



Benghazi University

Faculty of Medicine

Department of pediatrics

**Demography and Risk Factors of Febrile Convulsion in
North Eastern Part of Libya (2012)**

Prepared by : Dr Elsalmi .M .Elsalmi

Supervisor : Prof . Nuri .M. Shembesh

**This thesis is submitted in partial fulfillment of requirement for the degree of
master in pediatrics**

Benghazi 2017

AKNOWLEDGMENTS

This thesis takes the considerable time and efforts of some people if it is to be successful . First and for most , I am indebted to professor Nuri .M. Shembesh who devoted his time effort in its success.

I wish to express my gratitude to my family and to all my friends and colleagues in Benghazi Children hospital for their cooperation and great help.

ELSALMI .M. ELSALMI

Contents	Page
Acknowledgements.....	2
List of tables.....	6
List of figures.....	7
Abstract.....	8,9
Chapter I.....	10
I . Introduction.....	11,12,13,14,15
Chapter II.....	16
II. Literature Review.....	17,18,19,20,21,22,23,24 ,25,26,27
Chapter III.....	28
III. Aim of the study.....	29
Chapter IV.....	30
IV. Methods:.....	31
1.Study population.....	32
2. Clinical methods.....	33
3.StatisticalAnalysis.....	34
Chapter V.....	35
V. Results.....	36
1. Gender and FS.....	36

2.Residence and Address.....	37
3.Age Distribution of Children with FS	37,38
4.Duration of Hospitalization	39
5.Etiology of fever in the Children with convulsion.....	40,41
6.Temperature degree at admission in Children with FS.....	42
7.The monthly Distribution of the Children with FS.....	43
8 - Table7:- Monthly distribution of FS in 19444 patients admitted during the year 2012.....	44
9.Birth history of the Children with FS	45
10.Family history of FS or epilepsy	46
11.Family history of consanguinity.....	46
12.Type of the FS.....	46
13.The risk factor of recurrence	46,47,48,49,50
13.Relation between anemia and FS.....	51,52
14.Table11 Comparison of demographic of our study with some Arabic Countries	53
15. Table12 Comparison of demographic of our study with some World Countries.....	54

Chapter VI.....	55
VI. Discussion.....	55
1.Evalution of Demography.....	56,57,58
2.Evalution of recurrence and risk factors.....	59,60
3.Anemia and FS.....	60,61
Chapter VII.....	62
VII. Conclusions.....	63,64
Chapter VIII.....	65
VIII. Abbreviations.....	66,67
Chapter IX.....	68
IX .Limitation.....	69
Chapter X.....	70
X. Reference	72,73,74,75,76 ,77,78,79
Chapter XI	80
XI. Arabic summary.....	81,82,83

List of Tables

Table 1 Worldwide incidence of febrile seizures

Table 2 Sex distribution in 443 pts admitted during year 2012 with FS

Table 3 Age distribution of 443 pts admitted with FS during 2012

Table 4 Admission period in 443pts with FS during year 2012 in north east part of Libya

Table 5 Causes of fever in 443 pts admitted with FS from north east part of Libya in year 2012

Table 6 Degree of temperature at admission in 443 patients with FS in north east of Libya

Table7:- Monthly distribution of FS in 19444 patients admitted during the year 2012

Table 8 Birth history of 351 Children with FS from north east part of Libya

Table 9 Variables that significantly affected FS recurrence in 443 pts with FS from north east part of Libya

Table 10 Comparison of demographic characteristic of Children in both FS and control groups

Table 11 Comparison of laboratory characteristic of Children in both FS and control groups

Table 12 Comparison of demographic characteristic of our study with some studies in Arabic Countries .

Table 13 Comparison of demographic characteristic of our study with some studies in World Countries.

List of Figures

Figure 1 Sex distribution in 443 pts with FS admitted during year 2012

Figure2 Age distribution of (443) patients admitted with FS during 2012

Figure3 Causes of fever in 443 pts admitted with FS in north east part of Libya

Figure4 Seasonal variation for 443 pts admitted with FS during 2012 from north east part of Libya

ABSTRACT

Background:-

Febrile seizures are common and mostly benign . They are the most common cause of seizures in children less than five years of age . There are two categories of febrile seizures, simple and complex. Both the International League against Epilepsy and the National Institute of Health have published definitions on the classification of febrile seizures. Simple febrile seizures are mostly benign, but complex febrile seizure can have long term consequences. Most children who have a febrile seizure have normal health and development after the event, but there is recent evidence that suggests a small subset of children that present with seizures and fever may have recurrent seizure or develop epilepsy .

Objective:-

To study the prevalence and demography and the risk factors of recurrent febrile seizures (FS) in north eastern part of Libya

Study Design: -

Descriptive retrospective study.

Place and Duration of Study:-

. Benghazi Children hospital(teaching) which is the primary pediatric referral hospital in the north eastern part of Libya. From 01 January to 30 December2012·

Patients and Methods

A total of 443 children [age ranges from 03 months to 60 months] were included in the study, while they were admitted with the diagnosis of FS during the study period, in Benghazi Children Hospital . The data were collected from the medical record office of the hospital

Results :

During the study period (443) children were admitted for FS, the mean age of children in our sample was 20 months. There was a preponderance of male children. M:F ratio 1.35:1 upper respiratory tract infection was the commonest cause of fever in (73%) and 2nd was Gastroenteritis , the mean temperature at presentation was 38.7°C, The mean duration of admission was 1-2 days in (66%), 106 patients (93%) had positive family history of FS and 8(7%) patients had positive family history of epilepsy out of 114pts with positive family history . Recurrent febrile seizure was found in 91 (22.9%) children out of 396 patients with FS . There was a statistically significant association between type of FS (complex FS) and recurrent FS in(33%) patients (p-value= 0.01). Similarly, the association of duration of FS (>10min) and recurrence was found to be significant in 34.5% (p-value= 0.003). In frequency (more than one fit)and recurrence was found to be significant in34%(p-value=0.01). The age less than 12months was 36 (29.8%)patients in recurrence group ,while 85(72.2%)patients in non recurrence group and in the age more than 12months was 55(20%) patients in recurrence group ,while 220 (80%) patients in the non recurrence group , so the age is considered as risk factor of recurrence FS, p=0.038 . Not significant factors were sex and family history and temperature. In our study the mean level of HB,MCV,MCH,MCHC in FS group were lower than in control group ,However this was not a statistically significant difference p value >0.05.

Conclusions:

FS is a common pediatric problem predominantly seen in males. The most causative factor was the upper respiratory infection ,more common during winter. No effect of birth wt ,gestation age or mode of delivery on the occurrence or recurrence of FS. Type of seizure, age ,duration ,number of attacks are considered as significant risk factors for recurrence FS, the recurrent rate in north east part of Libya is (22.9%) There is no statistically significant correlation between anemia and FS. The febrile convulsion is benign condition and all admitted Children recovered and discharged without any significant complication .

Chapter I

Introduction

Febrile seizure (FS) is the single most common seizure type and occur in 2 to 5% of children younger than age 5years with a peak incidence in the second year of life.¹

Historically FS were reviewed using large epidemiologic studies. Initial studies did not exclude seizures associated with underlying neurological disorders.²

It is currently accepted that most children who have a FS often have normal health and development after the event.³

FS are considered benign, but there is recent evidence suggests a small subset of children that present with seizures and fever may have recurrent FS ,later develop epileptic syndrome.³

The incidence and prevalence of FS is similar across the numerous FS studies but there is variation of incidence of FS based on geographic location.^{4,5,6} The reported incidence of FS in children before age of 5 years varies widely from 1% in China and 2% in Taiwan to 8% in Japan and 14% in Guam. In the United States and Europe, the incidence ranges from 2% to5%. In Benghazi Libya FS diagnosed in99pts out of the 8564 pts admitted to Children hospital during year2000 ,admission rate 1.1%.⁴⁴

Generally the prevalence of FS is lower in western countries(1.7% in the United States , 3.9% in Holland) than eastern world (9.3% Japan).^{7,8}(except in China, prevalence was ranging from 0.5 to1.5%) with higher prevalence found in Japan and Guam.

Table 1. Worldwide Incidence of Febrile Seizures^{9,10}

Location	% of population affected
China	0.5-1.5%
Mexico	1.2%
Rochester ,MN	2.0%
Oakland.CA	2.2%
Great Britain	2.3%
Denmark	3.24%
Chile	4%
Finland	6.9%
Japan	8.8%
Guam	14%

The prevalence in boys has generally been found to be higher than girls^{6,11,12,13}.

Though in the Child Health and Education Study (CHES) found no statistical difference between boys (2.29%) and girls (2.12%).¹⁴

Age is an important factor in febrile seizures . Most studies have shown that the majority of febrile seizures occur between 6 months to 3 years with peak in the second year of life.^{11,12,13,14}

FS occur in the setting of a febrile illness, which could cause seasonal variation. In Japan a study of FS showed two peaks of incidence, November to January and June to August, which correspond to peaks of viral upper respiratory infections and gastrointestinal infections respectively¹⁵ . A study performed in Italy, which looked at 188 first FS, found that there is a significant increase in FS from 6 PM to 11:59 PM and a seasonal peak in January¹⁶ . There have been multiple studies have supported the conclusion that FS have a peak in the winter and end of the summer^{17,18,19}.

Genetic factors contribute significantly to the etiology of febrile seizures.²⁰

Family studies have shown that relatives of these pts are at increased risk compared to The general population.²⁰ Twin studies have also indicated that genetic factors play an important role in susceptibility to febrile seizures.²¹

Segregation patterns in families with febrile seizures suggest different modes of inheritance. Most studies have supported a polygenic or multifactorial model with estimated heritability of 75%.^{22,23} However ,in families of probands with multiple febrile seizures ,the inheritance pattern was consistent with a single-major-locus model that best fit autosomal dominance with penetrance of 65%. Linkage analysis studies identified five chromosomal loci for febrile seizures :FEB1at 8q13-q21,FEB2 19p,FEB3at 2q23-q24,FEB4 at5q14-q15 and FEB5at 6q22-q24.^{24,25}

. Dravet syndrome, also known as severe myoclonic epilepsy of infancy (SMEI), is a type of epilepsy with seizures that are often triggered by hot environment or fever.²⁶ It often begins around six months of age²⁶

Dravet syndrome are not hereditary and the mutated gene is found for first time in a single family member.²⁷ This gene normally codes for neuronal voltage-gated sodium channel Na(V)1.1.²⁸ In mouse models, these loss-of-function mutations have been observed to result in a decrease in sodium currents and impaired excitability of GABAergic interneurons of the hippocampus.²⁸ The researchers found that loss of NA(V)1.1 channels was sufficient to cause the epilepsy and premature death seen in Dravet syndrome.²⁸ Vaccinations can trigger the onset of seizures in one third of patients with Dravet syndrome²⁹.

The previously used whole-cell diphtheria/tetanus/pertussis and measles containing vaccines have an established association with FS, but the less reactogenic diphtheria, tetanus, and acellular pertussis (DTaP) vaccine has been developed and is currently used and does not increase the risk of FS.²⁹

Children less than 2 years of age have an increased risk of FS after the first dose of a measles containing vaccine when it is administered with a varicella vaccine³⁰. The measles containing vaccines have not been found to be associated with an increased risk of FS in children over 4years, regardless of whether varicella is given at the same time.³¹ There is no evidence that children should not be vaccinated. FS are not considered a form of epilepsy but a FS can be the first presentation of subsequent epilepsy or epileptic syndrome ,it is not possible to predict which child will develop an a febrile seizure after presenting with FS.³²

The International League against Epilepsy (ILAE) defines a FS as a seizure occurring in childhood after one month of age, associated with a febrile illness that is not caused by an infection of the central nervous system.³³

Child with the diagnosis of FS cannot have a history of neonatal seizures, a previous unprovoked seizure or meet criteria for other acute symptomatic seizures.³³

The lower age limit of the ILAE definition is younger than the limit proposed previously by the National Institutes of Health (NIH).

The NIH Consensus Conference definition of FS is an event usually occurring between 3 months and 5 years of age, associated with fever, but without evidence of intracranial infection or defined neurological cause.³⁴

Febrile seizures are categorized into two types: complex or simple. Classification is important as there are different long-term prognosis associated with each, and the clinical approach to acute management may also differ by febrile seizure subtype.³⁵

SIMPLE FEBRILE SEIZURES

A simple febrile seizure is characterized by a brief (usually seconds to a few minutes, certainly < 15 minutes), generalized seizure associated with a fever which does not recur during the index febrile illness.³⁵

COMPLEX FEBRILE SEIZURES

Febrile seizures are categorized as complex if the seizure is prolonged (> 15 minutes), recurrent within the same febrile episode, or if it has any focal features. Note that in the presence of any one of these features, the febrile seizure should be considered complex. The presence of focality can be characterized by the clinical seizure semiology as reported by witnesses, but may also be evident on examination if the child has a transient focal neurologic abnormality indicative of the Todd's paralysis phenomena.³⁵

Complex febrile seizures may indicate a more serious disease process, such as meningitis, abscess or encephalitis. Current recommendations include consideration of a lumbar puncture, especially in children younger than 18 months, because meningeal signs are less reliable in this group³⁵.

Recurrence FS in the third world range from 21%-29.3%as indicated by studies conducted in the Middle East and Nigeria.^{36,37} In the West however, recurrence rates are much more varied ranging from30%-50%.³⁸

There are many well established risk factors for recurrence of FS the major factors are age less than 1 year ,duration of fever less than 24hours , and fever between 38-39c⁰.^{39,40}.

Age of onset is one of the most consistent and strongest predictor of the recurrence.⁴¹.

Developmental delay and younger age are associated with prolonged FS.⁴²

Subsequent febrile seizures can be prolonged if the initial febrile seizure was prolonged.⁴³.

Febrile status epileptics (FSE) is a subgroup of complex FS. The risk factors are family history of febrile seizures, epilepsy, perinatal insult and low plasma ferritin level reflecting poor iron status or iron deficiency⁴³.

