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Prospective Cross Sectional Study on Risk Factor Assessment of Epilepsy

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Abstract

Epilepsy is a chronic neurological & non-communicable disorder of the brain that affects around 50 million people worldwide. It is characterized by recurrent seizures, which are brief episodes of involuntary movement that may involve a part of the body (partial) or the entire body (generalized) and are sometimes accompanied by loss of consciousness and uncontrolled bowel or bladder function. It is estimated in various studies that the overall prevalence in India is 5.59-10 per 1000. There are several common risk factors like occurrence of high fever during childhood, stress, consanguinity, alcohol, new born distress etc. leading to epilepsy. The motive of this study is to assess risk factors associated with occurrence of epilepsy along with its prevalence prioritizing different set of age groups and to identify the most frequent type of epilepsy in a locality. This study permits to capacitate early detection of the disease leading to improved clinical care.

Keywords: Risk factors, Epilepsy, Type of seizures, Gender.

INTRODUCTION

Epilepsy is a chronic neurological & non-communicable disorder of the brain that affects around 50 million people worldwide. It is characterized by recurrent seizures, which are brief episodes of involuntary movement that may involve a part of the body (partial) or the entire body (generalized) and are sometimes accompanied by loss of consciousness and uncontrolled bowel or bladder function.[1]

The objective of this study is to assess risk factors associated with occurrence of epilepsy along with its prevalence prioritizing different set of age groups and to identify the most frequent type of epilepsy in a locality. This study permits to capacitate early detection of the disease leading to improved clinical care.

TYPES OF SEIZURES:

1. Generalized
2. Focal
3. Unknown.

SIGNS AND SYMPTOMS BASED ON TYPE OF SEIZURES:

Many different symptoms happen during a seizure. This new classification separates them simply into groups that involve movement.

1) For Generalized Onset Seizures begin with a widespread electrical discharge that involves both sides of the brain at once.

• Motor symptoms may include sustained rhythmical jerking movements (clonic), muscles becoming weak or limp (atonic), muscles becoming tense or rigid (tonic), brief muscle twitching (myoclonus), or epileptic spasms (body flexes and extends repeatedly).

• Non-motor symptoms are usually called absence seizures. These can be typical or atypical absence seizures (staring spells). Absence seizures can also have brief twitches (myoclonus) that can affect a specific part of the body or just the eyelids.

2) Focal seizures begin with an electrical discharge in one limited area of the brain. These seizures are also called partial seizures.
• Motor symptoms may also include jerking (clonic), muscles becoming limp or weak (atonic), tense or rigid muscles (tonic), brief muscle twitching (myoclonus), or epileptic spasms. There may also be automatisms or repeated automatic movements, like clapping or rubbing of hands, lipsmacking or chewing, or running.
• Non-motor symptoms: Examples of symptoms that don't affect movement could be changes in sensation, emotions, thinking or cognition, autonomic functions (such as gastrointestinal sensations, waves of heat or cold, goosebumps, heart racing, etc.), or lack of movement (called behavior arrest).

3) Unknown seizures: When the beginning of a seizure is not known, it's now called an unknown onset seizure.
• Motor seizures are described as either tonic-clonic or epileptic spasms.
• Non-motor seizures usually include a behavior arrest. This means that movement stops – the person may just stare and not make any other movements. [2]

RISK FACTORS FOR EPILEPSY

1) Obstructed Labor:
Nerve damage is another possible risk of forceps delivery. These injuries can occur when the pressure of the forceps causes a loss of movement in the face. The baby's face may appear to droop or become weak. For many cases, this happens on just one side of the face. In rare instances, nerve damage occurs on both sides of the face. As the doctor places forceps around the baby's head, the pressure can cause the nerves to be damaged in the process.[3]

2) Hypoxic Brain Injury:
Hypoxic ischemic encephalopathy (HIE) is a condition that happens when there is a loss of oxygen and/or reduced blood flow to the brain. It most commonly happens in the womb, or around the time of birth, and less commonly can be seen in childhood or adulthood. HIE causes injury to the brain which may cause seizures. In many cases, seizures may resolve as an infant recovers. However, in other cases, seizures may recur weeks to years later, and range in severity.
Sometimes, seizures happen again later because of the underlying brain injury. In such cases, seizures are most likely to develop in the first two years of life but may occur 10+ years after birth. [4]

3) Any Newborn Distress:
Due to its immature state, the neonatal brain is prone to seizures due to an imbalance of neuronal excitation over inhibition.
In the neonatal brain, however, the chloride concentration intracellularly is high, with a reversal of the chloride ion gradient. Thus, when the GABA receptor is stimulated, chloride ion channels open, there is an efflux of chloride ions, and depolarization of the neuron occurs that through an influx of sodium and calcium ions.
Other factors involved in this imbalance include the development of excitatory synapses before inhibitory synapses and early maturation of voltage-gated ion channels specific to depolarization. [5]

4) Any Developmental Disorders:
Epilepsy comorbidity can be explained by a common hypothesis that postulates that neurodevelopmental deficit of multiple origins (e.g., genetic, metabolic, immune, and environmental) results in an altered structure and function of excitatory and inhibitory circuits. A persistent E/I imbalance and hyper excitability are caused by aberrant neuronal activity. Neurodevelopmental deficits in inhibitory circuits and the subsequent E/I imbalance

are mainly due to defects in GABA-mediated activities and hyper excitability caused by the increased glutamatergic signaling and function .During embryonic and early postnatal brain development, all these deficits may hamper synaptic plasticity and neuronal connectivity and can manifest in hyper excitability; cognitive, social, and emotional deficits; and intellectual disability (ID). [6]

5) Occurrence Of Fever During Childhood:

A febrile seizure is a neurological abnormality that occurs as a result of a peripheral infection, to which the immune system reacts by producing an inflammatory response thereby, inducing a fever and subsequently increasing the core temperature of the body. The increase in temperature leads to increased neuronal excitability resulting in convulsions. [7]

6) Cerebral Palsy :

Seizures are common among children with cerebral palsy because CP is caused by a brain injury occurring before, during or shortly after birth. Brain injuries increase the chance for abnormal nerve activity to occur within the brain, which can result in seizures. Children with hemiplegia and quadriplegia are most at risk for co-occurring CP and epilepsy. [8]

7) Any Family History Of Epilepsy:

A genetic epilepsy occurs when an individual inherits a gene, or a number of genes that result in a higher likelihood of seizures. In many cases of idiopathic generalized epilepsy (such as childhood absence epilepsy, juvenile absence epilepsy, juvenile myoclonic epilepsy or epilepsy with generalized tonic-clonic seizures alone), epilepsy is the result of inheriting a number of abnormal genes, each of which contribute a relatively small amount to the risk of seizures. If one inherits a number of these genes, epilepsy is more likely. [9]

8) Consanguinity:

The detrimental health effects associated with consanguinity are caused by the expression of recessive genes inherited from a common ancestor(s). This probably applies to rare single gene conditions as well as to multigene disorders with multifactorial inheritance. [10]

Further population studies revealed an increased familial clustering of epilepsy among first degree and to a lesser degree second degree relatives. Idiopathic epilepsy has a higher familial clustering of epilepsy. Similar association has been seen for cryptogenic epilepsy also in population studies especially for generalized seizure and younger onset of epilepsy.[11]

9) Any Previous Head Injury:

Head trauma is a well-known cause of seizures. Depending on the kind of head trauma a person has suffered, it can damage the brain in different ways. Brain trauma can leave scarring on brain cells. This may change how electrical signals get sent in the brain and make the person have epileptic seizures. [12]

10) Stress:

Emotional stress also can lead to seizures. Emotional stress is usually related to a situation or event that has personal meaning to you. It may be a situation in which you feel a loss of control. One study found that in some patients, anxiety—another term for worry and fear—led to hyperventilation (over breathing) and an increase in abnormal brain activity and cause seizures.[13]

