

# Investigating Non-pharmacological Treatments for Psychological Problems Associated with Epilepsy: A Narrative Review

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## Abstract

Epilepsy is one of the problems and diseases that accompanies a person for the rest of his/her life after diagnosis. This disease can severely affect a person's physical condition and lead to psychological problems. Many patients with epilepsy suffer from psychological problems and are under the supervision of a psychiatrist, and they take medications to control the mental state. However, many patients are reluctant to take other medications, including psychiatric medications, due to long-term use of the drug. Therefore, in this study, we examined non-pharmacological treatments for psychological problems caused by epilepsy. In addition to developing epilepsy and receiving medications for the disease, these patients develop mental illnesses such as stress, depression, anxiety, and cognitive processes that require treatment. After searching for texts published in various English language databases, the required items were obtained. First, some of the psychosocial consequences of epilepsy, including negative attitude towards epilepsy, social stigma, family factors, quality of life, and sexual activity, were evaluated. Furthermore, the concurrency of psychological disorders (stress, depression, anxiety, cognitive processes, and theory of mind) along with non-pharmacological treatments were investigated.

**Keywords:** Epilepsy; Mental Illness; Non-pharmacological Interventions

## 1. Context

Epilepsy is one of the most important neurological disorders of the nervous system. It is caused by sudden and excessive electrical discharge of neurons in the cerebral cortex that occurs intermittently and is characterized by the long-term risk of recurrent epileptic seizures (1). The basis for the diagnosis of epilepsy is past medical history, clinical findings, and electroencephalography (EEG) results (2). Epilepsy affects people of both genders in all age groups, races, and social classes (3). However, it tends to develop more in children and middle-aged people. According to reports, it is slightly more common in males than females. In a systematic review and meta-analysis by Fiest et al. (2016), the estimated global incidence rate of epilepsy was 2.2 to 41.0 per 1000 people (4).

Epilepsy may have destructive economic, social, and cultural outcomes for epileptic patients. It is associated with a broad spectrum of biological and psychopathological aspects, among which depression is the most common psychological disorder in epileptic patients. The first-line treatment for epilepsy is drug therapy, and psychological methods should not replace pharmacological therapy. However, some psychological interventions have been shown to be effective in solving the psychological problems of these

patients (5). Accordingly, the present study reviewed the psychological factors and interventions in the treatment of epilepsy and its sociopsychological outcomes (6).

## 2. Socio-Psychological Outcomes of Epilepsy

Epileptic patients need to adjust to the psychosocial outcomes of epileptic seizures and long-term care and medical treatment. Also, they have to cope with negative attitudes and false beliefs about epilepsy that exist in most communities and are more unpleasant than the epileptic seizures themselves (7). With the occurrence of the first epileptic seizure and the continuation of these attacks, deep changes happen in the personality traits and in the emotional, educational, behavioral, occupational, social, and family aspects of life, all of which arise from the label "epileptic". Finally, the continuance of these attitudes and labels leads to behavioral, emotional, and cognitive disorders and abnormalities, plus disruption of family, marital, professional, and social relationships (8). Epilepsy results in psychosocial problems because it is a chronic and lifelong disease. It affects different aspects of patients' life, as well as their quality of life (QOL). Ultimately, it leads to problems such as lack of self-respect, depression, anxiety, social isolation, and fear of death during epileptic seizures. The following



is a brief review of some of the psychosocial outcomes of epilepsy (9,10).

### 2.1. Negative Attitudes Towards Epilepsy

Epileptic patients and the people around them, including parents, teachers, or even the public, lack sufficient information and knowledge regarding this disease. This results in misinterpretation and negative attitudes towards epilepsy among the public. These wrong attitudes and perceptions in the community cause more restrictions for an epileptic patient than the disease itself (11). The community's attitude and behavior towards epileptic patients and the actions it takes in relation to them differ in social groups, and even in various geographical subgroups. In this regard, the social background, religious beliefs, and cultural criteria influence the community's attitude towards epilepsy (12). Furthermore, low self-esteem and negative self-concept in epileptic patients are closely related to the attitudes towards this disease. Therefore, having proper knowledge and information about the causes of epilepsy is an important factor in reducing negative attitudes towards epilepsy among the public, improving psychosocial adjustment of epileptic children and psychological well-being of parents, developing social skills in these children, and enhancing their social relationships and success after graduation from school (13).

### 2.2. Social Stigma

Epileptic people deal with feelings of disgrace and unworthiness, which starts with labeling and leads to social isolation and exclusion, and in most cases, to social stigma. Social isolation perceived by patients is associated with mood disorders, anxiety, and low self-esteem, which cause patients to consider epileptic seizures a factor leading to more severe disability, as well as lower QOL and psychological well-being. Felt stigma and enacted stigma are the two types of social stigma in epileptic patients. Felt stigma refers to the shames of being epileptic and the fear of confronting the related feeling of disgrace. Enacted stigma refers to real periods of discrimination because of being afflicted with this disease (14).

