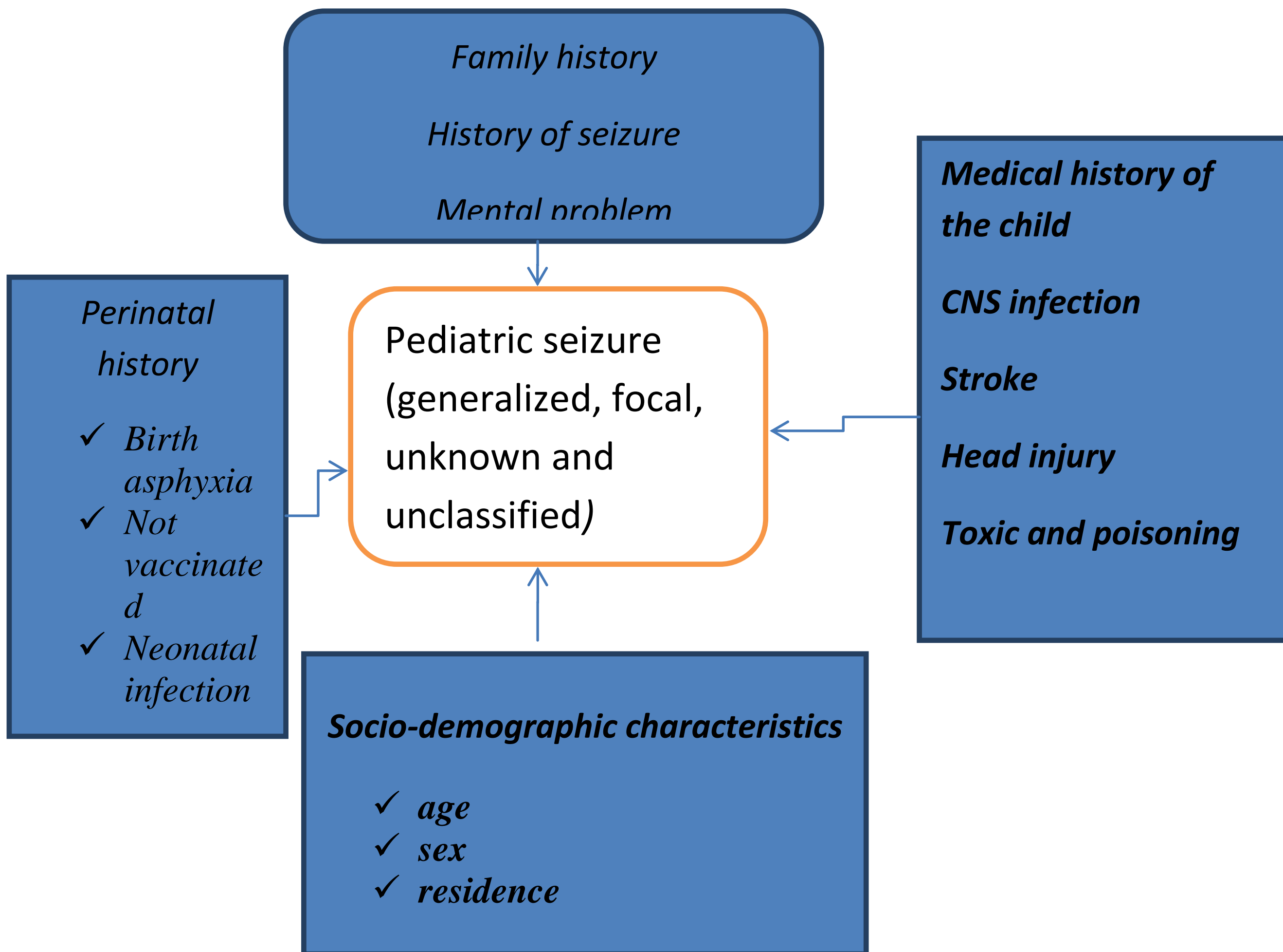


Figure 1:Conceptualframework: Summary Of The Relationship Between Independent And Dependent Variables.

# 3. OBJECTIVE

### *3.1 General Objective*

- To assess the magnitude and associated factors of seizure among children 1 month -12 years of age admitted in pediatric emergency unit ,tashfrom november 2016- november 2019.

### *3.2 Specific Objective*

- To determine prevalence of seizure disorder among 1 month -12 years of age children admitted in tash, pediatric emergency unit.
- To determine the common type of pediatrics seizures among 1 month -12 years of age children admitted in pediatric emergency unit ,tash.
- To describe the associated factors and age of onset pediatric seizures among 1 month -12 years of age children admitted in pediatric emergency unit,tash.

# 4.METHODOLOGY

## *4.1 Study Area And Period*

### 4.1.1 Study Area

The study was carried out at pediatric emergency department in tikur anabessa specialized hospital, addis ababa ,ethiopia. It is located in lideta sub-city, addis ababa. Tikur anbessa specialized hospital (tash) is the teaching hospital of the college of health sciences, addis ababa university.It is awell-known specialized hospital in our country, with over 700 beds, and serves as a training center for undergraduate and postgraduate medical students, dentists, nurses and midwives, pharmacists, medical laboratory, radiology technologists, and others who shoulder the health problems of the community and the country at large. It services the most critical referred patients throughout the country. tash pediatric emergency unithas42beds and sees approximately 13,300 presentations per year. two pediatric emergency medicine and critical care specialists, pediatricians, pediatricresidents,and nurses staffed it.

### 4.1.2 Study Period

The study was conducted fromjanuary 10-april 25/ 2020to assess the magnitude and associative factors of pediatrics seizure disorders in the pediatric emergency unit of tikur anbessa specialized hospital, from december 2016- december 2019.

## *4.2 Studydesign*

Institutional Based Retrospective, Descriptive Study, Cross-Sectional Study Was Carried Out.

## *4.3 Populations*

### 4.3.1 Source Population

All patients presented to pediatric ed of at tash due to any type of medical condition and trauma in the past three years was the source population.

### 4.3.2 study population

Those children 1month -12 years old children admitted to pediatric emergency with seizure.

## *4.4 Inclusion And Exclusion Criteria*

### 4.4.1 Inclusion Criteria

All children aged 1month to12 years  with seizure disorders.patients who consented for participation.

### 4.4.2 Exclusion Criteria

- Pediatric seizure patient’s charts which are lost from record office due to consultation transfer or any other medical reason at the time of data collection

## *4.5 Sample Method*

### 4.5.1 Sample Size Determination

Total number children with seizures at pediatric emergency unit,tash who were seen within the past three yearswas 662.sample size for each objective was calculated by using statcalc function of epi info version 7 software, and the maximum calculated sample size was taken for this study. for magnitude of seizure and associated factors among 1 month -12 years of age children admitted in pediatric emergency unit, population survey/ single population proportion formula was used by considering the assumption; the proportion of 50% with 95% confidence level and 5% marginal error; for which the following formula was applied:the calculated sample size was 267.

$$N = \frac{Z^2 P(1-P)}{d^2},$$

Where N= Sample Size

Nf = Final Sample Size

N = Total Size Of Population= 662

Z = Tabulated Value Of Z At 95 % Confidence Interval (1.96)

P= Proportion Of Seizure Among Pediatrics (0.5)

D = Margin Of Error To Be Tolerated (0.05)

$$N = \frac{(1.96)^2 X\ 0.5\ (0.5)}{(0.05)^2}$$

N= 384 This Is For Large Population(≥10,000) Or For Population Whose Total Number Is Unknown. But, We Have Total Number Of 662 Which Is Less Than Ten Thousand.Therefore, We Have To Use The Correction Formula:

Then ,Nf= $\frac{n}{1 + n/N}$ = 384 / 384 + 662 / 662

Then ,Nf = 243

Incomplete Data And Non-Response Was Estimated To Be As High As 10%. So ,The Total Final Sample Size Wasnf+ Non-Response Rate

= 243 + (243 X 0.1)

= 267

### 4.5.2 Sampling Technique

Systematic random sampling technique was employed by using the k value of every third case based on the patient record order as a sample frame and the first case was selected by using the lottery method.

