

# A Study Based on Indian Population on Risk Assessment and Comorbid Conditions in Sudden Unexpected Death in Epilepsy (SUDEP)

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**Abstract:** Sudden unexpected death in epilepsy (SUDEP) as considerable death rates, which is caused by a neurological disorder. However the recent advancement in technology and medicine has improved diagnosis and treatments in seizures and epilepsy control. Commercial available Anti epilepsy drugs (AED) are proven to have control over the conditions at a higher rate. Although with more efficient AED and diagnosis the sudden unexpected death in epilepsy (SUDEP) causes still remain highly unpredictable. The mortality rate of SUDEP is reasonably scattered in a broader spectrum which accounts to most inconclusive deaths which is not found under autopsy or toxicology study. The inconclusive nature of sudden unexpected death in epilepsy (SUDEP) has led to investigation of occurrences of the event and preventive measures for this fatal scenario which can lead to declination of early death in epilepsy. In this short review, we compile evidence from epidemiological research of 70 sudden unexpected death in epilepsy (SUDEP) cases, which can help an individual assess the personal risk of SUDEP. Besides varying global practices and health care policy, health care providers are looking forward to promote routine SUDEP awareness in patient counselling. Detailed understanding of the risk may improve the patient adherence to the disease, treatments and optimization of the death.

**Keywords:** Sudden unexpected death in epilepsy (SUDEP), neurological disorder, risk assessment, comorbid conditions

## 1. Introduction

Epilepsy is one of the highest common and predominantly encountered neurological condition that causes heavy burden on individuals, families, and also on healthcare systems. As per a study, 70 million people have epilepsy worldwide and out of which nearly 90% of them are found in developing regions. [1]. During the past the diagnosis and treatments for neurological disorders like seizures and epilepsy were less, which eventually caused higher death rates, out of which most cases were undiagnosed. Most death due to seizures were assumed to be caused due to suffocation while encountering an unattended episode. However the recent advancement in technology and medicine has improved diagnosis and treatments in seizures and epilepsy control. Commercial available AED Anti epilepsy drugs are proven to have control over the conditions at a higher rate. On accounts of recent development epilepsy was perceived to be a benign condition by many. Epilepsy became a less fatal and death rates declined making it a less risk neurological condition. In most cases the sudden unexpected death of a young person who is healthy, apart from epileptic diagnosis, is unexpected or accepted by family and friends. It is a shocking event aggravated by the fact of not knowing such deaths are possible. Despite comprehensive investigation of the deaths, including autopsies, a clear explanation of the cause remains elusive [2] adding to the unpredictability of the condition and causes of the death leaves a lot of Unanswered question while discussing sudden unexpected death in epilepsy (SUDEP).

## 2. Epidemiology

Sudden unexpected death in general population is rare in young adults with an reported incidence of 5–10/100,000 person-years, while there is a surge with advancing of age to approximately 300/100,000 person-years in the older adults [3]. The incidence of sudden death in patients with epilepsy is significantly higher and varies markedly with the population studied [4]. For example, in population-based studies the incidence has been reported to be 0.35 and 2.7/1000 person-years depending on the methodologies employed [5,6]. This increases of between 2 and 5.9/1000 person per year in collation with patients attending to specialist epilepsy clinics [7] and up to 9.3/1000 person-years in epilepsy surgery candidates [8, 9]. The incidence of sudden death in young adults with intractable epilepsy is therefore many times that of the general population, with a peak between the ages of 20 and 40 years [14]. In elderly age groups the surging incidence of SUDEP is too small, and is compromised with other occurrence of co-morbidity such as vascular infections and diseases, respiratory or cerebrovascular disease [10].

## 3. Sudden unexpected death in epilepsy (SUDEP) in Indian population

### 3.1 Pathophysiology

The Majority of the sudden unexpected deaths in epilepsy (SUDEP) have occurred due to generalized tonic-clonic seizures (GTCS) or grand mal seizures. In this study of 70 SUDEP cases, which had causes such as suffocation, terminal apnea and respiratory obstructions. Although the current evidences report that the terminal pathway involves severe compromise of cardiopulmonary and

cardiorespiratory function as a result of the seizure. The witnesses in most cases have reported a delay in the seizure and death which explains more about the primary respiratory inhibition which is followed by cardiac pulmonary dysfunction and development of pulmonary edema and hypoxia. The current reports that are drawn is significantly limited by the integrity of the retrieved information and lack of additional relevant cardiopulmonary and cardiorespiratory parameters.