CHAPTER II

Literature review

Retrospective study conducted in Benghazi Children in the year 2000 by Dr.Aziza Ezzidin et al . were 100 Children with FS included 61 (61.1%) were males and 38(38.4%)were females ,male to female ratio being 1.6:1,most of the patients were living in Benghazi 84(84.8%),15patients (15.2%)were from surrounding cities, Admission rate was found to be1.1%. The peak age was between 6-12 months In Children less than 24months occurred more frequently 69patients (69.8%) than over 24 months (30.2%). Temperature degree at admission was between 38-39°C in 88 patients (88.8%)and 11pts (11.2%)had temperature >39-40 °C. The most common cause of fever was URTI in 72patients (72%) and second common cause was GE in 15 (15.1%) . In this study almost all the patients were full term 91pts (91.9%) , 6 were premature (6.1%) , the birth weight of 32patients was within normal range (2.5-3.5kg), low Birth weight was recorded in 11 <2.5kg, Birth weight >3.5-4.5kg was recorded in 12 , 67(67.7%) of patients admitted for 1-2 day, 10patients (10.1%)admitted for more than 4 day.

The Family history of FS positive in 15patients (15.1%)and Family history of epilepsy in 10 patients (10.1%), Simple FS found in (82%) and Complex FS found in 18 (18%) (12patients of 18 were females (66.6%) and only 6 were male (33.3%)). Recurrent FS found in 23patients (23.2%) , 7patients (30.4%) with recurrence attacks were females, whereas 16(69.6%) in recurrence were males.

There was no statistical significant difference ($p >0.05$) regarding the type of seizure and temperature at admission in recurrence and non recurrence group , the young age less than 2 years wasn't considered as one of significant risk factor of recurrence $p>0.05$. Family history of febrile seizure and epilepsy statistically wasn't significant $p>0.05$.⁴⁴.

In a study conducted in Khartoum-Sudan in the period December1981-April 1982. 70 Children with FS were studied out of 3871 patients admitted .The prevalence of was found to be 1.8%. The mean age was 30.3 months . There was preponderance of males being about two thirds of total There were 43(61.4%)male and 27 (38.6%) were female male to female ratio 1.6:1. The mean age for males was 28.4⁺-16.2months , while that for females was 30.9⁺-20.2months . There was no significant difference between the mean age for males and females . In 28 Children out of 37 Children who had convulsions on admission , in 18(64.3%) of them ,temperature was found to be more than 39 °C. The mean temperature at presentation was 39.3°C .

10 Children(35.71%)had temperatures between 39-40 °C.

The highest incidence of FS was in first born (25.7%)) and 36Children (51.4%)with convulsions gave positive family history . of these 28(40%) were febrile and the remaining 8(11.4%)were Non -febrile . Causes of fever among Children with FS were URTI(18.6%) ,pneumonia (22.9%) ,malaria(20%) accounted for two thirds of patients In 49 patients (70%)the seizures were brief (<15 min.) and in 211patients (30%) were prolonged (>15min.) . In68 patients (97.7%) convulsions were generalized and in only 2(2.9%)were focal . Number of fits (33patients (47%) had >one fit and 32patients (45.7%) had solitary seizure⁴⁵.

A study conducted in prince Hashem Hospital (Jordan)in 2007to 2009. In this study 88Children with FS were included . Among of them 52(59%)were male and 36(41%)were female ,male to female ratio 1.4 :1. The most affected age group corresponding to 1to2 years with 38(43%) patients followed the group of 2to5years with30(34%) patients ,ending with group of 6months to 1years in 20 (23%) patients . The seasonal with highest patient number was winter with 37(42%) patients ,followed by summer with21(24%)patients ,While it was 19%(17patients) and 15%(13patients) in spring and autumn respectively . The family history was present in 14patients (16%). The cause of fever were gastroenteritis in 38patients(43%)and URTI 32(36%)patients , pneumonia in 4 patients (5%), 3patients(4%) post vaccination ,2patients cellulites and 1patient UTI . The cause of infection according to the season was found during the winter ,respiratory tract infection was 19(51%) patients followed by gastroenteritis in12(32%) patients during summer and spring seasons ,the most prevalent was the gastroenteritis with 52%and70%of patients respectively.⁴⁶

In 1997 Saudi group reviewed 69 Children with febrile seizure, there were 41 (59.5%) Male and 28 (40.5%) Female, male to female ratio being 1.46:1. 49 were Saudi ethnic origin , their age ranged between 7-70 months, and duration of hospitalization ranged between 1-14 days. 15 Children have history of previous FS and 23children have positive family history of FS . focus of infection in 65% of Children with FS was URTI⁴⁷.

prospective study conducted in king Khalid university hospital Hail Saudi Arabia from October 2010 to September 2011. In this study 132 children

admitted with febrile seizure were included, age ranges from 3 months to 60 months and followed for one year for any recurrence . The cause of febrile illness was found out to be viral prodrome in 63patients(47.73%) , non specific febrile illness in 28patients(21.21%), gastroenteritis in 22patients(16.66%). URTI In 12patients(9.1%) and UTI in 07patients (5,3%) . There was male predominance with a male to female ratio 1.5 :1. The mean age of children was 16 months ,ranging from 5 to 56 months, family history of febrile seizures was positive in 38(28.79%)children . Most of children presented with simple febrile seizures. The mean temperature at 1st febrile seizure was 39.8°C,ranging from38.2 to 41.2°C. Recurrence of febrile seizure was found in 46(34.85%) of children . There was a statistically association between low temperature at onset of febrile seizure and recurrence FS in 65,22% case p=0.001. The younger age <12 months at onset of 1st FS and complex FS had a statistically significant association with its recurrence in 65..22% and 69.57% of cases respectively (p=0.01 and 0.001), not significant factors were sex and family history.⁴⁸

The rate of recurrence of febrile seizures and the factors predictive of a recurrence were prospectively studied in a cohort of 98 Saudi children who presented consecutively with their first febrile seizure at the pediatric emergency department of the King Khalid University Hospital, Riyadh, Saudi Arabia..

Children with prior afebrile seizures or evidence of neurodevelopmental deficit were excluded. The median age was 15 months (range, 4 to 60 months). Of the 98 children, 72 had simple and 26 had complex initial febrile seizures. In a follow-up 3 to 6yrs (mean, 49 months), 26% of the 98 untreated children had at least one recurrence and only 8% had more than three recurrent febrile seizures; 30% of first recurrences took place within 3 months, 60% within 6 months, 72% within 12 months, and 96% within 24 months of the onset. Four major risk factors for recurrent febrile seizures were identified: younger age at onset (< 12 months), first-degree consanguinity of parents, epilepsy in a first-degree relative, and complex initial febrile seizure. Gender, family history of febrile seizures, and degree of fever were not related to recurrence.⁴⁹.

A study conducted in Iraq between first February 2002to30th January2003 . In this study 169 Children with FS were included . The proportion of pts with FS among all admitted patients was 7.6% ,The Male : Female ratio 1.3 :1 , the mean age of patients with FS was 25.8 months , the peak age was18-19 months. The mean age

of 1st attacks was 23.5 months and for recurrent attacks was 29.8 months . The mean temperature for 1st attacks was 39.3°C and for recurrent attacks was 38.2°C .The family history was positive in 35% of patients. There was history of prematurity in 13% , epilepsy in 17%, complex FS were seen in 27% of patients and febrile status epileptics in 3%. URTI and LRTI were the cause of fever in 67% of patients . The majority of them were admitted in the cold months.⁵⁰

another study conducted in Iraq in year 2009 , in this study 155 Children with FS were included . The sex incidence was slightly higher in males (59%). With Male to Female ratio 1.4 :1 and peak age of frequency for FS was in the second year of life. In 57 (20%)(patients)had positive family history of FS and 32 (11%)patients had positive family history of epilepsy . The FS was the 1st attacks in 110 (71%) pts and 45(29%) patients had recurrent FS, the simple FS found in 142 (90%) patients while 15(9.5%) patients had complex FS.⁵¹

Retrospective study was done in occupied Palestine . In this study 374 Children diagnosed as febrile seizures during period (1989-1991) were included . The Children aged 3months to 7years comprised 261Jews and 113 Bedouins . The Bedouins population included 69(61%) males and 44(39%)females. Male to female ratio 1.58 :1. The Jews population included 158 (60.5%) males and 103(39.5%) females and male to female ratio 1.53 :1. No statistical difference between Bedouins males and females was found compared to the Jews . Seventy five percent of Jews group developed first febrile seizures before age of 2 years by contrast , 81.4% of Bedouins group developed first febrile seizure at the same age . The prevalence till age 2year relatively higher than that after age 2 year while simple seizure was found among 80.4% and 72.2% of the Jews and Bedouins groups respectively. Complex seizure was found among 19.6% and 28.8% of Jews and Bedouins groups respectively. Eighteen point four percent of the Jews and 17.8% of the Bedouins experienced more than one febrile convulsion . The most common cause of fever between two groups by time of febrile seizure was otitis- media ,34.5% of the Jews and 37.2% of the Bedouins however pneumonia was the source of fever in 15% of the Bedouins and only 3.8% of the Jews ($p<0.005$). 19.1% of the Jews population was found to suffer from URTI ,as compared to 9.7% of the Bedouins ($p <0.05$)⁵².

A retrospective study of 482 Children with FS conducted from 2004 to 20 Hedi Chaker University Hospital in Tunisia, in this study simple FS were found in 55.2% of Children and complex FS were observed in 44.8%. Total of 57 Children (11.7%) developed recurrent seizures . This study suggest that a family history of FS , young age at onset , and low degree of fever were predictive of recurrent FSs. No deaths or permanent neurological deficits due to FSs were observed, and only 6 Children(1%) developed epilepsy ⁵³.

prospective ,cross-section Study was conducted at the Wesley Guild hospital (South West Nigeria)in year2014 during period of 7months . In this study 158 Children with FS were included. 95(60.1%) were males while 63(39.9%) were females giving a male to female ratio of 1.5:1 indicating preponderance of febrile convulsion in males. Eighty nine (56.3%)patients had complex febrile convulsions ,while 69(43.7%) had simple febrile convulsions .Thus the ratio of simple to complex febrile convulsion is 1:1.3, out of the 95males with FS ,53(55.8%)had complex FS ,while 42(44.2%)had simple FS. and 36(57%)of 63 females had complex FS and 27(43%)had simple FS . Comparing sex with the of febrile convulsions :a higher proportion of females had complex FS while a higher proportion of males had simple FS .,the difference wasn't statistically significant($p=0.87$). The mean (SD) age of Children with febrile convulsions was 26.2(14.5)months with range of 3months to 6years . The 13-24months had the largest representation, 34(21.5%)of patients had past history of convulsion ,32patients (20.3%)had positive family history of FS, Cause of fever ,malaria was the most common cause of fever ,accounting for 127(80.4%)of patients and URTI in 29(18.4%)of patients while 2(1.2%)Children had pneumonia. The 70 (44.2%) patients were discharged within 24hours of admission while 74 (46.8%)were discharged between 24-72hours of admission.⁵⁴

In a study conducted in Malaysia in August 1990 . In this study 117Children with FS were included , there were 70 males and 47 female .Male to female ratio 1.5:1 The majority of patients were Malays (62.4%)followed by Indians(26.5%) ,Chinese (8.5%) and other (2.6%). The age range at presentation was from1 month to 119 months with mean age 20.9months . Most of patients were aged 6months to 24months (66.7%) ,with largest number 33(28.2%) in the age group 6months to 12months , 20 patients had previous history of FS and 97patients had no previous

history in many of patients first FS, occurred at the age 6months to 24months, 30patients (31.3%) had their first FS at 6to12months of age. Out of 117patients,39(33.3%) had Complex FS and rest of patients had Simple FS , the most common cause of fever was inflammed throat in 88patients (76.5%) and an inflammed tympanic membrane in 4(3.4%). The patients stayed on the average 3.1days (SD=2.2days)in the ward with the minimum stay being one day and maximum 18days. In the perinatal history, information was not available on the maturity of 7patients at birth. Of the remaining 110, 108(98.2%) were term and 1 (0.9%)was preterm and 1(0.9%)was post term. Delivery was by spontaneous vaginal delivery in96(82.6%),induced vaginal delivery in 8 (7%) and Caesarean section in 8(7%),assisted breech in 2 (1.8%) and instrumental delivery in 7(6.1%).⁵⁵

A study was done in 2008 in Nepal , in this study 110 Children from 6 months to 5 years with FS were included . Among them 64 (58%)were Males and 46 (42%) were Females, male to female ratio1.39:1. There were total 28 Children in 12 months and 31 Children in12-18 months and 51 Children above 18 months and positive family history in 3% of first degree relatives and history of FS sibling in 13% . Causes of Fever among patients with FS were URTI(28%)and pneumonia 27(24.5%) and UTI 18(16%) and GE 14 (13%). URTI was commonest cause and Complex FS were seen in 16 Children (8%).⁵⁶

Another retrospective study conducted from July 2009 to June 2013 among Children admitted with febrile seizure in the teaching hospital in Nepal . in this study 103 Children with febrile seizure were included out of 1965patients admitted which constituted 5.2%of total Children admission. 69patients(67%)were males and 34(33%)patients were females ,male to female ratio2:1. The mean age of presentation was 24.9 months and highest prevalence was among 13-24months age group and lowest was noted among 49months and above age group. Simple febrile seizure was observed in 79(76.7%)patients and complex febrile seizure was seen in 24(23.3%)patients . Most of Children83(80.6%) had one attack of seizure per febrile episode. Whereas 9(8.7%) patients had two attacks ,9(8.7%) patients had three attacks and 2(1.9%)patients had four attacks of seizures in the febrile episode . The mean duration of seizure was 4.9 minute and 81(78.6%)had seizure for 5 minute or less duration, the temperature of >38 °C was documented in 66patients at

presentation to hospital and mean degree of temperature was 38.3 °C , 12(11.7%)Children had positive family history of febrile seizure , 2(1.9%)Children had history of epilepsy in family . URTI was the most common cause of fever which was seen in 58(56.3%) of Children , GE was seen in 20(19.4%)Children and pneumonia in 16(15.5%) patients , UTI was seen in 8(7.8%)patients . Over all 33% of patients developed recurrence of febrile seizure and first attack of febrile seizure at age of one year or below was association with febrile seizure recurrence.⁵⁷

The study conducted in 2011 in Iran and in this study 250 Children were included and there were 134 Male and 126 Females, male to female ratio 1.1: 1 and peak age of FS in the age 1-2years and the commonest underling causes were Respiratory infections in (56.8%) and followed by AGE (22.4%) . In 91.3% of patients FS occurred within 24 hrs after onset of fever and FS more common during Winter and Simple FS were commonest⁵⁸

Another study was done in August 2009 in Iran and in this study 214 Children were included 124pts(57.9%)were male and 90 pts (42.1%)were female, male to female ratio1.37:1. The mean age of the patients was25.24 months ,and 128Children (59.8%)were under 2 years. The mean age for male and female were(25.62)and (25.13)months respectively (p=0.81). 109 patients (50.9%) had a positive family history .Simple FS were seen in 175 patients (81.8%) and Complex FS were seen in 39pts(18.2%) and in patients with Complex FS,23 pts(59%) had the repetitive type , Most of the Complex FS patients with repetitive type(78.3%) occurred in patients under 24 months old .and the study did not show significant different between two gender for simple FS and Complex FS . The mean temperature upon admission was 38.2°C URTI were seen in most of patients(74.29%) and The second most common cause of fever was gastroenteritis (11.68%).⁵⁹

A study conducted in 2002 in Hong Kong , 159 Children with FS were included 37 Children (23.3%)had Complex FS and 29 Children (18.2%)had positive family history of first degree relative and in82pts (52%)had FS below 2years of age and 24patients in age group 6-12months and 31 patients in age group of 13-18 months and 27 patients in age

group 19-24 months . In 134 Children (84.8%)had FS of Less than 5min ,out of this 159 patients 36 had recurrent seizure within 2years age⁶⁰.