### *4.6 Variables*

#### 4.6.1 Dependent Variables

Pediatric Seizure.

Age At Onset Of Pediatric Seizure.

#### 4.6.2 Independent Variables:

Age

Developmental Delay

Sex

Fever

Head Trauma

New Born Distress

Place Of Birth

Hypoxic Brian Injury

Family History

Immunization History

Income And Living Condition

Hypertension

Neonatal Infection

### *4.7. Data Collection Methods*

#### 4.7.1 Data Collection Tool Anddata Collectors

Structured, pre-tested english version questionnaire within five parts adopted and modified from different reviewed literature in line with the epidemiological studies protocol recommended by the international epileptic seizure union epidemiology and prognosis committee. with a reliability coefficient of all the questions except the socio-demographic was 0.888, was used to collect data regarding the it consists of socio-demographic characteristics of patients, different determinant factors of seizure, and the types of seizure disorders interviewing the family for the incomplete chart by using the telephone. structured and pretested english version

standard checklist was adopted and modified from different reviewed literature and guidelines were used to review medical records of the pediatric seizure. Four data collectors(four bsc nurses) and one bsc supervisor who was not an employee of the study hospital were selected. Data collectors and supervisors were trained by the principal investigator for two days with the aim of the study and the contents of the instruments, method of selecting the participants, how to fill the information on the checklist as well as the ethical aspect in approaching during collection. Therefore the data collectors became familiar with the tool and did the data collection with coordinator.the principal investigator with supervisors was closely supervising the overall activity during the data collection period.

### 4.7.2 Data Collection Procedure

The coordinator in the hospital had facilitated the procedure by familiarizing the environment and helps in the recruitment of charts. informed, voluntary consent was taken from the head of each hospital and each participant family of children. participant families of children were assured of their confidentiality by not using their names in their questionnaire. So the participant had responded for the questionnaire individually or by a time fixed phone call interview .Permission for reviewing records was obtained from the medical director of the hospitals. The coordinator had communicated with the medical record department director and took systematically random selected charts. Then data collectors had assessed the magnitude and associated factors of the pediatric seizure the checklist in a selected quite place. After the charts had been reviewed coordinators took back and hand over them to the medical record department director in a daily manner. the data collection held for two consecutive month from january 10-april25/ 2020.

## *4.8 Data Quality Control*

### 4.8.1 At The Questionnaire Level

To assure the quality of data properly aimed data collection tool was prepared and tested on five percent (14) of the total sample in tash prior to the actual data collection period to assess the reliability, clarity, sequence, consistency, understandability and the total time that it will take to finish the questionnaire. later on, necessary comments and feedbacks were incorporated in the final tool to improve its quality.

### 4.8.2. At Data Collection Stage

From the beginning the data collectors recruited were not the employee of the study hospitals to minimize bias and adequate training was given for those data collectors regarding to data collection procedure, ethical consideration of the participants and danger of validity of the data if they will not follow what is intended. On each data collection day, some percent of the collected data were examined by the principal investigator and any forwarded problem had got an immediate solution.

### 4.8.3. At Data Processing Stage

After the data have been collected it was checked for completeness, accuracy, clarity, and consistency by the principal investigator and supervisors before data entry into software and each questionnaire that was decided to be entered into the software for analysis was properly coded or given their specific id number. double data entry into epi data version 4.6.02 was done to minimize errors from design skipping patterns, then after it was export to spss v.25 for windows version to identify the association between patients' characteristics and age of onset of pediatric seizures by using logistic regression. Then logistic regression was computed with p-value <0.05 considered as significant. after all, data screening for outliers and missing values were made through running descriptive statistics and data cleaning measures were taken accordingly before data analysis. Finally, the data was presented by statements, tables, figures, and other diagrams then it was validated to check the consistency of data entry.

### *3.9. Method Of Data Processing And Analysis*

After checked, coded, entered to epi data version 4.6.02, validated and compared to the original data, corrective measures were taken accordingly. Data were exported to the statistical package for social science [spss] version-25 software for analysis.Variables were computed and recoded through transform function of spss. descriptive analysis was done to compute proportions and summary measures. The descriptive analysis and logistic regression was computed with p value <0.05 considered as significant. magnitude of association measured using or at 95% ci **.**simple frequency, summery measures, tables and figures were used to present the processed information. . The age onset and pediatric seizure was used in the bivariate and multivariate analysis to identify associated factors.

### *4.10. Ethical Consideration*

Ethical clearance was obtained from addis abeba, college of health and medical sciences, institute health research ethics review committee (aau-ihrerc). A formal letter of permission was written from the emergency medicine department to the pediatric emergency unit, tikur anbessa specialized hospital before the attempt of data collection. Ethical clearance was obtained from the research and publication committee of the department of pediatrics and child health, addis ababa university.

A permission letter was provided to tikuranbesa hospital administrative body to get their informed consent for data collection before starting to collect the data. Explanation about the aims, objectives, benefits, and risks of the study was provided and approval was obtained from the participating hospitals. informed, voluntary, consent was obtained from each child's family. Participants were told about the confidentialityof their information and the right to refuse to answer the questionnaire, stop or withdraw at any time of data collection. confidentiality was maintained at all levels of the study through the anonymous data collection.

### *4.11. Dissemination Plan*

The result of this study would be presented to addis ababa university, college of health science, department of emergency medicine, and the finding would be disseminated to concerned bodies such as service providers, policy makers and other concerned stakeholders. Finally, it will be published through relevant journals.

### 4.14. Operational Definitions

**Magnitude Of Seizure**: -A Numerical Quantitative Measure Expressed Usually As A Multiple Of A Standard Unit.

**Generalized Seizure**: - Is type seizures originate at some point within, or rapidly engage bilaterally distributed networks, which can be subcortical or cortical structures and are frequently both.

**Focal Seizure**: - Associated with seizures that are inferred from clinical or eeg data to originate in networks limited to one hemisphere

**Unclassifiedseizure**: -If there is not enough information about a seizure, or if it is unusual.

**Unknown Onset Seizure**:-This term is used for seizures in which it cannot be clearly determined whether onset is focal or generalized.

**Febrile Seizure**:-Defined as convulsions and fever occurring after 5 month to 6 years of age, without evidence of central nervous system infection or other recognized acute neurologiccauses.

**Status Epilepticus**:- Is a single epileptic seizure lasting more than five minutes or two or more seizures within a five-minute period without the person returning to normal between them.

