Chapter - 1

The condition of epilepsy is the focus of this thesis. Epilepsy can have significant psychological and social as well as medical consequences and may be life threatening. Epilepsy has a long, complicated and contradictory history (Trostle, 2005). The word ‘epilepsy’ comes from the Greek word epilambanein, which means to seize or attack (World Health Organisation, 2001). The earliest medical texts on epilepsy were produced by the Babylonians around 1050BC and indicate that they believed epilepsy to be caused by demons and ghosts (Wilson & Reynolds, 1990).

The Greek physician Hippocrates has been attributed with writing the first book about epilepsy, where he described it as a brain dysfunction and argued against the idea that seizures were supernatural (Bladin, 2001). However, during the Middle Ages, possession, magic and witchcraft again became the dominant explanation for the illness (Masia & Devinsky, 2000). These mythical beliefs continue in some cultures even today (Awaritefe, Longe, & Awaritefe, 1985; Baskind & Birbeck, 2005) and almost certainly contribute to the stigma sometimes attached to the condition. However, Susruta describes it as a disease produced by ‘Vayu’ and stated that “the aggrevated Vayu finds lodgement in the regions of the head, heart and temples. It presses upon these parts and gives rise to convulsive movements”. (Kutumbiah, 1969).

A number of famous men like Pythagoras, Caesar, Democritus, Mohammad suffered from epilepsy, as also philosophers and artists like Socrates, Pascal, Flaubert and Vincent Van Gaugh (Lennox, 1960). This association between the disorder and men of name and fame made epilepsy a disease of genius. All this led to a deeper interest in the aetiology and management of the disorder.

Description

Epilepsy is now considered a chronic disorder and has been described as a tendency to recurrent seizures, usually defined by two or more unprovoked seizures (World Health Organisation, 2001). A seizure is a “clinical manifestation presumed to result from an abnormal and excessive discharge of a set of neurons in the brain” (Hopkins & Shorvon, 1987). So epilepsy is a disorder that comes in various forms and shows up as a fault
somewhere in the complex electrical circuits of the brain & the nervous system. This minor fault results in the brain being unable to work properly for a brief period. Various symptoms depend on what part of the brain is affected. The nature of the disturbance can best be pictured as an electric type short-circuit that is brief & temporarily disturbs the normal brain activity. People with epilepsy are just like everybody else, except they sometimes have seizures.

A seizure is caused by a sudden burst of excess electrical activity in the brain, causing a temporary disruption in the normal message passing between brain cells. This results in the brain’s messages becoming temporarily halted or mixed up. The brain is responsible for all our bodily functions. So what a person experiences during a seizure will depend on where in the brain the epileptic activity begins and how widely and rapidly it spreads. For this reason, there are many different types of seizures and each person will experience epilepsy in a way that is unique to them but most of the time the cause is unknown. All seizures are not due to epilepsy. In epilepsy, disturbed neuronal activity or spasms cause strange sensations, emotions and behaviour or sometimes convulsions, muscle and loss of consciousness.

In the majority of cases, seizures go unnoticed or are very difficult to detect by those present during seizure. However, seizures can be violent and very noticeable. Epilepsy does not indicate the degree or severity of a seizure. Seizures are also called “attacks” which is an acceptable word. The term ‘fit’ is acceptable in Brain. (Burnham, 2002; Guberman and Bruni, 1999; Engel and Pedley, 1997). In many individuals seizure onset occurs in childhood, before the age of 15, during young adulthood or in middle age, seizure onset is less likely. The frequency of seizure varies enormously. Some individuals experience only a few seizure during their whole lives, other people experience many seizures every day.

Recently, there has been an attempt to fit epileptic syndromes. An epileptic syndrome consists of a seizure types, a prediction about the time of seizure onset and (possibly) offset, a possible cause, a prognosis, and a likely response to medication. Well known and very serious epileptic syndromes include West syndrome and Lennox Gastaut Syndrom. West syndrome usually has its onset during the first year of life, where as Lennox-Gastaut Syndrome usually begins between ages 1 to 8. Both syndromes involve
drug resistant seizures, an abnormal EEG between seizures, and in most cases, mild to severe development delay.

Incidence and prevalence

Epilepsy is the most common serious brain disorder worldwide and occurs across all age range, social classes and nationalities. Incidence is the number of new cases of a disease that occur during a specified period of time in a population. Prevalence is the number of affected persons present in the population at a specific time (Gordis, 2004). There are 40 to 50 million people with epilepsy across the world, and at least 50 per cent of cases begin in childhood or adolescence (World Health Organisation, 2002a). In a review of total population studies reporting the incidence of the first diagnosis of an unprovoked seizures, Hauser (1998) reported that the incidence of epilepsy ranges from 26 to 53 per 100,000 person per years when limited to recurrent seizures and up to 70 per 100,000 person per years when single unprovoked seizures are included. The incidence of epilepsy was found to be higher in males than females. However, in a recent study in Iceland, incidence among males and females was similar (Olafsson et al., 2005). As quoted by Jain (2005) the World Bank Report “Investing in Health” (1993) states that in 1990 epilepsy accounted for nearly 1% of the world’s disease burden. This is partly attributable to the fact that epilepsy commonly affects young people in the most productive years of their lives, often leading to unavoidable unemployment. W.H.O studied that in Germany, Italy and the United States, 15-20% of people with epilepsy are unemployed and 20% will retire early, while another declares that the unemployment rate for American epileptics is 25%. Economic conditions for epileptics in developing countries are so bad that obtaining medication is difficult and can lead to further health problem. In U.K 1 in every 200 adults and children have epilepsy. This means that there are at least 300,000 people with epilepsy in UK (Kolb, 1973). In a survey conducted in the Kandy district of Sri Lanka it was observed that 9 out of 100 people had epilepsy. Though there are no national statistical data from Bangladesh, it is estimated that there are at least 1.5-2.0 million people with epilepsy. The overall incidence of epilepsy in Europe and North America ranges from 24 and 53 per 100,000 per year respectively (Hauser, 1993; Forsgren, 2004, and Forsgren et al, 2005).

The picture in India is all the more poor because roughly 10 million Indians may be suffering from epilepsy. (Jain, 2005). The problem varies from 9 per 1000 in Bangalore, 5 per 1000 in Mumbai, 4 per 1000 in New Delhi and 3 per 1000 in Calcutta. The annual incidence of
epilepsy is 23-190 per 100,000 (Kotsopoulos, 2002). In developing countries, the incidence of disease is higher than that in industrialized countries and is up to 190 per 100,000 (Kotsopoulos, 2002; Preux and Dreut, 2005). It is higher in the lower socioeconomic classes. This assumption is supported by the comparison between industrialized and developing countries and by the comparison, with in the same population of people of different ethnic origin. Possible reasons for difference in incidence of developed and undeveloped countries include deficient public health care systems; lack of agreement on epilepsy and seizure definitions and thus diagnosis; dissimilarities in the desire to conceal the condition for fear of stigma; diversity in the general public’s understanding of epilepsy; possibly higher rates of head trauma due to traffic and work related accidents; and widespread poverty. Poverty results in compromised maternal care and increased infections due to a lack of hygiene and sanitation, more environmental toxins, a lack of access to medications and poor immunization (Bharucha & Shorvon, 1998).

