

Why does it happen?

The question uppermost in the patients' mind is the cause of their seizures. The seizure itself is a symptom of the underlying disorder of the brain, and results from the interaction between genetic, environmental and physiological factors.

Epilepsy can be broadly classified into two types depending upon the presence or absence of a known cause:

- (a) Idiopathic, where the cause is not known;
- (b) Symptomatic, secondary or situation-related seizures where the cause is known.

Idiopathic epilepsy

As the name itself suggests, the cause of this type of epilepsy is not known, although there are some risk factors associated with it. These include previous history of repeated febrile convulsions during early childhood and history of epilepsy among close family members.

Epilepsy and heredity

Some forms of epilepsy, but certainly not all, are hereditary, i.e. inherited due to genetic defects. Seizures are an important manifestation of more than 150 single-gene disorders. In certain parts of India, for example, South India, consanguineous marriages (uncle–niece) are in practice, with figures estimated at 33%. This type of marriage should not be encouraged in the event of a family history of epilepsy. Genetic counselling may be necessary for such families.

Possible Risk Factors and Their Contribution

Risk factor	Contribution to risk of seizure
Febrile seizures (repeated)	3–20% develop recurrent seizures (epilepsy)
Family history of seizures	Not known clearly, may increase risk
Brain infections	5–10% will have seizures at the time of infections
Brain injuries	5–10% will have seizures at the time of injury and another 10% during later years
Cerebrovascular disorders	5–15% develop seizures
Mental retardation or cerebral palsy	10–20% have seizures
Brain tumours	The majority will have seizures
HIV/AIDS	60% will have seizures at some time
Alcohol abuse	Heavy usage and withdrawal seizures
Drug abuse	Depends on type and dose of drug
Metabolic conditions	Variable: depends on severity of condition and age of patient
Hypocalcaemia, hyponatraemia, hypoglycaemia	

Secondary or Provoked Seizures

Birth injury

Birth injury and hypoxia (low oxygen concentration in the blood) are very important causes of secondary seizures and mental retardation in SEAR Member Countries where medical care at the time of delivery is often inadequate, especially in rural areas. Even today, many deliveries are conducted at home by traditional birth attendants. Preterm deliveries are twice as common as in developed countries. Chances of neonatal (newborn) infection leading to septicaemia (generalized infection) are very high in children born under these conditions. In the newborn, delay of the first cry, seizures in the first month (neonatal seizures), and infections in the first month (neonatal infections) such as blood infection and brain infection are predictors for later recurrent seizures. Malnutrition and infection in the mother during pregnancy are additional risk factors for injury to the newborn during birth.

Brain infection

Infections affecting the brain (encephalitis) or its coverings (meningitis) may result in seizures both during the acute phase of the illness or long after the infection has subsided. A convulsion in a child may be the first symptom of meningitis/encephalitis. Viral encephalitis due to Japanese B virus (Japanese encephalitis) is commonly reported among children in SEAR Member Countries. It occurs both as an epidemic, i.e. a large number of cases in a particular region at a particular time, or as an endemic, i.e. occurring throughout the year in a localized region.

Meningitis due to bacterial infection occurs following infections in the ear, lungs or elsewhere in the body. Chronic ear infection is common among children in these countries and this could spread to the brain.

Tuberculosis remains a very common disease in SEAR Member Countries. Tuberculosis could affect the coverings of the brain (tuberculous meningitis) or could occur as a collection of pus within the brain (tuberculoma). Early recognition and treatment are essential to prevent brain damage which may lead to mental subnormality and later seizures.

A few common causes of secondary/provoked seizures in different age groups.

Newborn

- Birth injury
- Metabolic abnormalities
- Congenital abnormalities
- Genetic causes

Infant

(less than one year of age)

- Birth injury
- Brain infection
- High fever

School-age child

- Genetic causes
- Brain infection
- High fever
- Brain injury

Young adult

(15–25 years)

- Genetic causes
- Brain infection
- Metabolic abnormalities
- Brain tumour

Adult

(26–50 years)

- Alcohol abuse
- Brain infection
- Brain tumours
- Brain injury
- Stroke.

Elderly citizen

(50 plus)

- Stroke
- Brain tumour
- Brain injury
- Alcohol abuse

Poor sanitation

may be the single most important social factor leading to secondary seizures in SEAR Member Countries. It has been proven that *neurocysticercosis* (a worm infection) is one of the leading causes for symptomatic seizures in India, Indonesia, Sri Lanka and Thailand. Contrary to popular belief, this worm's presence in the body is **not** due to eating pork alone, as it occurs in vegetarians and non-pork-eating communities as well. It is contracted by eating food contaminated with soil containing eggs of the worm. If such food is eaten without proper washing or cooking, the eggs hatch in the body and spread to the brain.