**Term**:- Babies born between 37 and 42 weeks of gestational age.

**Preterm**:-Babies bornprior to 37 weeks of gestational age and beyond 28 weeks of gestation.

**Post Term**: - Babies Born After 42 Weeks Of Gestation

**Early Onset Of Pediatric Seizure**:- It is the entrerage age at the first unprovoked seizure (onset)was 1 years (sd 2.2 years).

**Perinatal Asphyxia**:- Is a lack of blood flow or gas exchange to or from the fetus in the period immediately before, during, or after the birth process.

# 5. RESULT

## 5.1. Socio-Demographic Characteristics Of The Study Participants

Two hundred fifty-six (256) children records were reviewed and families were interviewed for incomplete documents with a 96% response rate. The prevalence of seizure was 4.52 %( 45/1000 people) for a total of children admitted within these three years at pediatric emergency. There were 155 male and 101 female with males to females ratio of (1.5:1). The mean age of reviewed patients was 3.7 years(std. deviation 2.8 ,at 95% ci 3.1 -4.5). The majority of the pediatric seizure onset is below one year of age 154(60.2%) with mean 1.6(std.deviation 1.7, 95% the ci (1.4 , 1.8. higher occurrence of seizure (50%) is observed in theage below six years.male predominance with a male to female ratio of = 1.5:1 is also identified . Majority of them (68%)were from addis abeba and most of the children were from trader parents(see table 1 below).

**Table 1:-Show The Socio-Demographic Characteristics Of Pediatrics Seizure At Emergency Departments Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-2019.(N=256)**

| Parameter | Category | Frequency | Relative Frequency | Sample Statistics |
|---|---|---|---|---|
| Age In Years | <1 | 52 | 20% | Mean=3.73 |
| | 1-3 | 77 | 30.02 % | Std. Deviation =2.78 |
| | 3-6 | 93 | 36.2 % | |
| | 7-12 | 34 | 13.2 % | |
| | Total | 256 | | |
| Sex | Female | 101 | 60.5% | |
| | Male | 155 | 39.5% | |
| **Residency** | Addis Ababa | 174 | 68.0% | |
| | Oromia | 49 | 19.1% | |
| | Ahmara | 15 | 5.9% | |
| | Others | 18 | 7.0% | |
| **Occupation Family** | Salaried Worker | 83 | 32.4% | |
| | Trader | 98 | 38.3% | |
| | Farmer | 72 | 28.1% | |
| | Others | 3 | 1.2% | |

| | | | | |
|---|---|---|---|---|
| Drop Out Of School | Yes | 56 | 21.9% | |
| | No | 200 | 78.1% | |

**Tabale 2:Show the clinical parameter of of pediatrics seizure at emergency departments tikur anbessa specialized hospital, addis ababa, ethiopia, 2016-2019. departmentstikuranbessa specialized hospital, addis ababa, ethiopia, 2016-2019.(n=256).**

Regarding to the type of seizure according this finding generalized tonic-clonic seizures were the most common seizure type and occurred in 203 (79.3%) followed by partial (focal) seizure 48(18.8), unclassified seizure 2(.8) and unknown onset seizure 4(1.7%). Mean age for onset of seizure for males was 1.3(std.deviation 1, at 95% ci for mean (1.06235, 1.46550) and for females mean 2.04050, std.deviation 2.11019 at 95% ci (1.62393, 2.45706). The minimum and maximum numbers of seizure attacks were 1, 12 respectively, and only 3 children had12 seizure attacks. The most repeatedly reported numbers of seizure attacks were three, and =>4 with which reported by 68(26.8%), and 127(49. %) respondents respectively. The episode majorly stays for three minutes. electroencephalograms were performed on 160 children of whom 158 (68.1%) had abnormal tracings, and most were found to have interictalepileptiformactivity(see table 2 below).

| Parameter | Category | Frequency | Relative Frequency | Sample Statistics |
|---|---|---|---|---|
| Pediatric Seizure | Generalized(Tonic-Clonic)Seizure | 203 | 79.2% | |
| | Paratial Seizure | 18.8 | 18.8% | |
| | Unclassified | 2 | 1.O8% | |
| | Unknown | 4 | 1.199% | |
| Age At Onset | Below One Years | 154 | 60.2% | Mean1.6,median=1 ,Range 8.995, |
| | Greater Than One Years | 102 | 39.8% | |
| Nutritional Status | Normal(Bmi >20,-2<Z) | 74 | 28.9% | |

| | | | | |
|---|---|---|---|---|
| | Underweight(Bmi<10,-2<Z>-3) | 125 | 49.1% | |
| | Wasted ( Bmi Z<-3) | 57 | 22.2% | |
| Length Of Episode | Below One Minute | 56 | 21.9% | Mean=2.37 Minute |
| | 1-3 Minute | 92 | 35.2% | Median=2 Minute |
| | 4-5 | 70 | 27.4% | Iqr=1.2 Minute |
| | 6-30 | 33 | 12.9% | |
| | =>30 | 5 | 2.0% | |
| Was The EEG Done | Yes | 160 | 62.5% | |
| | No | 96 | 37.5% | |
| If Yes What Was The Result | Normal | 2 | .0.8% | |
| | Abnormal | 158 | 61.7% | |
| | | | | Std1.692739 |
| | | | | |
| Event Frequency | Once Per Day | 9 | 3.5% | Mean 3.22 |
| | Twice Per Day | 52 | 20.3% | Std.Deviation 0.894 |
| | Three Times Per Day | 68 | 26.8% | |
| | =>4 | 127 | 49.6% | |

When we stratified seizure based on the gender partial (focal) seizure is 16.8% and 21.8% in male and female respectively. generalized (tonic- clonic) seizure is common in the male which account 81.9% and in female it is accounts 75.2% .unclassified seizure is 1.3% in male and unknown onset seizure is 3.0% in female(See Figure 2 ).