In retrospective study conducted in Italy during period January2012 to December2012and included Children with febrile convulsions . In this study 64Children with febrile convulsions over period of 1 year were included, out of which 39were males and 25 patients were females ,male to female ratio 1.56:1 . The youngest Child was of the age 6 months and oldest Child was of the age 5 years The prevalence of simple FS was 43(67.2%)of patients and complex FS was 21(32.8%) Complex Febrile seizures was significantly higher in males compared to females . The prevalence of anemia was 42%. Among of total 27 Children with anemia 19 (70.4%)had simple FS and 8(29.6%)had complex FS⁶¹.

cross section study was carried out in Sarajevo in two years period ,2011-2012. In this study 210 Children with febrile seizures were included. There were 118(56.2%)male 92(43.8%)female Children and male to female ratio 1.28:1 . The age range for the first febrile seizure was 20.82months, 21patients (10%) had family history of febrile seizure ,while 5patients (2.38%)had family history of epilepsies. Most common cause of fever was URTI in 88.9%of Children with febrile seizures and gastroenteritis 10patients(4.8%) ,UTI 5patients(2.4%).most common during winter⁶².

cross-section study conducted in Turkey from September to December 2011according to Turkish health system everyone living Eskisehir is registered in family health registration system . Of the 1,000 invited children, 933 (93.3%) participated and all of them remained through to final analysis.(randomly selected 0-6years old Children were invited to come to their family health centers). Their genders were equally distributed (48.6% males and 51.4% females). The mean age of the study group was 35.78 ± 19.65 months. Out of 933 Children Twenty-four children had FS . Its prevalence was calculated to be 2.57%. The ratio of male to female was 1:1 and mean age was 36.91 ± 16.83 month. The study reveals that attendance to day care center affects the prevalence of FS, with the risk of FS being 19.35 times higher if child attends to day care.

Also familial history of FS and consanguinity of parents increase the risk of their children whose FS is 7.52 and 13.1 times higher respectively. Based on parents' reports, simple types of FS occurred in 20 (83.3%) children. Eighteen children had had single seizure and in six children seizure repeated. The mean age of first seizure was 18.87 ± 11.85 month. The mean time between first and second attacks was 3.3 month and all second seizures had occurred within following 2 years⁶³

prospective study conducted in England from June 1989- February 1991 , in this study 347 Children (from 1 months to 10 years) who presented with febrile seizures were included . The Children were followed for a median of 20 months to ascertain whether febrile seizures recurred . The recurrent febrile seizures occurred in 94 of the 347 children (27%) with cumulative risk of 25% at one year and 305 at two years . the duration of fever before the initial seizure was associated with the risk of recurrence at one year: for fever lasting less than 1hr, the risk of recurrence was 44%, for fever lasting 1 to 24hrs 23% , for fever lasting more than 24 hrs .13%. With each degree of increase in temperature (in degree from 101f(38.3c) to >105f (40.6c), the risk of recurrence at one year declined ,from 35% to 30%,26% ,20% and 13%. An age of less than 18months and family history of febrile seizures were also associated with an increased risk of recurrence . A family history of epilepsy ,complex febrile seizures and neurodevelopmental did not increase the risk of recurrent febrile seizure. A shorter duration of fever before the initial febrile seizure and lower temperature are associated with an increased risk of recurrence in Children who have febrile seizures.⁶⁴

In retrospective study conducted in Pakistan in the period between January 1998-August2000. In this study 352 children (ages 3-84months) with FS included, 220males (63.5%)and 132 females (37.5%). The mean age was 24.3months ,SD=19.3months. There was preponderance of male children , the ratio of M:F being 1.7:1, the majority of our cohort were <24 months, had a single generalized seizure episode Lasting <5 minutes. Majority also had normal developmental history but a positive family history of FS, with no past history of previous seizure attacks. Fifty-six (16% of the total sample) cases of children had recurrence in the ER; of these, 32 (57%) were males and 22 (43%) females. The ratio of M:F being 1.3:1

.Temperature: Of the 52 cases (16%) who had recurrence of FS in the ER, 27% had temperature in the >37.5 to 38.5°C range, and 36% occurred in the >38.5 to 39.5°C temperature. Duration of seizures (>5 minutes), past history of seizures, past history number of seizures, and multiple seizure was significantly associated with FS recurrence in the ER, Males presenting with FS had a higher odds of a past history of seizures 1.59 than females. A total of 81 children (23% of the sample) had past history of FS; of these 59 (73%) were males and 22 (27%) were females. Age at the time of first FS is perhaps the single most consistent predictor of recurrent FS. However, age was not statistically significant at the bivariate level of analysis in our cohort. As with age, family history of FS was not statistically significant at the bivariate level of analysis in our study. Results: Of the 52 (16%) patients that had seizure recurrence in the ER, majority (36.5%) occurred in $>38.50 < 39.50$ C temperature range. The percentage declined to 15% at higher temperatures. Bivariate tests showed that age, family and developmental history, type of seizure and treatment given did not affect seizure recurrence in the ER. Past history number of seizures ($p = .006$), duration of seizure ($p <0.001$), past history of seizures ($p=0.004$) and multiple seizure ($p=0.024$) were factors significantly associated with seizure recurrence in the ER at the bivariate level of analysis. Duration of seizure was the most important prognostic indicator for recurrence in the ER. Conclusion: Duration of seizure (>5 minutes) was the most important prognostic factor for FS recurrence.⁶⁵

Multicenter study conducted in Department of pediatrics in Pakistan from 2008-2010 . In this study 310 Children aged between 6months-6years were included, 157 Children presented with FS as patients while ,153 Children presented with febrile illness as control. 31.85% of patients (50 out of 157) had iron deficiency anemia , whereas 19.6% of Control (30 out of 153)were found to have iron deficiency anemia as revealed by low levels of hemoglobin ,serum ferritin level ,MCV and MCHC. Odds ratio was 1.93. Patients FS are 1.93 times more likely to have iron deficiency anemia compared to febrile patients without seizures⁶⁶

Case control study done in India during period August 2009 to February 2010 . In this study 154 Children with FS as Cases and 154 Children with febrile without seizures as control, age between 6 month to 6years . The mean age of Cases and control was 17.5 and 17.6 months ,respectively . iron deficiency anemia found to be significantly associated with simple FS on univariate analysis. In this study, iron deficiency anemia was found as significant risk factor for simple FS in Children of age group 6months to 3 years ⁶⁷. Its association with febrile seizures was first observed and published in mid 90's in an Italian study.⁶⁷ In study done by Pisacane, e.⁶⁷, among Children of the same age group , similar result were noted and the odds ratio was 3.3 ,iron status was measured by hemoglobin ,MCV and serum iron in that study . Dawn, et al.⁶⁸ also found similar result with FSs almost twice likely to have iron deficiency anemia compared to control. In the study by Daoud, et al.⁶⁹, the significant of iron status as possible risk factor was evaluated . The mean serum ferritin level in this cases+ was 29.5mcg/l, much lower than the values in the control (53.5mcg /l). Similar observations were made in the study done by Vaswani,et al ⁷⁰. From Mumbai. The mean serum ferritin level was significantly low in Children with first FS (31.9mcg/l) as compared to control(53.9mcg/l)(p=0.003). However ,no significant difference was noted in the mean hemoglobin value of cases (9.4g%)and controls(9.5g%) p=0.7 ,or in the mean value of blood indices.

Some authors, linked between FS and Anemia in Children and some authors, no. of studies difference Found the Children with low hemoglobin level and iron deficiency anemia have high incidence FS while other authors ,found have no relation between the two. In 2009, Hartfield and colleagues, from University of Alberta, Canada reported in a retrospective study that children with febrile seizures were twice as likely to have iron deficiency as those with febrile illness alone. Some international studies denied any role of iron insufficiency in febrile seizures. In fact, in an Iranian study, Bidabadi and Moushaf from University of Guilan, concluded that iron deficiency is less frequent in children with first febrile seizure.⁷¹ In 2001, Naveed-ur-Rehman and colleagues conducted the only local study at Aga Khan University Hospital which the convincingly associated iron deficiency anemia as a risk factor for febrile seizures⁷². As in Kobrinski's study, the incidence rate of iron deficiency anemia was significantly higher in the febrile convulsion group compared with the controls.⁷³

Chapter III

Aim of the study

- 1 - To study the prevalence and demography of febrile convulsion in Children 3months-6year from north eastern part Libya
- 2- Evaluation of the risk factors of recurrence of febrile convulsion in Children from north-eastern part of Libya

Chapter IV

Patients and Methods

IV- METHOD

This a retrospective study conducted in the period from 1.1.2012 to 31.12.2012 including all children admitted with febrile seizure to Benghazi children hospital which is the primary pediatric referral hospital in the north eastern part of Libya.

Records of all patients with a diagnosis of febrile seizure based on standard definition were included . This study included 443 patients , data were collected from the medical record office of the hospital.

To study the role of anemia as a risk factor for febrile seizures , 405cases out of 443 patients with FS and 404 controls were included in the study. Consecutive cases and concurrent controls were selected. Children of age group 3 months to 5 years presenting with febrile seizures. Controls were children of same age group presenting with febrile illness but without any seizures who were admitted during same period from January to December 2012 . Venous blood samples were obtained from the Children in FS group and Control group. Hemoglobin (Hb)level , Hematocrit (Hct), mean corpuscular volume (MCV)of Children were measured in the laboratory of Benghazi Children hospital.

The most commonly used definitions of anemia come from the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO).⁷⁴ Infants 0.5 to 4.9 years Hb level< 11 gm/dl and Children 5 to 11.9 years Hb level <11.5gm/dl.⁷⁴

Other definition of anemia is defined as having Hb level of less than10.5 g/dl in the 6months to 2year old ones and less than 11.5 g/dl in the 2 to 5years, , Hct<33%for 6-24months and <34% for >24- 60 months ,MCV<70fl for 6-24months and <75fl for 24-60months old ,MCH<23pg for 6-24months and <24pg for 24-60months old ,MCHC <30g% for 6-24months and <31g% for 24-60months and RBC, 3.7×10^6 for 6-24months and < 3.9×10^6 for 24-60months old.⁷⁵

IV.1-The study population:

A. Inclusion criteria:-

- 1-Age ; All patients aged \geq 3months and \leq 6 years.
- 2-Sex: Both male and female were included.
- 3-Social background : Children from different socio-economic classes were included.
- 4-Geographical area : most of the children were from Benghazi City in addition to some cases referred from villages away from Benghazi and from Cities from east and west of Benghazi.

B. Exclusion Criteria:-

- 1-Patients below 3 months and more than 6years were excluded.
- 2-Patients presented with afebrile convulsion were excluded.
- 3-Patients presented with fever and convulsion provoked by CSF infection as meningitis and encephalitis were excluded.
- 4-those with history of prior convulsion secondary to underlying neurological pathology like post-meningitis, post-encephalitis sequel or cerebral palsy were also excluded.
- 5-those with seizures secondary to electrolyte derangement or due to metabolic causes excluded from study.

C. Group Division :-

- All patients with febrile convolution were divided into two groups .
- 1.Recurrence group : this include the patients who presented with recurrent attacks of Febrile convolution.
 - 2.Non recurrence group: this include the patients with first attack febrile convolution.

D-The comparison was done between these two groups regarding sex ,age , type of seizures, temperature at admission , family history ,Duration, number of attack in both groups .

IV.2- Clinical methods :-

At the time of the study , the following data were collected in special case sheets as follows:-

A). case history:-

-code number

-name

- age

-sex

-day of admission

-day of discharge

- Detailed Address

1 -complaint and present illness include :-

i- type of seizure : simple or complex –duration -number of attacks.

ii- fever :-temperature degree at admission ,cause of fever .

2 -history of antipyretic intake before admission .

3 -history of recent immunization in the last 7days .

4 -Birth history:-birth weight ,mode of delivery ,history of birth asphyxia
.gestational age and if the patient was single or part of twins.

5- past history :previous febrile convulsion and family history of febrile
convulsions or epilepsy

6- history of consanguinity and number of children .

B). Examination history:-

-clinical status and neurological examination at admission

-clinical status before discharge.

C. Investigations :-

-CBC -serum electrolyte, Na ,K, blood glucose ca - Urine routine and culture .

-C.S.F routine and culture if the child less than 18months.

-others , chest x rays, USS.

IV.3-Statistical Analysis:-

Data were entered and analyzed using the Statistical Package for Social Science (SPSS). Nominal data were expressed as frequency and percentage. Numerical data were expressed as means and standard deviations and were compared using student's t-test. Associations were tested using Pearson's correlations. p-value less than 0.05 were considered significant. Bivariate statistical test of chi -square was used to analyze and describe the effect of temperature rise ,age, gender ,family , number of attacks ,type ,duration, on seizures recurrence in Benghazi Children hospital.