11) Unknown Reason:

According to the Epilepsy Foundation, epilepsy affects three million people in the U.S. and 50 million worldwide. Epileptic seizures may be tied to a brain injury or genetics, but for 70 percent of epilepsy patients, the cause is unknown. [14]

12) Other Neurological Conditions:

Epilepsies may develop as a result of brain damage associated with many types of conditions that disrupt normal brain activity such as Alzheimer’s disease. [15]

13) Viral Or Bacterial Infections:

Viral Infection:

Neurotropic viruses can invade the CNS via blood or axonal transport, and induce neuronal injury, abnormal modification of neural circuits linked to seizure cascade, and production of proinflammatory cytokines during infection . The proinflammatory cytokines can activate the innate immune system as well as the adaptive immune system . The activated macrophages and microglia, effector cells of the innate immunity, can produce interleukin (IL)-6 and tumor necrosis factor (TNF)-α during viral infection.The inflammatory macrophages play a role in the clearance of virus from the brain, but at the same time may trigger seizures via promoting the production of IL-6 . The proinflammatory cytokines such as IL-6 and TNF-α have been demonstrated to disrupt the neuronal excitation/inhibition balance and increase neuronal hyperexcitability.[16]

Bacterial Infections:

Bacterial infections of the CNS involve mainly the meninges and the cerebral parenchyma; almost any CNS bacterial infection can result in acute symptomatic seizures and later acquired epilepsy Those CNS infections which lead to empyema and abscesses are particularly associated with the subsequent development of epilepsy although acute bacterial meningitis is also a culprit.

The route of entry of the infective agent to the CNS space may be haematogenous—through the BBB or the choroid plexus—or by direct invasion through trauma or from the cranial sinuses .For seizures to develop, the infectious agent needs to reach or to damage the cerebral cortex. The full pathogenesis of both acute symptomatic seizures and acquired epilepsy after bacterial CNS disease is, however, unknown but is likely to involve arteritis, ischemia and infarction triggering defense mechanisms with consequent inflammatory changes. [17]

14) Alcoholism:

Alcohol acts on the brain through several mechanisms that influence seizure threshold. These include effects on calcium and chloride flux through the ion-gated glutamate NMDA and GABA receptors. During prolonged intoxication, the CNS adapts to the effects of alcohol, resulting in tolerance; however, these adaptive effects seem to be transient, disappearing after alcohol intake is stopped.[18]

15) Smoking:

Nicotine in cigarettes in high doses may have direct convulsive effects in both animals (Beleslin & Krstic, 1986; Broide et al., 2002) and humans (Woolf et al., 1997), whereas in low doses, nicotine may be protective in mice (de Fiebre & Collins, 1988). In addition, smoking-related tissue hypoxia and sleep impairment may lead indirectly to seizures.[19]

16) Stroke:

There are several causes for early onset seizures after ischaemic strokes. An increase in intracellular Ca2+ and Na+ with a resultant lower threshold for depolarisation, glutamate excitotoxicity, hypoxia, metabolic dysfunction, global hypoperfusion, and hyperperfusion injury (particularly after carotid end arterectomy) have all been postulated as putative neurofunctional aetiologies. Seizures after haemorrhagic strokes are thought to be attributable to irritation caused by products of blood metabolism. The exact pathophysiology is unclear, but an associated ischaemic area secondary to haemorrhage is thought to play a part. Late onset seizures are associated with the persistent changes in neuronal excitability and gliotic scarring is most probably the underlying cause. Haemosiderin deposits are thought to cause irritability after a haemorrhagic stroke.[20]

17) Brain Tumor:

A seizure is a brief burst of abnormal electrical activity in the brain that leads to variable symptoms, such as twitching or whole body shaking. When someone has more than one unprovoked seizure, they are diagnosed with a brain condition known as epilepsy. When epilepsy is related to a brain tumour, seizures are caused by excessive firing of the neurons in and around the tumour.of drug development and be an approved drug available in the market [21].

Materials and methods
MATERIALS:
Patient Informed Consent Form (ICF)
Adult consent form
Pediatric consent form
Clinical data form (risk factor assessment)
Patient information Sheet

Study Design: A Prospective Cross Sectional Study.

Study Population: 150 cases of patients with Epilepsy.

Study site: The study has been conducted in Gayatri Vidya Parishad Institute of Health Care & Medical Technology, Vijayasri Hospital and other Neuroclinics in and around Visakhapatnam.

Study period: The study was conducted for a period of 6 months.

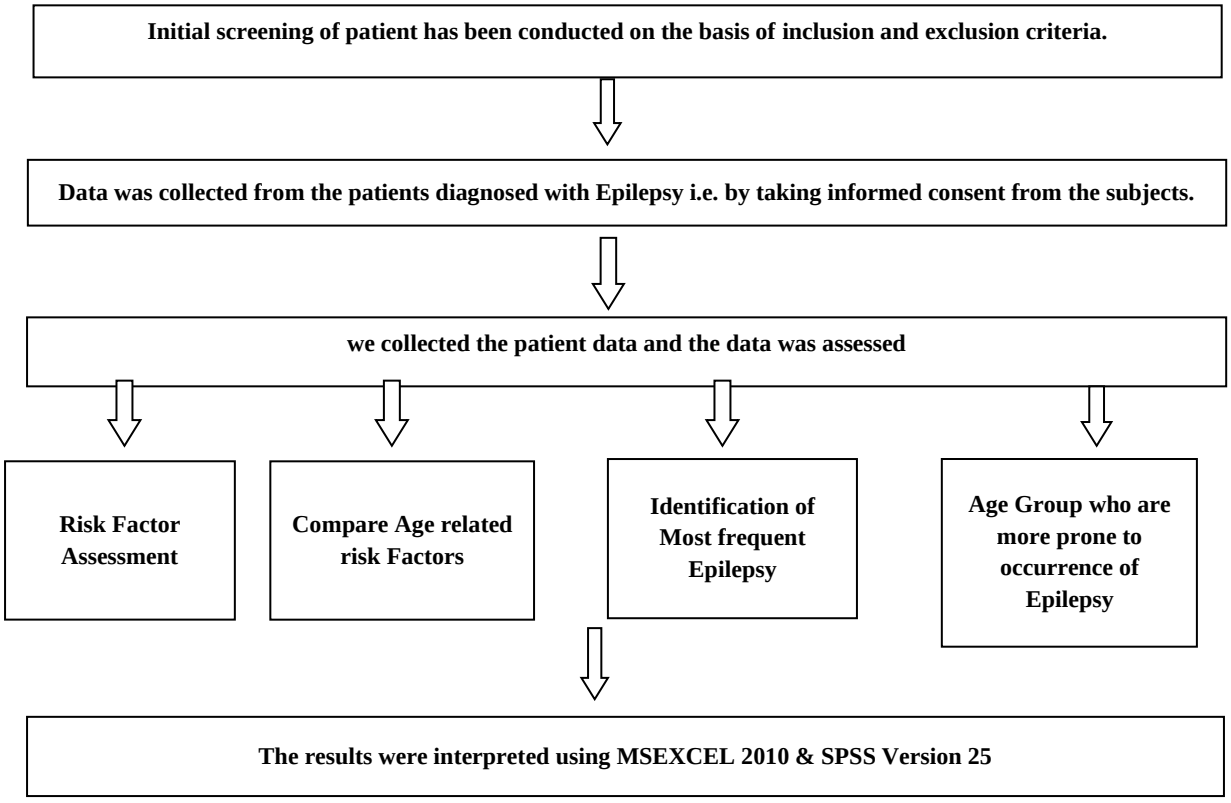
INCLUSION CRITERIA:

- Patients who are willing to sign the ICF.
- Patients of all age groups are considered.