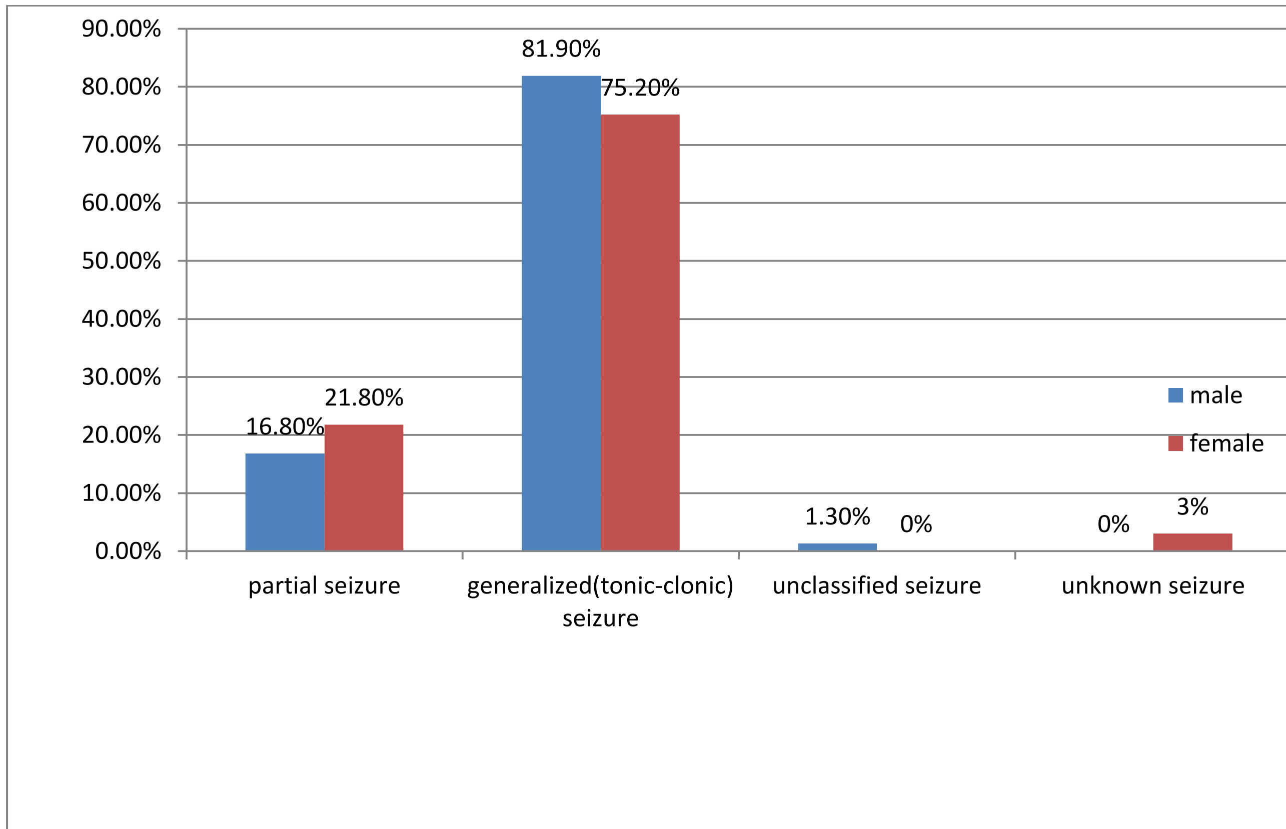


**Figure 1**- Shows Common Types Of The Pediatrics Seizure Based On The Sex At Emergency Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-2019.

### 5.2. Factors Associated With Pediatric Seizure And Age Of Onset

According to this study from the children with pediatric seizure,77.3% had a head injury; most of them had no history of stroke (96.9%); 6.3% had a cerebral tumor; 7.8% vascular malformation. A family history of seizure existed only in 10.5% of those children. The majority of the assessed children were delivered at term (80.9%) and the rest of them were at the gestational age of preterm and post-term, which accounts for 15.2% and 3.9% respectively. around 79.3%,19.9%, and 8% of the children were delivered by spontaneous vaginal delivery, cesarean section, and assisted vaginal delivery respectively.67.5 % of the children were having hypoxic brain ischemia(See Table 3)..

Table 3:- Shows Medical And Perinatal Condition Of The Pediatrics Seizure At Emergency Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-2019.

| Parameter | Category | Frequency | Percent |
|---|---|---|---|
| Head Trauma | Yes | 198 | 77.3% |
| | No | 58 | 22.7% |
| Stroke | Yes | 8 | 3.1% |
| | No | 248 | 96.9% |
| Cerebral Tumor | Yes | 16 | 6.3% |
| | No | 240 | 93.8% |
| Vascular Malformation | Yes | 20 | 7.8% |
| | No | 236 | 92.2% |
| Neurodegenerative | Yes | 12 | 5.7% |
| | No | 244 | 95.3% |
| Family With A Seizure | Yes | 29 | 10.5% |
| | No | 227 | 88.7% |
| Hypoxic Brain Ischemia | Yes | 173 | 67.5% |
| | No | 83 | 32.5 % |
| Gestetinal Age | Premature | 39 | 15.2% |
| | Term | 207 | 80.9% |
| | Post Term | 10 | 3.9% |

| Place Of Delivery | Health Center/Hospital | 102 | 39.8% |
|---|---|---|---|
| | Home | 154 | 60.2% |
| Mode Of Delivery | Cesarean Section | 51 | 19.9% |
| | Spontaneous Vaginal Delivery | 203 | 79.3% |
| | Assisted Vaginal Delivery | 2 | .8% |
| Developmental Delays | Yes | 168 | 65.6% |
| | No | 88 | 34.4% |
| Ne Wborn Distress | Yes | 199 | 77.7% |
| | No | 77 | 22.3% |

Regarding clinical profile,abnormal body movement 235(91.8%), fever 120(46.9%), vomiting 68(26.8%), and headache 37 (14.5%), were four leading clinical complaints in admitted seizure patients, where as speech disorder 21(8.6%) was the least common complaint(See Table 4)..

**Table4:- Show The Clinical Sign And Symptom At Admission Of The Pediatrics Seizure At Emergency Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2016-2019**

| **Parmetercategory** | | **Frequency** | **Percent** |
|---|---|---|---|
| | Yes | 120 | 46.9% |
| Fever | No | 136 | 53.1% |
| Headache | Yes | 37 | 14.5% |
| | No | 219 | 85.5% |
| Vomiting | Yes | 68 | 26.8% |
| | No | 188 | 73.4% |
| Aphasia | Yes | 21 | 8.6% |
| | No | 235 | 91.8% |
| Altered Mental Status | Yes | 71 | 27.5% |
| | No | 185 | 72.3% |
| Abnormal Body | Yes | 235 | 91.8% |

| Movement | No | 22 | 8.2% |
|---|---|---|---|

At univariate analysis, variables such as sex, residency, head trauma, fever, hypoxic brain ischemia, gestational age at birth , place of delivery, family with a seizure, cns infection, delays developmental, history of newborn distress and immunization history, were found to be significant. They were having a p value of less than 0.25 included in multivariable analysis.we carried out a logistic regression in which these factors were modeled against a dependent variable of the presence of pediatric seizures. In this analysis the model explained 42–58% of the variation (cox and snell r2=0.42, nagelkerke r2=0.577) in the outcome, those have variables such as fevers were 1.82 times more likely to have pediatric seizure than those have no fever, aor: 1.82 (1.702, 2.256,p=0.01). The odds ratio for newborn distress was 2.341 times more likely to had different pediatric seizure than those have no newborn distress, aor: 2.341(-.761, .0856,p=0.01), hypoxic brain ischemia was 2.43 times more likely had different pediatric seizure than those have no hypoxic ischemia, aor, 2.43. (.624, 5.996,p=0.00) those were delivered at home were 2.8 times more likely had different pediatric seizure than those have delivered at hospital or health center, aor, 2.8(2.576-3.302,p=0.01) were significantly associated with a pediatric seizure at p<0.05 with 95% ci (See Table 5).