Chapter V

Results

This study was conducted retrospectively during the year 2012 .

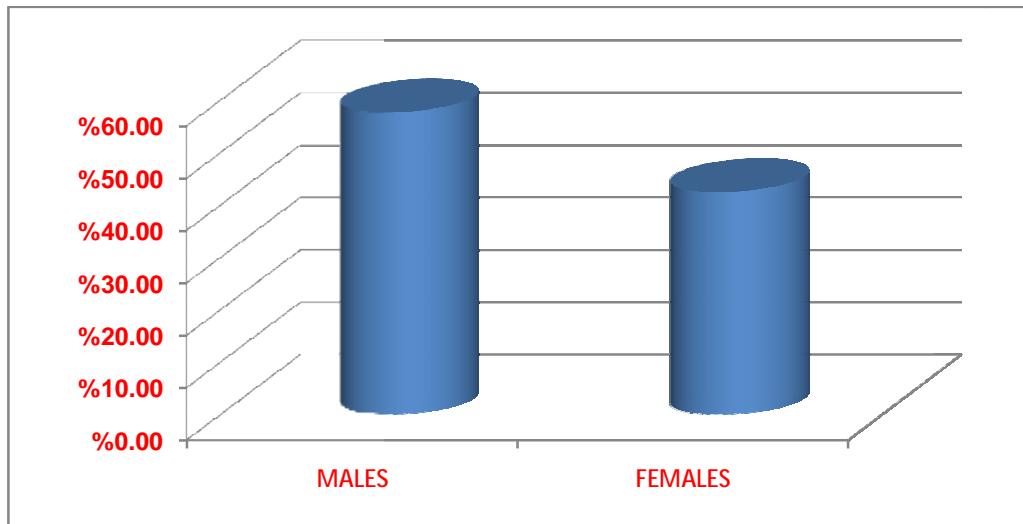
It included (443) Children diagnosed as febrile seizures out of (19444) patients admitted to Children Benghazi hospital during the period from January 2012 to December 2012. The hospital admission rate of febrile convulsion was found to be 2.3%.

V.1-Sex and febrile convulsions:-

In this study more than half of pts 255 patients(57.6 %) were males and 188 patients (42.4%) were females . male to female ratio 1.35: 1 as shown in(table 1,fig.1).

SEX	NO.OF PTS	%
male	255	57.6
female	188	42.4
Total	443	100

Table2: sex distribution in(443) patients admitted during year 2012 with FS



**Figure1 - Sex distribution in 443 patients with FS admitted during 2012 from
north east part of Libya**

V.2- Residence and Address :-

Most of patients 379 (85.5%) were living in Benghazi and 64 (14.5%) were from Cities and Villages surrounding Benghazi

V.3. Age Distribution of the Children with febrile convulsion:-

The commonest age group of patients admitted with FS 202 patients (45.6%) was between >12 – 24 months and 140 Children (31.6%) was between age group 3-12 months and 56 patients (12.6%) was between age group > 24-36 months. In Children less than 24 months of age FS occurred more frequently (342) patients (77.3%) than to Children over 24 months of age which only in 101patients (22.7%). The mean age of presentation was (20.99) months and highest prevalence was reported among >12-24 months age group lowest prevalence was noted among (>60-72) months age group as shown in table 2 .

Age in months	No. of pts	%
3-12	140	31.6
>12-24	202	45.6
>24-36	56	12.6
>36-48	22	5
>48-60	15	3.4
>60-72	8	1.8
Total	443	100

X =20.99month SD=14.082months

Table3:Age distribution of (443) patients admitted with FS during the year 2012

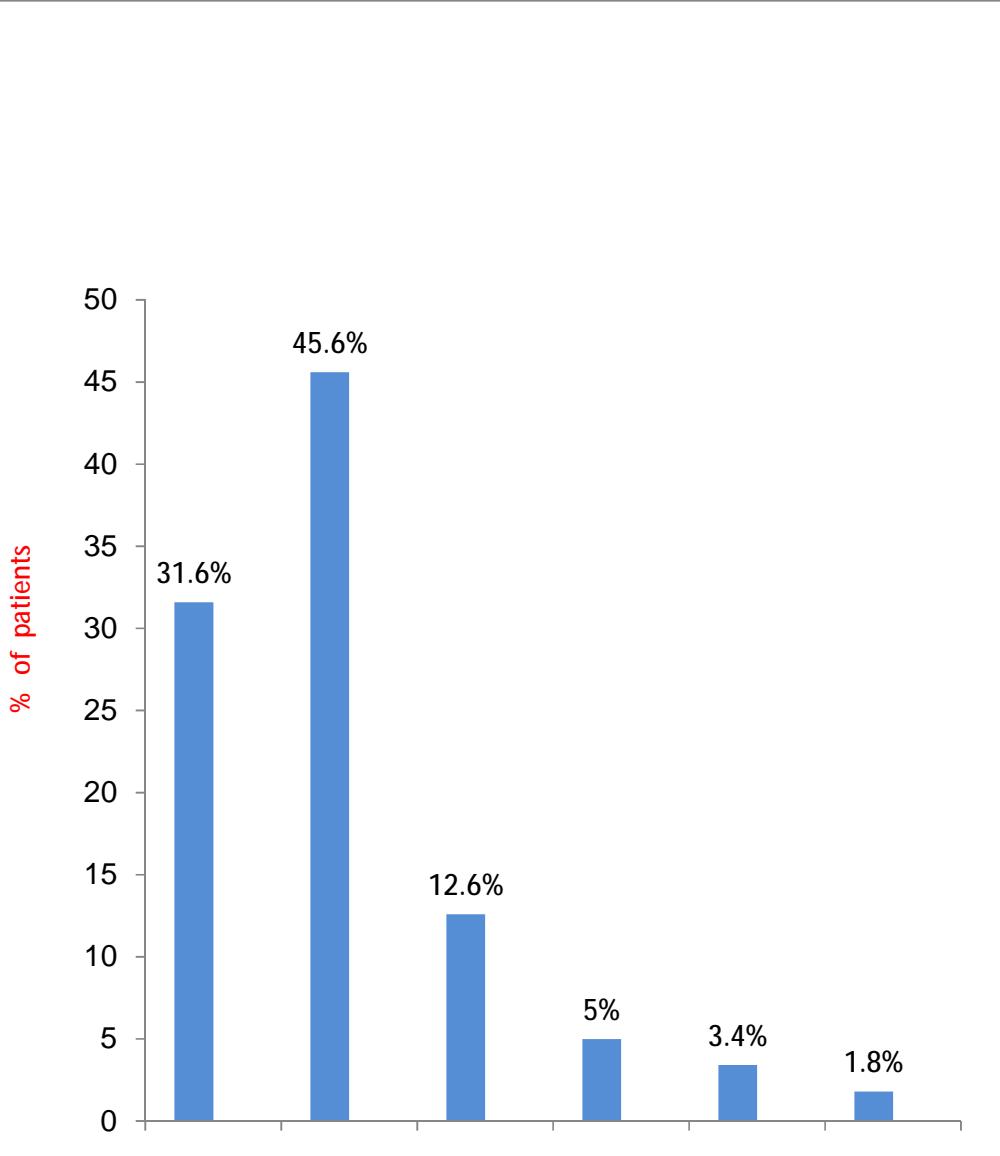


Figure2: Age distribution of 443 patients during the year 2012 in north east part of Libya

V.4- Duration of Hospitalization :-

Most of patients admitted to hospital for 1-2days which was the mean duration of admission for 291 patients (66%) and 95 patients (21.3%) were admitted for 3-4 days and 30 patients(6.7%) admitted for more than 4 days and 27 patients (6%) were admitted for less than 1day. As shown in table 3.

DAYS	NO. OF PATIENTS	%
<1	27	6
1-2	291	66
3-4	95	21.3
>4	30	6.7
Total	443	100

**Table 4: admission period in 443 patients admitted with FS during the year
2012 In North east part of Libya**

V.5- Etiology of the fever in the Children with FS:-

The upper respiratory tract infection was the commonest cause of fever in 323 patients (73%) and 2nd was Gastroenteritis in 54patients (12.1%) and then pneumonia in 20 patients (4.5%) and otitis media in 16patients (3.6%) and UTI in 13patients(3%) and also post vaccination in 12 patients (2.7%) and Chicken pox in 3 patients (0.7%) and Measles in 1patient(0.2%) and septicemia(0.2), as shown in table 4 ,figure3.

Causes of fever	No. patients	%
URTI	323	73
GE	54	12.1
pneumonia	20	4.5
OM	16	3.6
UTI	13	3
Post vaccination	12	2.7
Chicken pox	3	0.7
Septicemia	1	0.2
Measles	1	0.2
Total and %	443	100

Table 5: Causes of fever in 443patients admitted with FS from north east part of Libya

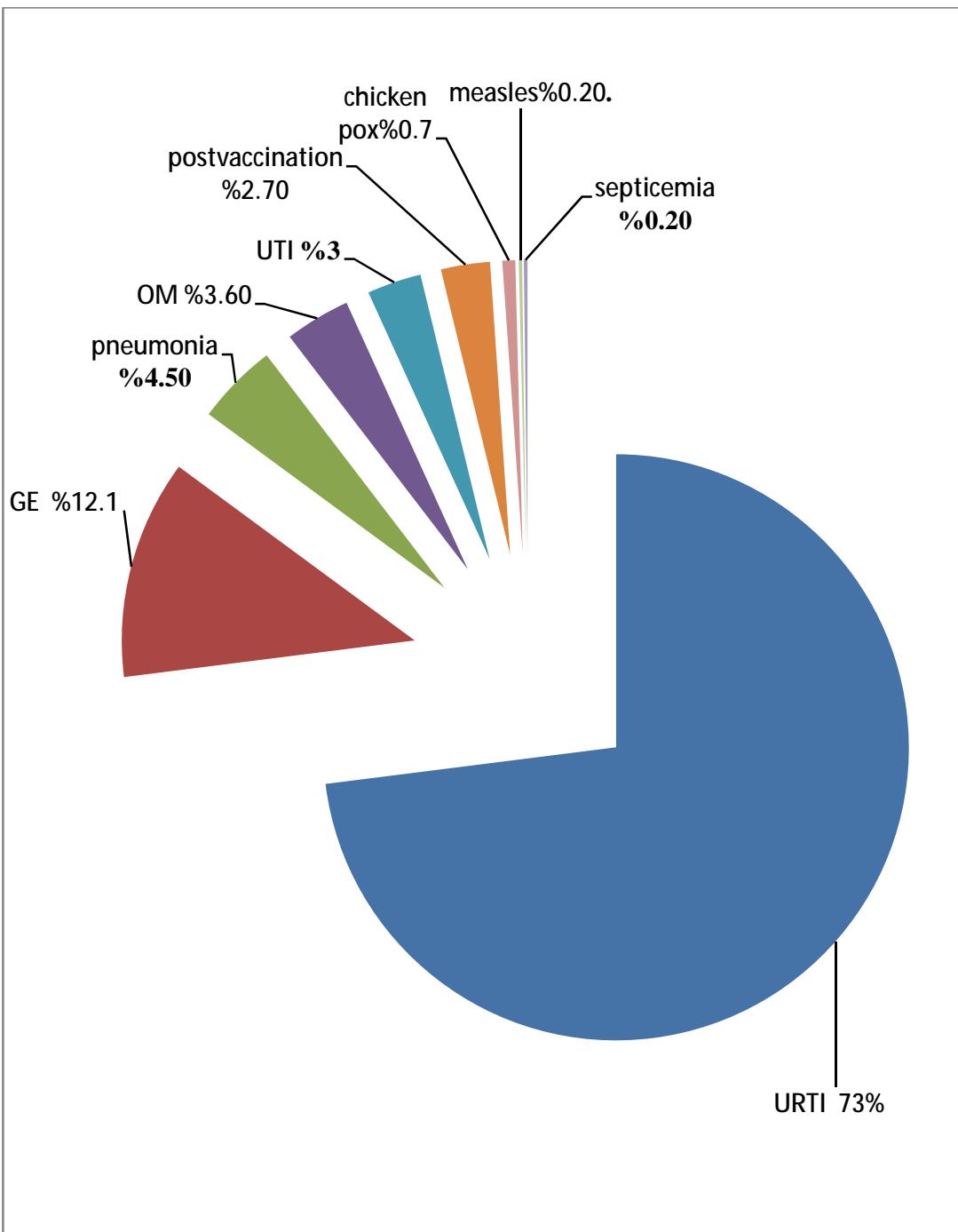


Figure3: Causes of fever in 443 patients admitted with FS from North.East part of Libya

V.6-Temperature degree at admission:-

The Temperature was recorded between 37.5-38.5°C in 254 patients (57.4%) at admission and 188 patients (42.4%) had temperature between 38.6 -40 °C, and Children were found to have a temperature more than 40.1°C (41.5°C) in 1 patient (0.2%). The mean temperature at presentation was 38.7°C ,SD= 0.61°C as shown in table 6 .

Temp.°C	No. of patients	%
37.5-38	104	23.5
38.1-38.5	150	33.9
38.6-39	116	26.2
39.1-39.5	34	7.7
40.1-42	1	0.2
Total	443	100

$$\mathbf{X=38.7^{\circ}\text{C} \pm SD= 0.61^{\circ}\text{C}}$$

Table 6:-Degree of Temperature at admissions in 443 patients with FS from north east of Libya

V.7- Seasonal distribution of the Children with febrile convulsion:-

The seasonal distribution of FS (160) patients (36.1%) of admitted was during Winter (January ,February, March) . During Spring (April to June) was 59 patients (13.3%) . During summer (July-September) was 127 patients (28.6%) and during Autumn (October-December) was 97 patients (21.89%) .as shown in Figure 4 .