The intensity of the feelings of being stigmatized differs in different patients. There is evidence indicating that the type of epilepsy, the age of onset of the disease, the patient's feelings regarding life and the damages caused by epilepsy, anxiety, uncertainty, anxiety resulting from epileptic seizures, social support, self-efficacy, occupational status, and other psychosocial problems influence the perception of social stigma in epileptic people (15).

### 2.3. Family

Epilepsy creates a unique challenge for the patients and their families. The social stigma attached to these patients in a more general perspective affects their family and their communication models, and lowers the prestige of the

family. The basis of the family adaptation model to deal with its epileptic member includes being aware of the affliction of the family member with epilepsy, re-regulating and re-developing the roles, facing social conflicts and problems, and helping the epileptic member to rejoin the community. Research has shown that there are higher levels of emotional expression, anxiety, and depression in families with epileptic members, and parents taking care of epileptic children become emotionally damaged and physically weak. Furthermore, the problems and concerns of parents with epileptic children lead to their excessive support and imposition of restrictions on these children's activities, or even to epileptic seizures (16, 17).

### 2.4. Quality of Life

The QOL of epileptic people is lower than that of the general population, and it is the same or even worse than that of patients with other chronic diseases, such as asthma and diabetes. The disruption in cognitive function is the most important cause of the decline in QOL. However, patients without seizures have desirable life satisfaction, and patients with a better QOL enjoy a better mental health. Evidence indicates that the factors pertaining to demographic characteristics and epilepsy, along with physiological and psychosocial factors (such as social support and self-management behaviors), anxiety, and uncertainty can affect patients' QOL. Various studies have reported that different factors have greater influence on patients' low QOL (18).

### 2.5. Sexual Activity

Sexual activity can trigger seizures in epileptic people with an incidence rate of 40% in all epileptic people. In these patients, heavy breathing during orgasm, sexual intercourse, and even self-stimulation in marital relationships can increase epileptic seizures. Besides, two-thirds of epileptic patients complain of reduction in or dysfunction of sexual activity, but in few cases, an increase in sexual desire has been reported. Sexual dysfunction has a negative effect on various dimensions of QOL in epileptic patients. Sexual dysfunction in these patients is experienced as arousal disorder or orgasmic dysfunction. A variety of etiological reasons have been proposed in this regard, including the process of epilepsy as a chronic and disabling disease, drug therapies for epilepsy, psychosocial factors (such as depression), hormonal disorders caused by drugs, dysfunction of the limbic-hypothalamic-pituitary system, increased secretion of prolactin and reduced secretion of gonadotropin, including LH and FSH followed by reduced secretion of testosterone, psychological factors (such as fear of the onset of epileptic seizure during sexual intercourse), and high prevalence of polycystic ovary syndrome (PCOS) in epileptic women. In general, the neurological factors and therapeutic, hormonal, cognitive, and psychosocial measures are involved in the development of sexual and fertility disorders in epileptic women (19).

## 2.6. Other Outcomes

Epilepsy can lead to academic failure, problems in communicating with peers, poorer academic performance in children, and problems in employment, marriage, having children, and legal restrictions in adult life. Besides, behavioral problems in children with epilepsy may damage their social adequacy. Mainly, epilepsy has an indirect effect on social adequacy and mental health. In accordance with the existing evidence, the lack of social skills and presence of attention problems make epileptic children prone to behavioral disorders. In addition, factors pertinent to epilepsy prevent children from acquiring desirable social adequacy. Fear of mental retardation, self-alienation, and uncertainty, fear of dying during epileptic seizures, inferiority complex, diminished self-confidence, deprivation of social rights such as driving, low annual income, and purchase of expensive drugs are among the other psychosocial outcomes of epilepsy (20, 21).

## 3. Concurrency of Psychological Disorders

Emergence of psychosocial problems exposes epileptic patients to various psychiatric disorders, such as anxiety, major depressive disorder, psychosis, personality change, erectile dysfunction in men, and sexual dysfunction in women. Depression has been observed in 20% of epileptic patients, and suicide risk among these patients is two times higher than the normal population. Furthermore, epilepsy is more common among autistic patients. This section investigates some of the psychological factors involved in the aggravation and treatment of epilepsy (22).