**Table 5:- Describe The Association Of Factors Of Pediatric Seizures By Using Logistic Regression Of In Pediatrics Emergency Among 1 Month -12 Years Of Age Children Admitted In Tash, Pediatric Emergency Unit.**

| **Parameter** | Categories | Pediatric Seizure | | | | Cor (Ci 95%) | Aor (Ci 95%) | P-Value |
|---|---|---|---|---|---|---|---|---|
| | | Generalized Tonic Clonic | Partial | Unclassified | Unknown | | | |
| **Sex** | Male | 127 | 26 | 2 | 0 | 1.842(1.750-1.933) | .611 (1.717,2.364) | 0.32 |
| | Female | 76 | 22 | 0 | 3 | 1 | 1 | |
| **Residency** | Addis Ababa | 144 | 28 | 2 | 0 | 2.000(1.783-2.217) | 0.936(1.524,3.092) | 0.96 |
| | Oromia | 38 | 11 | 0 | 0 | 6.184(1.702,2.256) | 4.43 (1.305,1.836) | |
| | Ahmara | 12 | 3 | 0 | 0 | 4.357(.247-2.029) | 0.236(0.325-1.25) | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Others | 9 | 6 | 0 | 3 | 1 | 1 | |
| **Head Trauma** | Yes | 125 | 50 | 7 | 8 | 1.791(1.781-1.864) | 1.965 (1.305,1.836) | 0.22 |
| | No | 33 | 25 | 0 | 0 | 1 | 1 | |
| **Fever** | Yes | 99 | 21 | 0 | 9 | 1.860(1.750-1.939)* | 1.82 (1.702,2.256)** | 0.01 |
| | No | 104 | 27 | 2 | 3 | 1 | 1 | |
| **Hypoxic Brain Ischemia** | Yes | 107 | 66 | 3 | 3 | 1.910(1.842-1977)* | 2.43. (.624, 5.996)** | 0.00 |
| | No | 54 | 24 | 2 | 3 | 1 | 1 | |
| **Time Of Birth** | Premature | 24 | 15 | 0 | 0 | 1.800(1.514-2.055) | 17.292 (-0.876,.966) | 0.25 |
| | Term | 171 | 31 | 2 | 3 | 1.965 (1.305,1.836) | 0.219(.011-4.37) | |
| | Post Term | 8 | 2 | 0 | 0 | 1 | 1 | |
| **Place Of Delivery** | Health Center/ Hospital | 52 | 45 | 2 | 3 | 1 | 1 | 0.04 |
| | Home | 96 | 54 | 3 | 1 | 1.842(1.629-2.086)* | 2.8(2.576-3.302)** | |
| **Family With A Seizure** | Yes | 65 | 25 | 0 | 0 | 1.844(1.771-1.963) | . 0.68(0.193-0.652) | 0.43 |
| | No | 135 | 13 | 0 | 0 | 1 | 1 | |
| **Cns Infection** | Yes | 72 | 35 | 2 | 3 | 1.826(1.756-1.897) | 0.24(0.876, 1.59) | 2.399 |
| | No | 129 | 34 | 0 | 0 | 1 | 1 | |
| **Delays Develop** | Yes | 134 | 34 | 0 | 0 | 1.932(1.834-2.029) | 0.861(4-1.59) | .885 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **mental** | No | 69 | 14 | 2 | 3 | 1 | 1 | |
| **History Of New Born Distress** | Yes | 109 | 90 | 2 | 0 | 1.896(1.829-5.9630)* | 2.341(-.761,.0856)** | 0.013 |
| | No | 42 | 27 | 2 | 3 | 1 | 1 | |
| **Immunization History** | Yes | 149 | 46 | 2 | 3 | 2.067(.247-2.029) | 0.772 (1.01,1.06) | .389 |
| | No | 7 | 2 | 2 | 0 | `1 | 1 | |

, Aor(Ci 95%) **= Significant Simply P<0.05;, Cor* (Ci 95%) = Significant Simply P<0.25.I Do The Adjusted Odd Ratio If And Only If The Crude Ratio Was Differ From One..

Linear logistic regression analysis in which these factors were modeled against a dependent variable of the presence onset age of pediatric seizure. Unadjusted univariate ors and their corresponding 95% confidence intervals (ci) were computed using logistic regression to evaluate associations between age onset of a seizure and the potential risk factors. factors with p values less or equal to 0.25. In the univariate analysis were used in the multiple regression models to determine the independent risk factors. Five factors were showed in the final multiple logistic regression association of each factor with early onsetage of the seizure. Those who have variables such as head trauma was 1.3 times more likely to have an earlier onset of the pediatric seizure, aor: 4.43 (1.305,1.836). The odds ratio for birth asphyxia was 2.1 times more likely to had an earlier onset of a pediatric seizure, aor: 5.0 (2.761,8.0856,p=0.00), hypoxic brain ischemia was 2.236times more likely had an earlier onset of a pediatric seizure, aor, 2.236(0.325-4.25,p=0.02). Those were had developmental delay were 2.52times more likely have an earlier onset of a pediatric seizure, aor, 2.52(1.140-3.008,p=0.01). fever was 1.205 times more likely to have an earlier onset of a pediatric seizure, aor, 1.205(.467-3.605,p=0,01)male was 2.718 times more likely to have an earlier onset of pediatric seizure aor, 2.718 (1.717,3.364,p=0.01)were significantly associated with pediatric seizure onset at $p<0.05$ with 95% ci**(See Table 6).**.

**Table 6:- Describe The Association Factors Of Age Of Onset Of Pediatric Seizures By Using Linear Logistic Regression Of In Pediatrics Emergency Among 1 Month -12 Years Of Age Children Admitted In Tash, Pediatric Emergency Unit.**

| Parameter | Category | 0nset Of Age Of Pediatric Seizure | | Cor (Ci 95%) | Aor (Ci 95%) | P-Value |
|---|---|---|---|---|---|---|
| | | Early Onset | Late Onset | | | |
| Sex | Male | 95 | 59 | 1.206(.724-2.04)* | 2.718 (0.12,3.364)** | .021 |
| | Female | 58 | 43 | 1 | 1 | |
| Residency | Addis Ababa | 107 | 67 | 2.0308(1.524-3.092) | 0.10(1.524,3.092) | 1.00 |
| | Oromia | 30 | 19 | .122(-1.75-0.06) | 0.628(.203-1.944) | |
| | Ahmara | 8 | 7 | 2.68(0.193-0.652) | .912(0.128-3.8190 | |
| | Others | 9 | 9 | 1 | 1 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fever | Yes | 84 | 36 | 2.002(1.314-2.698)* | 1.205(.467-3.605)** | 0.01 |
| | No | 70 | 66 | 1 | 1 | |
| Head Trauma | Yes | 120 | 78 | 0.816(0.489-1.365)* | 1.3 (1.305,1.836)** | 0.00 |
| | No | 38 | 20 | 1 | 1 | |
| Hypoxic Brain Ischemia | Yes | 116 | 57 | 3.218(1.717-6.030)* | 2.236(0.325-4.25)** | .002 |
| | No | 56 | 27 | 1 | 1 | |
| Gestational Age At Birth | Premature | 34 | 5 | 2.520(1.484-3.557) | 0.18(0.235-1.227) | .006 |
| | Term | 118 | 84 | 0.527(0.191-1.456) | 5.179(2.299-11.667) | |
| | Post Term | 2 | 8 | 1 | 1 | |
| Place Of Delivery | Health Center/Hospital | 139 | 95 | 0.390(0.126-1.1212) | .122(-1.75-0.06) | .996 |
| | Home | 18 | 4 | 1 | 1 | |
| Family With A Seizure | Yes | 63 | 28 | 1.936(1.126-1.212) | 0.68(0.193-0.652) | .012 |
| | No | 89 | 76 | 1 | 1 | |
| Mode Of Delivery | Cesarean Section | 40 | 11 | 0.600(-1.720-2.920) | (1.496,3.257) | .063 |
| | Spontaneous Vaginal Delivery | 112 | 91 | 1.826(1.756-1.897) | 0.24(0.876, 1.59) | |
| | Assisted Vaginal Delivery | 2 | 0 | 1 | 1 | |
| Delays Developmental | Yes | 112 | 56 | 2.19(1.292-3.711)* | 2.52(1.140-3.008)** | .001 |
| | No | 42 | 46 | 1 | 1 | |
| History Of New Born Distress | Yes | 109 | 91 | 3.25(1.708-6.139)* | 2.1 (2.761,8.0856)** | 0.00 |
| | No | 43 | 34 | 1 | 1 | |

, Aor(Ci 95%) **= Significant Simply P<0.05;, Cor* (Ci 95%) = Significant Simply P<0.25.I Do The Adjusted Odd Ratio If And Only If The Crude Ratio Was Differ From One..