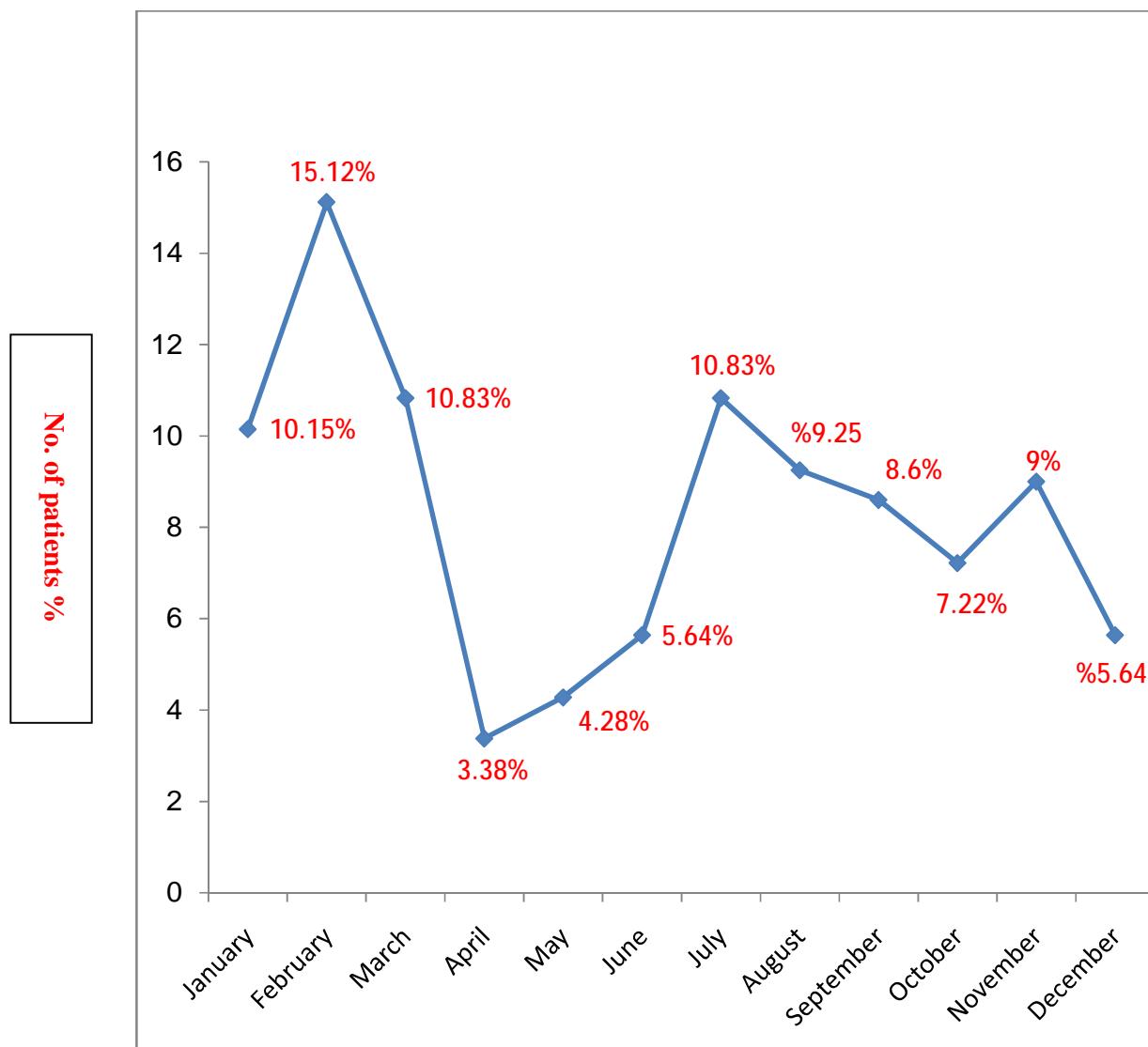


Figure 4: Seasonal distribution in 443patients with FS from north east part of Libya

months	No. of pts admitted	No. of pts with FS	%
January	1603	45	3
February	1583	67	4.2
March	1750	48	2.7
April	1738	15	0.86
May	1634	19	1.2
June	1642	25	1.5
July	1479	48	3.24
August	1305	41	3.14
September	1583	38	2.4
October	1604	32	2
November	1760	40	2.3
December	1763	25	1.4
Total	19444	443	2.3

Table7:- Monthly distribution of FS in 19444 patients admitted during the year with different diseases 2012

V.8- Birth history of the Children with febrile convulsions:-

Most of our patients 308 (87.7%) had no history of birth asphyxia , it was recorded only in 9 patients (2.6%) where as in 34 patients (9.7%) the history of birth asphyxia wasn't mentioned . Almost all the patients were full term normal delivery 244 patients (69.5%) and 88 patients full term Caesarian section (25.1%). Total no. of full term patients were 332 (94.6%) and 6 (1.7%) patients (PTND) and 13 (3.7%) patients (PTCS) . 19 (5.4%) patients were premature and the gestational age wasn't mentioned in 92 patients (26.2%).

The birth weight of 263 patients (75%)was within the normal range (2.5-3.5kg), low birth weight<2.5kgwas recorded in 30 patients(8.5%) and the birth weight of 58 patients (16.5%)was >3.5-5kg and birth weight wasn't mentioned in 92 patients(20%). As shown in table7. Twin delivery was recorded in 9 patients (2%) of all FS.

Statistics	Birth Weight			Total
	<2.5 kg	2.5 - 3.5 kg	>3.5 - 5 kg	
Birth History	8	65	15	88
				25.1%
FTCS	no.(patients)	7	194	244
	% (total)			69.5%
PTCS	no.(patients)	11	2	13
	% (total)			3.7%
PTND	no.(patients)	4	2	6
	% (total)			1.7%
Total	no.(patients)	30	263	351
	% total	8.5	75	100%

Table8 :- Birth history of 351 Children with febrile seizures from north east part of Libya

V.9 - Family history of febrile convulsions or epilepsy :-

-In this study the family history of febrile convulsions or epilepsy was recorded in 114patients (29%) out of 388Children,the family history wasn't mentioned in 55 patients. 106 (93%) patients had positive family history of febrile convolution and 8 (7%) patients had positive family history of epilepsy out of 114 patients with positive family history. So family history of FS positive in 106 (27%) patients out of 388 pateints.

V.10-Family history of consanguinity's:-

-In this study 31patients(6.9%)out of the 443patients had positive history of consanguinity.

-10patients had history of 1st degree consanguinity.

-17 patients had history of 2nd degree consanguinity.

-4 patients had history of 3rd degree consanguinity

V.11-Type of the febrile convulsions:-

-Complex type of seizure was presented by 98 patients (22%) of the 443 patients with febrile seizures and the simple type was found in 345patients (78%) of 443 patients.

V.12-The risk factor of recurrence :-

Operational definition for the purpose of our study, recurrence of FS was defined as subsequent FS following a previous episode, with a seizure free period of unspecified duration between the two events.

Recurrence was found in 91 Children (22.9%) out of the 396 Children with febrile seizure.

1- in recurrence group:-

91patients (22.9%) Of the 396 Children with febrile convolution had past history of febrile convolution and the past history wasn't mentioned in 47patients, comprising 54 patients males (23%) of The230 males patients and(59%)within recurrence and 37 patients females (22%) of the 166 females patients and (41%)within recurrence.

And 58patients(19%) of the 302 Children with simple febrile convulsion and % within recurrence(67%) and 29patients (33%) of 88 Children with complex febrile convulsion and % within recurrence (33%).

The age between 3-12 months 36 patients (29.8%) of the 121Children and % within recurrence(39.6%) and the age>12- 60 months 55patients (20%) with recurrence febrile convulsion of the 179Children and % within recurrence (60.4%) .

The 114(29%) patients of the 388Children with febrile convulsion had positive family history of convulsion, 29 patients (25%) with recurrent seizure of the 114 patients and percent within recurrence(33%) and 59 (22%)patients with recurrent seizure and percent within recurrence(67%) of the 274 patients had negative family history of febrile convulsion .

The 16 patients (16%) of the 97 Children with duration <5minute had recurrent seizure and the percent within recurrent (20%) and 43 (26%) patients of the 166 Children with (duration 5-10minute) had recurrent febrile seizure and the percent within recurrent(54%),12patients (26%)of the46 children with(duration >10-15minute) had recurrent seizure and percent within recurrent (15%) and 9(6%) patients of the 15Children with duration>15minute with recurrent seizure, percent within recurrent (11%).

The temperature at admission >38.5°C was recorded in 42(25%) patients had recurrent seizure of the 228 Children ,the percent within recurrent (46%).

Temperature at admission between ≤ 38.5°C was observed in 49(21%) patients with recurrent seizure of the 168Children, the percent within recurrent (54%).

One seizure was recorded in 63 (20%) patients with recurrent seizure of the312 Children, the percent within recurrent(69%) and more than one seizure in 28(34%) patients with recurrent seizure of the 83Children,the percent within recurrent (31%).

2-In non recurrence group:-

305pts (69%) of the 443 patients with febrile convulsion with negative past history of convulsion . comprising 176(77%) patients males of the 230 males patients, percent

within non recurrent(58%) and 129 (78%) females of the 166 female patients, percent within non recurrent (42%) and 244(81%) patients with simple febrile convulsion of the 302patients with simple type, percent within non recurrent(81%) and 59 (67%) patients with complex febrile convulsion of the 88pts with complex type, percent within non recurrent(19%).

Eighty five (70.2%) patients of the 121 patients during the age from 3-12months,percent within non recurrent(28%)and 220patients ,percent within age group (80%)of 275patients ,percent within non recurrent(72%)during the age >12-60 months.

And 215 (78%)patients of the 274patients had negative family history of febrile convulsion, percent within non recurrent(72%) and . 81 (84%) patients with duration < 5minute of the97 Children had non recurrent seizure ,percent within non recurrent(33%) and of the 166 children with duration 5-10 minute 123patients (74%) had non recurrent seizure ,percent within non recurrent(50%) and 34(74%) Of the 46 patients with duration >10-15 minute had non recurrent seizure ,percent within non recurrent(14%) 6pts (40%)of 15 patients with duration >15min with non recurrent attack ,percent within non recurrent (2%).

The temperature at admission between $<38.5^{\circ}\text{C}$ was recorded in 179 patients (79%) of 228pts with non recurrent seizures, percent within non recurrent(59%) and in 126 patients (75%) temperature at admission was $>38.5^{\circ}\text{C}$ out of 168 patients with non recurrent seizure, percent within non recurrent(41%). 249Children (80%) with non recurrent seizure of the 312 patients had one attack ,percent within non recurrent(82%) and 55 (66%) Children with non recurrent seizure of 83 patients had more than one .

3- the comparison between two groups :- (as shown in table 9)

In the recurrence group 54 patients (23%) and 176patients (77%) in non recurrence group were males ,where as 37patients (22%) in recurrence group and 129 patients (78%) in non recurrence group were females ,statistically there was no significant difference between two group, $p=0.78$.

There was statistical significant difference , $p=0.01$ ($p= <0.05$) regarding the type of seizure in two group ,where 58 patients (19%), and 244 (81%) patients had simple seizure in recurrence and non recurrence group respectively. and 29(33%) patients in

recurrence group ,and 59 (67%) patients in non recurrence group had complex seizure. so we considered the type of seizures is risk factor of recurrence in febrile seizure.

The age from 3-12 months was 36(29.8%) patients in recurrence group , while 85patients (70.2%) in non recurrence group whereas in the age >12months was 55(20%) patients in recurrence group , while 220 patients(80%) in non recurrence group ,so we considered the age is significant risk factor of recurrence febrile convulsions, p=0.038 .

The family history was positive in 29(25%) patients in recurrence group , an 85 patients (75%) in non recurrence group where as the family history negative in 59patients (22%) in recurrence group and in215patients (78%) in non recurrence group, these result even it is not statically significant, p=0.40 .

The temperature at admission $\leq 38.5^{\circ}\text{C}$ was recorded in 49 (21%)patients with recurrence ,and 179(79%) patients with non recurrence and the temperature at admission $>38.5^{\circ}\text{C}$ was observed in 42 patients (25%) with recurrence and in 126(75%) patients in non recurrence group, p=0.41,so also temperature at admission is not considered in our study as a risk factor of recurrence.

In recurrence group 63 patients (20%)had one attack ,and in non recurrence group 249(80%) patients had one attacks while 28(34%) patients with more than one attack in recurrence group ,and 55(66%) patients with more than one attack in non recurrence group, there was statically significant difference p=0.01, so number of attacks are considered in our study as a risk factor of recurrence .

In recurrence group16 patients (16%)while 81patients (84%) in non recurrence group had duration <5minute of the 97 patients, and 43 patients (26%) with recurrence and 123 patients(74%)with non recurrence of the 166 patients had duration from 5-10 minute and 12patients (26%)and in >10minute duration 21patients (30%)with recurrence and 40 patients(70%)with non recurrence of the 61patients .there was statistically significant p=0.003 so also the duration in our study considered as significant risk factor of recurrence.

**Table9:- variables that significantly affected febrile seizure recurrence
in 433 patients with FS from north east Libya**

parameters	Recurrence of febrile seizure				Total No.	Chi square	P value	Missing Case				
	Non recurrence		recurrence									
	No.	%	No.	%								
Type of FS												
Simple FS	244	81%	58	19%	302	7.43	0.01*	53				
Complex FS	59	67%	29	33%	88							
Sex												
Male	176	77%	54	23%	230	0.08	0.78	47				
Female	129	78%	37	22%	166							
Age												
3-12m	85	70.2%	36	29.8%	121	4.324	0.038*	47				
>12-60m	220	80%	55	20%	275							
Family H												
Positive	85	75%	29	25%	114	0.70	0.40	55				
Negative	215	78%	59	22%	274							
Duration												
<5min	81	84%	16	16%	97	13.741	0.003*	119				
≥5-10min	123	74%	43	26%	166							
>10 min	40	65.6%	21	34.4%	61							
Temperature at admission												
≤38.5°C	179	79%	49	21%	228	0.6728	0.41	47				
>38.5°C	126	75%	42	25%	168							
Frequency												
One	249	80%	63	20%	312	6.78	0.01 *	48				
More than one	55	66%	28	34%	83							

*Significant result p <0,05

V.13-Relation between anemia and FS :-

323(39.9%) Females and 486(60.1) Males out of (809) children with a mean age of 19.6 ± 13.4 months were evaluated

In Children with FS ,Hemoglobin level (11.02 ± 1.09 vs. 11.18 ± 1.40 g/dl, $p=0.088$), Hematocrit level ($32.88 \pm 3.41\%$ vs. $34.48 \pm 4.31\%$, $p=0.00$), MCV ($76.32 \pm 6.38 \mu\text{m}^3$ or fl vs $78.81 \pm 8.378 \mu\text{m}^3$ or fl, $p=0.397$) MCH(24.21 ± 2.859 vs. 25.6 ± 2.328 , $p=0.126$), MCHC (31.41 ± 3.48 vs 32.435 ± 2.47 , $p=0.127$)were lower than in Control Children group

Comparison of demographic characteristic of Children in both groups are shown in Table 10 which indicates that no statically significant difference were observed in term of sex distribution , $p=0.295$,while in mean of age were observed statically significant difference $p=0.036$.