EXCLUSION CRITERIA:

- Patients who are not willing to sign the ICF.
- Pregnant women.
- Lactating women.

METHODOLOGY FLOW CHART:



RESULTS & DISCUSSION

A total of 150 epilepsy patients were included and assessed in our study.

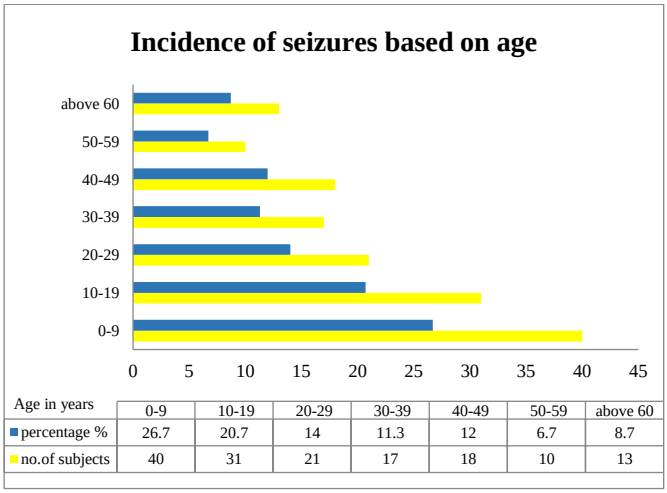
Several parameters were considered and assessed. The results were produced with emphasis on incidence of seizures based on age, gender and age group in each gender, frequency of each type of seizure, overall risk factor assessment, risk factor assessment based on age group, drug utilization evaluation based on type of therapy, drug utilization evaluation based on type of seizures, prescribing frequencies based on therapy.

I.Incidence of seizures based on age:

Patients included in our study were categorized into 7 different age groups (0-9, 10-19, 20-29, 30-39, 40-49, 50-59 and above 60). Results of our study specified that the subjects belonging age group 0-9 years showed greater incidence of 26.70% including 40 subjects, followed by age group 10-19years , 20-29 years, 40-49 years, 30-39 years , above 60 years with incidence of 20.70%, 14% , 12%, 11.30%, 8.70 % including 31,21,18,17,13 subjects respectively. And least incidence of 6.70% seizures involving 10 subjects was observed in age group of 50-59 years.

Age Group	No. of Subjects	Percentage
0-9	40	26.7
10-19	31	20.7
20-29	21	14
30-39	17	11.3
40-49	18	12
50-59	10	6.7
above 60	13	8.7

Table 1: Incidence of seizures based on age



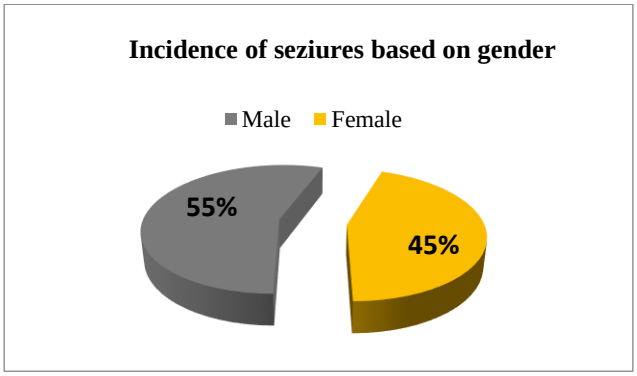
Graph 1: Incidence of seizures based on age

II.Incidence of seizures based on Gender

Among the subjects included in our study male subjects were slightly higher than female subjects with a difference of 10 %.

Male	Female
83	67

Table 2 : Incidence of seizures based on Gender



Graph 2: Incidence of seizures based on Gender

III. Incidence of seizures in male based on age group

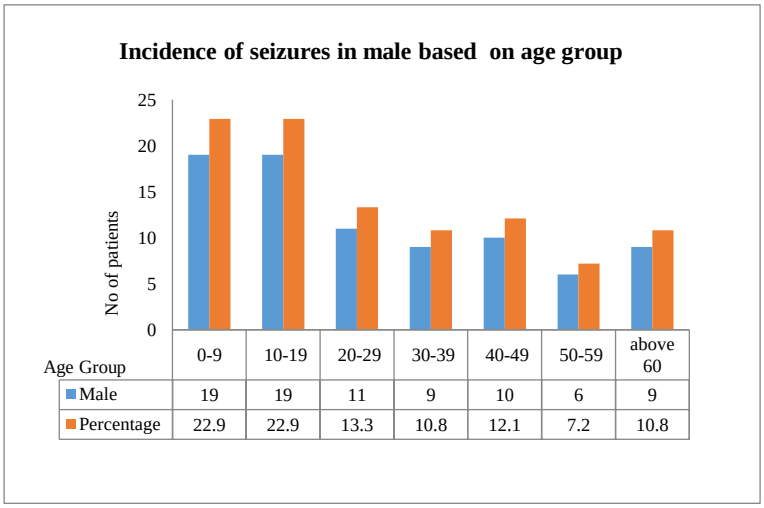
As we have already stated that we categorized the subjects in 7 different age groups and considered both the genders.

Among 150 subjects there are 83 male subjects in whom we observed greater incidence with 22.90% involving 19 subjects in both age groups 0-9 years, 10-19 years,

followed by incidence of 13.30%, 12.1%, 10.80%, 10.80% and 7.20% involving 11,10,9,9 and 6 subjects in age groups 20-29, 40-49, 30-39, Above 60 and 50- 59 years respectively.

Age Group	Male	Percentage
0-9	19	22.9
10-19	19	22.9
20-29	11	13.3
30-39	9	10.8
40-49	10	12.1
50-59	6	7.2
above 60	9	10.8

Table 3: Incidence of seizures in male based on age group



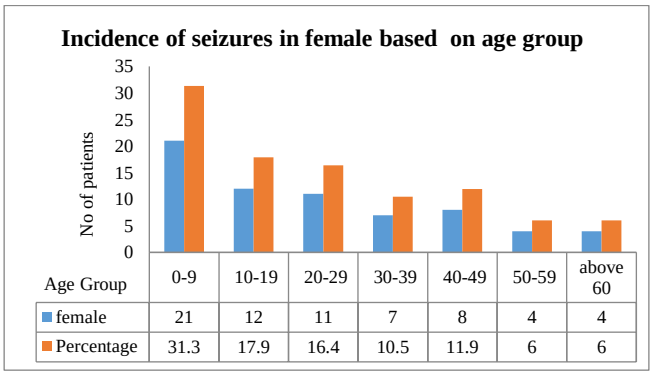
Graph 3: Incidence of seizures in male based on age group

IV. Incidence of seizures in female based on age group

Among 150 subjects there are 67 female subjects in whom we observed greater incidence with 31.30% involving 21 subjects in age group 0-9 years, followed by incidence of 17.90%, 16.4%, 11.90%, 10.50% ,6% and 6% involving 12,11,8,7,4 and 4 subjects in age groups 10-19, 20-29, 40-49, 30-39,50- 59 and above 60 years respectively.