Chadwick, 1994 stated that epilepsy is one of the most neurological disorder with an age adjusted incidence of 4-10 per 1000. It has been estimated that around 50 million people worldwide have epilepsy. In a review of age adjusted prevalence studies, Hauser (1998) concluded that prevalence rates range from 2.7 to more than 40 per 1,000 people, although most studies show a range from four to eight per 1,000 persons, with higher rates for males than females. Hauser (1998) concluded that this diversity primarily relates to differences in measurement methodology and data collection techniques and a lack of consensus on the definitions of epilepsy and seizures across studies. Economic assessment of the national burden of epilepsy have been conducted in a number of high income countries (Taylor, 1986 and Meinardi, 1999) and more recently in India (II.AE, 1981), all of which have clearly shown the significant economic implications the disorder has in terms of health care service needs, premature mortality and lost work productivity.

A multi state study by the centers for Disease Control and Prevention (2008) has found that 1 out of 100 adults have active epilepsy, and more than one third are not getting sufficient treatment. The prevalence of individuals with medically refractory epilepsy can be estimated to be 2,700 when extrapolated from the results of the age adjusted incidence rate and prevalence findings of the epidemiological study. (Hauser, Annegers and Kurland, 1984). In India epilepsy has a prevalence of 2.5-5.6 per thousand. The burden and magnitude of the problem of intractable epilepsy is not exactly
known due to non-availability of uniform epidemiological data, it is estimated that, approximately, 2,40,000-3,20,000 patients would be suffering from intractable epilepsy in India and incidence of intractable epilepsy is around 6-7-1,00,000.

**Types of Epilepsy**

DSM-IV coded for selected general medical condition and medication induced disorders. They describe following types of epilepsy.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>345.10</td>
<td>Epilepsy Grandmal</td>
</tr>
<tr>
<td>345.40</td>
<td>Epilepsy partial with impairment of consciousness</td>
</tr>
<tr>
<td></td>
<td>(Temporal lobe).</td>
</tr>
<tr>
<td>345.50</td>
<td>Epilepsy, partial, without impairment of consciousness</td>
</tr>
<tr>
<td></td>
<td>(Jacksonian)</td>
</tr>
<tr>
<td>345.00</td>
<td>Epilepsy, petit Mal (Absence)</td>
</tr>
</tbody>
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Source: DSM-IV, Appendix-G (Diagnostic Criteria for Epilepsy).

1. **Epilepsy Grandmal - Now known as Generalized Tonic-Clonic**: This type of seizure is characterized by a sudden cry (as the diaphragm often spasms, forcing air from the lungs), a fall, momentary rigidity then jerking of the muscles, uncontrolled spasmodic movement of the head limbs and body, shallow breathing, and bluish skin (cyanosis).

2. **Complex partial (Temporal Lobe, or Psychomotor)**: A blank stare, automatic or random activity, and a chewing motion are characteristics of this type of seizure. The person may be dazed and unaware of their surroundings and may act oddly. The aura which itself a form of partial seizure accompanies.

3. **Simple partial (Jacksonian)**: Jerking begins in the fingers and toes and progresses up through the body. It produces a sudden shock-like jolt to one or more muscles which increases muscle tone and causes the sudden jerky movement (similar to those that sometimes occur in healthy people as they go to sleep) The person remains conscious.

4. **Epilepsy Petitmal (Absence)**: It is characterized by a blank stare lasting about half a minute or more, and the person appears to be day dreaming. The individuals who are unaware of their surroundings, usually return to normal after two or three minutes.
International Classification of Epilepsies and Epileptic Syndromes:-
Since its presentation (Commission 1989), the International classification system of
epilepsies and epileptic syndromes has been in general use in epilepsy research.
According to the International classification system, epilepsies and epileptic syndromes
are classified into three main categories: (1) Localization-related, (2) generalized, and (3)
undetermined. Epilepsies within category 1 are classified as idiopathic, symptomatic or
cryptogenic cases, whereas those within category 2 i.e generalized seizures are classified
as idiopathic, cryptogenic/symptomatic and symptomatic cases. In idiopathic epilepsies
no underlying cause can be found to explain the seizures and the onset is frequently in
childhood.
Symptomatic epilepsies may occur at any age and mental retardation can be present. The
etiology is known in such cases. In cryptogenic cases the cause is unclear or hidden, but
it is presumed that the epilepsy is symptomatic. Within each of the subgroups mentioned
in this section there are several specific, more or less well defined epilepsy types, e.g.
benign partial epilepsy of childhood with centrotemporal spikes (Rolandic epilepsy or
BECT), childhood absence epilepsy, juvenile myoclonic epilepsy, infantile spasms,
Lennox Gastaut syndrome etc. In clinical practice epilepsies are also frequently divided
into two main categories, those with remote symptomatic etiology (known cause) and
those without such etiology. Whatever be the type, major characteristic of epilepsy is a
seizure.
Epileptic seizures.
Since its presentation, The Revised Clinical and Electroencephalographic Classification
System of Epileptic Seizures (Commission 1981) has been in general use in epilepsy
research. In this system a basic differentiation is made between seizures of focal onset
(partial or localization-related seizures) and seizures without focal onset (generalized
seizures) (Gastaut 1969). Partial seizures have clinical or electroencephalographic
evidence of local onset (Porter 1988). They arise in specific loci in some neocortical
region and carry with them identifiable signatures, either subjective or observational,
which may range from disorders of sensation or convulsive movements of a part of the
body which may become generalized seizures.(Dreifuss 1987). During simple partial
seizures, consciousness is preserved and the symptoms can be motoric, sensoric,
autonomic or psychic. In complex partial seizures, consciousness (responsiveness) is altered (Porter 1988). Such seizures might begin as simple partial with progression that includes impairment of consciousness with automatisms. They may also start with impairment of consciousness. Any activity during the seizures occurs in the form of automatisms (Dreifuss 1987).

**Complex partial seizures** feature discharges from various areas of the limbic system and the temporal lobes. (Wolf 1985, Dreifuss 1987, Spiers et al 1988, Wieser 1986). **Secondary generalized seizures** are those with partial onset evolving usually to generalized tonic-clonic (grand mal) seizures.