# 6. DISCUSSION

Seizures are more common in younger children compared to older ones with male preponderance.this is observed in the current study the higher prevalence of seizures in younger age groups (0–6years >7–12years) with male predominance (male/female = 1.5:1). The prevalence of seizure was 4.52 %( 45/1000 people) for a total of children admitted within these three years. the prevalence was slightly higher among males compared with females. the same finding has been reported in other studies.male predominat might be due to greater risk-taking behavior of males compared with females the event of head injury is significant.this finding is almost similar to research is done in nepal, southern brazil, united kingdom (5,8,15). Nevertheless, a study was done in egypt and kenya the prevalence was 8% and 11% respectively (4,14).This two studies were inconsistent with our study.finding. the reason for the higher occurrence of seizures in children as compared to our study may be due to the inclusion of newborn having seizures in the kenya study. inour study, children below one month of age were not included. This difference could be due to the study method and in the age group selected for the study in egypt was up to 18 but in in our case, it was 12 years.

Age onset for children was at a median of 1.00 years, and the median duration of seizures was 2 minutes. This median age onset is lower than the study done in ghana and kenya the median age of onset of seizures was 8.0 and 2 years respectively, and the median duration of seizures was 10.2 minute . (14,22). This difference could be due to the difference in socio-demographic characteristics of study participants like the age of study participant they used up to 18 years of child's age .the duration may be due to a lot of children in their study had status epileptics while not in our finding.

The type of seizure according to this finding generalized tonic-clonic types of seizure were predominant which accounts for 203 (79.3%) followed by partial (focal) seizure 48(18.8), unclassified seizure 2(.8) and unknown onset seizure 4(1.7%). Based on the sex partial (focal) seizures were 16.8% and 21.8% in males and females respectively. generalized (tonic-clonic) seizure was common in the male, which accounts for 81.9%. this finding is consistent with the study done in the united kingdom, nepal and ghana, which state that the generalized tonic-clonic was the most common followed by partial, unknown and unclassified and it was at the same time common in the male(5,15,22) .

Electroencephalograms haave been performed on 160 children of whom 158 (68.1%) had abnormal tracings, and most were found to have interictalepileptiform activity. This finding could show some similarities, as found

on the seizure disorder in children, retrospective review in ghana eegs was abnormal (slow disorganized response) inieo , Out of the 15 patients in which it was done. also with a study done on, rural kenya, show electroencephalograms performed on 80 children of whom 16 (20%) had abnormal tracings, and six were found to have interictalepileptiform activity(14). This difference could be due to differences in the sample size was (n=267) and their sample was (n=168)and beside this may be it is due to high brain ischemia in our study , so the have high chance of having abnormal interictalepileptiform.

In our study, a higher proportion of children had etiological factors such as head injury (38.3%), febrile convulsion (39.1%), and hypoxic brain injury (67.5%) and developmental delays (65.6%) and at univariate analysis, variables such as sex, residency, head trauma, fever, hypoxic brain ischemia, time of birth, place of delivery, family with a seizure, cns infection, delays developmental, history of newborn distress and immunization history, were found to be significant. Nevertheless, in the multivariate logistic regression, only five factors included show association. those with fever are 1.85 more likely to have a seizure.it is similar with a study done in nepal and kenya which indicate that seizure are more likely to appear in those with fever 2.8-3.5 folds(8,13). (or 3.5) (or=2.75; 95% ci: 1.240-6.09,p=0.03) respectively (5,14). it is also consistent with a study done in turkey that shows that fever raises the risk of developing seizure by 10.9-fold(19). most of the study done before found that the family history and head injury are more associated with the seizure even though in our study they didn't showed any significance. this could be due to the difference in age of the study group to be at risk for head injury and there were no parental consanguinity in our setup. those with history of newborn distress are 2.3more likely to have a seizure . Similarly, the study done in turkey andkerela conclude perinatal insult like newborn distress renders the child for a subsequentdevelopment of seizure (17,19).hypoxic brain ischemia and home delivery were significantly associated with a pediatric seizure in our study .this findingswere alike with the studies done in ghana,which show, in sub-saharan africa age <18 years, factors related to hypoxic ischemic encephalopathy (or=3.45, ci: 1.3-7.2,p=0.01) and home delivery (or=2.7) were associated with the greatest relative increase in pediatric seizure( 20,22).

On the early onset of a pediatric seizure, only five factors were showed in the final multiple logistic regression association of each factor with age onset of a seizure. those have variables such as head trauma4.43times more likely to had an earlier onset of a pediatric seizure. It was similar to a study done in egypt which states that history of head trauma had 1.3 times the risk of having early onset of s seizure (4). However, it is not consistent with research done at atlanta head trauma not show association with the onset of the seizure (p=0.04, or=0.23).hypoxic brain ischemia show significance with the onset of the seizure (p=or=2.24). Similar study on risk factors of seizure in atlanta on the year onset of seizures was significantly associated with hypoxic-ischemic

Encephalopathy (hie; p = 0.007), or-2.35(25). developmental delay (or=2.52) show significance in our study however according to study in brazil delay in development did not show significance (p=0.12, or=1.2) (8). fever and male sex were, 1.205 and2.718 times more likely to had an earlier onset of a pediatric seizure. newborn distress (or= 5.), there was a significant association between early onset of pediatric seizure and history of newborn distress. there were 154 (39.8%) children with the age of onset earlier than 1 year (96 of them had a history of newborn distress) and 102 (60.2%) with the age of onset later than 1 year (87 of them had a history of newborn distress). This finding shows great consistency with the research done in kerala, significant newborn distress, significantly related early onset of a seizure. (17).A study done in sub-saharan africa and associated risk factors, shows for children (aged <18 years), factors related to their antenatal period and delivery were associated with the greatest relative increase in the prevalence of seizure, also seizures in the family, sex, and head injuries were significantly associated age onset of seizure(20).

# 7.CONCLUSION

Approximatley 5% of children visting the pediatric emergency had seizure .besides ,higher burden of seizure was identified in the young ages.we also observed poor control of seizure in a half of our patients.generalized tonic clonic seizure was most apparent type of seizure and the majority have its onset less one year of age.

Finally, in this study, only four factors like fever, newborn distress, hypoxic brain ischemia, and those delivered at home were significantly associated with a pediatric seizure.underlying the need to advocate the need of proper management of pregnancy and delivery.

# 8. STRENGTH AND LIMITATION

**Strength**

We adopted a systematic sampling for this study to identify important risk factors for seizure in children who attend hospital for treatment. Most of the data could be checked every day with the medical records to confirm the accuracy. We examined four broad categories of risk factors for seizure, (1) familial, (2) maternal factors, (3) perinatal factors, and (4) postnatal factors.