Age Group	Female	Percentage
0-9	21	31.3
10-19	12	17.9
20-29	11	16.4
30-39	7	10.5
40-49	8	11.9
50-59	4	6
above 60	4	6

Table 4: Incidence of seizures in female based on age group



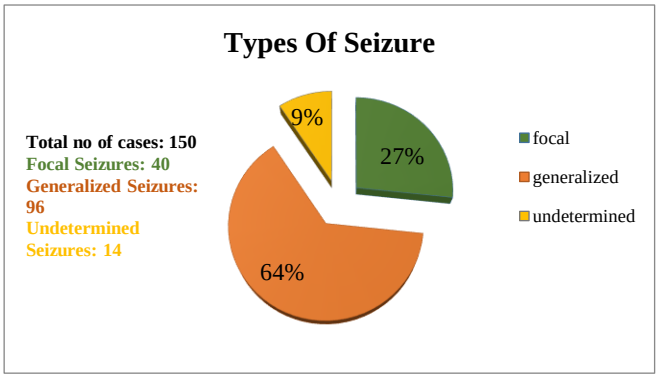
Graph 4: Incidence of seizures in female based on age group

V. Type of seizure

Seizures are generally classified into 3 major categories namely Focal seizures, Generalized seizures and Undetermined seizures. In our study we perceived a larger percentage of Generalized Seizures with prevalence of 64% involving 96 subjects followed by Focal Seizures and Undetermined Seizures with prevalence of 27% and 9% involving 40 and 14 subjects respectively.

Focal	Generalized	Undetermined
40	96	14

Table 5: Type of seizure



Graph 5: Type of seizure

VI.Risk factor assessment

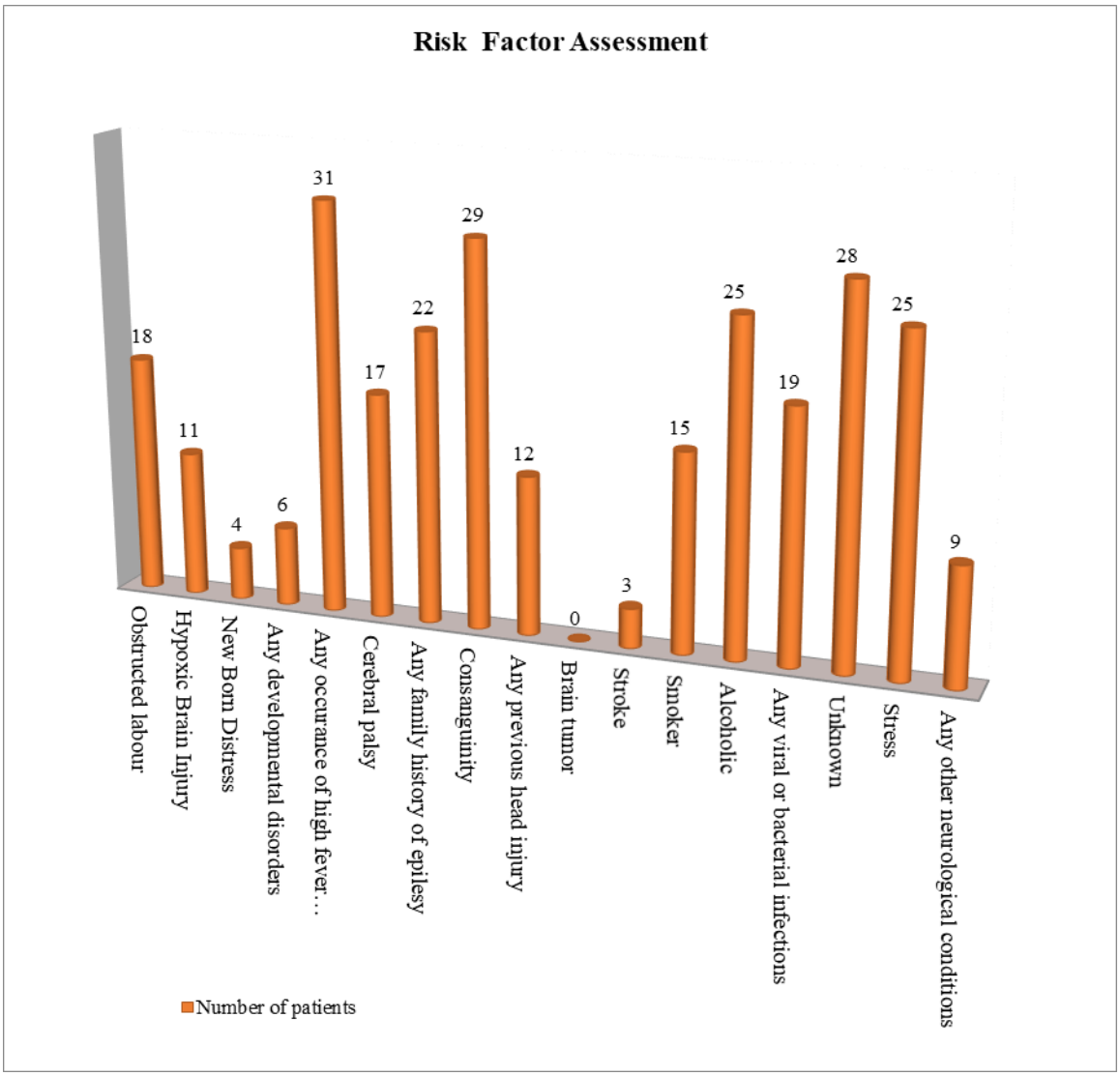
We initially categorized several risk factors that are playing a major role in occurrence of epilepsy in correspondence to all the subjects involved in the study.

Amidst all the risk factors, occurrence of high fever during childhood was identified as prime risk factor (31 of 150 subjects), accompanied by consanguinity (29 of 150 subjects), sequenced by unknown (28 of 150 subjects), followed by Alcohol, stress, family history, viral or bacterial infection, obstructed labor, cerebral palsy, smoking, head injury, hypoxic brain injury, other neurological conditions, developmental disorders and new born distress including 25,25,22,19,18,17,15,12,11,9,6,4 and 3 of 150 subjects.

We observed no subjects with brain tumor as a risk factor for occurrence of epilepsy.

Risk Factor	**Number of patients**
Obstructed labour	18
Hypoxic Brain Injury	11
New Born Distress	4
Any developmental disorders	6
Any occurrence of high fever during childhood	31
Cerebral palsy	17
Any family history of epilepsy	22
Consanguinity	29
Any previous head injury	12
Brain tumour	0
Stroke	3
Smoker	15
Alcoholic	25
Any viral or bacterial infections	19
Unknown	28
Stress	25
Any other neurological conditions	9