Table 10:-Comparison of demographic characteristics of children in both groups. Sex distribution was not statistically different between the two groups .

Demographic Variables		Febrile Seizure group	Control group	P- value
Sex	Females	169(41.7%)	154(38.1%)	0.295
	Males	236(58.3%)	250(61.9%)	
Age in months (mean +- SD)		(20.56 ± 12.39)	(18.58 ± 14.32)	0.036

Table 11:-Comparison of laboratory characteristics of children in both groups . In FS group ,hemoglobin level , MCV,MCH, MCHC level were lower But statistically there is no significant difference , Hematocrit level was lower in patients with FS ,there was statically significant difference between two groups p<0.05

	Febrile Seizure	Control group	P- value
Laboratory findings	mean ± SD	mean ± SD	
Hemoglobin (g%)	11.02 ± 1.09	11.18± 1.40	0.088
Hematocrait (%)	32.88± 3.413	34.48± 4.319	0.001
MCV (μm^3 or fl)	76.32± 6.387	78.81± 8.378	0.397
MCH (pg)	24.21± 2.859	25.6± 2.328	0.126
MCHC (g%)	31.41± 3.484	32.435± 2.470	0.127

*Significant result p<0.05

Table12: Comparison demographic characteristic of our study with some studies in Arabic countries

Place and duration of study	Benghazi Children hospital during year2012	Benghazi Children hospital during year 2000	Khartoum-Sudan from December 1981to April 1982	Saudi Arabia from 10.2010- 9.2011	Iraq from 1.2.2002 to 30.1.2003	Jordan from 2007 to 2009
Study design	Retrospective	Retrospective	Prospective	Prospective	Retrospective	-
Patients and methods	443 patients with FS out of 19444 were included	99 patients with FS out of 8564 were included	70 patients with FS out of 3871 were included	132 patients with FS were included	169 patients with FS were included	88 patients with FS were included
Demographic Variables						
Sex						
male	255(57.6%)	61(61.1%)	43(61.4%)	More in Male	More in Male	52(59%)
female	188(42.4%)	38(38.4%)	27(38.6%)			36(41%)
Ratio	1.35:1	1.6:1	1.6:1	1.5:1	1.3:1	1.4:1
Age in months						
peak	<24m	<24m			18-19m	12-24m
mean	20.99m		30.3m	16m		
Temperature						
At admission		38-39°C				No data
mean	38.7°C		39.3°C	39.8°C	39.3°C	
Cause of fever						
Most common	URTI	URTI	URTI	Viral Prodrome	URTI LRTI in 67%of pts	GE
2 nd cause	GE	GE	Pneumonia	Non specific febrile illness		URTI
Type of seizures						
Simple	78%	82%	97.7%	Most of pts had simple	73%	
Complex	22%	18%	2.9%		27%	
Positive Family history of FS	106(27%)	15(15.1%)	28(40%)	38((28.79%)	35%	14(16%)
Recurrence rate	91(22.9%)	23(23.2%)	No data	46(34.85%)	No data	No data
Proportion of FS among all admission pt	2.3%	1.1%	1.8%		7.6%	-

Table13: Comparison of demographic characteristic of our study with some studies in World Countries

Place and duration of study	Benghazi Children hospital during year2012	Nigeria in year 2014 during period 7ms	Nepal from 7.2009 to 6.2013	Iran during year 2009	Malaysia in August 1990
Study design	Retrospective	prospective	Retrospective	No data	No data
Patients and methods	443 patients with FS out of 19444 were included	158 patients with FS were included	103 patients with FS out of 1965 pts were included	214 patients with FS were included	117 patients with FS were included
Demographic Variables					
Sex					
Male	255(57.6%)	95(60.1%)	69(67%)	124(57.9%)	70(59.8%)
Female	188(42.4%)	63(39.9%)	34(33%)	90(42.1%)	47(40.2%)
Ratio	1.35:1	1.5:1	2:1	1.37:1	1.5:1
Age in months					
Peak	<24m	13-24m	13-24m	<24m	6-24m
Mean	20.99m	26.2m	24.9m	25.24m	20.9m
Temperature					
At admission			>38°C		
Mean	38.7°C	39.4°C	38.3°C	38.2°C	38.6°C
Cause of fever					
Most common	URTI	Malaria	URTI	URTI	URTI
2 nd cause	GE	URTI	GE	GE	
Type of seizures					
Simple	78%	69(43.7%)	83(80.6%)	175(81.8%)	78(66.7%)
Complex	22%	89(56.3%)	20(19.4)	39(18.2%)	39(33.3%)
Family history positive in	106(27%)	32(20.3%)	12(11.7%)	109(50.9%)	
Recurrence rate	91(22.9%)	34(21.5%)	33%	No data	20(17%)
Proportion of FS among all admission pt	2.3%	No data	5.2%	No data	No data

Chapter VI

Discussion

VI.1-EVALUATION OF DEMOGRAPHY:-

This retrospective study included 443 patients with febrile seizures admitted to Benghazi Children hospital during period January 2012 to December 2012. This study on Children with febrile seizure from Benghazi and surrounding area , generally share similar clinical characteristics as children with febrile seizures elsewhere.

In our study, the prevalence of febrile convulsions was found to be 2.3% in 443 Children out of the 19444 patients admitted to Children hospital during 2012, whereas in previous study done in Benghazi during the year 2000, the prevalence was 1.1% which considered to be low in comparison to present study [44].

A study conducted in Tripoli, Libya in the year 2007 ,the prevalence was 7.9%in 126 patients with febrile convolution admitted to khadra hospital [76].

The prevalence in Japan 8% and 14% in Guam[4,5,6], which considered to be higher in comparison to our study ,whereas in developed countries in United States and European, china the prevalence ranging from 0.5%to5% [7,8] which considered to be similar to our study .

In this study most of the Children were from Benghazi 379 (85.5%) patients, whereas 64(14.5%) patients were referred from areas surrounding Benghazi. These results similar to that reported in study done in Benghazi Children hospital in the year 2000 [44].

In our study ,we found the male to female ratio 1.35 :1, majority of Children 255 (57.6%) were males and 188 (42.4%) were females ,these results similar to that reported in many studies and males usually outnumber the females [44, 45, 46 ,47, ,48 ,50 ,51 ,52,54 ,55,56 ,57,59 ,61,65].

The peak age of the pts with febrile seizures was between >12-24 months in 202patients (45.6%) and in 342(77.2%) Children with febrile seizure were less than 24 months which are usually considered as the peak age of presentation of febrile seizures which proved in many studies [44,46,48,50,52,54,55,57,58,59,60]. Most studies have shown that the majority of febrile seizure occur between 6months to 3years with peak in seconds years of the life [11,12,13, 14].

In this study the commonest cause of fever was URTI which recorded in 323 (73%) of the Children and this explain the reason for admission of 160 (36.1%)of the children with febrile seizure was during winter months and the mean duration of admission for

291(66%)of the children was only for 1-2 days and second common cause of fever was gastroenteritis which was recorded in 54(13.2%)of the patients which was also found in many studies in the literature, like in [44,46,47,50,55,56,57,59,60]and in Japan study of FS, study performed in Italy as in introduction[15,16]. There have been multiple studies have supported the conclusion that FS have a peak in the winter and end of the summer[17,18,19]. In a study which was conducted in Nigeria in 2014,malaria was the most common cause of fever [54] ,in study done in Sudan in1982 , Bronchopneumonia was common cause of fever (22.9%)followed by malaria (20%)of the patients as in literature [45].

In our study in most of the patients , the temperature was between 38-38.5°C in 254 pts (57.4%) at admission and 188 patients(42.4%) had temperature more than38.6 -40°C ,but in the study which was conducted in Benghazi Children hospital during year 2000, the most of patients (88.8%) had temperature ranging between>38-39°C[44,59,48] and in other studies usually temperature of majority of the patients was reported >39°Cup to 40°C like in some studies in the literature [44,45,48,50] and in some study the mean temperature at admission 38.2-38.3c⁰ [56,57,59,63],in other studies the mean temperature at admission39.3°C [45,50],whereas in Saudi study the mean temperature at admission was 39.8°C[48]in comparison to our study, the mean temperature at admission 38.7°C.

In our study the temperature between 39.6-40°C in 39 patients (8.6%) and in only 1(0.2%) patients temperature was found to be between 40.1-42.5°C(41.5°C).in Sudanese study and Saudi Arabia study [45,48] temperature ranging from 38.2°C to41.2°C

In our study there was no significant relationship between birth asphyxia, prematurity and the history of febrile seizure , 308 patients (87.7%) had no history of the birth asphyxia , in 9 patients(2%) mentioned to have history of birth asphyxia and in 34 patients (9.7%) history of birth asphyxia not mentioned. Two hundred and forty four patients (69.5%) patients were full term normal delivery) and 88 patients full term Caesarian section (25.1%). Total no. of full term patients were 332 (94.5%) and 6 patients (1.7%) were premature normal delivery and 13 patients (3.7%) were premature caesarian section. Total no. of premature were19patients (5.4%), this agree with study done in Benghazi Children hospital during the year 2000 [44]. The importance of the birth history, asphyxia and prematurity as predication factor in febrile convulsion still unknown.

Because it is thought now that the genetic basis has a major role in the etiology of the febrile convulsion.[20].

Family studies have shown that relatives of these patients are at increased risk compared to the general population [20]. Twin studies have also indicated that genetic factors play an important role in susceptibility to febrile seizures[21].

So the study of the family history of febrile convulsion and epilepsy is important to prove that suggestion. In this study the family history of febrile convulsions or epilepsy was found in 114 patients (29%) out of 388 Children where 106 patients (27.3%) patients had positive family history of febrile convulsion and 8 (2.1%) patients had positive family history of epilepsy of the 388 patients which agree with some studies in literature [44,45,46,47,48,51,54]. In Nepal study reported a positive family history of FS in 12 pts (11.7%), 2 patients (1.9%) had positive family history of epilepsy[57] and in Sarajevo study reported in 21 patients (10%) had positive family history of FS and 5 patients (2.38%) had positive family history of epilepsy[62], in Iran study reported in 109 patients (50.3%) had positive family history of FS out of 214 Children[59] in comparison to our study.

In our study majority of the children admitted for FS had simple FS. It was found in 302 patients (77%) of 390 patients . Complex type of seizure was seen in 88 patients (23%) of the 390 patients with febrile seizures. Although majority of patients admitted with febrile seizures were males but those Presented with complex FS 46 pts(52.3%) were females and 42 patients (47.7%) were males which was observed also in other studies higher proportion of females had complex FS while higher proportion of males had simple FS it agree with many studies in literature [44,51,52,54,55,57] while in a study done in Italy (complex FS was significantly higher in males compared to females [61] and in a study conducted in Iran[59] ,the study did not show significantly different between two gender for simple FS and complex FS in comparison to our study.

In our study the Children with febrile convulsion did not differ from the rest of the population in any detectable aspect of their social background .

VI.2-EVALUATION OF RECURRENCE AND RISK FACTORS:-

although there are risk factors that predispose the febrile convulsion to recur ,but still the risk to become epileptic is low , In this study 91 patients (22.9%) were found to have a recurrence which is considered to be similar in comparison to recurrence FS in the third world countries ranging from 21% to 29.3% as indicated by studies conducted in the middle east and Nigeria [36,37] . In the west however , recurrence rates are much more varied ,ranging from 30% to 50%[38]which is considered to be high in comparison to our study . There are many well established risk factors for recurrence of FS. The major factors are age less than 1 years ,duration of fever less than 24hrs and fever between 38-39 °C [39,40]. Age of onset is the most consistent and strongest predictor of the recurrence [41].

In this study ,the age less than 12 months was 36 (29.8%) patients in recurrence group , while 85 patients (70.2%) in non recurrence group and the age more than 12months was 55(20%)patients in recurrence group, while 220(80%)patients in non recurrence group so the age is considered as one of significant risk factor of recurrence in febrile convulsions, where $p = 0.038$. This agree with the majority of studies like in the literature[48,49,57,63,64.], reported that the young age less than 12months usually considered as risk factor of recurrence and showed declined trend in recurrency with increasing age , whereas in the study was conducted in Benghazi Children hospital during the year 2000 and in Pakistan study which show no significant difference with age [44,65] .

The temperature at admission is not also statistically significant risk factor, in our study, $p=0.41$. This result proved in some studies as the study which was conducted in Benghazi Children hospital during year 2000 and in Saudi Arabia [44,49] as temperature is not the risk factor that increase the recurrence rate , either with high or low grade fever , but in some studies as shown in introduction and literature [39,40,48,50,53,56,64] ,there was a statistically significant association between temperature at onset of seizure and recurrence so considered as risk factor .

In our study regarding the complex FS in both recurrence and non recurrence group also are considered as statistically significant risk factors, $p=0.01$,but the gender are not

considered as risk factor of recurrence, $p=0.78$ as reported in many studies the complex type were recorded as a risk factor of the recurrence .but the gender is not considered as risk factor of recurrence (48,49,59), where as in the study done in Benghazi –Libya during year 2000 and in England study [44,64] ,complex FS and gender is not considered as significant risk factor ($p>0.05$).

-In our study the family history of febrile convulsion or epilepsy was not statistically significant $p=0.40$. This result similar to that reported in some studies as shown in literature [44,48,49,64,65] , but still we considered that the family history may has a role in increase risk of recurrence in our patients because the family history of febrile seizure was positive 114(29.3%) patients of the 388Children , 29 patients (25.4%) with recurrent seizure of the 114 patients and 85 patients (74.6%) in non recurrence seizure. These findings agree with many studies as family history has a role in increase the risk of recurrence in febrile seizures [51,43,54,63].