**Limitation**

Some of the limitations this study confronted were lack of proper categorizations in the archive and lack of accurate registration of descriptions and the results of clinical examinations in the records. as the study design is cross-sectional it might not determine the causal relationship between the dependent and independent variable in the analysis. a community-based study is an ideal design to identify risk factors. we included neither newborn with seizures admitted to nicu nor children having seizures from the outpatient department. this may alter the findings of the present study significantly. There are several practical difficulties in undertaking such studies within a short period and with this covid-19 pandemic. Because this is a retrospective study, as the respondents were asked to recall exposure to risk factors in the past, this could have resulted in recall bias .

## 9. RECOMMENDATIONS

**Based On The Findings, The Following Recommendation Are Forwarded**

- Policymakers and ministry of health need to consider and plan for the implications of increased numbers of the child with pediatric seizure and should work on the prevention of these more comprehensively.
- Health facilities better to give health education and health promotion to improve orto advocate the need of proper management of pregnancy and delivery.
- Health professionals at different levels of the institution should work to reduce the occurrence of childbirth asphyxia that commonly shows most significant with the risk of pediatric seizure and onset of it.
- For effective control of seizure, it would be better if a health-professionals, community and government should work on the awareness creation on the common risk factors of seizure.
- Family of the patient and health worker should be trained on different types of risk factors of seizure focusing on the prevention or reduction of the new incidence of the child having a seizure.
- Lastly, i recommend studies incorporating multi-center on this topic for the better estimate of the association as well as the temporal relationship of different determinant factors and seizure overall community.

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# ANNEXES I:-QUESTIONARIES AND CHECK- LIST (IN ENGLISH)

# I. STUDY INFORMATION SHEET FOR INTERVIEW

In Ensuring The Health Of Children, We Should Know About The Magnitude And Associated Factors Pediatric Seizures, Which Has High Morbidity And Mortality In Children. You Are Cordially Invited To Participate In The Interview On "Magnitude Of Seizure And Its' Associative Factors Among 1 Month -12 Years Of Age Children Admitted In Tash, Pediatric Emergency Unit From December 2016- December 2019.

The Study Attempts To Assess Magnitude Of Seizure And Its' Associated Factors Among 1 Month -12 Years Of Age Children Admitted In Tash. The Research Was Helpful To Understand The Magnitude And The Associated Factors Of Seizure In The Children.

**Title**: Magnitude Of Seizure And Its' Associated Factors Among 1 Month To 12 Years Of Age Children Admitted In Pediatric Emergency Unit,Tash, From December 2016- December 2019.

**Purpose Of The Study**: This Study Is Planned To Generate Information On Prevalence Of Seizure And Its' Associated Factors Among 1 Month To12 Years Of Age Children Admitted In Tikur Anbessa Specialized Hospital, That Is Basic For Further Intervention On Prevention And Control Of Pediatric Seizures.

**Procedure**: You Are Selected For This Interview And I Got Your Telephone From Your Child Medical Record By Asking Permission From The Pediatric Sand Child Health Department Of Tash And Securing Ethical Clearance. If You Are Willing To Participate In This Study, You Will Respond For The Questions That I Will Ask You. We Would Expect You To Respond For The Questionnaire Quickly As Much As Possible. The Maximum Time For The Interview Is About 10 To 20 Minutes.

**Risks And Benefits Of The Study**: - Your Participation Will Be Helpful To Determine Magnitude Of Seizure And Its' Associated Factors Among 1 Month To 12 Years Of Age Children Admitted In Tikur Anbessa Specialized Hospital. The Results Of The Study Will Be Baseline For Further Intervention On Prevention And Control Of Pediatric Seizures. Your Participation In This Study Will Not Involve Any Risks To You.

**Rights**: Your Participation In This Interview Is Voluntary And You Have The Right To Refuse To Participate Or To Answer Any Questions That You Feel Uncomfortable With. The Decision Not To Participate Will Not Affect Any Future Medical Care Your Child Shall Require Or Any Other Benefits To Which You Would Be Entitled. If There Is Anything That Is Unclear Or You Need Further Information, We Shall Be Delighted To Provide It.

**Confidentiality**: - The Information That You Provide During The Interview Will Be Kept Confidential. Only The Researchers Will Have Access To The Information That You Provide. If You Have Any Doubt During Interview, You Can Ask.

### *Ii. Informed Consent Form*

**Members Of The Family Self-Reporting On The Interview**

I Have Got Sufficient Information Through Description Of The Study Entitled "Magnitude Of Seizure And Its' Associated Factors Among 1 Month To 12 Years Of Age Children Admitted In Pediatric Emergency Unit ,Tash From December 2016- December 2019" By Listening What You Have Read From The Information Sheet.

I Know That I Can Refuse To Respond Without Penalty Or Loss Of Benefit To Which I Would Have Been Otherwise Entitled. I Have The Right To Withdraw From This Interview At Any Time I Want, Without Any Negative Impact On Me. Hereby, I Voluntarily Respond For The Question.

***<u>ለጥናትተሳታፊዎችመረጃፎርም</u>***

***<u>ውድተሳታፊዎቻችን</u>***

ጤናይስጥልኝ! ስሜ--------------------

ነው፣እዚህየተገኘሁትአቶአሳምነዉሐብታሙንበመወከልሲሆን፣እርሱምበአዲስአበባዩኒቨርሲቲኢመርጀንሲሜድሲንት/ትክፍልየሁለተኛዲግሪውንበመማርላይይገኛል፡፡የዚህትምህርቱአካልየሆነጥናትየሚያደርግሲሆንይኸውምየሚጥልበሽታበህፃናትላይያለዉመጠንእናመንስኤወቹየሚለዉንያጠናል፡፡ስለሆንምበቅድሚያስለጥናቱናስለእርስዎድርሻእንደሚከተለውበማብራራትእጀምራለሁ፡፡

**የጥናቱዓላማ፡-**የሚጥልበሽታከ1 ወርእስከ 12 ዓመትባሉህፃናትለይያለዉመጠንእናመንስኤወቹምንእንደሆነመለየትእናማሳወቅ፡፡

**ጥቅም፡-**

የጥናቱውጤትየሚጥልበሽታህፃናትላይእንዲቀንስየሚጠቅምይሆናል፡፡እርስዎምየዚህጥናትአካልበመሆንዎከፍተኛአስተዋፅኦያደርጋሉ፤ከዚህውጪግንየገንዘብምሆነሌላየሚያገኙትቀጥተኛጥቅምየለም፡፡

***የጉዳትሥጋት፡-***

*ቃለመጠይቁየተሳታፊውንጥቂትጊዜየሚወስድእናጥቂትምቾትይነሳልግንተሳታፊውበጥናቱየሚደርስባቸውምንምዓይነትጉዳትየለም፡፡*

**የጥናቱመረጃምስጢራዊነት፡-**

እርስዎየሚሰጡትምላሽሁሉበምስጢርየሚያዝናለሌላሰውተላልፎየማይሰጥይሆናል፡፡ስምዎምሆነየስልክቁጥርዎአይ መዘገብም፡

**የጥናቱተሳታፊዎችመብት፡-**

በጥናቱመሳተፍየእርስዎፈቃድእስከሆነድረስብቻነው፡፡በጥናቱሲሳተፉመመለስየማይፈልጉትንጥያቄመዝለልናእንዲ ሁምበፈለጉትሰዓትጥናቱንአቋርጠውየመውጣትመብትዎየተጠበቀነው፡፡