Table 6: Risk factor assessment



Graph 6: Risk factor assessment

VII.Risk factor assessment based on age group

I.0-9 years

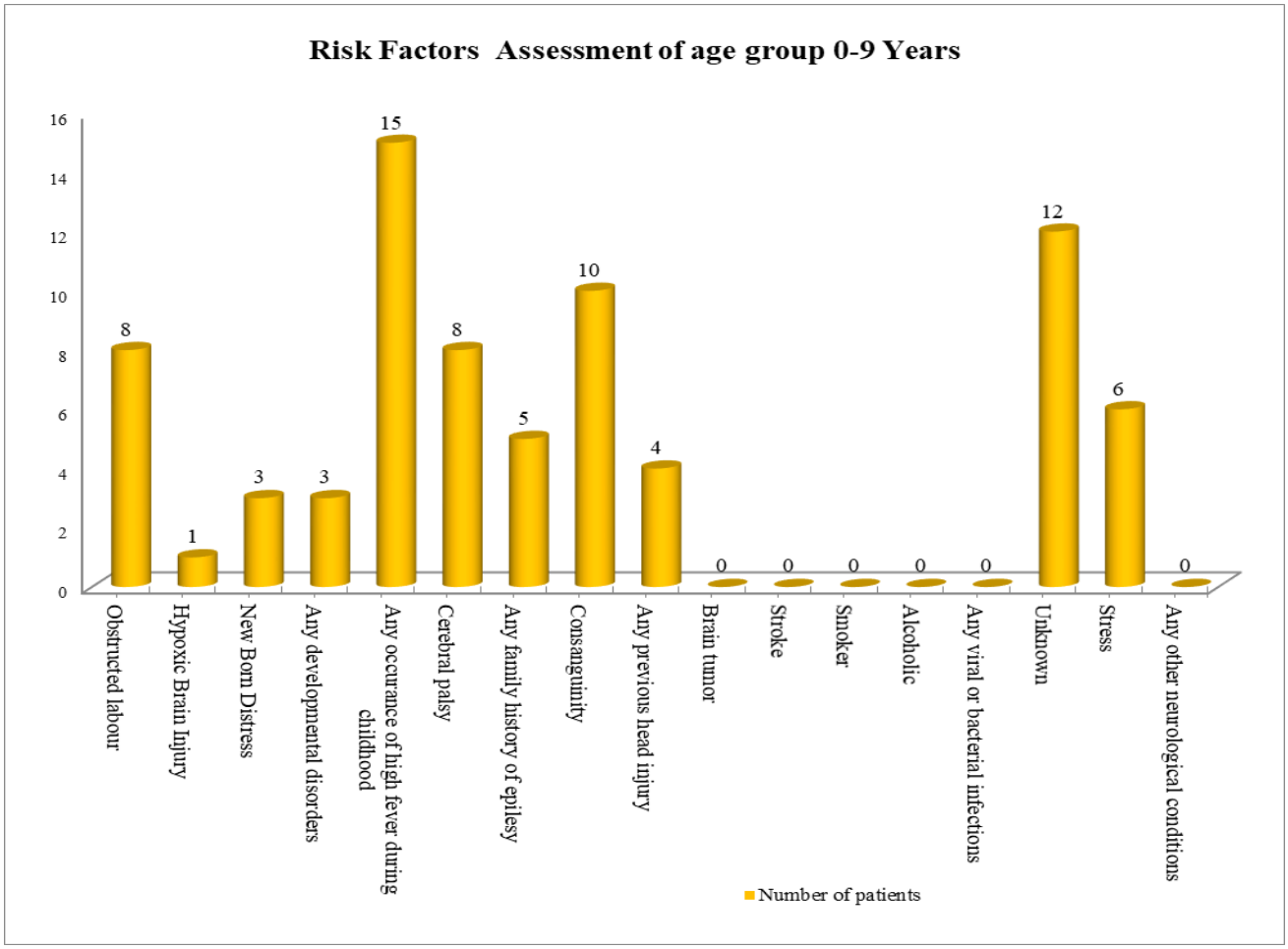
Amidst 40 subjects in age group 0-9 years, occurrence of high fever during childhood was identified as prime risk factor (15 subjects), accompanied by unknown (12 subjects), sequenced by consanguinity (10 subjects), followed by obstructed labor, cerebral palsy, stress , family history, head injury, new born distress, developmental disorders, and hypoxic brain injury including 8,8,6,5,4,3,3 and 1 subjects.

We observed no subjects with Alcohol, other neurological conditions, smoking and brain tumor as a risk factor for occurrence of epilepsy.

Risk Factor	Number of patients
Obstructed labour	8
Hypoxic Brain Injury	1
New Born Distress	3
Any developmental disorders	3

Any occurrence of high fever during childhood	15
Cerebral palsy	8
Any family history of epilepsy	5
Consanguinity	10
Any previous head injury	4
Brain tumour	0
Stroke	0
Smoker	0
Alcoholic	0
Any viral or bacterial infections	0
Unknown	12
Stress	6
Any other neurological conditions	0

Table 7: Risk Factors Assessment of age group 0-9 Years



Graph 7: Risk Factors Assessment of age group 0-9 Years

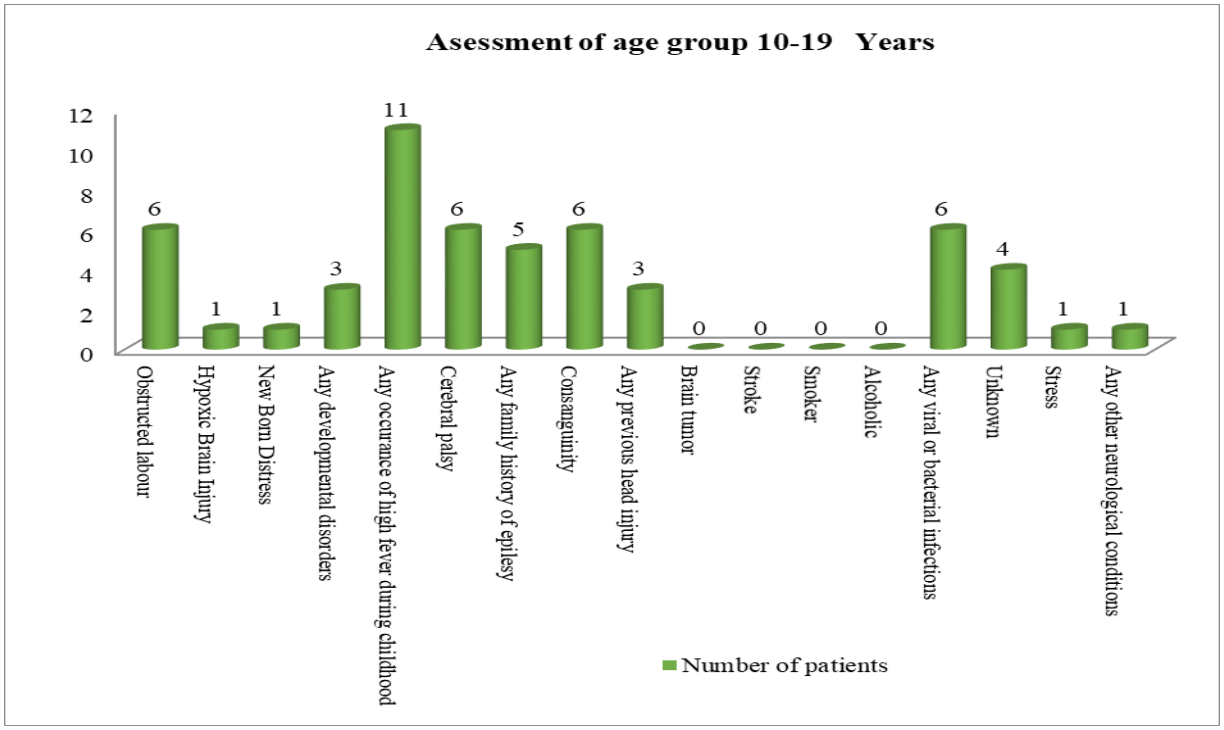
II.10-19 years

Among 32 subjects in age group 10-19 years, occurrence of high fever during childhood was the prime risk factors involving 11 subjects; Sequenced by obstructed labor, Consanguinity, cerebral palsy, viral or bacterial infection involving equal number of subjects (6 subjects), accompanied by family history with 5 subjects, followed by

unknown reason, developmental disorders, previous head injury, Hypoxic brain injury, new born distress, stress and other neurological conditions including 4,3,3,1,1,1,1 respectively.
We observed no subjects with alcohol, stroke, smoking and brain tumor as a risk factor for occurrence of epilepsy.