In our study regarding the number of attacks in both recurrence and non recurrence groups also are considered as significant risk factor , $p= 0.01$. These finding agree with many studies [49,45,57] . Also in this study the duration is considered as one of the significant risk factors of recurrence $p=0.003$, which proved in some studies as shown in the literature [64,65].

VI.3- Relation between anemia and FS :-

. anemia and febrile seizures are two common diseases in children worldwide as well as in our country. Iron insufficiency is known to cause neurological symptoms like behavioral changes, poor attention span and learning deficits in children. Therefore, it may also be associated with other neurological disturbances like febrile seizures in children .^{77,78,79,80}

In our study Hb ,HCT, MCV,MCH, MCHC were measured among FS and control groups. In the present study , we found that the mean Hb ,MCV,MCH.MCHC level in FS group were lower than those of control group. No statistically significant difference was found $p>0.05$. HCT level in FS group lower than in Control group , there was statically significant difference $p <0.05$, these results suggest that anemia may predispose Children to FS but we feel more hematological and iron studies are needed to clarify this association.

Daoud et al., reported that the mean level of ferritin in case with FS is significantly low as

compared to control group , but the mean levels of HB,MCV,MCH were lower in children with FS than in children in the control ,although the differences were not significant⁶⁹.

Pisacane et al., compared the level of HB,MCV ,and serum iron among control and patients with FS ,they reported that iron deficiency is significantly more frequent among the FS group than control group⁶⁷.

In 2001, Naveed -ur- Rehman and colleagues conducted the only local study at Aga Khan University Hospital which the convincingly associated iron deficiency anemia as a risk factor for febrile seizures, found that the proportions of cases with low levels of HB,HCT,MCV,MCH, ferritin were higher among children with FS than among control and the differences were statistically significant ⁷².

In Kibrinski's study, the incidence rate of iron deficiency anemia was significantly higher in the febrile convulsion group compared with the controls⁷³.

In contrast, Momen and Hakimzadeh found no relationship between iron-deficiency anemia with first febrile convolution in children younger than 5 years of age in Iran ⁸¹.

Talebian et al . in 2006 reported that the probability of the occurrence of convolution in children with anemia significantly decreases and anemia may have protective role against occurrence of FS⁸².

Derakhshanfar et al . attributed the probable reason for the protective role of iron deficiency to the role iron plays in the activity of exciting neurotransmitters such as monoamine oxidase and aldehyde oxidase . They also added that the lack of iron leads to a reduction in excitation power of the neurons and to a decline in the probability of excitation and convolution in iron deficiency anemia⁸². Various studies on relationship between FS and iron deficiency anemia have given contradictory results.

Chapter VII
Conclusion

From our study of febrile seizure in Benghazi and surrounding area we conclude that :-

- I. Febrile seizures in Benghazi area has shown that our children generally share similar demographic and clinical characteristics of other children with febrile seizures elsewhere.
- II. FS is one of the common causes of pediatric hospital admissions and the occurrence of febrile seizures was higher in the boys than girls, simple FS account for the majority of cases. In addition ,the most causative factor was the upper respiratory tract infection which is similar to reports from some Arabic countries , Asia countries and some European countries .
- III. Age ,type of seizure,, duration, number of attacks in both recurrence and non recurrence groups are considers as significant risk factors for recurrence febrile seizures.
- IV. there were not statistically significant difference in both recurrence and non recurrence groups regarding the family history of febrile seizures and epilepsy.
- V. The genders and degree of temperature has no significant role in increase recurrence rate in Benghazi area Children with febrile seizures .
- VI. No effect of Birth weight , gestation age or mode of delivery on the recurrence of FS .
- VII. Febrile seizures were more common in winter time and summer time properly due to increase Respiratory infection during winter and GE during summer .
- VIII. The recurrence rate in north east part Libyan Children is (22.9%) similar to other third world countries (from 21% to 29.3%) but lower than in USA ,European ,west countries. (from 30% to 50%).

IX. Based on the result of the our study was conclude that there is no statistically significant correlation between HB,MCV,MCH,MCHC level and febrile seizures , but there is statically significant correlation between HCT level and FS Further hematological and iron studies are needed to establish the correlation between occurrence of anemia and febrile seizures and to evaluate the possible role of anemia as a risk factor for febrile seizures. Children with febrile seizures are more likely to have anemia as compared to children with a febrile illness without seizures.

X. The febrile convulsion is benign condition and all admitted Children recovered and discharged without any significant complication .

Chapter VIII

Abbreviation

VIII. LIST ABBREVIATIONS :-

1. FS – (FEBRILE SEIZURE)
2. URTI -(UPPER RESPRATORY INFECTIONS)
3. GE -(GASTROENTRITIS)
4. OM- (OTITS MEDIA)
5. UTI -(URINARY TRACT INFECTIONS)
6. CHES-(CHILD HEALTH AND EDUCATION STUDY)
7. Hb-(HEMOGLOBIN).
8. HCT-(HEMATOCRIT).
9. MCV-(MEAN CORPUSCULAR HEMOGLOBIN).
10. MCH-(MEAN CORPUSCULAR HEMOGLOBIN).
11. MCHC-(MEAN CORPUSCULAR HEMOGLOBIN CONCENTRATION).
12. WHO-(THE WORLD HEALTH ORGANIZATION).
13. CDC-(CENTER FOR DISEASE CONTROL AND PREVENTION)
14. Birth H -(Birth history)
15. B W-(BODY WEIGHT)
16. FTND (FULL TERM NORMAL DELIVERY)
17. FTC/S (FULL TERM CEASEARAN SECTION)
18. PTND (PRETERM NORMAL DELIVERY)
19. PTC/S (PRETERM CEASEARAN SECTION)
20. FIG (FIGURE)
21. ER (EMERGENCY ROOM)
- 22 . NO. (NUMBER)
23. N.E (NORTH.EAST)
24. M (MONTHS)
25. > (MORE THAN)
26. < (LESS THAN)
27. ≤ (EQUAL AND LESS THAN)

28. \geq (EQUAL AND MORE THAN)
29. PTS (PATIENTS)
- 39 . SD (STANDARD DEVIATION)
40. SPSS (STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES)
41. CBC (COMPLETE BLOOD COUNT)
42. CSF (CEREBROSPINAL FLUID)
- 43 . P VALUE (PROBARE VALUE)

Chapter IX
Limitation

Limitation of the study :-

A major limitation of this study was some data wasn't recorded in files of patients and it may affect the results of our study as following:-.

1. In 34 patients (9.7%) out of 351 patients the history of birth asphyxia wasn't mentioned in file of patients . The birth history was not recorded in 92 patients out of 443 patients(p.45).
 2. The family history wasn't mentioned in 55 patients out of 443 patients (p.46).
 3. The past history of febrile seizure wasn't mentioned in 47patients out of 443 patients(p.46).
 4. CBC wasn't mentioned in 38 patients out of 443 patients (p.31).
 5. Iron studies were not done in all patients with FS.
 6. Antipyretic and antibiotic are received in some patients before admission and this may affect the degree of temperature at admission ,while in other patients the history of antipyretic intake before admission wasn't recorded .
- 7.Duration of FS was recorded in 324 patients while in 119 patients were not recorded in the files of patients.

Chapter X
References

1. Shinnar S . Febrile Seizures and Mesial Temporal Sclerosis. *Epilepsy Curr.* 2003;3:1,p 15-118
2. Van der Berg BJ and Yerushalmy J (1969) Studies on convulsive disorders in young children I. Incidence of febrile and nonfebrile convulsions by age and other factors. *Pediatric Res* 1969; 3: 298-304.
3. Wallace SJ . They don't do very well. *Pediatrics* 1980; 65: p678-679.
4. Mathai KV et al. (1968) Convulsive disorders in the Mariana Islands. *Epilepsia* 1968 :9: p 77-85.
5. Stanhope JM et al. Convulsions among the Chamorro people of Guam, Mariana islands. II. Febrile convulsions. *Am J Epidemiol* 1972 : 95 : p 299 - 304
6. Tsuboi T. Epidemiology of febrile and a febrile convulsions in children in Japan . *Neurology* 1984 :34: 175-181
7. Shinnar S , Glauser TA. Febrile seizures. *J Child Neurol.* 2002 ;17 (Suppl 1): S44- 52
8. Leung AK ,Robson WL. Febrile seizures. *J Pediatric Health Care.* 2007;21(4):25- 0255
9. Hauser WA .The prevalence and incidence of convulsive disorders in children *Epilepsia* 1994 ;35(suppl 2):S1-S6
10. Vestergaard M, Pedersen CB , Sidenius P et al. The long-term risk of epilepsy after febrile seizures in susceptible subgroups. *Am Jn Epidemiol.* 2007 ;165 (8): 911-918

11. pisacane A, Sansone R, impagliazz oN et al. Iron deficiency anemia and febrile convulsions :case –control study in Children under 2years: BMJ 1996 : 313-343
12. Stanhope J M, Brody JA , Brink E . (1972) Convulsion among the Chamor people of Guam Mariana islands .Am J Epidemiol.1972 : 95 : 29.
13. Warden CR et al. Evaluation and management of febrile seizures in the out – of-hospital and emergency department settings , Ann Emerg. Med 2003 :41:215 - 22.
- 14 .Berg AT et al. (1995) The epidemiology of seizures and epilepsy in Children
15. Tsuboi T , Okada S. Seasonal variation of febrile convulsion in Japan. Acta Neurol. Scand 1984 :69: 285-292.
16. Manfredini R, VergineG, Boari B et al. Circadian and seasonal variation of first febrile seizures J Pediatr 2004 :145: 838-839.
- 17.Stokes MJ, Downham MA, Webb JK et al. Viruses and febrile convulsions. Arch Dis. Child 1977:52:129-133
- 18.Tay JS, Yip WC, Yap HK et al . Seasonal variations in admissions to a tropical pediatric unit. Trop. Geogr. Med. 1983 : 35: 167-172.
19. Verburgh ME, Bruijnzeels MA, Van der Wouden JC et al. (1992) Incidence of febrile seizures in The Netherlands. Neuro. epidemiology 11: 169-172 .
20. Tsuboi T, Genetic aspects of febrile convulsions , Hum .Genet. 1977 : 38 : 169 - 373
- 21.Tsuboi T, Endo S . Genetic studies of febrile convulsions: analysis of twin and family data .Epi ;psy Res Supp.1991 :4:119-28

- 22.Rich SS, Annegers JF, Hsuser WA et al . complex segregation analysis of febrile convulsions Am J Hum Genet 1987 :41:249-57.
- 23.Johnson WG, Kugler SL, Stenroos ES et al . pedigree analysis in families with febrile seizures , Am J Med Genet 1996 :61:345-52.
- 24.Wallace RH, Berkovie SF , Howell RA et al. , Suggestion of a major gene for familial febrile convulsions mapping to 8q13-21J med. gen. 1996 ;33 : 308- . 12
- 25.Nakayama J, Hamano K, Iwasaki N et al. Significant evidence for linkage of febrile seizures to chromosome 5q14-q15. Hum Mol Genet. 2000 ;9:87-91.
- 26- Simon Shorvon, Renzo Guerrini , Mark Cook et al. (2013) Oxford textbook of epilepsy and epileptic seizures. : Oxford Univ. Press. 2013 p. 13.
27. Selmer K.K, Eriksson A-S, Brandal k et al."Parental SCN1A mutation mosaicism in familial Dravet syndrome". Clinical Genetics 2009: 76 (4): 398–403 .
- 28.Cheah C, Catterall,W.A. (2012). "Characterizing the role of sodium channels in mouse models of Dravet Syndrome. .
29. Cendes F ,Sankar R . Vaccinations and febrile seizures. Epilepsia 2011 :52 Suppl 3: 3-25.
30. Klein NP ,Fireman B, Lewis E et al. Measles mumps rubella-varicella combination vaccine and the risk of febrile seizures. Pediatrics 2010:126: e1-8.
31. Klein NP, Lewis E, Baxter R et al. Measles containing vaccines and febrile seizures in children age 4 to 6 years. Pediatrics 2012 :129: 809-814..
32. Berg AT , Shinnar S . The contributions of epidemiology to understanding of childhood seizures and epilepsy. J Child Neurol.1994: 9 Suppl . 2:19- 26

- 33.[No authors listed]. Guidelines for epidemiologic studies on epilepsy Commission on Epidemiology and Prognosis , International League Against Epilepsy Epilepsia 1993 :34: 592-596.
- 34.[No authors listed] Consensus statement Febrile seizures : long term management of children with fever-associated seizures. Pediatrics 1980 :66: 1009-1012
35. Gretchen L Birbeck . febrile seizures, epidemiology, clinical management , risk factors , etiology, malaria, traditional medicines, complex febrile seizures. Febrile . seizures in the Tropics 2010 Volume 22 issue 2, p103-9
- 36.Bessisso MS, Elsaid MF, Almula NA . Recurrence risk after a first febrile convulsion. Saudi Med J 2001 ; 22:254-8.
- 37.Airedi Al. Febrile convulsions: factors and recurrence rate. Trap Geogr . Med1992 :44: 233-7.
- 38.Van Stuijvenberg M et al. Temperature, age, and recurrence of febrile seizure Arch Pediatr Adolesc Med 1998 ; 152 : 1170
- 39.Muhammad A. Mikati . Febrile seizures: In Nelson Textbook of Pediatrics: Elsevier Saunders; 19th Edition 2011; 2017-2018,
- 40.Mikati MA, Rabi A . Febrile seizures; from molecular biology to clinical practice, Neurosciences 2004 :10:. 14-22;
41. Hirtz, DO . Febrile Seizures. Pediatric Rev. 1997 ;l 8:5-8
42. Hesdorffer DC, Benn EK , Bagiella E et al. Distribution of febrile seizure duration and associations with development. Ann Neurol. 2011: 70: 93-100.
43. AT Shinnar S . Complex febrile seizures. Epilepsia 1996 :37: 126 -132

44. Dr. Aziza Ezzidin, prof. Nuri Shembesh. demography of Febrile seizure in north eastern part of Libya . International Congress of pediatric in China (2002).

