Original Article

Effect of Structured Educational Package on Self Efficacy and Drug Adherence among Epileptic Patients

Hamda Ahmed Mohamed Eldesoky(1), Azza Ibrahim Abdelkader Habiba(2), Fatma Mohmmed Abouelala(3)

(1) Lecturer, Medical Surgical Nursing Department, Faculty of Nursing, Alexandria University, Egypt.

(2) Assistant Professor of Medical- Surgical Nursing, Faculty of Nursing, Damanhour University.

(3) Lecturer of Medical Surgical Nursing, Faculty of Nursing, Kafrelsheikh University, Egypt.

ABSTRACT

Background: Epilepsy is the most common serious neurological illness worldwide, affecting all age groups. Epilepsy specialist nurses assume a vital role in providing a comprehensive epilepsy education. This will increase patient's knowledge, adherence to management plan improves their self-efficacy to care for themselves, enhance their quality of life, and possibly reduce patient morbidity and mortality rates. **Aim:** Evaluate the effect of the structured educational package on self‑efficacy and drug adherence among epileptic patients. **Research Design:** Quasi experimental study was used. **Setting:** This study conducted at outpatient neuropsychiatry clinic Damnhour National Medical institute, El-Boheria governorate, Egypt. **Subject**s: A convenient sample of 100 epileptic patients, they were randomly assigned into two equal study and control groups. **Tools**: Three tools were used, tool I "Patient's Socio-demographic and Clinical Data", tool II: "Epilepsy Self‑efficacy Scale" used to assess the different aspects of efficacy in the self-management of epilepsy and tool III: "Medication Adherence Scale" it was used to evaluate a specific adherence behavior. **Results**: There was statistically significant improvement of level of the self-efficacy and the drug adherence after the first and third-month post implementation of the structured educational package. Additionally, it was found a positive significant correlation between self-efficacy and drug adherence between both studied groups. **Conclusion**: The structured educational package for epileptic patients had a positive effect on increasing the adherence to medications and improves patient's self-efficacy. **Recommendation:** Engage the structured educational package in treatment plan of epileptic patients' side by the with the traditional treatment.

Keywords: Drug Adherence, Epilepsy, Self -Efficacy, Structured Educational Package

INTRODUCTION

Epilepsy is the most common serious neurological illness worldwide; it is affecting all age-groups and crosses all geographic boundaries. Approximately 70 million people globally have epilepsy**.** The overall prevalence of this disease is 7.6/1,000 people worldwide (**Singh, & Trevick, 2016).** The worldwide prevalence of epilepsy is inconsistent among countries where it is found to be with a ratio of 7 to 14 in 1000 people in developing countries (**WHO, 2019a**). Ten million people in Africa directly have epilepsy, accounting for approximately 20% of the global population (**Mugumbate & Zimba, 2018**). In Egypt, the epidemiologic data of epilepsy are lacking. Upper Egypt is characterized by a relatively high incidence and prevalence of epilepsy, depending on a community-based survey conducted in Fayoum governorate, the crude prevalence rate of epilepsy is 12/1000 and active prevalence rate was 6.9 /1000, while the incidence rate was1.5/1000 (**Abdel-Whahed, et al., 2022**).

Epilepsy is a common, debilitating, and costly disease. It imposes a substantial burden on individuals affected by it, their families, and society as a whole. This increased burden is adversely affecting the quality of life, and requires regular use of medications, regular check-ups, and patients' preparedness for medical emergencies (**Beghi, et at., 2019**). Patients with epilepsy experience difficulties in finding a job decrease in self-esteem, social isolation, stigma, and problems related to their marital lives. In addition, epileptic seizures affect the physical, psychological, and

social well-being of patients by causing physical trauma, asphyxia, and burn (**Patel et al., 2017**).