**Primary generalized seizures** are regarded to originate clinically and electroencephalographically at the same time in both hemispheres. **Generalized tonic-clonic seizures** (grand mal) start with a tonic phase evolving to a clonic phase. Typical absences start and cease suddenly, whereas atypical absences have a slower start and termination and may be accompanied by movements. Other generalized seizure types are myoclonic, clonic, tonic and atonic seizures. **Myoclonic seizures** also known as juvenile myoclonic epilepsy. It is describe isolated muscle jerking. This type of epilepsy begins in adolescence and is characterised by sudden muscular contractions usually on awakening. These normally affect one or both arms. There may be a brief period of loss of consciousness. **Tonic seizures** cause a brief loss of consciousness. The body becomes rigid and the person falls to the ground. There is no subsequent convulsion or clonic phase and the person regains consciousness. Injury may be sustained during the fall. **Clonic seizures** cause loss of consciousness with rhythmic muscular jerking. There is no preceding stiffness or rigidity. **Atonic seizures** cause a brief loss of consciousness with sudden loss of muscle tone so that the person falls to the ground. The exact mechanisms underlying the generation of epileptic activity are not known.

**Evoked and psychogenic seizures**: Fenwick and Brown (1989) have indicated that psychological and neurophysiological events may be intimately related in the precipitation of evoked and psychogenic seizures. Evoked seizures are those which are precipitated by specific external stimuli like reading, eating, stimulation of the skin, movement, sound, smell etc. Unlike evoked seizures, psychogenic seizures are produced
by the direct action of will (primary psychogenic seizures) or they are caused by ongoing activity of the mind (secondary psychogenic seizures).

Psychogenic seizures are not classified as a form of epilepsy. They affect between 5 and 20 percent of people thought to have epilepsy. It occurs at any age, but are more common in age of 55. They occur 3 times more frequently in women than men. They may arise from various psychological factors, may be prompted by stress, and may occur in response to suggestion. It may be self-induced, to get attention, to be excused from work, to collect financial compensation, or merely to escape an intolerable social situation. They seldom occur in the absence of others. Trauma related to physical illness has been found to trigger these seizures in elderly individuals.

People with early-onset psychogenic seizures often have a history of sexual abuse. These seizures can be characterized by features common with epilepsy like writhing and thrashing movements, quivering, screaming or talking sounds, and falling to the floor. Psychogenic attacks differ from epileptic seizures in that out-of-phase movements of the upper and lower extremities, pelvic thrusting, and side-to-side head movements are evident. Statistical indicate that, in 20-30% of cases, epileptologists are incorrect in attempting to distinguish one from the other. Although psychogenic seizures are not caused by electrical discharges in the brain and thus do not register any EEG abnormalities, they are often mistaken for epileptic disorders. It is also possible to have both psychogenic seizures and epilepsy. Most patients with psychogenic seizures are misdiagnosed and consequently treated with epilepsy drugs or other epilepsy therapies, sometimes with severe and fatal side effects. Medications are ineffective in the treatment of psychogenic disorders. Patients who are diagnosed with psychogenic seizures are usually referred to a therapist, to learn to control stress and become familiar with coping techniques. Since the vast majority of psychogenic seizures operate on a psychological level, behavioral manipulation methods may be used.

**Intractable epilepsy:** Intractable epilepsy is defined as a disorder in patients having at least two seizures a month for over two years despite the administration of two first line antiepileptic drugs. Drug resistant seizures are called ‘intractable’ or ‘refractory’. Children with intractable seizures have lower IQ’s, often in the ‘low normal’ range of 80-85. A significant correlation between low IQ and the duration of the child’s seizure
disorder has been observed. When IQ is normal range, they do less well in school than non-epileptic children.

Reproductive and hormonal disorders are common in both men and women with intractable epilepsy. In women, menstrual disorders are found, such as irregular or missed menstrual cycles, or cycles in which there is no ovulation. Fertility is reduced to 70-80% of normal. In men, there is an increased risk or erectile dysfunction, 90% of men with epilepsy have abnormal semen analysis, including decreased sperm count and impaired sperm motility. (Boro and Haut, 2003; Isojarvi, 2003; Morrell, 2003; and Edwards et al 2000). To conclude it broadly there are 4 categories of people suffering from epilepsy Group I – People whose epilepsy is well controlled with medication, where the epilepsy has been of a shorter duration and the concerned individuals function adequately at all levels. Group II – People who have suffered from uncontrolled seizures for a long duration (most of whom have had early onset of seizures) but who in the recent years, because of advances in treatment and medication, have achieved some degree of seizure control but are still dependent on others. Group III – People who have suffered from uncontrolled seizures for a long duration and continue to do so. The chronic nature of their illness has impacted all major domains of life and because of the unpredictability of seizures they require constant care and attention. Group IV – People who have epilepsy with associated neurological disorders e.g. mental retardation. They are dependent on a caregiver for looking after all their needs. Depending on which category the person with epilepsy belongs, difficulties regarding education, employment and marriage will vary.

Precipitators of seizures
A number of factors have been identified as potential precipitators of seizures in people with epilepsy. Some of the more common triggers include stress, sleep deprivation and fatigue, alcohol and alcohol withdrawal, toxins and drugs, metabolic disturbances, caffeine, and, for women, the menstrual cycle (Bonilha & Li, 2004; Silva Sousa, Lin, Garzon, Sakamoto, & Yacubian, 2005; Hart, 2004; Shorvon, 2000; Spinella, 2001). Furthermore, it is possible that stress may interact with some of these triggers to amplify their affect (Kaufman & Sachdeo, 2003; Lester, 1995). Each person is unique, and some people with epilepsy will have identifiable and unique triggers. The avoidance of such
triggers may result in greater seizure control but cause various lifestyle restrictions. Therefore the causes can be both biological and psychological.

**Etiology:** Neurological changes have been described as a cause for seizures in epilepsy. **Biological causes** are also important.

**Lockard’s Model (1980):**

It is a model of seizure genesis in focal epilepsy. Group one neurons are those situated at the center of an epileptic focus and are damaged. Their activity is continuously abnormal. Group two neurons, surrounding group one neurons show either normal or epileptic paroxysmal activity. Localized seizures discharges involve the recruitment of group two neurons by group one neurons. Generalized seizures occur when group two neurons in turn recruit normal neurons that surround the focus.

For both evoked and psychogenic seizures, either sensory stimulation or specific forms of mental activity aid to the stimulation of specific neuronal circuits. If these are epileptogenic stimulation, it will enhance the probability and may precipitate seizure.

If interventions are devised to alter the level of stimulation in group two neurons and also in surrounding neurons, it should be possible to limit the spread of focal epileptic seizures.

**Reticulo-cortical generation of spike and wave seizures:**

Gloor and associates (1980) have proposed that overall changes in reticular activity might lead to either the genesis or inhibition of seizure discharges. Reticular activity, like cortical activity, varies as a function of behavior; so behavior could be expected to have a direct effect on seizure frequency.