Risk Factor	Number of patients
Obstructed labour	6
Hypoxic Brain Injury	1
New Born Distress	1
Any developmental disorders	3
Any occurrence of high fever during childhood	11
Cerebral palsy	6
Any family history of epilepsy	5
Consanguinity	6
Any previous head injury	3
Brain tumour	0
Stroke	0
Smoker	0
Alcoholic	0
Any viral or bacterial infections	6
Unknown	4
Stress	1
Any other neurological conditions	1

Table 8: Risk Factors Assessment of age group 10-19 Years



Graph 8: Risk Factors Assessment of age group 10-19

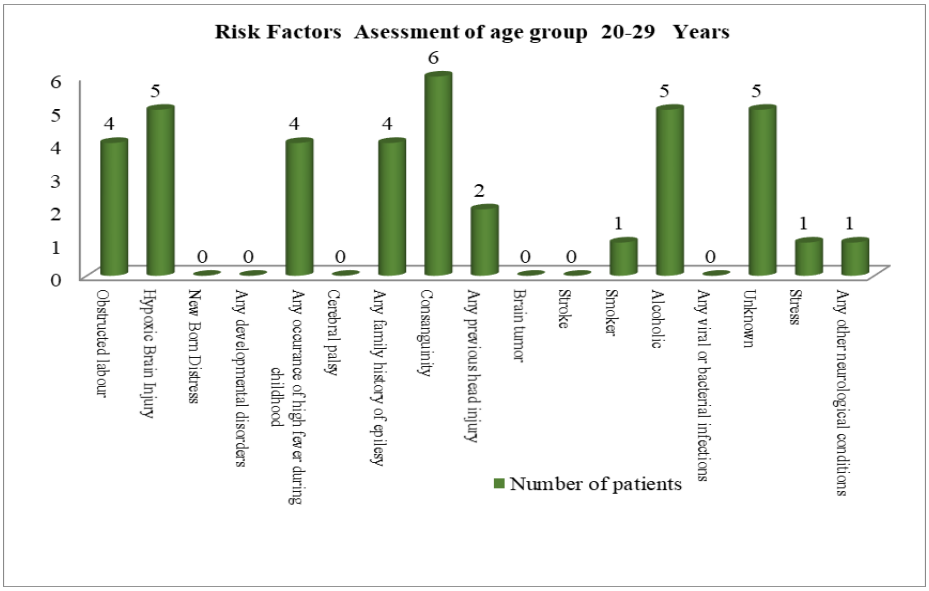
III.20-29 years

Among 21 subjects in the age group 20-29 years, Consanguinity is the major risk factor involving 6 subjects, accompanied by alcoholism, hypoxic brain injury and unknown reason involving equal number of subjects (5), sequenced by obstructed labor, occurrence of high fever in childhood, family history with equal number of subjects (4), followed by head injury (2), sub sequenced by smoking, stress and other neurological conditions with 1 subject.

We observed no subjects with new born distress, developmental disorders, cerebral palsy, stroke, viral or bacterial infection and brain tumor as a risk factor for occurrence of epilepsy.

Risk Factor	Number of patients
Obstructed labour	4
Hypoxic Brain Injury	5
New Born Distress	0
Any developmental disorders	0
Any occurrence of high fever during childhood	4
Cerebral palsy	0
Any family history of epilepsy	4
Consanguinity	6
Any previous head injury	2
Brain tumour	0
Stroke	0
Smoker	1
Alcoholic	5
Any viral or bacterial infections	0
Unknown	5
Stress	1
Any other neurological conditions	1

Table 9: Risk Factors Assessment of age group 20-39 Years



Graph 9: Risk Factors Assessment of age group 20-29 Year

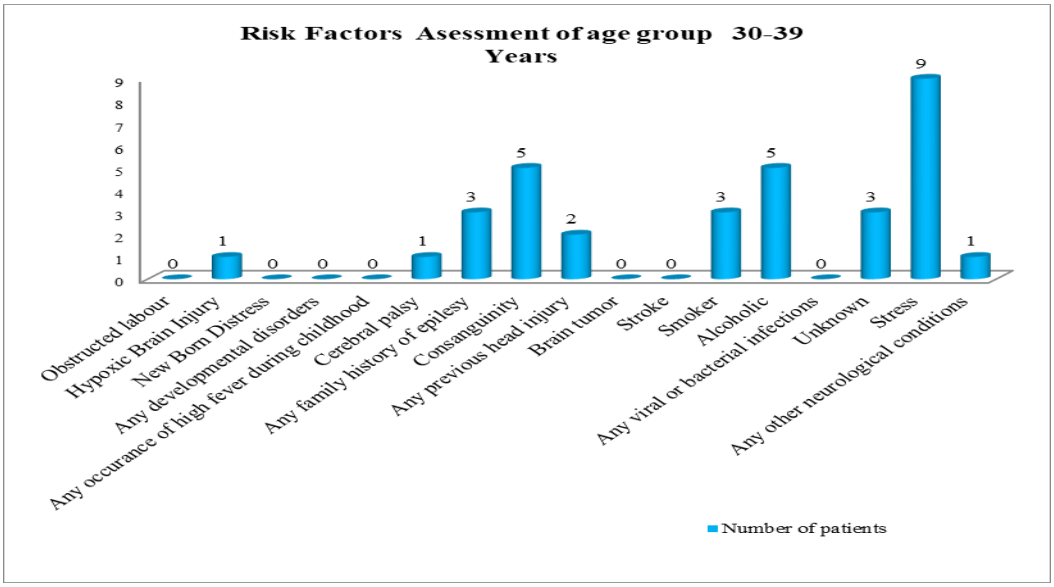
IV.30- 39 years

Amidst 17 subjects in age group 30-39 years, stress is observed to be the paramount reason for occurrence of epilepsy involving 9 subjects, accompanied by an equal number of subjects (5 subjects) showing consanguinity and alcoholism as an risk factor, sequenced by family history, smoking and unknown reason (3 subjects), followed by previous head injury, hypoxic brain injury, cerebral palsy and other neurological conditions involving 2,1,1,1 subjects respectively.

We observed no subjects with obstructed labour, new born distress, developmental disorders, occurrence of high fever during childhood , stroke, viral or bacterial infection and brain tumor as a risk factor for occurrence of epilepsy.

Risk Factor	**Number of patients**
Obstructed labour	0
Hypoxic Brain Injury	1
New Born Distress	0
Any developmental disorders	0
Any occurrence of high fever during childhood	0
Cerebral palsy	1
Any family history of epilepsy	3
Consanguinity	5
Any previous head injury	2
Brain tumour	0
Stroke	0
Smoker	3
Alcoholic	5
Any viral or bacterial infections	0
Unknown	3
Stress	9
Any other neurological conditions	1

Table 10: Risk Factors Assessment of age group 30-39 Years



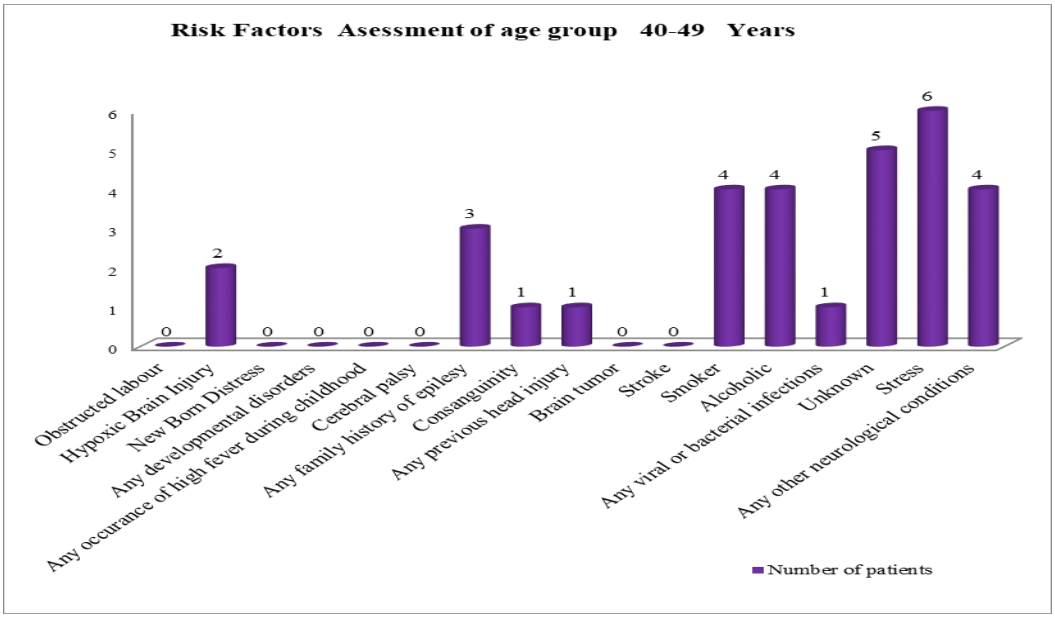
Graph 10: Risk Factors Assessment of age group 30-39 Years

V.40-49 years

Among 18 subjects in the age group 40-49 years, stress was observed to be major factor for occurrence of epilepsy involving 6 subjects, followed by unknown reason involving 5 subjects, accompanied by smoking, alcoholism, other neurological conditions involving equal number subjects (4), sequenced by family history, hypoxic brain injury , consanguinity, previous head in jury, viral or bacterial infections involving 3,2,1,1,1 subjects respectively. We observed no subjects with obstructed labour, new born distress, developmental disorders, occurrence of high fever during childhood, cerebral palsy, stroke and brain tumor as a risk factor for occurrence of epilepsy.