Epilepsy is characterized by recurrent epileptic seizures that usually recur unpredictably in absence of provoking factors. Seizures are abnormal, sudden, and excessive discharges of electrical activity in the brain and characterized by the paroxysmal occurrence of short-lived disturbances of consciousness, involuntary convulsion muscle movement and psychic or sensory disturbances. It is divided into generalized seizures and partial seizures. Generalized seizures affect the whole brain, but partial can only affect part of the brain (**Sridhar, 2019**). Compared with the general population, epilepsy triples the risk of injury and premature death**.** Epilepsy has numerous causes, such as hypoxia-ischemia, intracranial hemorrhage, and central nervous system infection. Genetic factors have a strong association with idiopathic epilepsy. Causes of epilepsy can be divided into three groups: unknown, genetic, and structural/metabolic causes (**Stafstrom, & Carmant, 2015**).

Self-management education for patients with epilepsy focuses primarily on take their medications regularly, avoid situations that trigger seizures, adequately and regularly eat, rest, and control stress. (**Badawy et al., 2018**).

The key to exhibiting efficient self-management behaviors and achieving desired objectives is the concept of self-efficacy. Self-efficacy is an important component of health-promoting behaviors in chronic patients and an

important determinant in the initiation and maintenance of positive health behaviors. **(Pandey, et al., 2019)**.

Self-efficacy is the beliefs of patients, who have to live with a health problem that requires constant care and treatment. It play a key role in adapting to the disorder, coping with the problems caused by the disorder more easily, determining the activities that they can do and avoid during the disorder process, and learning new skills for the management of the disorder **(Yildirim, & Yildiz, 2022; Mohammed, & Abou Zed, 2020).** As well as self-efficacy in management of seizures denotes to personal opinion about the ability to initiate and successfully accomplish the tasks regard to management of epilepsy every day **(Michaelis, et al., 2018).**

Adherence to treatment is a key determinant of treatment success, and adherence to it is a serious problem not only affecting the patient but also affects the health care system **(Zullig, & Bosworth, 2017)**. Antiepileptic drugs (AEDs) can control epileptic seizures by up to 67%. However, drug treatment in patients with chronic diseases such as epilepsy, requires adherence to complex and long-term medication regimens that sometimes last until the end of a patient's life **(WHO, 2019b)**. As a whole, the non-acceptance AEDs has been estimated to be between 30 and 50%, which has been found to be associated with an increase in referrals to emergency centers and hospitalization and

ultimately an increase in treatment costs **(Zafar, et al., 2019).**

Non adherence to AEDs has been found to be high due to poor healthcare system, illiteracy, poor health awareness, number of medications, duration of therapy and cultural un acceptance of modern medicine. Non adherence remains the leading cause of treatment failure in epilepsy, it is crucial to provide these with the essential supportive education and counseling regarding the condition, treatment and importance of adhering to therapy as well as regular follow -up **(Das et al., 2018; Smith, et al., 2019)**.

Instructional design for teaching is a systematic method for planning, developing, evaluating, and managing the instructional process effectively .This field includes study and views on motivational, behavioral learning, and process models for both designing educational programs and providing a link between learning theories and their practice in order to solve health problems and challenges **(Morrison, et al., 2019).** Education programs can be conducted in the form of group education or individualized. Group education can help people with epilepsy to obtain information about epilepsy as well as provide them with an opportunity to share experiences about epilepsy among themselves.

The Modular Service Package Epilepsy is one educational program that was successful in improving knowledge, seizure outcomes and coping among people with epilepsy **(Dash, 2015)**. A similar study in Iran also highlights the benefit

of an educational program for self-management of people with epilepsy (**Edward, et al., 2015).** The structured educational package from the view of the current study can defined as a class of adaptive health behavior and activities that an individual can perform to promote seizure control and enhance self-efficacy and drug adherence. (**Moursy, & Mekky, 2015**).

Epilepsy specialist nurses assume a vital role in providing a comprehensive epilepsy education. The primary approach is to frame an individualized educational plan of care. Patients with epilepsy need accurate and adequate information to help them understand the nature of their illness, drug regimen and restrictive activities that lower the seizure threshold. Nurses should provide continuous educational programs about the disease and its management. This will increase patient's knowledge, adherence to management plan improve their self-efficacy to care for themselves, enhance their quality of life, and possibly reduce patient morbidity and mortality rates (**Bell & Liu, 2016**).