### 3.1. Stress

Many epileptic patients have reported the effect of stress on the frequency and aggravation of epileptic seizures (incidence rate: 50 - 80% in all epileptic people). Most of the known causes of epileptic seizures, such as tumors, brain damages, or quitting alcohol, which in some cases lead to epilepsy, are stressors. In this regard, chronic stress can result in the development or diagnosis of epilepsy. Several studies stated that fatigue, sleep deprivation, stress accompanying insomnia, and stress itself are among the independent factors that lead to epileptic seizures (23). Stress as a defense mechanism, if severe, can lead to changes in hormonal balance, reduce sexual activity, and lead to poor sexual function (11). Increased stress is also inversely related to QOL, so that the higher the stress, the lower the QOL in epileptic people (13). Finally, family relationships in patients with epilepsy and high stress are strongly affected by stress, which leads to such adverse effects as separation, violence, and fights (23).

### 3.2. Depression

One out of every three epileptic people has experienced depression in their life. Depression is more common in

these patients compared to other people (incidence rate: 25 - 55% in all epileptic people). Furthermore, people with family records of depression are at risk of depression. Depression affects the QOL related to health in epileptic people. Psychosocial problems, such as adaptation to epilepsy, fear of the onset and continuance of seizures, financial pressure, social support and family, occupational and social problems are all involved in aggravation of depression in epileptic people (24).

Some epileptic people experience depression before, during, or after seizures. Depression can occur hours prior to seizure. Furthermore, some epileptic patients may experience a sudden change of mood prior to their first seizure (warning symptoms of seizure). This is more common among people with temporal lobe epilepsy. Depression might not occur within several hours or more than seven days after the seizure. People whose seizure is not controlled with anti-epileptic drugs (AEDs) are more at risk of depression. Depression can aggravate epilepsy, disrupt a person's sleep pattern, or cause a person to forget the dosage of their AEDs. Both cases may trigger seizures in some epileptic patients (25, 26).

Some AEDs can affect epileptic patients' mood and lead to depression as a side effect. The depression cases depend on the dosage of consuming some AEDs, but not all of them. Hence, the higher the dosage of consuming a specific drug, the higher the risk of the development of depression. Patients who consume more than one type of AEDs are more at risk of depression (3).

Depression is a more severe form of stress that leads to a severe decline in QOL in epileptic people. Also, in people with epilepsy and depression, family relationships might be destructed (19). Researchers have shown that the higher the severity of depression, the more questionable and easily destroyed the friendships that are at the heart of the family (11, 17). There is also a decrease in the cooperation of family members with the patient. The sexual life of these people is also impaired due to the suppression of the sexual system following the imbalance of sex hormones (22).

### 3.3. Anxiety

In general, 35% of epileptic patients suffer from anxiety and depression. Anxiety in epilepsy can be classified on the basis of the temporal relationship with stressful events. Accordingly, epileptic people experience anxiety before, during, and after a seizure. Pre-seizure anxiety occurs several hours or several days before the seizure, and post-epileptic seizure anxiety may continue up to seven days after the seizure. In pre-seizure, anxiety, rage, fear, and irritability can cause a partial seizure or a complex partial seizure, especially in temporal lobe epilepsy (26).

Anxiety during a seizure refers to the presence of symptoms of anxiety with no temporal relationship with seizure and appears as panic disorder, generalized anxiety disorder (GAD), and obsessive-compulsive disorder (OCD). Different

studies have reported the prevalence of anxiety during seizure; however, it has been reported more often in patients with focal epilepsy than in patients with other chronic diseases and normal people. The origin and types of seizure, time of diagnosis, temporal lobe epilepsy, consumption of AEDs, and psychosocial factors can aggravate anxiety in epileptic people (27). Anxiety has a similar mechanism to stress, but it is less severe (19). Therefore, in people with epilepsy, anxiety has less effects on such variables as sexual desire, QOL, and family relationships. Thus, it is better to treat anxiety in the early stages to reduce its severity (20, 21).

### 3.4. Cognitive Processes

Although most epileptic patients enjoy normal intelligence, they generally have poorer cognitive functions such as attention problems, slowed thought processes, word finding difficulties, and memory problems compared to normal people. However, an intelligence range lower than normal has been observed in epileptic patients with and without brain damage, as well as in patients with more frequent seizures kept at clinical centers. In some studies, a slight but general defect was reported in cognitive functions of these patients, including perception, recognition, judgment, learning, and memory. Even in the absence of epileptic seizures, attention deficit disorder has been observed in these patients (28).