Lockard (1980) and Engel (1981) have postulated that spike frequency probably can be related either directly or indirectly to seizure frequency. Gloor et.al.,(1980) found that if penicillin, a GABA inhibitor is injected in cats, a generalized spike and wave activity will be induced. It implied that spike and wave generation although predominantly cortical, could be modified by reticular formation. Thus a complete description of seizure genesis is probably reticulo-cortical. Engel et al., (1981) postulate that spikes are inhibitory in nature because spike activity usually slows and then ceases before the development of a convulsion. This model also suggests that changes in spike
frequency can be related to seizure frequency. This indicates that the epilepsy may not necessarily be neurological but there can be behavioral and other precipitators.

**Psychosocial Causes**: A large number of scientists and researchers in the area give more weightage to the psychosocial causes. According to Besag (2004) psychosocial and cognitive functions are, apart from control of seizures, two of the most important factors in determining how well a child with epilepsy progresses towards independence. The psychosocial, emotional and physical components of the child's life must all be considered as well. Parents may interfere with their child's healthy psychosocial adjustment by being overprotective, rejecting, or having low expectations of him/her.

Bagadia, Jeste, Charegaonkar, Pradhan, and Shah (1973) using a sample of 180 epileptic patients, interviewed each patients and their parents. They included detailed central nervous system check up and physical examination, fundoscopy etc. They calculated all percentages and reported that the causes of epilepsy were the factors like age, educational performance, occupational stress, economic status, family, emotional states, mental deficiency of various degrees, epileptic personality traits, organic brain damage, epileptic discharges and arteriosclerosis. They also found that males and females were equally affected by epilepsy. Banerjee (1985) studied a sample of 50 epileptic patients. The measure was using Rorchach Ink Blot Test and EEG. Results showed that the cause of epilepsy were a typical personality pattern which were extraverted, not methodical, lack abstract thinking and good commonsense have a tendency to escape from reality, emotional immaturity ever possibility of emotional outburst, presence of hostile, inner force and anxiety, intellectually deficient and not susceptible to the environmental influence. They had a highly disbalanced and disintegrated personality. Elisabete and Priscila (2005) studied anxiety and depression in patients with epilepsy and evaluate their relationship with neuroepilepsy and psychological variables. They assessed that epilepsy was associated with disease 63.4%, mental problems 11.6%, feelings of shame, fear, worry and low self esteem 56.6% and perception of stigma 26.6%. There was a significant association between psychological symptoms and perception of seizures control, which reinforces the importance of subjective aspects involved in epilepsy. Konishi, Naganuma, Hongo et al. (1992) also mentioned that 51.5% of 264 children with epilepsy had some inducing factors e.g. fatigue after exercise (15.2%), sleep disturbance
(9.1%), psychic stress (8.3%), emotional change (6.8%). Inducing factors have been found to be more common with partial epilepsies (64.3%).

**Impacts:** The general assumption underlying the medical model is that the disease process itself primarily determines psychosocial distress. A worse clinical cause is assumed to result in greater psychosocial upset and stress over time. Conversely, a benign course of epilepsy should be associated with levels of psychosocial functioning that do not differ significantly from those of the period before illness. The social science model posits that a set of causal influence factors on adjustment processes in chronic disease is located in the social environment of the patient and determines the short term and long term adjustment processes. Having epilepsy can create an enormous challenge for the child developing adaptive behaviour. Children work very hard to make a positive adjustment to epilepsy. However, having to deal with seizures as part of their everyday development has the potential to traumatize children. Therefore, in addition to the disease process itself and in accordance with the so-called biopsychosocial model a supportive environment is considered a second major determinant of the psychosocial status of the patient. Because the consequences are more far reaching than only the physical aspect, it is obvious that only aspects in the ‘physical domain’ should be assessed and evaluated but also those of other life domains such as emotional functioning, role activities and social functioning, health perceptions and general satisfaction with life. (Bury, 1991; Bergner, 1989; Hermann, 1992; Spilker, 1990; Charmaz, 1983; Wiener, 1975).

Further, many of the studies have indicated that the disease is accompanied by anxiety and depression (Cramer Brandenburg; Johnson, Jones, Semdenberg; Jackson, Turkington, Souza, and Salgado, 2005; Smith, Baker and Dewey, 1991). Despite the best efforts of parents, physicians, counsellors, etc., the child may feel so overwhelmed that their psychosocial development is affected. When trying to cope with the disruption of epilepsy, the child may experience behavioural and emotional (psychosocial) difficulties. Even when seizures are controlled, some children still have these difficulties. Warning signs, especially when seen in combination, may indicate that child is having trouble dealing with epilepsy. These warning signs may include hyperactivity, depression, confusion, disorganized speech, inability to listen to and comply with directions, and lack of pleasure.
The attitudes of others about epilepsy has more impact on people than does epilepsy itself. Attitudes toward people with an invisible impairment, such as epilepsy, are generally less positive than towards those with a visible impairment. The social stigmas associated with epilepsy can be very detrimental to children with epilepsy. Children are often very self-conscious about their appearance and it may be very difficult for them to deal with having even brief seizures in public. Children fear being viewed as "different."

Education - is affected because of misunderstanding, ignorance and fear among parents and teachers. This is supported by teachers too as it reduces their burden. An epileptic attack in the classroom is a nuisance and disturbance, especially if the way to handle the person during a seizure is not known. If the teacher has negative reactions to the person with epilepsy, the reactions of students are bound to be negative as well. They also tend to be looked down upon by the family members and neighbours and this gives them an inferiority complex. Whilst education of most people with epilepsy does not pose a problem, those with continuing seizures face this difficulty.

Employment – Once the education of the child remains incomplete the future of the child tends to be bleak, even if later full seizure control or cure is obtained. Again it is worth pointing out that most people with epilepsy do get employment or do something on their own. Those with continuing seizures have to exploit their talents (which all of us have) and become contributing members in society. Epileptic patients face discrimination in work place and are frequently unemployed or underemployed, work and a stable income are major problems. These people need sympathy and support. (Bishop and Allen, 2001; Wada et al, 2001).

Marriage – Without proper education and employment, marriage prospects go down. The stigma of epilepsy also contributes to poor marriage prospects. People with epilepsy are however advised to reveal the disorder to their partner before the marriage takes place. What people with epilepsy need most are confidence building exercises/activities. They need to be as independent as possible. Like everyone else they need goals and the knowledge and skill on how to achieve their goals.

Successful treatments of a seizure disorder can improve psychological, social, sexual and behavioral functions. 50% of the children with intractable epilepsy having serious
psychosocial problems, psychiatric disorders were identified in 33% of children with epilepsy as compared to 7% in the general population and 12% in children with other chronic diseases.