Significance of the study

Epilepsy is multifaceted chronic neurological disorder in patients that requires lifelong treatment. According to evidence-based practices, it was noted that patients with epilepsy needs to learn about the disorders and its management. So, further research is needed to provide epileptic patients with appropriate strategies to improve their self-efficacy to care for themselves and improve adherence rates through comprehensive education and counseling about

707

disease and treatment; modifying non-adherence barriers; providing good communication with health care providers; as well as continuous evaluation of adherence. Thus, improves their self-efficacy which can lead to better quality of physical, psychological and social life.

Aim of the study:

This study aimed to evaluate the effect of the structured educational package on self‑efficacy and drug adherence among epileptic patients through the following:

- Assess self-efficacy of patients with epilepsy,
- Assess epileptic patents adherence to their antiepileptic drug regimen
- Designing and implementing the structured educational package based on the patients' needs.
- Evaluate the effect of the structured educational package on self-efficacy and drug adherence.

Research hypotheses:

H1: Epileptic patients self-efficacy scores will be improved post implementing of the structured educational package than patients who do not receive.

H2: Epileptic patients' adherence to their drugs will be improved post implementing the structured educational package than patients who do not receive.

MATERIALS and METHOD

Research design:

A quasi-experimental research design with pre structured educational package, after one

month and after three months was utilized to achieve the aim of this study. Quasi experimental research involves the manipulation of an independent variable with the random assignment of participants to conditions or orders of conditions. Among the important types are equivalent groups designs, pretest-posttest, and interrupted time series designs **(Baker, 2017)**.

Setting:

The present study was conducted at the outpatient neuropsychiatry clinic at Damnhour National Medical institute, El-Boheria governorate, Egypt. The setting was composed of one room. The clinical time schedule was three days weekly for diagnosis and follow up of patients with epilepsy (Sunday, Tuesday and Thursday). The working hours of the clinic were from 9 am to 1 pm.

Subjects:

A convenient sample of 100 epileptic adult patients, in the above-mentioned settings were recruited in the study. They were randomly assigned into two equal study and control groups (50 patients each). *Control group (G1);* received hospital care only, while *study group (G2)* received a structured educational package. The **Epi- info-7 program** was used to estimate the minimum sample size using the following parameters, population size 650, prevalence rate of 50%, confidence coefficient 95%, and acceptable error of 10%. The minimum sample size required is 100 patients.

Inclusion criteria:

- Male and female adults ranging from 20- 60 years old.
- Able to communicate verbally and agree to participate in the study.
- Had a diagnosis of epilepsy for at least 6 months duration.
- Patient had stable clinical condition at the time of assessment.
- Free from psychotic disorders and other neurological disease such as brain tumor and stroke.
- Not schedule for brain surgery.

Tools for data collection:

Three tools were used in this study for data collection.

Tool I: Patient's Socio-demographic and Clinical Data:

This tool was developed by the researcher after reviewing the related literature **(Elnaser et al., 2018; Mohammed & Abou Zed, 2020).** It was structured interview schedule which composed of two parts:

Part I: Patient's Socio-demographic data such as; age, sex, marital status, level of education, occupation, adequacy of monthly income from the patient point of view and residence area,

Part II: Patient's history and clinical characteristics such as; age at first seizure (years), family history, presence of aura, type, duration, frequency, triggers of seizure and the prescribed medications.

Tool II: Epilepsy Self‑efficacy Scale (ESES)

This scale was adapted by **Dilorio, & Yeager, (2001)** and modified by the researchers and translated to Arabic Language, it was structured interview schedule to assess the different aspects of efficacy in the self-management of epilepsy. It consisted of 33 items with 4 subscales; medication management, information management, seizure management subscale and life style management. These items were assessed on a 3-points rating scale ranging from (1-3) = cannot do at all, (4-7) = Moderately sure I can do, and (8-10) = sure I can do.