On the other hand, simple and complex reaction time in epileptic patients is longer than in normal people, and they have poorer personal and spatial perception functions. Defects in memory functions in idiopathic epilepsy and reduced brain functions in temporal lobe epilepsy, which affects some of the speech activities, memory function, and visual and auditory functions, are also observed. Epileptic seizures, confusion following seizures, brain tumor, AEDs, seizure deep in the temporal lobe, age at onset of epileptic seizures, and the duration of epilepsy can affect the memory function and problems related to it in epileptic people. Furthermore, people suffering from left temporal lobe epilepsy experience speech memory problems, whereas people with right temporal lobe epilepsy suffer from visual memory problems. There is contradictory evidence regarding improvement in patients' intelligence, memory, spatial perception, and personal perception after cessation of epileptic seizures (29).

### 3.5. Theory of Mind

Theory of mind deficit in epileptic people may cause problems in bilateral interactions and relationships, which are one of the features of this deficit and originate from a neural basis, the effect of drugs, and clinical, personality, and situational characteristics of patients. Researchers define the theory of mind as the capacity of a person in ascribing mental states to oneself and others and predicting behaviors on the basis of mental states. Furthermore, some other researchers define the mind as the power of the human mind for imagining one's

own states and those of others. There is a relationship between the age of onset of epilepsy and theory of mind deficit. The earlier the age of onset of epilepsy, the higher theory of mind deficit. Patients with temporal epilepsy suffer from a defect in the basis and progress of the theory of mind, and this damage is reported to occur more in people with right temporal lobe epilepsy (30). Patients with middle temporal lobe epilepsy demonstrate problems regarding learning from feedbacks and making decisions in vague and undetermined conditions. These patients face problems in the various aspects of social cognition and are at risk. They encounter more problems than patients with non-temporal lobe epilepsy. Mind in patients with focal epilepsy has a specific impact on self-evaluation, ability to cope with problems, and QOL. Studies on other types of epilepsy indicated bilateral amygdala damage in processing the theory of mind. Besides, the evident brain areas along with epileptiform discharges affect the neural networks of the theory of mind (31).

## 4. Treatment

Even though most cases of epilepsy cannot be prevented, taking measures to reduce the damage to the head and providing the required care at birth may be beneficial in preventing epilepsy. Epilepsy is usually treated after the first seizure by daily consumption of drugs. AEDs are considered selective therapy for epilepsy, and probably they should be used throughout the entire life of epileptic patients. AEDs are selected on the basis of the type of seizure, epilepsy syndrome, other employed therapies, health problems, age, and lifestyle of the patient. Drug therapy is the first line of treatment of epilepsy; however, considering the psychosocial problems associated with this disorder, psychological and psychosocial interventions can be employed as a complementary treatment to improve the mental hygiene of epileptic people. Here, the types of treatments and their effectiveness in these patients will be discussed (32).

### 4.1. Drug Therapies

Drug therapy is the front-line treatment for epilepsy. Prescribing AEDs has been quite successful in preventing or reducing the frequency of seizures. The main AEDs are carbamazepine, phenytoin, and valproic acid, and the new drugs include gabapentin, lamotrigine, tiagabine, and topiramate. Drug selection must be based on diagnosis, clinical conditions, facilities, healthcare, and economic status of the patient. AEDs can control epileptic seizures to a considerable extent; however, their side effects, such as causing behavioral problems and affecting cognitive functions and memory are among the serious problems. AEDs can have harmful effects on cognitive functions by preventing neuronal excitability or increasing neuronal transfers. The old AEDs, such as phenobarbital, phenytoin, carbamazepine, and sodium valproate, have unfavorable effects on cognition (attention span, motor function continuity,

and time of doing specific homework) and memory. New AEDs (felbamate, vigabatrin, gabapentin, and lamotrigine) are more tolerable for patients, although their delayed and long-lasting side effects cannot be ignored. Certain new AEDs such as gabapentin and lamotrigine have less harmful effects on cognitive functions and mostly affect emotions. However, several studies have mentioned the positive effects of new drugs; for instance, lamotrigine can cause behavioral improvement, increased alertness, and reduced absence seizures. Considering the undesirable side effects of drugs on cognition and memory functions in patients, it appears that greater attention should be paid to psychological treatments alongside pharmacological therapies (33).