45. Ahmed El Nur .Abdalla , Abdel Moneim El Seed . Febrile convulsions in Sudanese. Sudanese Journal Paediatrics 1986; 5:49-66

46. Khaled Amro MD, Ghazi Salaita MD, Reham Mardini MD et al . Infectious causes associated with febrile seizure in Children , Jordanian Royal Medical Services, Amman- Jor. International Journal Latest Research in Science and Technology 2014 Volume 3, Issue 5: Page No 43-45..

47.Al-Khathlan NA and Jan MM . Neurosciences (Riyadh, Saudi Arabia) 2005 ;10(1) : 30-33] Type: Journal Article

48. M Musarrat Jamal , Waseem Ahmed. to identify the factors affecting the risk of recurrent febrile seizures in Saudi Children. King Khalid Hospital Hail Saudi Arabia(Pak Armed Forces Med J 2015 ; 65(4): 458-63).

49 .AL-Essia YA . Febrile Seizure. Rate and risk factors. J.ch .Neurol , July1995 , 315- 9

50.AL-Zwaini , Essam J . (Epidemiological and clinical features of hospitalized patients with febrile seizures in Ramadi) Journal of pediatric neurology: JPN 201505(04):311-315.

51. Ali Abdul- Razak Obed. Demographic Criteria and Causes of Convulsive Disorders in Children below 5 Years of Age Admitted to Al-Elwia Pediatric Hospital, Baghdad (Iraqi J. Comm. Med., July. 2012 ,22-7)

52. Avi Shimony , Zaid Afawi, Muhammad Mahajnah et al.(2008) Epidemiological characteristics of febrile seizures— Comparing between Bedouin and Jews in the Southern part o f Israel British Epilepsy Association. Published by Elsevier Ltd. January 2009 Volume 18 , Issue 1, Pages 26–2.
53. S faihi L, Maaloul I, Kmiha S et al . (2012 Oct) Febrile seizures an epidemiological and outcome study of 482 cases. Child Nerv. Syst. 2012 ;28 (10):1779-84.
54. O. A.Olubosede ,S.B.A Oseni, T.A .Aladekomo et al .international Prevalence, Aetiology and Outcome of Febrile Convulsions at the Wesley Guild Hospital, Ilesa, South-WestNigeria British Journal of Medicine& Medical Research 2015 :8:(5): 470- 476.
55. Zulkifli M , Jalan Raja Muda AbdulAziz . Prospective study conducted in Malaysia (Med J Malaysia Dec 1994 Vol.49 NO.4.)
- 56 Dr. Shree Krishna Shrestha. Role of CSF Analysis for the First Episode of Febrile Seizure among Children between Six Months to Five Years of Age Hospital, Pokhara, Nepal . 2010 : Vol 30/Issue 2J.Nepal Paediatr. Soc.
57. Shrestha D, Dhakal AK, Shakya H et al. Clinical Characteristics of Children with Febrile Seizure ,Nepal, 2Nepal Health Sector Support Programme , Nepal. JNHRC Vol. 12 No. 3 Issue 28 Sep - Dec 2014.
58. Journal of Mazandaran University of Medical Sciences(JMUMS) :Nov2012,Vol 22 Issue 94, p35 Academic Journal.
59. Hamed Esmaili Gourabi ,Elham Bid Abadi MD, et al. Demographic Features and Causative Factors of Febrile seizures . Iran j Child Neurology Vol,6N0.4 Autumn 2012,6(4),33-37

60. KK Chan, SWW Cherk , CHChan et al . Retrospective Review of First Febrile Convulsion and Its Risk Factors for Recurrence in Hong Kong Children, HK J Pediatric (new series) 2007 :12:181-187.
61. Vitus D'silva , K Shreedhara Avabrahma . A retrospective study of hemoglobin levels in children with febrile seizures between the age group 6 months to 6 years (International Journal of Recent Trends in Science And Technology, , 2014 Volume 13, Issue 2p 341-344)
62. Smail ZUBČEVIĆ1 et al. The seasonal distribution of febrile seizures does not follow the seasonal distribution of febrile illness in infants and toddler University Clinical Center Sarajevo, Bosnia and Herzegovina (Paediatrics Today 2015;11(2):136-143 .
63. Kursat Bora Carmana, Arzu Ekicia, CoskunYarara et al. The Prevalence of Febrile Seizure and Associated Factors Among Turkish Children (Int J Clin Pediatr. 2014 ; 3 (1) :1-4).
64. Ann T Berg, Shlomo Shinnar, Allen Hauser et al. A prospective study of recurrent febrile seizures . (The England Jounal of Medicine Oct,15 ,1992) .
65. S. Akram, B. Hasan , S. Ibrahim. Febrile Seizures:. Factors affecting risk of recurrence in Pakistani Children presenting at The Aga Khan University Hospital. (January 1998-Augast2000)
66. Ahmad Sherjil, Zaheer us Saeed , Sohail Shehzad et al. Iron deficiency anemia a risk factor for febrile seizures in Children . J Ayub. Med Coll. 2010;22(3)
- 67.Pisacane A, Roland p, Sansone R et al. Iron Deficiency anemia and febrile convulsions : A case control study. BMJ. 1996;313:343.
- 68.Dawn SH, Jonatan T, Jerome Y et al. The association between iron deficiency and febrile seizures in childhood. Clin. Pediatr. 2009 ;48:420-6.

69. Daud AS, Batieha A, Ekteish A et al .Iron status: a possible risk factor for first febrile seizures Epilepsia 2002 ;43:740-3
- 70.Rajwanti KV et al . Iron deficiency as a risk factor for first febrile seizure Indian Pediatrics. 2010;47
71. Bidabadi E , Mashouf M Association between iron deficiency anemia and first febrile convulsion: A Case control study. Seizure.2009;18(5):347–51.
- 72.Naveed-ur-Rehman , Billoo AG. Association between iron deficiency anemia and febrile seizures. J Coll .Physicians Surg. Pak. 2005.; 15(6):338–40
- 73.Kobrinsky NL, Yager JY, Cheang MS et al . Does iron deficiency raise the seizure threshold. J Child Neurol. 1995.; 10 (2):105–9.
- 74-U.S. Preventive Services Task Force . Screening for iron deficiency anemia including iron prophylaxis. In: Guide to Clinical Preventive Services. Baltimore : Williams and Wilkins 1996 ; p. 231–46..
75. Oski FA , Brugnara C, Nathan DG . . diagnostic approach to the anemic patients, in hematology of infancy and Childhood 2016 ,5th ed Appendix 11 ,WB, Company
76. ZEGLAM Adel M, Al-Hmadi Suad, Beshish Asaad . auditing the attitude and knowledge of parents of Children with febrile seizure . Al-Khadra Teaching Hospital, Tripoli, Libya . (2007- 2008)
- 77.Ohis RK ,Christensen RD. Iron deficiency anemia . Nelson text book of pediatrics. 18th Edition . Philadelphia Saunders:2008. 2014-17.
- 78.Rehman N and Billoo AG . Association between iron deficiency anemia and febrile seizures . J Coll Physicians surg. Pak.2005:15(6):338-40.

- 79.Mahoney DH .Iron deficiency anemia in Children . Last Literature Review version 17.2:May2009.
80. Ambruso DR, Hays T, Goldenberg NA. Iron deficiency anemia . Current diagnosis and treatment- Pediatrics 19 Edition .Denver USA :Mc Graw Hill :2009.p.810-11.
81. Momen AA, Hakimzadeh M. Case-control study of the relationship between anemia and febrile convulsion in children between 9 months to 5 years of age. Scientific Medical Journal of Ahwaz University of Medical Sciences 2003;1(4):54-50.
- 82.Talebian NM, Mosavi GA, Khojasteh MR. Relationship between febrile seizure and anemia. Iran J Pediatr. 2006 ; 16:79-82
- 83.Derakhshanfar H, Abaskhanian A, Alimohammadi H, ModanlooKordi M. Association between iron deficiency anemia and febrile seizure in children. Med Glas (Zenica) 2012; 9: 239-42.

تم بحمد الله

Chapter XI

Arabic summary

ملخص الدراسة

المقدمة:-

نوبات التشنج الحراري شائعة ومعظمها حميدة وهي السبب الأكثر شيوعاً من بين التشنجات الأخرى التي تصيب الأطفال أقل من 5 سنوات من العمر . هناك نوعان من التشنجات الحرارية وهي بسيطة و معقدة , كل من الرابطة الدولية لمكافحة الصرع و المعهد الوطني للصحة نشرت تعريفات على تصنيف التشنجات الحرارية, تشنجات حرارية بسيطة وهي في معظمها حميدة و تشنجات حرارية معقدة وهي معظمها لفترات طويلة من الزمن ويمكن أن تكون لها عواقب على المدى الطويل , معظم الأطفال الذين لديهم تشنجات حرارية يكون بصحة جيدة و طبيعي النمو بعد حدوث التشنج ولكن هناك أدلة حديثة تشير إلى إن مجموعة صغيرة من الأطفال المصابين بالتشنج الحراري قد يكون التشنج الحراري متكرر أو يتطور إلى الصرع .

أهداف الدراسة:-

دراسة نسبة حدوث التشنج الحراري لدى الأطفال من عمر 3 أشهر إلى 6 سنوات في شمال شرق ليبيا للذين تم إيوائهم خلال الفترة من 1 يناير 2012م إلى 30 ديسمبر 2012م إلى مستشفى الأطفال بنغازي بأطفال بعض الدول العربية وأجزاء أخرى من العالم

تصميم الدراسة :-

دراسة وصفية بأثر رجعي.

مكان و مدة الدراسة :-

مستشفى الأطفال بنغازي في شمال شرق ليبيا من 1 يناير إلى 30 ديسمبر 2012 م .

المرضى وأسلوب البحث :-

شملت الدراسة نحو 443 طفل (يتراوح أعمارهم بين 03 شهراً إلى 60 شهراً) تم إيوائهم إلى مستشفى بنغازي لطب الأطفال وشخصت تشنج حراري وقد تم جمع البيانات من مكتب السجلات الطبية في المستشفى .

نتائج الدراسة :-

خلال الدراسة كان متوسط عمر الأطفال 20 شهراً و معظم الحالات من الذكور ، وكانت نسبة الإناث إلى الذكور 1.35:1 وكان الجهاز التنفسي العلوي السبب الأكثر شيوعاً بنسبة (73%) وكان السبب الثاني التهاب المعدة والأمعاء ، وكان متوسط درجات الحرارة 38.5°C ، وكان متوسط مدة الإيواء 1-2 يوم في(66%), التاريخ العائلي الإيجابي للتشنج الحراري في 106 (93%) والتاريخ العائلي الإيجابي للصرع في 8 (7%) من الأطفال وكان معدل تكرار التشنج الحراري في 91 (22.9%) من الأطفال وكان هناك ارتباط ذات دلالة إحصائية بين نوع من التشنج الحراري المعقّد و حدوث التشنج الحراري المتكرر في (33%) من الحالات (القيمة الاحتمالية = 0.01) و كذلك هناك ارتباط ذات دلالة بين مدة التشنج الحراري وتكرار التشنج الحراري في (34.5%) (القيمة الاحتمالية= 0.003) و في تكرر نوبات أكثر من مرة واحدة كذلك هناك ارتباط ذات دلالة إحصائية في(34 %) من المرضى (القيمة الاحتمالية= 0.01) وهي أقل من 0.05 و وكذلك هناك ارتباط ذات دلالة إحصائية بين العمر و حدوث التشنج الحراري المتكرر للأطفال أقل من 12 شهراً في (29.8%) من المرضى (القيمة الاحتمالية = 0.039) وهي أقل من 0.05, من العوامل الغير

هامة في احتمالية التكرار التاريخ العائلي و الجنس و درجة الحرارة في دراستنا ، في مجموعة أطفال التشنج الحراري كانت اقل مما كانت عليه في مجموعة الأطفال MCH,MCHC,MCV,HB المصابين بحرارة فقط ولا توجد دالة إحصائية الفرق في القيمة أكثر من 0.05 .

الاستنتاجات :-

التشنج الحراري مشكلة الأطفال الشائعة ، أكثر الأطفال المصابين من الذكور وكان الجهاز التنفسى العلوي السبب الأكثـر شيـعا ، أكثر شيـعا خـلال فـصل الشـتاء و لا تـأثير لـلوزـن الـولادة و عمرـالـحمل و طـرـيقـة الـولـادـة في حـدـوث تـكرـار التـشـنجـالـحرـارـيـالـعـمـرـوـنـوـعـالـتـشـنجـوـمـدـةـالـتـشـنجـوـعـدـمـرـاتـالـتـشـنجـتعـتـبـرـهـامـةـبـالـنـسـبـةـلـلـتـكـرـارـالـتـشـنجـالـحرـارـيـ، مـعـدـلـتـكـرـارـالـتـشـنجـالـحرـارـيـلـدـيـالـأـطـفـالـفـيـشـمـالـشـرـقـلـبـيـاـ(22.9%)ـوـلـيـوـجـارـتـبـاطـإـحـصـائـيـبـيـنـقـرـالـدـمـوـالـتـشـنجـالـحرـارـيـ، مـنـ443ـطـفـلـمـصـابـبـتـشـنجـحرـارـيـ422ـطـفـلـقـدـتـمـعـلـاجـهـمـوـخـرـوجـهـمـلـلـمـنـزـلـبـدـونـأـيـعـجـزـعـصـبـيـفـيـحـيـنـبـاـقـيـ27ـطـفـلـبـنـسـبـةـ6%ـخـرـجـواـضـدـالـمـشـورـةـالـطـبـيـةـوـلـاـجـوـدـلـحـالـاتـوـفـاهـ.

تم بحمد الله سبحانه و تعالى



جامعة بنغازي

كلية الطب البشري

قسم طب الأطفال

دراسة نسبة حدوث التشنج الحراري لدى الأطفال من عمر 3 أشهر إلى 6 سنوات في شمال شرق ليبيا الذين تم إيوائهم خلال الفترة من 01.01.2012 إلى 30.12.2012 إلى مستشفى الأطفال بنغازي بالمقارنة بأطفال بعض الدول العربية وأجزاء أخرى من العالم

إعداد

د. السالمي محمد السالمي

إشراف إستاد دكتور

نوري محمد شميش

رسالة مقدمة لغرض استكمال متطلبات الحصول على درجة التخصص العالية

الماجستير بقسم طب الأطفال - جامعة بنغازي

بنغازي 2016