Medication management subscale, included 9 items about medication name, take medication most of the time, take medication around people who do not know that I have seizures, antiepileptic drug compliance, deal with any side effects from seizure medication, fit seizure medication schedule around daily activities, avoiding skipping doses, medication schedule, antiepileptic drug refill and handling medication running out.

Seizure management subscale, included 9 items about keeping seizure medication when going away from home, plan ahead so that I do not run out of seizure medication, stress management techniques to stop seizures, care of day-to-day changes in epilepsy , managing epilepsy in new situations, keep epilepsy under control, avoid situations or activities that make seizures worse, ability to drive or get a ride to the doctor's office when I need to see him or her and get medical help when needed for seizures.

Information management subscale, included 7 items about calling physician in case of antiepileptic drug side effects, medication safety, situations or activities that may make seizures worse, reporting doctor about more seizure than usual, ways to remember to take medication, carrying information stating having epilepsy and social support and socialization.

Life style management subscale, included 8 items about practice relaxation technique management, diet, sleep, exercise, driving and transportation; handle situations, stress management, check-up schedule.

Total score for items was calculated and transferred to percent score. The level of patient's self-efficacy was presented as follows:

- Less than 60% indicated poor self-efficacy.
- 60 % to less than 75% indicated fair self-efficacy.
- More than or equal 75% indicated good self-efficacy.

Tool III: Medication Adherence Scale

This tool was adapted from **Carbone et al., (2013)** and translated to Arabic language, it was structured interview schedule used to evaluate a specific adherence behavior. It consisted of 27 items with 4 domains; Epilepsy and treatment knowledge and expectations (8 items), adherence to medications and clinic appointments (8 items).

These items assessed on a 5-points rating scale ranging from (1) = strongly Disagree, (2) = disagree, (3) = neither agree nor disagree, (4) = agree and (5) = strongly agree. The other two domains related to beliefs about medication

efficacy (3 items), and barriers to Medication Adherence (8 items) these two items assessed on 5-points rating scale ranging from (1) = never, (2) = seldom, (3) = sometimes, (4) = often and (5) = always. The total scores ranged from 27-135. Statistically, this score was translated to the corresponding level adherence as follows:

- Less than 45 indicated low level of drug adherence.
- 45 to less than 90 indicated medium level of drug adherence.
- 90-135 indicated high level of drug adherence.

Method:

Tool development:

- Tool I was developed based on a review of related literatures. Tool II and III were adapted and translated to Arabic by the researchers.

- The content validity of the tools was tested by a jury of 5 experts in the field of medical surgical nursing and two experts in Neurological Medicine Alexandria and Damanhour University, and necessary modifications, correction and clarification of the items were introduced thereafter.

- The tools reliability was tested by test- retest method within two weeks interval on 10 patients on 2 weeks interval where Cronbach's alpha for the tool 2, and tool 3 were r =0.86, r=0.85 respectively.

Pilot study:

- A pilot study was initially carried out on 10% of study sample (10 patients), prior to the actual data collection phase, to check clarity, feasibility and applicability of the tools and determine obstacles that might be encountered during period of data collection, and needed modifications were introduced. Pilot study subjects were excluded from the study thereafter.

Collection of data:

- Data were collected over a period of seven months, starting from the beginning of February to the end of August 2022.

- Patients meeting the inclusion criteria were enrolled using a convenience sampling technique and equally divided into control and study groups, as follow *Control group (G1);* received the routine epilepsy care offered by their clinic, which is brief history taking, prescribing Antiepileptic drugs and asking laboratory investigation and or diagnostic studies as needed, while *Study group (G2)* received a structured educational package in addition to the routine hospital care.

- Data were collected initially from the control group followed by the study group, to prevent any influence on knowledge and practices contamination of the control group. In order to address the effect of health education program on self-efficacy and drug adherence.

Data were collected through the following phases:

I. Assessment phase:

- Patients in the control and study groups were interviewed individually and in privacy, to assure confidentiality of information.