#### 4.2. Psychological Interventions

Some psychological interventions can be employed to reduce psychological problems in epileptic people. In this regard, cognitive-behavioral therapy (CBT) is effective in treating inefficient attitudes and depression. This model argues that patients' psychological problems are due to their inefficient beliefs and fundamental assumptions regarding the self, the world, and human beings. Inefficient thoughts and attitudes and negative reactions in the community towards this disease lead to despair and passivity in most of these patients. The CBT targets these intellectual distortions and negative attitudes, and corrects and replaces them with positive and constructive thoughts. Besides, it treats the psychological disorders in these patients and enhances their QOL by correctly accepting the disease and increasing their daily activities (7). Another therapeutic approach is teaching the coping skills to patients to reduce stress. Since a broad spectrum of behaviors can be effective in reducing stress, it is possible to control the emotional and behavioral outcomes of the disease by learning the required skills. The precede-proceed model is another training approach that affects patients' awareness, attitudes, and behavior. This approach is a model for planning and consists of two parts. The first part includes a series of designed evaluations that produces the information to be used in subsequent decision-making. This collection of the stages includes considerable investigation and classification of all factors and refers to the precede part of the model (i.e., the predisposing, reinforcing, and enabling factors for training, ecological, and evaluation recognition). The second part is determined by the strategic execution of the multiple activities that are based on what was learned from the evaluations in the first stage (34).

The intervention based on emotion regulation has a positive impact on psychological well-being. In this intervention, people learn the correct methods of coping with problems and events and the appropriate way of communicating with others by learning the correct methods of expressing emotions. This can lead to the establishment of a better relationship between the epileptic person and others, logical interpretation of events, and also correc-

tion of communicative and interpersonal problems in epileptic patients. One of the approaches in behavioral therapy is progressive muscular relaxation, in which the patient helps the general relaxation of the body by contracting and relaxing a group of muscles. In this therapeutic approach, the patients are trained to contract a group of their muscles from head to toe, count to five, relax, and count to ten (35).

Mindfulness therapy is another therapeutic approach that emphasizes the present moment via a special, targeted, and non-judgmental method. This therapy combines the methods of meditation and body inspection to increase the understanding and mindfulness of thoughts, feelings, and automatic and unintentional bodily sensations. In this method, patients are trained to employ methods to remove the automatic state of the responses dependent on thoughts, feelings, and bodily sensations and make changes in their occurrence. Another effective approach for epileptic patients resistant to treatment is based on acceptance and commitment. In this method, the patients are confronted with situations that they normally avoid. They are also trained to experience their thoughts and feelings merely as thoughts and be aware of the inefficient nature of their current plan instead of trying to suppress those thoughts and feelings, and instead of providing an answer to them, carry out what is important for them in life and is in line with their values. Patients with epilepsy are more inclined towards depression due to frequent confrontation with uncontrollable events (epileptic seizures) and the fear of these epileptic seizures happening in the social environment, as well as concerns regarding the perceptions of others about them, which might result in strengthening the inefficient beliefs in them. On the other hand, the continuation of epileptic seizures and disruption in cognitive function can lead to a reduction of QOL in epileptic people. The CBT targets automatic thoughts and changes the fundamental beliefs of patients attributing the failures caused by epilepsy to themselves, which results in the improvement of their mood and depression. Planning the activities also helps epileptic patients to improve their QOL by reducing their failures in achieving their daily goals and valuing any increase in the level of the daily activities (36).

Epileptic patients experience their first epileptic seizure following stressful events, and in many cases, the stress is effective in the repetition of seizures. Thus, teaching coping skills to epileptic people helps them to know the relationship between epilepsy and stress and gradually minimize the stress by employing the appropriate coping methods, stress-management methods, social support seeking methods, positive reinterpretation of epileptic seizures to cope with avoidance of the disease, and actively confront the problems. Epileptic patients do not have sufficient information and knowledge regarding their disease, treatment options, and psychosocial outcomes. However, the precede-proceed model is a collection of

consecutive stages that proposes objectives and criteria regarding the policy, implementation, and assessment of precede stages to identify the priorities and regulate goals in the proceed stages. Thus, it improves the mindfulness, attitude, and behavior of epileptic patients. These patients have lower levels of psychological well-being. On the other hand, when facing an emotional situation, a good feeling and optimism are not sufficient for controlling emotions; however, patients with epilepsy are required to employ the best cognitive function in these situations. Thus, emotion regulation based intervention promotes the psychological well-being of epileptic patients by increasing the ability to understand the emotions, modify the experience, and express emotions (37).

As mentioned, epileptic people have a lower QOL compared to the normal population and patients of other chronic diseases. Therefore, progressive muscle relaxation prevents negative thoughts and emotions, such as anxiety and stress, and neutralizes the effects of the increase in muscular pressure on the body. As a result, it enhances the QOL of the patients by reducing the number of epileptic seizures. Furthermore, a computer-based training package indirectly reduces the difficulties of families regarding the problems pertinent to health since the awareness and attitudes of epileptic people, their family, and the community towards epilepsy has a vital role in the process of treatment, and it can affect the QOL of these patients. Mindfulness therapy emphasizes the non-judgmental approach regarding the internal experiences (feelings and cognition) over time and increases awareness and acceptance of life events pertinent to epilepsy, mindful attention, and emphasis on the present time, confrontation with unpleasant thoughts and feelings, Not avoiding bad feelings and accepting them and accepting them, all of which can result in improvement of QOL in epileptic patients. In the treatment based on acceptance and commitment, the patients are trained to propose a suitable meaning for their problems, accept the psychosocial outcomes of epilepsy, avoid verbal rules and evaluations through diffusion, live in the moment, behave with respect to their values through committed actions despite the social stigma caused by the disease, behave according to their selected values, and find their selected orientations in life (38).