ጥያቄካለዎትበየትኛውምሰዓትማንሳትይችላሉ፡፡እንዲሁምከዚህበታችበተገለፀውአድራሻየጥናቱንአድራጊማናገርይች ላሉ፡፡እንግዲህከላይያነሳሁልዎትንሀሳቦችከግንዛቤአስገብተውበጥናቱስለመሳተፍዎያለዎትንውሳኔከዚህቀጥሎባለው ፎርምላይይገልፁልኝዘንድበትህትናእጠይቅዎታለሁ፡፡

የጥናቱአድራጊ፡- አሳምነዉሐብታሙ

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**<u>የስምምነትውሳኔመስጫፎርም</u>**

ከዚህበላይያለውንመረጃአንብቤናበሚገባኝቋንቋተገልፆልኝ፤የጥናቱዓላማ፣ጥቅም፣ጉዳትናምስጢራዊነትየተረዳሁሲ ሆንበጥናቱስለመሳተፌምያለምንምግፊትበራሴውፍላጎትየሚከተለውንወስኛለሁ፡፡በጥናቱለመሳተፍወስኛለሁ

(ወደሚቀጥለውፎርምይለፉ) ☐

የጥናትአድራጊውስም፡- አሳምነዉሐብታሙ

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ይህቃለመጠይቅየተደረገበትቀን---------------

የተጀመረበትሰዓት----------- ያለቀበትሰዓት-------------

የመረጃሰብሳቢውስም----------------------- ፊርማ---------------------

የጥናቱተቆጣጣሪስም---------------------- ፊርማ--------------

***Iii. Questionnaire .***

Title: Magnitude And Associated Factors Of Pediatrics Seizures At Pediatrics Emregency Unit, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2020: A Retrospective, Descriptive Study.

Date Of Data Collection ______________ Department________________

Questionnaire Sn __________________ Name Of Data Collector_________

**Please Read The Following Questions Very Carefully And Then Answer Them By Circling Or Put A √ Symbol Based On The Information From The Interview And Child's Medical Records.**

**I. Socio-Demographic Characteristics Of The Study Subjects..**

| Serial Numbers | Patients Characteristics | Make A Right In The Circle ( √) For The Write One. |
|---|---|---|
| 1. | Age | ………………… |
| 2. | Sex | Male |
| | | Female |
| 3. | Residency | Addis Ababa |
| | | Oromia |
| | | Ahmara |
| | | Tigray |
| | | Others (Somalia, Gambela, Snnp.) |
| 4. | Occupation Of Parents? | Salaried Worker |
| | | Trader |
| | | No Occupation |
| | | Farmer |
| 5. | Has The Child Been Forced To Drop Out Of School Because Of Seizure? | Yes |
| | | No |

**Ii.Nutritional Status, And Description Of The Event..**

| Serial Numbers | Patients Characteristics | Make A Circle For The Rightone. |
|---|---|---|
| 1. | Overall Nutritional Status | Normal(Bmi >20,-2<Z) |
| | | Underweight(Bmi<10,-2<Z>-3) |
| | | Wasted( Bmi Z<-3) |
| 2. | Seizure Episodeduration In Minute | ………………… |
| 3. | Age At Onsetof Seizures | ……………………… |
| 4. | Seizure Frequency | Once Times Per Day |
| | | Twice Per Day |
| | | Three Times Per Day |
| | | >=4 |
| 5. | Precipitating Factors | Fever |
| | | Sleep Deprivation |
| | | Stress |
| | | Photosensitivity |
| | | Drugs |
| 6. | Which Types Of Seizure Do The Child Has? | Focal Seizures |
| | | Generalized Seizures |
| | | Unknown Onset Seizures |
| | | Unclassified Seizure Disorders |
| 7. | Was The Eeg Done? | Yes |
| | | No |
| 8. | If Yes What Was The Result ? | Normal |
| | | Abnormal |
| 9. | If It Was Abnormal Which Form? | Epileptiform(Ictal/Interictal) |
| | | Non Epileptiform |
| 10. | Was Ct/Mri Brain Done For The Child. ? | Yes |
| | | No |
| 11. | If It Is Performed, What Was Its Finding ? | Abnormal |
| | | Normal |

**Iii. Clinical Symptoms The Child Had During Admission. Make √ In Front Of The Symptom They Have.**

| Serial Number | Clinical Symptoms | Put √ In Front Of The Sign The Child Has |
|---|---|---|
| 1. | Fever | |
| 2. | Headache | |
| 3. | Vomiting | |
| 4. | Change In Mental Status | |
| 5. | Aphasia | |

**Iv. General Medical History Of The Child**

Which One Of The Following Condition Does The Child Has In Is Life Time Or Until He Develop This Condition. Make The √ Sign In Front Of The Condition The Child Was Has.

| Serial Numbers | Medical Condition | Make Write Sign(√) In Front Of The Condition The Child Has |
|---|---|---|
| 1. | Head Trauma | |
| 2. | Stroke | |
| 3. | Brain Tumor | |
| 4. | Vascular Malformations | |
| 5. | Neurosurgery | |
| 6. | Vascular Disease | |
| 7. | Neurodegenerative Disorders | |
| 8. | Toxic Or Poisoning Disorders | |
| 9. | Febrile Illness | |

**V. Family History**

1. Does Anyone In The Family Have A History Of Seizure/ Epilepsy?

A).Yes B). No

2). If Yes, Please Indicate The Member Of The Family With A Seizure? A) Brother/Sister

B) Parent C) Uncle/Aunt D) Nephew/Niece E) Other(Specify)___________

3) Is There Is A Blood Relationship Between The Child's Parents? A) Yes B) No

4) Are There Any Of The Family Members Who Have Mental Retardation? A). Yes B). No

**Vi) Pregnancy/Perinatal History**

1) Maternal Problems A) Hypertension B) Diabetes C) Seizures D) Hiv E) Malaria F) Severe Anemia G) Threatened Abortion

2) Time Of Birth Of This Child A) Premature B) Term C) Post-Term

3) Place Of Delivery A) Health Centre/Hospital B) Home

4) What Was The Mode Of Delivery? A) Cesarean Section B). Spontaneous Vaginal Delivery

C) Assisted Instrumental Delivery

5. How Was The Duration Of Labor? __________ (In Hrs.)

6) Did The Child Have Difficulties Crying, Breathing Or Feeding After Birth?

A) Yes B) No

7) Was The Child Resuscitated Immediately After Birth? A). Yes B). No

8) Neonatal Complications (First 1 Month Of Life) A)None B) Neonatal Infection C)Neonatal Jaundice Neonatal D)Seizures E) Malformation F) Neonatal Tetanus G)Other:

9) Did The Child Complete All Vaccines According To The National Immunization Calendar?

A). Yes B). No

10) Did This Child Ever Have Convulsions During He/She Has A Fever? A). Yes B) No

11) Do/Did Any Siblings Have Seizures During A Fever As A Child? A) Yes B) No

12).Has The Child Ever Been Treated For Meningitis? A). Yes B).No

13) Has The Child Ever Received Blood Transfusion For Severe Anemia? A). Yes B). No

14).Was There Any Delays In Attaining Developmental Milestones (Crawling, Walking, And Speech). A). Yes B). No

15). Does Anyone In The Family Have A History Of Developmental Delays, Neurological Illness, Or Psychiatric Illness? A) .Yes B) .No