- The researchers introduced themselves to the patients and explained the purpose of the study.

- During interview, tool I was used to obtain patient's demographic and clinical data and Initial assessment was done using tool (II) and tool (III).

- The individual assessment session took from 25-30 minutes.

II.   Planning phase:

- the structured educational package was developed by the researchers based on assessment phase and reviewing current national and international literatures.

- It included goals, content, priorities and expected outcomes, according to patient's individual needs and problems.

- Illustrated educational package in a simple Arabic language with simple pictures was designed and introduced to patients.

III. Implementation phase:

- Patients in the study group were divided into ten groups. Each group was including 5 patients. Each group was receiving 4 educational sessions scheduled as 1 session per week for one-month duration. Each session was taking approximately 45-60 minutes.

- The educational content was delivered in group sessions through face to face lecture. The content was presented using audiovisual material and histories of patients facing the challenges of epilepsy as the famous and talented people in the history suffered from epilepsy. The educational content was covered into four sessions:

- **The first session :** consisted of education about the medical aspects of epilepsy, including the following: Meaning of epilepsy, causes of epilepsy, the different types of seizure, predisposing factors (the triggers) of a seizure, signs and symptoms, diagnostic procedures, complications and the treatment modalities.

- In addition, during the first session, each patient in the study group was supported by a simple teaching booklet that contained the content of the educational package as an illustrative guide for more clarification. Patients were asked to bring one of the family members to attend the health education sessions for reinforcement of the prescribed in the instructions.

- **The second session** : included self – management practices in the following area: medication management, AEDs, the importance of adherence and the consequences of non-adherence, modifying non- adherence barriers seizure safety, first aid management of a seizure by patient & the family members, dietary intake to

overcome some of the side effects of AEDs, and the rest and the sleep.

- ▪ **The third session** : included the self-efficacy guidelines, the activities that could do them, and commandments to reduce the frequency of epileptic seizures, safety management, lifestyle modification, physical activities and exercise, stress management, information management, the special considerations for women and support of the family.

- ▪ **The fourth session:** it was allocated for reinforcement and answering of the patients' questions.

IV. Evaluation phase:

Both the control and the study groups were assessed to evaluate the effect of the structured educational package to study group on self‑efficacy and drug adherence in comparison with the control group. It was conducted after one-month post implementation of a structured educational package using tools I, II, II and then after 3 months using the same tools.

Ethical considerations:

- Written approval from the Research Ethics Committee of Faculty of Nursing, Damnhour University was obtained.

- An official letter from Faculty of Nursing, Damnhour University was submitted and directed to responsible authorities at neuropsychiatry clinic at Damnhour National Medical institute, El-Boheria governorate.

-After official permission was obtained, the aim of the study was explained to the participants.

-Informed consents were obtained from each patient to participate in the study, after clarifying the aim and procedures of the study.

- Participants were informed about their right to refuse participation and to withdraw at any time without any consequences.

- Confidentiality of data was ensured.

- Patients' privacy was respected.

Statistical analysis of the data:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The **Kolmogorov-Smirnov** test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median. Significance of the obtained results was judged at the 5% level.

The following statistical analysis measures were used:

1 - Chi-square test: For categorical variables, to compare between different groups

2 - Fisher's Exact or Monte Carlo correction: Correction for chi-square when more than 20% of the cells have expected count less than 5

3- Student t-test: For normally distributed quantitative variables, to compare between two studied groups

4- Friedman test: For abnormally distributed quantitative variables, to compare between more than two periods or stages

5 - ANOVA with repeated measures: For normally distributed quantitative variables, to compare between more than two periods or stages

6 - Pearson coefficient: To correlate between two normally distributed quantitative variables.