Malaria

Malaria, although preventable, continues to be the commonest infection in South-East Asian countries and could affect the brain (cerebral malaria). Acute symptomatic seizures in the form of generalized convulsions occur in 40% of adults and in a majority of children with cerebral malaria.

Brain Injury

Among adults and the middle-aged population, brain injuries due to road traffic accidents, falls, violence and industrial accidents are common causes of secondary seizures (post-traumatic seizures). Traffic accidents are very common in SEAR Member Countries such as India, Indonesia and Thailand. Some of these are probably due to poor road conditions, poor driving habits and a higher density of two-wheel vehicles. Thailand has specific legislation regarding the compulsory wearing of helmets for two-wheel vehicle travellers and seat-belts for front seat passengers of four-wheel vehicles. Most other countries of the Region have not made these precautions compulsory. Seizures might occur in the acute phase of an injury or much later, secondary to scarring of the brain. Post-traumatic seizures are one of the most common and preventable causes of secondary seizures.

Stroke

It is well known that reduced blood flow to the brain may precipitate seizures. A small, unrecognized cerebral stroke may be enough to cause seizures, especially in people above the age of 40 years.

Alcohol and substance abuse

Alcohol and seizures are closely related. In alcoholics,

intoxication as well as alcohol withdrawal result in seizures. Alcohol use is associated with an increasing number of road traffic accidents and violence. Alcohol and substance abuse are not limited to urban areas but are common among the rural folk in SEAR Member Countries.

HIV infection

HIV and AIDS cases are commonly reported from India and Thailand, placing them second to sub-Saharan Africa. In Thailand, about 34–40% of people with central nervous system complications associated with HIV infection have seizures. It is known that 60% of patients infected with HIV have a seizure at some point in their lifetime and this may soon become a leading cause of seizure disorder in these countries.

Diarrhoea in children

Infantile and childhood diarrhoea may cause seizures in a predisposed child. This may be secondary to electrolyte and fluid imbalance or due to severe infection, e.g. *Shigella* infection. In Bangladesh, diarrhoeal disorders are very commonly reported among children and are a leading cause of emergencies.

Metabolic disturbances

Metabolic disturbances such as hypocalcaemia (low blood calcium), hypoglycaemia (low blood sugar) and hyponatraemia (low blood sodium) cause seizures in children and the elderly. Certain inborn errors of metabolism such as phenylketonuria or other aminoacidurias could cause seizures and mental retardation.

Infancy and epilepsy

Infants below the age of one year may have prolonged seizures, sometimes lasting up to thirty minutes or one hour. Since these seizures may be bizarre and fragmented, it is difficult to make a correct diagnosis. Child specialists need to be knowledgeable about the different types of childhood seizures. This is specially required in developing countries such as those in the SEA Region, where very few trained paediatric neurologists (neurologists specializing in brain disorders of children) are available. The common causes for seizures during infancy are: (i) birth injury; (ii) metabolic disturbances and (iii) brain infections. In addition, there are certain special forms of epileptic syndromes, such as infantile spasms. These



Dos and don'ts for the elderly with epilepsy.

Avoid multiple drug therapy.

Antiepileptic drugs might cause **increased drowsiness**, so be careful, especially when you are outside the house alone.

Kidney and liver damage are not uncommon and hence **proper dosage of the medications** needs to be calculated.

The elderly are prone to **dehydration and electrolyte imbalance**, particularly in tropical countries, which may affect antiepileptic drugs.

More often than not, elderly people are on other medications, hence, **drug interactions need to be considered** before the proper antiepileptic drug can be chosen.

need to be diagnosed and properly treated to prevent the development of mental handicaps and intractable epilepsy.

Febrile convulsions

Children below six years of age are prone to convulsions when they have high fever. These are known as febrile convulsions and are not epileptic. This phenomenon occurs all over the world. Parents are advised to reduce the fever as early as possible by: (1) tepid sponging whenever the temperature touches 100°F, and (2) immediately administering medicines to lower the temperature. Many parents cover their children with a blanket during the fever. It is not unusual to see parents in many parts of Bangladesh, India and Sri Lanka bringing completely covered children to the clinic. This is again due to a misconception that during fever, the patient feels cold. However, covering the child with a blanket makes the body warmer and raises the temperature further. They have to be advised to expose their children rather than cover them during a fever. Apart from this, rectal/oral diazepam should be administered at the onset of fever. Generally, these children do not require antiepileptic drug treatment, since febrile convulsions are a benign condition, disappearing spontaneously after six years of age.



Epilepsy in the elderly

As longevity is increasing in some South-East Asian countries such as India, DPR Korea, Sri Lanka and Thailand, it is not uncommon to find epilepsy among the elderly. Special precautions should be observed when treating epilepsy in the elderly.