#### 4.3. Self-Management Behaviors

Epileptic people are required to carry out a considerable psychosocial and behavioral adjustment in their daily routine to have a high QOL. Behavioral adjustment includes observing medical diet, receiving sufficient sleep and appropriate nutrition, and adopting stress-relieving plans to improve the general health status. Psychosocial adjustment includes an adjustment to attachments caused by the disease in conducting the daily routine (e.g., inability to drive or work), or tolerating the social stigma caused by epileptic seizures for patients. Psychosocial and behavioral adjustments constitute self-management behaviors when

combined. Several studies argued that self-management behaviors in epilepsy include the management of information, safety, drugs, epileptic seizures, and the lifestyle of a person. Epileptic people employ self-management behaviors to a moderate extent. Epileptic attacks have a direct relationship with the amount of control over the disease and self-management behaviors (17, 39).

Finally, it can be said that self-management behaviors increase the QOL in patients with epilepsy (18) by increasing the mental and psychological capacity of individuals; this leads to a feeling of freshness and positivity and improves family relationships (25). On the other hand, this issue can lead to better management of sexual function and, following the establishment of hormonal balance, leads to optimal sexual function in epileptic patients (31).

#### 4.4. Conclusion

Psychosocial problems in epileptic people expose them to a variety of psychological disorders, such as anxiety, major depressive disorder, psychosis, personality changes, erectile dysfunction in men, and sexual dysfunction in women. Many psychological factors (such as stress, anxiety, depression), sexual activities, cognitive processes, theory of mind, and self-management behavior have a vital role in aggravation and treatment of epilepsy. The first line of treatment for epilepsy is drug therapy, and other psychological methods should not be used as a replacement for drug therapy. However, the behavioral-cognitive interventions and the third wave can be employed to improve the psychological well-being of epileptic patients. The third wave therapies are a combination of the spiritual tradition of the East, such as meditation techniques and mindfulness with the traditional cognitive-behavior therapy, which was commenced in the early 1990s and emphasizes mindfulness of the now and accepting it. Besides, in this approach, the schema that narrates the fundamental beliefs, which is the constituent of a person's viewpoint regarding self, others, and the surrounding world, was employed to help the process of treatment. Epilepsy in itself is not a debilitating and regressive disease and can be treated. Even in case of psychosocial problems, patients can manage different dimensions of their life affected by epilepsy through observing the multifaceted precautions. Therefore, it is recommended to employ a comprehensive psychosocial rehabilitation model, which includes prevention, treatment, rehabilitation, and improvement of the QOL of epileptic people and comprises a collection of units of diagnosis, inpatients and outpatients, training, in-person, and phone consultation, family consultation, treatment group, empowering, social work, job training, and job-seeking, treatment at home.