Amongst adults also when compared with uncontrolled seizures, and normal IQ’s reported that about 30% had psychiatric disorders including psychosis, antisocial personality disorders, anxiety & depression. Both in children & adults, these psychiatric problems are responsive to therapy including therapy with antidepressant medications. These psychiatric problems are diagnosed and treated (Boro and Haut, 2003; Bortz, 2003; Gilliam, Hecimovic and Sheline, 2003; Vazque and Devinsky, 2003; Blumer, 2002; Harden and Goldstein, 2002; Leonard and George, 1999; Jahnukainen, 1995; Sahlholdt, 1995).

Besides the frequency and duration of seizures, reactions to seizures, feeling about this, reaction of other people, the limitation and restriction imposed in work and daily life, one’s hope about recovery, settlement in future, married life, social difficulties resulting in withdrawal or isolation, helplessness about the control on disability caused by epilepsy, poor self concept, low self confidence and lower self esteem etc. can all lead to poor SWB. (Batra and Neha, 2009). All this indicates that epilepsy is not only caused by psychosocial factors but also leads to serious psychosocial consequences. Subjective well being is of interest to the present investigation that will be deal with theoretically in the last section of the chapter.

Health care providers and parents tell the school about the child’s seizure and how they are to be managed, education plan to improve academic success is evolved, educational support, importance of child’s participation in many activities, social interactions with peers are encouraged. (Tidman, Saravanan and Gibbs, 2003; Hightower, Carmon and Minick, 2002). To conclude this section it is very clear that epileptic seizures lead to very poor conditions socially and mentally and there need to be tackled. Before discussing the concept of SWB following section deals with the management of epilepsy.

Management of epilepsy:
Generally for managing the disease psychological and neurophysiological basis of behavioral treatment have been given. The treatment carries an important value not only
because the diseases must be cured but also as it leads to many serious impacts There are studies indicating that epilepsy for longer duration leads to psychosis e.g. schizophrenia (Gangadhar, Kumar and Cariappa, 1981; Swamy, Mallikarjunaiah, Bhatti and Kaliaperumal, 1985; Fernandez, Khanna and Channabasavanna, 1988; Banerjee, 1985; Vaidyalingam, 1979). The intellectual functioning has also been found to deteriorate with the passage of time in the epileptic patients (Vaidyalingam, 1979; Agnihotri et al, 1972; Banerjee, 1985; and George 1981). These patients are found to be emotionally disturbed. (Agnihotri et al, 1972; Bagadia et al, 1973; Banerjee, 1985) and maladjusted with their families and peer group. (George, 1981; Agnihotri et al, 1972; and Bagadia et al, 1973).

It has been further shown to reduce the well being and quality of life of patients. The treatment can be carried in two ways i.e. either by using biological and by using any psychosocial modes. Avoidance of adverse reactions to the medication is also important, leading to a focus on adjusting doses and trying different medications to minimize these reactions (Perucca, 2004; Sheth & Gidal, 2006). However, the same anticonvulsant medication is not equally effective for all individuals with the same diagnosis and often result in a variety of adverse reactions (Brodie & Dichter, 1997).

A careful look at various studies in the past indicates that it would not be enormous to say that if the medicine is started in time, a large number of population becomes seizure free in a successful manner. Sillanpaa, Jalava, Kaleva and Shinnar (1998) and Sillanpaa, Haataja and Shinnar (2004). Sander (2003) commented that, in the developed world, the overall good prognosis for seizure control is often attributed to the widespread and early use of anticonvulsants. However, somewhat controversially, he suggested that a significant number of people with epilepsy may naturally enter a permanent remission regardless of the use of anticonvulsant medications (Sander, 1993; Sander & Shorvon, 1996). Some support for this proposition has come from analyses of epidemiological data from developing countries where, despite poor access to anticonvulsant medication, a significant number of people with epilepsy enter longterm remission (Sander, 1993; Shinnar & Berg, 1994).

Epilepsy surgery to remove an area of abnormal brain tissue may be considered for a very small proportion of people who have seizures that are initiated from an identified focal point in the brain and whose seizures are not well controlled with
anticonvulsant medication (Cascino, 2004; Polkey, 2004; Wiebe, Blume, Girvin, & Eliasziw, 2001). Clinical research has found seizure reduction rates of between 50 and 80 per cent after surgery (Arzimanoglou et al., 2004) and the range of possible surgical procedures continues to expand (Duchowny, 1999). It is a safe and effective alternative treatment. Investment in epilepsy surgery centers, even in the poorest regions, could greatly reduce the economic and human burden of epilepsy. There is a marked treatment gap with respect to epilepsy surgery, however, in industrialized countries. Another procedure that offers improved seizure control for some people is the use of a vagal nerve stimulator, which is a device implanted just beneath the chest muscle that emits a regular electrical impulse to stimulate the vagal nerve in the neck (Ben-Menachem, 2002; Schachter, 2004). However, the underlying mechanism for its mode of operation remains unknown (Binnie, 2000). Clinical research has found seizure reduction rates between 30 and 50 per cent for the vagus nerve stimulator (Binnie, 2000; Boon, Vonck, de Reuck, & Caemaert, 2002; DeGiorgio et al., 2000; Tatum, Johnson, Goff, Ferreira, & Vale, 2001). However, the vagus nerve stimulator is usually an adjunctive treatment for people with epilepsy that is not well controlled by anticonvulsant medication (Handforth et al., 1998).

Unfortunately, there may be significant adverse reactions to anticonvulsant medications. Common adverse reactions include drowsiness, headaches, gastric upsets, weight gain or loss, acne, skin rashes, unwanted facial hair, hair loss, dizziness, vision problems, irritability, hyperactivity, depression, cognitive impairment such as problems with memory and attention, and personality changes, including increased levels of aggression (MIMS Australia, 2005). The choice of an inappropriate anticonvulsant can even aggravate seizures (Genton, 2000; Sazgar & Bourgeois, 2005).

Many researchers have found that commonly used anticonvulsant medication, including newer medications such as lamotrigine, topiramate and oxcarbazepine, may impede cognitive functioning. As such, it may have substantial effects on patients’ performance of critical activities of daily living, such as education, employment or driving (Aldenkamp, De Krom, & Reijs, 2003; Bourgeois, 2002, 2004; Vermeulen & Aldenkamp, 1995). Broek and Beghi (2004) showed that 199 people with epilepsy and 123 people without epilepsy reported an accident. The risk amongst those with epilepsy was highest for concussions, abrasions and wounds and lowest for strains,
sprains, burns and fractures. Compared with controls, participants with epilepsy reported more hospitalisation, complications and medical action. Researchers have consistently shown that people with epilepsy, despite an overall good prognosis for seizure control, have a small increased risk of untimely death compared with those without it (Bell & Sander, 2001; Camfield, Camfield, & Veugelers, 2002; Forsgren et al., 2005; Gaitatzis, Johnson, Chadwick, Shorvon, & Sander, 2004; Lhatoo & Sander, 2001) Pregnancy and hormonal cycles may also influence epilepsy and its treatment (Tatum, Liporace, Benbadis, & Kaplan, 2004). White and Hayman (2004) also found that 31 per cent of 15-year-olds and 44 per cent of 17-year-olds were consuming alcohol in excess of the recommended daily maximum of six standard drinks for males and four standard drinks for females on any one day. Most adolescents with epilepsy believe it is a major barrier to their sense of normalcy (Elliott, Lach, & Smith, 2005) and report that they rarely or never talk to others about it (Westbrook, Bauman, & Shinnar, 1992). The goal of treatment should be the maintenance of a normal lifestyle, preferably free of seizures and with minimal side effects of the medication up to 70% of people with epilepsy could become seizure free from antiepileptic drug treatment. In 25-50% of people with epilepsy the seizure can not be controlled with drugs. All this above discussion and the psychosocial causes and impacts discussed earlier in this chapter indicate a dire need of looking into psychosocial and behavioural ways of coping with epilepsy.