### **3.2 Children in Indian**

Every year in India there are many SUDEP cases which involves death of infants and toddlers. In most cases attenders are not aware of the causes of death and in some cases the observed never reports the cause of death of infant or toddlers. SUDEP is one of the most directly related cause of epilepsy disorder in infants and toddlers. Although the risks vary with the epileptic population .It is observed to be higher in patients with generalized tonic-clonic seizures (GTCS). Given the higher incidence with social and economic slabs of the population in India the treatment and mortality rate is frequent. The data used is highly limited with this in India due to absence of medical record system and follow up studies .the healthcare system of India is too fragile to capture the precise cause or history of the condition at the time of death of the individual. SUDEP and other epilepsy related deaths are not given prime importance by the fatality caused due to epilepsy is still seeing a steady surge. Many healthcare providers do not consider this a serious cause in India due many unreported cases, but the actual projection can reflect on the belief that is epilepsy is really to be considered a benign condition.

### **3.3 Risk Assessment**

The risks associated with unexpected death of the loved ones due to epilepsy has inflicted greater trauma in lives of families related to the victims. The loss of an individual as raised a lot of questions to the minds of the families and clinicians as a lot of evidences are still unclear to justify or predict the occurrence of the event. It is critical for individuals with epilepsy and their families to be aware of the SUDEP. The progressive identification of risk factors for SUDEP through retrospective research can facilitate improved risk awareness of epilepsy related death, as physicians and patient can discuss further on individual risk assessment of SUDEP. Risk factors can be considered with patient's individual diagnosis, progress and circumstances. There are negligible risks associated with certain seizure types, while other types of epileptic disorders are less susceptible to SUDEP with evidences from retrospective data this allows the doctor to reassurance to lower risk patients. On the other hand, seizure frequency is a significant risk which must be given major attention as that can lead to unmonitored circumstance where the epileptic individual is left unnoticed. These discussions can also lead to lay emphasis on patients about the importance of striving for the best control treatments possible. Nevertheless, deaths is still unfortunate which can also occur in patients with low

susceptibility. It is always advisable to minimize than to exaggerate on the fear of SUDEP and also important to not give false assurances about the condition of the individual.

### **3.4 Comorbidity**

Among comorbid diseases, cardiopulmonary dysfunction, respiratory disorders and sleep apnea are few common comorbid conditions in SUDEP. However there are no documented evidence for existences of such comorbid conditions in SUDEP victims. Current research studies are reaching out to evidences or statements form the observers when SUDEP occurred with an epileptic trigger.

### **3.5 Result**

The pilot study of 70 cases of SUDEP give the crucial need and understanding of monitoring epileptic population. Most of the death recorded do not have clear witness which cannot explain the reason of fatality. However cardiopulmonary dysfunction, respiratory disorders and sleep apnea are some widely accepted reasons for the tragic loss.

## **4. Discussions**

In our literature review, we have coined various reasons and discussions. These discussions show stronger scopes in understanding SUDEP in epileptic populations. Two most important questions have emerged about sudden unexpected death in epilepsy (SUDEP) .first what should be the cause of SUDEP and, second would be how to convey precautionary message to an epileptic population and their families without creating an unnecessary panic. However till today there has not been any evidences that can reveal the actual cause of sudden unexpected death in epilepsy (SUDEP), consequently it has made it difficult for physicians or other health service providers to give adequate information's to the patients. If we do not know the cause, they ask, how can it help people to hear about this risk? While many argue that despite the fact that SUDEP occurrences there is no guarantee in preventive measures or causes which a patient needs to be aware of [11]. SUDEP continues to be an important topic of discussion and research internationally with scientific studies yielding some promising results. [2] From the clinical point of view, SUDEP is causing a positive outlook on the approach to epilepsy management. The epidemiology of risk assessments underlines the need for the best possible seizure control in all epilepsy patients [2]. Guidelines for epilepsy services in UK now published and recommend having a discussion of SUDEP as part of routine general epilepsy information and equal importance to be given when decisions are made regarding antiepileptic drug treatment. [12, 13] In rare cases, the treating doctor may think it is necessary to limit the amount of information provided to avoid unnecessary panic.

## **5. Conclusions**

The study throws in light the risk and co morbid conditions which have higher susceptibility in epileptic population

which can cause a SUDEP. The risk evaluation must be individually assessed by the physician and should be made sure that the family and the epileptic individual is aware of SUDEP.

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