Risk Factor	Number of patients
Obstructed labour	0
Hypoxic Brain Injury	2
New Born Distress	0
Any developmental disorders	0
Any occurrence of high fever during childhood	0
Cerebral palsy	0
Any family history of epilepsy	3
Consanguinity	1
Any previous head injury	1
Brain tumour	0
Stroke	0
Smoker	4
Alcoholic	4
Any viral or bacterial infections	1
Unknown	5
Stress	6
Any other neurological conditions	4

Table 11: Risk Factors Assessment of age group 40-49 Years



Graph 11: Risk Factors Assessment of age group 40-49 Years

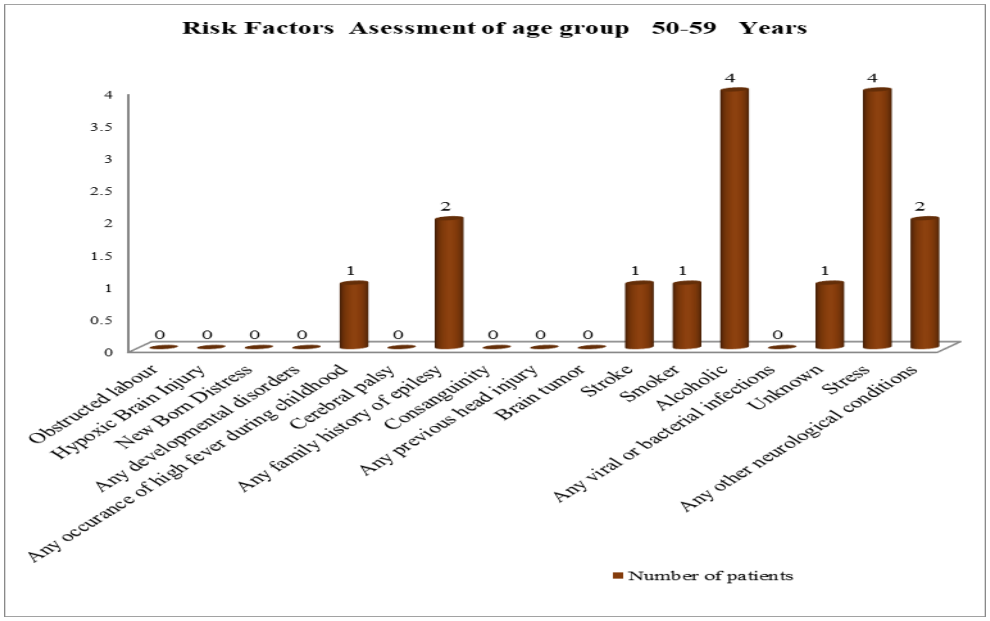
VI.50-59 Years

Amidst 10 subjects in the age group 50-59 years, alcoholism and stress was observed as a prime factor for occurrence of epilepsy involving equal number of subjects (4), followed by family history , other neurological conditions involving 2 subjects each, sequenced by occurrence of high fever during childhood, stroke, smoking, unknown reason involving 1 subject each.

We observed no subjects with obstructed labour, hypoxic brain injury, new born distress, developmental disorders, cerebral palsy, consanguinity, previous head injury, viral or bacterial infections and brain tumor as a risk factor for occurrence of epilepsy.

Risk Factor	Number of patients
Obstructed labour	0
Hypoxic Brain Injury	0
New Born Distress	0
Any developmental disorders	0
Any occurrence of high fever during childhood	1
Cerebral palsy	0
Any family history of epilepsy	2
Consanguinity	0
Any previous head injury	0
Brain tumour	0
Stroke	1
Smoker	1
Alcoholic	4
Any viral or bacterial infections	0
Unknown	1
Stress	4
Any other neurological conditions	2

Table 12: Risk Factors Assessment of age group 50-59 Years



Graph 12: Risk Factors Assessment of age group 50-59 Years

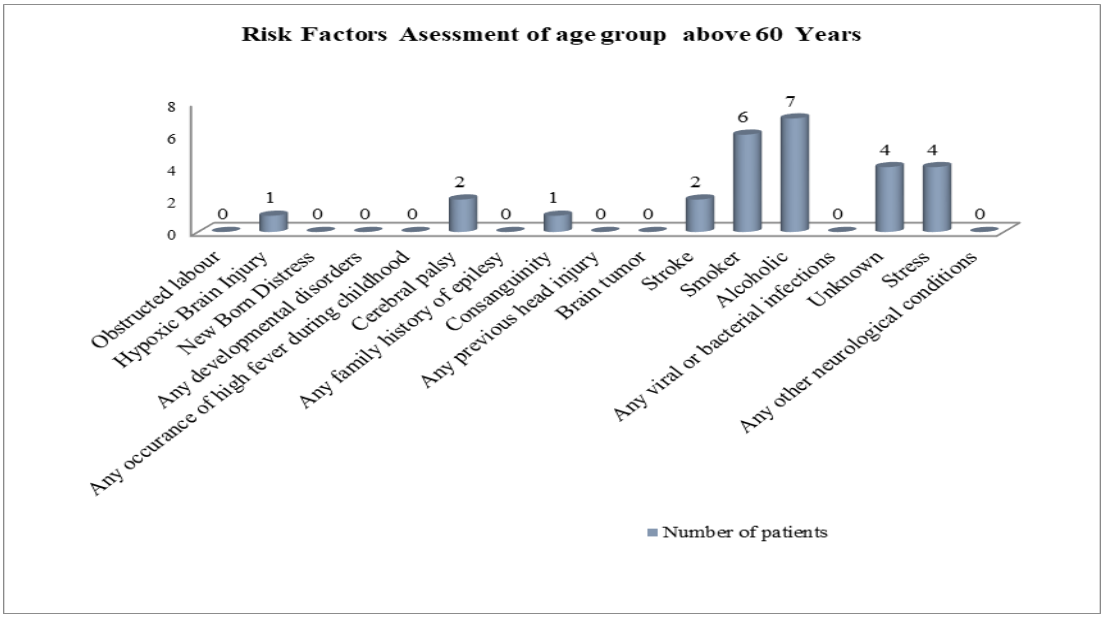
VII.Above 60 Years

Amidst 13 subjects in age group above 60 years, alcoholism was observed to be one of the major risk factor involving 7 subjects, followed by smoking with 6 subjects, accompanied by unknown reason, stress with 4 subjects, sequenced by cerebral palsy, stroke, consanguinity and hypoxic brain injury involving 2,2,1 and 1 subjects respectively.

We observed no subjects with obstructed labor, new born distress, developmental disorders, occurrence of high fever during childhood, family history, previous head injury, viral or bacterial infections and brain tumor as a risk factor for occurrence of epilepsy.