**Contingent negative variation and behavior**

The contingent negative variation is a slow negative potential shift arising on the cortical surface in a forewarned reaction time task. Rockstroh and associates (1993) have shown that there is a rapid increase in the scalp negativity in the seconds before a seizure occurs. He has suggested that with the help of biofeedback, these people can be helped to make cortex more positive and abort the seizure onset or spread.

Though varying in content all these models lead to one conclusion. They show that if individually tailored behavioral interventions are devised the person will be able to abort his seizure.
Techniques based on classical and operant conditioning

Kraft and Poling (1982) have reviewed eleven studies using operant or classical conditioning to reduce seizure frequency. Operant programs can either be reward management or punishment.

Reward management program

Rewards are given either overtly or covertly for seizures free period. Differential reinforcement also can be used by involving both restraint and reward. In such differential reinforcement program, seizure free period is followed by rewards and seizures are followed by punishment.

Sometimes seizures are followed by humane response from family members like involvement, over protection. Due to temporal relationship to seizure, this response may reinforce the behavior leading to a seizure. The psychological strategy of denial of reward is a direct attempt to break this cycle.

Punishment program

It can either take the form of a penalty program, wherein after a seizure the patient is placed, in a time out room. Or a seizure can be followed immediately with an unpleasant stimulus such as a foul odor, electric shock shouting or hitting the patient.

In relief avoidance paradigm a seizure triggers an unpleasant stimulus either electrically or behaviorally. The stimulus continues till there is improvement in electrical seizure activity.

In avoidance strategies reduction in seizure frequency is achieved by the manipulation of the environment. These strategies are helpful in evoked epilepsies. But it may not be possible to avoid all seizure triggers. Thompson and Baxendale (1996) described on an idiosyncratic basis for seizures evoked by specific triggers such as music or particular visual stimuli, whereas it may not be possible to avoid all seizure triggers some reduction in seizure frequency may be achieved by manipulation of the environment.
Classical conditioning

Interventions based on classical conditioning include systematic desensitization. In this hierarchies of anxiety provoking situations associated with seizures are presented to patients under conditions of relaxation (Goldstein, 1997).

Self control strategies

In these strategies, after careful behavioral analysis the person is made aware of the events precipitating his epileptic attack. After this he is helped to take any activity which is incompatible with the precipitating event. The strategies can be very specific like countermeasures or they can be nonspecific like relaxation. Wysocki and Gavin (2005) have provided additional evidence that general social support is important for effective self management. They reported that greater paternal involvement was associated with the maintenance of self-management regimes for adolescents and resulted in higher subjective levels of their physical, psychological, and social functioning, across a range of chronic illnesses. Epilepsy also imposes a range of lifestyle restrictions with regard to education, employment, driving, alcohol intake and illicit drug use that can affect the psychosocial functioning of people with epilepsy. These issues also need to be addressed when developing effective self-management strategies.

Countermeasure

Fenwick (1994) has defined a countermeasure as a behavioral strategy employed at the onset of focal seizure to abolish it or to reduce its spread.

Countermeasures can be internal or external. Thinking about relaxing situations, imagining a smell that has been conditioned to stop a seizure or focusing attention in such a way that seizure spread is limited-all these are internal countermeasures. External countermeasures are standing up or walking about flicking an elastic band on the wrist or hitting a part of the body at seizure onset.

Psychotherapy

It has been shown in various studies that individual and group psychotherapy are useful in reducing seizure frequency. Different variables like locus of control (Correa 1987), cognition surrounding the seizures (Gottschalk 1953), helpfulness, resourcefulness (Rasenbaum and Palmon 1984) have been discussed by different researchers in psychotherapeutic sessions.
Psychotherapy probably works at many different levels. Better life adjustment leads to greater relaxation and a sense of fulfillment.

**Psychophysiological training**

Anticonvulsant rhythms:

(Sterman 1970) observed that 12 to 16 Hz sensorimotor rhythm has anticonvulsant properties. He also suggested patients could be given biofeedback to increase their sensorimotor rhythm (SMR) to 12 to 16 Hz. Though other studies using this technique were successful, (Fenwick 1994) failed to show that the success was specific to SMR biofeedback.

Other investigators studied biofeedback training with different rhythms, for example conventional occipital rhythm biofeedback training (Cabral and Scott 1970), biofeedback training to increase fast low voltage activity and suppress slow wave activity surrounding the epileptic focus. Biofeedback has also been given of end tidal CO₂ (Fried 1993).

All these techniques focus on psychological factors in precipitation and inhibition of seizures. Psychological treatment of epilepsy can also target various psychosocial factors associated with epilepsy like depression, anxiety, low self esteem, stigma etc. These treatment approaches have also found to reduce seizure frequency, though it is not their primary goal.

**Relaxation**

The patient is taught deep muscular relaxation. He is then encouraged to reproduce these feeling if a seizure seems imminent. Used this way the induction of relaxation is a countermeasure. If used before the seizure occurs, it is a nonspecific behavioral strategy.

Further extension of relaxation training is relaxation and covert desensitization. In this method the patient carries out relaxation and while relaxed, he imagines the occurrence of a seizure, and the anxiety which having a seizure produces.

Several studies in the last decade have used stress reducing technique in the treatment of epilepsy. Research released in the 1980's indicated stronger ties between stress and health and showed benefits from a wider range of relaxation techniques than
had been previously known. This research received national media attention, including a New York Times article in 1986. (Goleman, 2006).