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## References

- Banerjee PN, Filippi D, Allen Hauser W. The descriptive epidemiology of epilepsy—a review. *Epilepsy Res.* 2009;85(1):31-45. doi:10.1016/j.eplepsyres.2009.03.003. [PubMed:19369037]. [PubMed Central:PMC2696575].
- Smeets VM, van Lierop BA, Vanhoutvin JP, Aldenkamp AP, Nijhuis FJ. Epilepsy and employment: Literature review. *Epilepsy Behav.* 2007;10(3):354-62. doi:10.1016/j.yebeh.2007.02.006. [PubMed:17369102].
- Forsgren L, Beghi E, Oun A, Sillanpaa M. The epidemiology of epilepsy in Europe - a systematic review. *Eur J Neurol.* 2005;12(4):245-53. doi:10.1111/j.1468-1331.2004.00992.x. [PubMed:15804240].
- Fiest KM, Sauro KM, Wiebe S, Patten SB, Kwon CS, Dykeman J, et al. Prevalence and incidence of epilepsy: A systematic review and meta-analysis of international studies. *Neurology.* 2017;88(3):296-303. doi:10.1212/WNL.0000000000003059. [PubMed:27986877]. [PubMed Central:PMC5272794].
- Charsouei S, Jabalameli MR, Karimi-Moghadam A. Molecular insights into the role of AMPA receptors in the synaptic plasticity, pathogenesis and treatment of epilepsy: therapeutic potentials of perampanel and antisense oligonucleotide (ASO) technology. *Acta Neurol Belg.* 2020;120(3):531-44. doi:10.1007/s13760-020-01318-1. [PubMed:32152997].
- Josephson CB, Dykeman J, Fiest KM, Liu X, Sadler RM, Jette N, et al. Systematic review and meta-analysis of standard vs selective temporal lobe epilepsy surgery. *Neurology.* 2013;80(18):1669-76. doi:10.1212/WNL.0b013e3182904f82. [PubMed:23553475].
- Ramaratnam S, Baker GA, Goldstein LH. Psychological treatments for epilepsy. *Cochrane Database Syst Rev.* 2008(3):CD002029. doi:10.1002/14651858.CD002029.pub3. [PubMed:18646083].
- Rantanen K, Eriksson K, Nieminen P. Social competence in children with epilepsy—A review. *Epilepsy Behav.* 2012;24(3):295-303. doi:10.1016/j.yebeh.2012.04.117. [PubMed:22595143].
- Wo MC, Lim KS, Choo WY, Tan CT. Employability in people with epilepsy: A systematic review. *Epilepsy Res.* 2015;116:67-78. doi:10.1016/j.eplepsyres.2015.06.016. [PubMed:26354169].
- Barakchian SN, Shati M, Mortazavi SS, Nikanfar M, Charsouei S. Psychometric properties of the Persian version of the Patient-Weighted Quality of Life in Epilepsy Inventory-10-P. *Epilepsy Behav.* 2020;111:107243. doi:10.1016/j.yebeh.2020.107243. [PubMed:32593136].
- Jones C, Atkinson P, Helen Cross J, Reilly C. Knowledge of and attitudes towards epilepsy among teachers: A systematic review. *Epilepsy Behav.* 2018;87:59-68. doi:10.1016/j.yebeh.2018.06.044. [PubMed:30173018].
- Khanbabayi Gol M, Eidy M, Zamani Esfahlani M. [Frequency ratio of carpal tunnel syndrome in women with breast cancer treated with lymphedema in Tabriz medical education centers; 2018-2019]. *Iran J Obstet Gynecol Infertil.* 2020;22(12):62-8.
- Gourie-Devi M, Singh V, Bala K. Knowledge, attitude and practices among patients of epilepsy attending tertiary hospital in Delhi, India and a review of Indian studies. *Neurology Asia.* 2010;15(3).
- Jacoby A. Epilepsy and stigma: An update and critical review. *Curr Neurol Neurosci Rep.* 2008;8(4):339-44. doi:10.1007/s11910-008-0052-8. [PubMed:18590619].
- Bandstra NF, Camfield CS, Camfield PR. Stigma of epilepsy. *Can J Neurol Sci.* 2008;35(4):436-40. doi:10.1017/s0317167100009082. [PubMed:18973059].
- Rodenburg R, Meijer AM, Dekovic M, Aldenkamp AP. Family factors and psychopathology in children with epilepsy: A literature review. *Epilepsy Behav.* 2005;6(4):488-503. doi:10.1016/j.yebeh.2005.03.006. [PubMed:15907744].
- O'Toole S, Benson A, Lambert V, Gallagher P, Shahwan A, Austin JK. Family communication in the context of pediatric epilepsy: A systematic review. *Epilepsy Behav.* 2015;51:225-39. doi:10.1016/j.yebeh.2015.06.043. [PubMed:26298868].
- Seiam AH, Dhaliwal H, Wiebe S. Determinants of quality of life after epilepsy surgery: Systematic review and evidence summary. *Epilepsy Behav.* 2011;21(4):441-5. doi:10.1016/j.yebeh.2011.05.005. [PubMed:21697015].
- Atif M, Sarwar MR, Scahill S. The relationship between epilepsy and sexual dysfunction: a review of the literature. *Springerplus.* 2016;5(1):2070. doi:10.1186/s40064-016-3753-5. [PubMed:27995047]. [PubMed Central:PMC5135706].