RESULTS

Table (I): Illustrates distribution of patients' socio-demographic characteristics for studied groups, in reference to age the mean age for the control and study group was 34.68 ± 9.90 and 35.78 ± 10.49 respectively. In relation to gender more the half 54.0% and 58.0% for control and study group were male respectively. Concerning level of education 34.0% and 36.0% was reading and writing for both groups while 8.0% of the control group and 6.0% of the study group were university education. 44.0% of the control group and 42.0% was housewives. The monthly income was not enough in 98.0%, and 96.0% for both study and control group respectively. No significant differences were detected between the control and the study group regarding demographic characteristics.

Table (2): Shows clinical characteristics of the studied groups. Regarding to age of onset of the first attack of epilepsy, it noticed that 62.0% of the control groups compared to 60% of the study group were suffering from first attack of epilepsy in the age group from one year old to less than ten years old. Concerning family history of epilepsy 78.0% and 80.0% for control and study group respectively didn't have family history of epilepsy.

Generalized type of epilepsy represented 76.0% of the control group and 80.0% of the study group.

Poly-therapy were prescribed for 58.0% of the control group and 66.0% of the study group. In addition to 60.0% and 54.0% of the control group and study group have no symptoms of aura. As regards to number of seizures in last month, this table clarified that 44.0% and 52.0% for both control and study group respectively suffered from seizures more than twice. In relation to seizure triggers, this table showed that stressors factor represented 58.0% and 52.0% of the control and study group respectively. There were no statistically significant differences between control and study group regarding clinical characteristics

Table (3): Clarifies that there was no statistically significant difference between the study and control groups in all items self-efficiency subscales pre implementation of the structured educational package. While, there was statistically significant difference in all items of self-efficacy subscales which include medication management, seizure management, information management, and life style management at one- and three-months post implementation of the structured educational package where (p<0.001*).

Table (4): Summarizes the level of patient's self-efficacy, it showed that there was 100% of the patients in the control group had poor level of self-efficacy along the study period. Conversely, in the study group there was 100% of the participant had poor level of self-efficacy pre implementation of the structured educational package. After one month post implementation the

structured educational package, it was found that only 6% of the study group patients had poor level, and 54% had fair level and 40% had good level of self-efficacy, then after 3 months, this percentage increased to reach 36% had fair level and 64% had good level of self-efficacy with statistically significance differences between both groups post implementation of the structured educational package (p<0.001*).

As observes in **Table (5),** There was statistically significant improvement of all drug adherence subscales namely disease and treatment knowledge and expectations, adherence to medications and clinic appointments, beliefs about medication efficacy, and barriers to medication adherence subscale post implementation of the structured educational package (P>0.001). In reference to overall drug adherence subscales, this table shows significant improvement of the mean percent score of the study group (23.67 ± 9.50), (65.69 ± 10.86) and (73.48 ± 11.20) at pre, post one, and three months respectively.

Table (6): This reveals that (86%, 76%, and 64%) of the control group had low level of the overall drug adherence at pre, post one, and three months post implementation of the structured educational package respectively. However (78.0%) of the study group had poor level of the overall drug adherence subscales pre implementation of a structured educational package and then after implementation of the structured educational package (18%, and 64%) of the study group had high level of the overall drug adherence subscales after one, and three months respectively with statistically significance differences between both groups in one and three months (p<0.001*).

Tables (7): reflects the correlation between drug adherence and self-efficacy among the studied patients. According to this table, there was a significant positive correlation between total self-efficacy and overall drug adherence in the study group after one and three months, while in the control group there was a significant positive correlation between total self-efficacy and overall drug adherence after three months.

Table (1): Socio-Demographic Characteristics of Patients in the Control and the Study Group (N =100)