Various techniques are used by individuals to improve their state of relaxation. Some of the methods are performed alone, and some require the help of another person, often a trained professional, some involve other elements. Autogenic training, Biofeedback, Deep breathing, Meditation, Progressive Muscle Relaxation, Pranayama, Visualization and Personal satisfaction are some relaxation techniques. Movement based relaxation methods incorporate Exercise such as walking, gardening, Yoga, Taichi, Qigang, and more. Some forms of bodywork are helpful in promoting a state of increased relaxation, for ex.,:- Massage, Acupuncture, Feldenkrais method, Reflexology, and Self Regulation. Some relaxation methods can also be used during other activities, e.g. Autosuggestion and Prayer. (Lehrer, Paul, David, Barlow, and Robert et. al, 2007) suggested that listening to certain types of music, particularly New Age music and classical music, can increase feelings associated with relaxation, such as peacefulness and a sense of ease. Homeopathy has been used to support relaxation, and some find humor to be helpful. Relaxation technique are also known as relaxation training. It is a method, process or activity that helps a person to relax, to attain a state of increased calmness, or otherwise reduce levels of anxiety, stress or tension. Relaxation techniques are often employed as one element of a wider stress management program and can decrease muscle tension, lower the blood pressure and slow heart and breath rates, among other health benefits. (Goleman, 2006).

Jacobson’s Progressive Muscle Relaxation (JPMR) is an easy technique, (Jacobson, 1938) that can be employed by the subject himself after a training of 2-3 sessions.

**Relaxation therapy in Epilepsy :-** The patients are trained in Jacobson’s Progressive Muscular Relaxation (JPMR) technique and they are taught to induce these feelings when the seizures are about to occur. They have to practice the muscular relaxation technique thrice a day. This technique is based on classical conditioning methods. Automatically, the patient learn to induce this feelings when aura occurred. Similarly, the relaxation has also been useful in the cases with primary generalized tonic clonic seizures. It may be that the patients might be relieved from experiencing the stress or it may increase their
subjective state of well being and sense of control, finally resulting in the reduction of seizures.

Melin and Dahl (1981) used contingent relaxation successfully in four single subjects with different seizure types. They showed significant decline in seizure in all their patients. They also showed that simple and complex partial seizures respond more to behavioural treatment and that relaxation is necessary. But non-specific controls were not used in this study. Snyder (1983) found that three of four adults trained in relaxation and who practiced it for at least 15 days per month experienced an average reduction in seizure frequency.

Mostousky and Vicks (1973) reported the successful treatment of a 28 years old retarded woman with Grand mal and Absence seizures with progressive muscle relaxation. Progressive relaxation led towards a decrease in seizures and increase in overall well being. Patients reported that they were sleeping better, were less aggravated or less tense during the day, had improved feelings of control over their epilepsy and were less afraid of their seizures. (Rousseau, Hermann and Whitman, 1985). Dahl, Melin, and Lund (1987) indicated that the contingent relaxation therapy may be of substantial help to adults whose seizures. Progressive relaxation has been shown to be highly effective in the reduction of seizures. (Whitman, Dell, Legion, Fihllyn, and Staatsinger, 1990).

Progressing relaxation training employed in one study resulted in a 25% reduction in seizure after only 6 sessions (Puskarich, Whitman, Dell, Hughes, Rosen and Hermann, 1992).


**Subjective well being:** In recent years, both in the scientific as well as in popular literature there has been an increased interest in the quality of life, the attributes that describe quality of life, and the events that affect quality of life. Most often, quality of life is conceptualized as a composite of physical, psychological and social well being of
an individual, as perceived by the person or the group. A very important aspect of quality of life is the happiness, satisfaction or gratification subjectively experienced which is often called as well-being.

While discussing the impacts of epilepsy in an earlier section it has been already highlighted that the QOL and SWB of epileptic victims seems to be highly deteriorated. Further the behavioral interventions setting out to reduce the frequency of epileptic seizures have also improved patient psychological state. So psychological well being is also an important and relevant variable in these studies (e.g., Rousseau et al., 1985). Since the emergence of the field over five decades ago, the SWB literature has progressed rapidly. First, as recent surveys show, psychologists and other social scientists have taken huge steps in their understanding of the factors influencing people’s SWB. In addition, the methods by which empirical content is given to the concept of SWB have drastically improved and are expected to continue to do so as increasing use will be made of advances in information- and communication technology (ICT). As such, SWB research solicits increasing attention of politicians, government officials and the public alike.

Well being research is concerned with individual’s subjective experience of their lives. The underlying assumption is that well being can be defined by people’s conscious experiences in terms of hedonic feelings or cognitive satisfaction. The affective part is a hedonic evaluation guided by emotions and feelings, while the cognitive part is an information-based appraisal of one’s life for which people judge the extent to which their life so far measures up to their expectations and resembles their envisioned ‘ideal’ life. The field is build on the presumption that to understand the individual’s experiential quality of well being, it is appropriate to directly examine how a person feels about life in the context of his or her own standards.

Veenhoven (1984) defines subjective well being as the degree to which an individual judges the overall quality of his or her life as a whole in a favourable way. In other words subjective well being is how well a person likes the life he or she leads. Shmotkin and Lomranz (1998) state that subjective well being refers to the overall evaluation of one’s quality of life on a positive and negative continuum and is more intuitively conceived as happiness or satisfaction.
Subjective well-being can be simply defined as the individual’s current evaluation of her happiness. Such an evaluation is often expressed in affective terms; when asked about subjective well-being, participants will often say, “I feel good” (Schwartz & Strack, 1999). The hallmark of measures of SWB is that they are obtained through self-reports: people are asked to evaluate their lives as a whole or some aspect of it. The questions can be relatively straightforward and a widely used one simply asks: ‘Taking all things together, would you say you are …: very happy, quite happy, not very happy or not at all happy’. More elaborate measures use multiple items to target a specific part of SWB and consequently render more reliable results single-item measures do (thought at an expense).

Subjective well-being is thus, at least in part, a proxy for a global affective evaluation. Few people have ever doubted that happiness is very important. In fact, starting at least with the Ancient Greeks, the concept has been subject of unremitting debate. Surely this would not have been the case if people generally felt it did not matter.

Since happiness has captured, and continues to capture, the interest of so many people, it should not come as a surprise that philosophers and many others debating the concept have long yearned for a way to measure it. The breakthrough came in the 1950s. Psychologists – until then mainly interested in negative emotional states such as depression and anxiety – became interested in positive emotions and feelings of well-being. Within the discipline a consensus grew that self-reports on how well life is going, can convey important information on underlying emotional states, and so the field pushed ahead with measuring what is best referred to as subjective well-being (commonly abbreviated as SWB). SWB, we should immediately note, is not the same as happiness although the terms are often used synonymously. SWB, in fact, is ‘a broad category of phenomena that includes people’s emotional responses, domain satisfactions, and global judgements of life satisfaction’ (Diener et al., 1999: p. 277). Specifically, reported SWB consists of two distinctive components (Diener, 1994: p. 106): an affective part, which refers to both the presence of positive affect (PA) and the absence of negative affect (NA), and a cognitive part.
CORRELATES AND DETERMINANTS OF SUBJECTIVE WELL-BEING

Surveys show that social sciences have taken huge steps in their understanding of the factors underlying differences in SWB ratings (Diener et al., 1999. Levesque et al. (2003) applied functional magnetic resonance imaging (MRI) and found that sad feelings were associated with significant bilateral activations of the midbrain, the medial prefrontal cortex, the anterior temporal pole and the right ventrolateral prefrontal.