- Calabro RS, Marino S, Bramanti P. Sexual and reproductive dysfunction associated with antiepileptic drug use in men with epilepsy. *Expert Rev Neurother.* 2011;11(6):887-95. doi:10.1586/ern.11.58. [PubMed:21651335].
- Timer E, Charsouei S, Bebek N, Baykan B, Bilgic B, Sabanci PA, et al. Neurosurgical treatment of nonconvulsive status epilepticus due to focal cortical dysplasia. *Epilepsy Behav Case Rep.* 2018;10:4-7. doi:10.1016/j.ebcrc.2018.03.003. [PubMed:30023174]. [PubMed Central:PMC6050350].
- Xue M, Brimacombe M, Chaaban J, Zimmerman-Bier B, Wagner GC. Autism spectrum disorders: Concurrent clinical disorders. *J Child Neurol.* 2008;23(1):6-13. doi:10.1177/0883073807307102. [PubMed:18056691].
- Galtrey CM, Mula M, Cock HR. Stress and epilepsy: Fact or fiction, and what can we do about it? *Pract Neurol.* 2016;16(4):270-8. doi:10.1136/practneurol-2015-001337. [PubMed:26933239].
- Saboktakin L, Rafeey M, Kousha A, Moradi SM. Study on prevalence of Helicobacter pylori infection in adolescents with failure to thrive to compare with control group. *Life Sci J.* 2012;9(4):1425-31.
- Mehndiratta P, Sajatovic M. Treatments for patients with comorbid epilepsy and depression: A systematic literature review. *Epilepsy Behav.* 2013;28(1):36-40. doi:10.1016/j.yebeh.2013.03.029. [PubMed:23651914].
- Gandy M, Sharpe L, Perry KN. Psychosocial predictors of depression and anxiety in patients with epilepsy: A systematic review. *J Affect Disord.* 2012;140(3):222-32. doi:10.1016/j.jad.2011.11.039. [PubMed:22197509].
- Reilly C, Agnew R, Neville BG. Depression and anxiety in childhood epilepsy: A review. *Seizure.* 2011;20(8):589-97. doi:10.1016/j.seizure.2011.06.004. [PubMed:21741277].
- Lagae L. Cognitive side effects of anti-epileptic drugs. The relevance in childhood epilepsy. *Seizure.* 2006;15(4):235-41. doi:10.1016/j.seizure.2006.02.013. [PubMed:16563808].
- Bailey K, Im-Bolter N. Language in childhood epilepsy: A systematic review and meta-analysis. *Epilepsy Behav.* 2021;114(Pt A):107621. doi:10.1016/j.yebeh.2020.107621. [PubMed:33257294].
- Stewart E, Catroppa C, Gill D, Webster R, Lawson J, Mandalis A, et al. Theory of Mind and social competence in children and adolescents with genetic generalised epilepsy (GGE): Relationships to epilepsy severity and anti-epileptic drugs. *Seizure.* 2018;60:96-104. doi:10.1016/j.seizure.2018.06.015. [PubMed:29933178].
- Stewart E, Catroppa C, Lah S. Theory of Mind in Patients with Epilepsy: A Systematic Review and Meta-analysis. *Neuropsychol Rev.* 2016;26(1):3-24. doi:10.1007/s11065-015-9313-x. [PubMed:26797753].
- Lezaic N, Gore G, Josephson CB, Wiebe S, Jette N, Keezer MR. The medical treatment of epilepsy in the elderly: A systematic review and meta-analysis. *Epilepsia.* 2019;60(7):1325-40. doi:10.1111/epi.16068. [PubMed:31185130].
- Eadie MJ. Shortcomings in the current treatment of epilepsy. *Expert Rev Neurother.* 2012;12(12):1419-27. doi:10.1586/ern.12.129. [PubMed:23237349].
- Lai ST, Lim KS, Tang V, Low WY. Positive psychological interventions for people with epilepsy: An assessment on factors related to intervention participation. *Epilepsy Behav.* 2018;80:90-7. doi:10.1016/j.yebeh.2017.12.019. [PubMed:29414564].
- Carlson P, Nicholson Perry K. Psychological interventions for psychogenic non-epileptic seizures: A meta-analysis. *Seizure.* 2017;45:142-50. doi:10.1016/j.seizure.2016.12.007. [PubMed:28063373].
- Noble AJ, Marson AG, Blower SL. Psychological interventions for epilepsy: How good are trialists at assessing their implementation fidelity, what are the barriers, and what are journals doing to encourage it? A mixed methods study. *Epilepsy Behav.* 2019;97:174-81. doi:10.1016/j.yebeh.2019.05.041. [PubMed:31252275].
- Jackson CF, Makin SM, Baker GA. Neuropsychological and psychological interventions for people with newly diagnosed epilepsy. *Cochrane Database Syst Rev.* 2015(7):CD011311. doi:10.1002/14651858.CD011311.pub2. [PubMed:26198593].
- Saboktakin L, Bilan N, Nikniaz A, Nazari M. Study on serum Leptin level of children with Asthma. *Life Sci J.* 2012;9(4).
- Luedke MW, Blalock DV, Goldstein KM, Kosinski AS, Sinha SR, Drake C, et al. Self-management of Epilepsy: A Systematic Review. *Ann Intern Med.* 2019;171(2):17-26. doi:10.7326/M19-0458. [PubMed:31261386].