Risk Factor	Number of patients
Obstructed labour	0
Hypoxic Brain Injury	1
New Born Distress	0
Any developmental disorders	0
Any occurrence of high fever during childhood	0
Cerebral palsy	2
Any family history of epilepsy	0
Consanguinity	1
Any previous head injury	0
Brain tumour	0
Stroke	2
Smoker	6
Alcoholic	7
Any viral or bacterial infections	0
Unknown	4
Stress	4
Any other neurological conditions	0

Table 13: Risk Factors Assessment of age group above 60 Years



Graph 13: Risk Factors Assessment of age group above 60 Years

STATISTICAL ANALYSIS (SPSS)

Descriptive Analysis

A total of 150 Subjects were included in our Statistical Analysis. Using SPSS software we had conducted the descriptive Statistical Analysis for gender, type of therapy & type of seizures.

1) Gender:

Male had shown greater percent (55.3%) when compared to female (44.7%) amid the total population involved in the study.
Female population had shown mean of 3.51 with standard error (SE) of 0.062 followed by median, variance, std. deviation, skewness & kurtosis are 4, 0.254, 0.504, - 0.031 (SE: 0.293) & - 2.062 (SE: 0.523) respectively.
Male population had shown mean of 3.55 with standard error of 0.055 followed by median,
variance, std. deviation, skewness & kurtosis are 4, 0.25, 0.5, -0.222 (SE: 0.264) & -1.999 (SE: 0.523) respectively.

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	67	44.7	44.7	44.7
	Male	83	55.3	55.3	100
	Total	150	100	100	

Table 14: Gender

Descriptive					
	Gender			Statistic	Std. Error
Type of therapy	Female	**Mean**		**3.51**	0.062
		95% Confidence Interval for Mean	Lower Bound	3.38	
			Upper Bound	3.63	
		5% Trimmed Mean		3.51	
		Median		4	
		Variance		0.254	
		Std. Deviation		0.504	
		Skewness		-0.031	0.293
		Kurtosis		-2.062	0.578
	Male	**Mean**		**3.55**	0.055
		95% Confidence Interval for Mean	Lower Bound	3.45	

			Upper Bound	3.66	
		5% Trimmed Mean		3.56	
		Median		4	
		Variance		0.25	
		Std. Deviation		0.5	
		Skewness		-0.222	0.264
		Kurtosis		-1.999	0.523

Table 15: Gender - Descriptive

2) TYPE OF SEIZURES

Generalized Seizures had shown greater percent 64% followed by focal & undetermined 26.7% & 9.3% respectively.

Focal seizures had shown mean of 3.58 with standard error (SE) of 0.079 followed by median, variance, std. deviation, skewness & kurtosis are 4, 0.251, 0.501, - 0.0315 (SE: 0.374) & - 2.003 (SE: 0.733) respectively.Generalized seizures had shown mean of 3.52 with standard error of 0.051 followed by median,variance, std. deviation, skewness & kurtosis are 4, 0.252, 0.502, -0.085 (SE: 0.246) & -2.036 (SE: 0.139) respectively. Undetermined seizures had shown mean of 3.50 with standard error of 0.139 followed by median, variance, std.deviation, skewness & kurtosis are 3.5, 0.269, 0.519, 0.000 (SE: 0.597) & -2.364 (SE: 1.154) respectively.

Type of seizures					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Focal	40	26.7	26.7	26.7
	Generalized	96	64	64	90.7
	Undetermined	14	9.3	9.3	100
	Total	150	100	100	

Table 16: Type of Seizures

Descriptives					
	Type seizures			Statistic	Std. Error
Type of therapy	Focal	**Mean**		**3.58**	0.079
		95% Confidence Interval for Mean	Lower Bound	3.41	
			Upper Bound	3.74	
		5% Trimmed Mean		3.58	
		Median		4	
		Variance		0.251	
		Std. Deviation		0.501	

		Skewness		-0.315	0.374
		Kurtosis		-2.003	0.733
	Generalized	**Mean**		**3.52**	0.051
		95% Confidence Interval for Mean	Lower Bound	3.42	
			Upper Bound	3.62	
		5% Trimmed Mean		3.52	
		Median		4	
		Variance		0.252	
		Std. Deviation		0.502	
		Skewness		-0.085	0.246
		Kurtosis		-2.036	0.488
	Undetermined	**Mean**		**3.5**	0.139
		95% Confidence Interval for Mean	Lower Bound	3.2	
			Upper Bound	3.8	
		5% Trimmed Mean		3.5	
		Median		3.5	
		Variance		0.269	
		Std. Deviation		0.519	
		Skewness		0	0.597
		Kurtosis		-2.364	1.154

17: Type of Seizures - Descriptive

T- TEST

We divided entire sample size (150) into 7 different age groups which are then organized into two different sets (< 3, >= 3).
The age groups involved in < 3 set are group 1 (0-9 years) & group 2 (10-19 years).
The age groups involved in >= 3 set are group 3 (20-29 years), group 4 (30-39 years), group 5 (40-49 years), group 6 (50-59 years) & group 7 (above 60 years).

1. AGE GROUPS – RISK FACTORS

Hypothesis:

- **H_0 (Null Hypothesis):** There is no significant difference between the two set of age groups for the risk factor that cause epilepsy.
- **H_1 (Alternative Hypothesis):** There is a significant difference between the two set of age groups for the risk factor that cause epilepsy.

Group Statistics					
	Age	N	**Mean**	Std. Deviation	Std. Error Mean

OHF	>= 3	5	**1**	1.732	0.775
	< 3	2	**13**	2.828	2

Table 18: Group Statistics

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OHF	**Equal variances assumed**	**0.952**	**0.374**	**-7.171**	**5**	**0.001**	**-12**	**1.673**	**-16.301**	**-7.699**
	Equal variances not assumed			-5.595	1.315	0.071	-12	2.145	-27.778	3.778

Table 19: Independent Sample Test

At degrees of freedom (df) 5 & level of significance (α) 0.05 the table t-value is 2.5706.

Interpretation:

We observed a clear difference between the mean of 2 set of age groups for a risk factor that cause epilepsy in table 27.
The calculated t-value (7.171) is greater than table t-value (2.5706). So we have to reject null hypothesis and accept alternative hypothesis.
Therefore there is a significant difference between the two set of age groups for the Occurrence of High Fever (OHF) that cause epilepsy.
Hence our data is statistically significant

CONCLUSION

In our study we concluded that males were more prone to develop epilepsy than females & this is mostly due to consumption of alcohol & smoking which was confirmed by the data obtained from the subjects.

Incidence of epilepsy is high in age group 0-9 years due to occurrence of high fever during childhood, among males the incidence of seizure was higher in age groups in 0-9, 10-19 years and female it was 0-9 years. The prevalence of generalized seizures was higher than focal and undetermined seizures. Overall, the most common etiology for onset of seizures is occurrence of high fever during childhood. Other causes in a descending order are consanguinity, unknown causes, alcohol, stress, family history, viral or bacterial infections, obstructed labor, cerebral palsy, smoking, head injury, hypoxic brain injury, other neurological conditions, developmental disorders, new born distress amid 150 subjects those were involved in our study.

The occurrence of seizures can be controlled by avoiding stress in adults which is the prevailing factor. Similarly febrile seizure can be minimized by consulting physician at early occurrence of fever.

By conducting statistical analysis using SPSS our data is observed to be statistically significant as the visualization of mean between sets in each category had shown the same result as statistically interpreted data.

Our study helps to identify potential risk factors in different age groups which helps in early prediction and taking preventive measures to reduce the risk of occurrence of epilepsy.

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Conflict of interest

Nil

Ethics committee

The institutional Ethics committee GVPIHCMT had approved for project title "A prospective cross-sectional study on risk factor assessment of epilepsy".

Approval Number :GVIHCMT/ICE/20221003/02

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