Ryff et al. (2004) present some preliminary findings showing that people with higher SWB (specifically more meaning, purposeful engagement et cetera in their lives) have lower levels of daily salivary cortisol and pro-inflammatory cytokines. In addition, for them the duration of REM sleep is longer than for those with lower levels of reported SWB. Finally, Steptoe et al. (2005) find that positive affect is associated with reduced neuroendocrine, inflammatory and cardiovascular activity. Positive affect was also inversely related to cortisol output during the day (controlling for other factors such as age and gender) and heart rate. During mental stress testing in the laboratory people with higher positive affect had smaller plasma fibrinogen stress responses.

Earlier accounts of the state of affairs in SWB research are provided by Fellows (1966), Veenhoven (1984) and Wilson (1967). discusses some of the uncovered correlates and determinants of SWB, classifying them in six broad groups: (i) personality factors; (ii) contextual and situational factors; (iii) demographic factors; (iv) institutional factors; (v) environmental factors; and (vi) economic factors.

Psychologists have deeply studied the influence of personality on SWB, and found it to be the strongest and most dependable factor underlying differences in SWB between persons. Tellegen et al. (1988) compared levels of SWB for monozygotic and dizygotic twins raised together and raised apart. Their study shows that 40% of the variance in positive emotionality and 55% of the variance in negative emotionality is attributable to genes, whereas shared familial circumstances account for only 22% and 2% of observed variance respectively. Much work has assessed the role of measured personality characteristics and these are also consistently found to be highly significant predictors of SWB. Notably neuroticism and extraversion go along way in accounting for differences in levels of SWB.
Although inherent factors play a fundamental role in SWB, individual, contextual and situational factors are also important sources of difference in SWB scores. Notably, a consistent finding across samples of individuals reporting on, amongst others, SWB is that better health is associated with higher SWB, and that married people report higher SWB than others, e.g. single people, divorced people etc. The third group of factors strongly associated with SWB concerns demography. Gender and age in particular are robust determinants of SWB. Generally, women report higher SWB scores than men do, and SWB is U-shaped with age: SWB is higher among young people, declines in middle age cohorts and increases again at older age. Institutional conditions constitute a fourth group of factors found to have a systematic relationship with SWB. For instance, the results of Frey and Stutzer (2000) suggest that forms of direct democracy increase the level of SWB. Radcliff (2001) finds a positive relation between the ideological complexion of governments and levels of SWB. He also reports a positive correlation between qualitative features of the welfare state and SWB. Veenhoven (2000) finds that political and private freedom add to SWB but only in rich countries.

Environmental conditions are an important factor in observed differences in SWB that operate strictly at a macro level. Rehdanz and Maddison (2005), using data on 67 countries between 1972 and 2000, find that climate variables have a highly significant effect on SWB and that climate changes due to global warming might reduce SWB around the world in the next decades. Becchetti et al. (2007) confirms the link between climate and SWB but indicates that global warming might, in contrast, lead to higher SWB worldwide. Finally, part of individual and cross-country differences in well-being is attributable to differences in economic circumstances. In particular, it is well-established that unemployment affects SWB through two channels: it has a direct negative effect on people who lose their job, and an indirect negative effect on the entire population.

Among the variables commonly treated as causes of SWB. The six domains selected for analysis - marriage, work, material standard of living, leisure, friendship and health - have consistently been found to be strong correlates of SWB (Andrews and Withey, 1976; Argyle, 1987; Campbell, Converse and Rodgers, 1976; Headey, Holmstrom and Wearing, 1985).
Diener (1984) has distinguished between bottom-up and top-down theories of SWB. Bottom-up causation is where particular variables cause SWB and top down causation is where SWB produces certain outcomes. He notes that high intercorrelations among domain satisfactions could be taken as evidence for a top-down model. The correlations suggest that domain satisfactions could be just a spin-off from overall levels of life satisfaction. Costa and McCrae (1980), is that apparent causal relationships between domain satisfactions and measures of SWB are spurious, with both sets of variables being dependent on stable personal traits, notably extraversion and neuroticism. Most researchers have assumed that a bottom-up model is appropriate and, more precisely, that a linear additive combination of domain satisfactions accounts for SWB (Andrews and Withey, 1976; Argyle, 1987; Campbell et al., 1976 and Headey et al., 1985).

Indeed, the evidence indicates that the relative strength of BU and TD effects varies from domain to domain. It should be emphasized that results are only as good as the statistical assumptions underlying them. Informally, however, there has been a tendency to dismiss these exhortations as requiring investigation of hopelessly confounded chicken-and-egg issues; 'there is no point in asking which came first the chicken or the egg'.

A few studies mentioned with encouraging findings in the past from various corners of the world, the need to control the fit due to its negative impacts on the well being and life satisfaction. Collings (1990) found general low well-being among the epilepsy sample when compared with a non-epilepsy sample matched for age and sex. Amir, Ronner, and Knoll, et al. (1999) stated that factors contributing negatively to psychological well-being include a sense of not being in control of one's life, feeling stigmatized, (Jacoby, 1994), having problems related to quality of life, Loring, Meador, and Lee, (2004); such as comorbid depression and anxiety, Johnson, Jones, Seidenberg, and Hermann, (2004); and stress inducing events in life. Hermann, Whitman, Wyler, Anton, and Vanderzwagg, (1990).

Besides the frequency and duration of seizures, reactions to seizures, feeling about this, reaction of other people, the limitation and restriction imposed in work and daily life, one's hope about recovery, settlement in future, married life, social difficulties
resulting in withdrawal or isolation, helplessness about the control on disability caused by epilepsy, poor self concept, low self confidence and lower self esteem can all lead to poor SWB. Epilepsy is a chronic disorder that has complex effects on many aspects of personal and subjective health. These attacks reduce the subjective well being and quality of life. These effects have been assessed to be as large as with diabetes mellitus and active cardiovascular diseases (Frank, 2003). The adverse medication effects and depression also have a strong association with subjective health status in epilepsy. Collings (1990) also reported an overall reduction in the physical, psychological and sociological well being in 392 Ss with epilepsy.

This past decade has seen a dramatic increase in the knowledge about epilepsy, but there remains much tragedy in the lives of many people with the disorder. To brighten tomorrow’s outlook for those who must live with seizures, the epilepsy research community continues to concentrate its efforts on finding the causes of epilepsy. Basic research aims to identify viral, genetic or other factors that cause epilepsy. These findings provide the basis for developing new and improved methods of prevention and therapy.