Socio-demographic	Control (n = 50)		Study (n = 50)		Test of Sig.	P
	No.	%	No.	%		
Age (years)						
▪ 20-	17	34.0	15	30.0	$\chi^2=$ 0.411	0.938
▪ 30-	19	38.0	19	38.0		
▪ 40-	8	16.0	8	16.0		
▪ 50-60	6	12.0	8	16.0		
Mean ± SD.	34.68 ± 9.90		35.78 ± 10.49			
Gender						
▪ Male	27	54.0	29	58.0	$\chi^2=$ 0.162	0.687
▪ Female	23	46.0	21	42.0		
Marital status						
▪ Single	19	38.0	16	32.0	$\chi^2=$ 0.938	$^{MC}p=$ 0.884
▪ Married	26	52.0	30	60.0		
▪ Divorced	2	4.0	2	4.0		
▪ Widow	3	6.0	2	4.0		
Level of education						
▪ Illiterate	10	20.0	10	20.0	$\chi^2=$ 0.288	0.991
▪ Read and write	17	34.0	18	36.0		
▪ Basic education	13	26.0	12	24.0		
▪ Secondary education	6	12.0	7	14.0		
▪ University education	4	8.0	3	6.0		
Occupation						
▪ Clerical work	3	6.0	3	6.0	$\chi^2=$ 0.959	$^{MC}p=$ 0.963
▪ Manual work	7	14.0	10	20.0		
▪ Professionals	3	6.0	2	4.0		
▪ Housewives	22	44.0	21	42.0		
▪ Not working	15	30.0	14	28.0		
Area of residence						
▪ Urban	34	68.0	38	76.0	$\chi^2=$ 0.794	0.373
▪ Rural	16	32.0	12	24.0		
Monthly income						
▪ Not enough	49	98.0	48	96.0	$\chi^2=$ 0.344	$^{MC}p=$ 1.000
▪ Enough	1	2.0	2	4.0		

SD: Standard deviation $\quad\quad$ χ^2: Chi square test $\quad\quad$ MC: Monte Carlo
t: Student t-test $\quad\quad\quad\quad\quad$ p: p value for comparing between the studied groups
*: Statistically significant at $p \leq 0.05$

Table (2): Clinical Characteristics of the Patients in the Control and the Study Group (N=100)

Clinical data	Control (n = 50)		Study (n = 50)		Test of Sig.	P
	No.	%	No.	%		
Age of onset of the first attack of epilepsy (years)						
▪ 1-	31	62.0	30	60.0	$\chi^2=$ 3.258	MCp= 0.585
▪ 10-	9	18.0	14	28.0		
▪ 20-	6	12.0	5	10.0		
▪ 30-	2	4.0	1	2.0		
▪ 40-50	2	4.0	0	0.0		
Family history of epilepsy						
▪ No	39	78.0	40	80.0	$\chi^2=$ 0.060	0.806
▪ Yes	11	22.0	10	20.0		
Type of seizure						
▪ Partial	12	24.0	10	20.0	$\chi^2=$ 0.233	0.629
▪ Generalized	38	76.0	40	80.0		
The prescribed medication						
▪ Mono-therapy	21	42.0	17	34.0	$\chi^2=$ 0.679	0.679
▪ Poly- therapy	29	58.0	33	66.0		
Presence of aura						
▪ Yes	20	40.0	23	46.0	$\chi^2=$ 0.367	0.545
▪ No	30	60.0	27	54.0		
Number of seizures in last month						
▪ None	2	4.0	0	0.0	$\chi^2=$ 2.347	MCp= 0.535
▪ Once	10	20.0	11	22.0		
▪ Twice	16	32.0	13	26.0		
▪ More than twice	22	44.0	26	52.0		
Seizure triggers						
▪ Noncompliance with medication	14	28.0	16	32.0	$\chi^2=$ 1.124	MCp= 0.813
▪ Insufficient sleep	2	4.0	4	8.0		
▪ Stressors	29	58.0	26	52.0		
▪ Menstruation	5	10.0	4	8.0		

SD: Standard deviation χ^2: Chi square test MC: Monte Carlo
t: Student t-test p: p value for comparing between the studied groups
*: Statistically significant at p ≤ 0.05.

Table (3): Mean Scores of the Patients' Self-Efficacy Subscales Items in the Study and the Control Group Pre and Post Implementation of the Structured Educational Package (N =100).

Self-efficacy Subscales	Control (n =50)						Study (n = 50)						Test of sig.(p1)	Test of sig. (p2)	Test of sig. (p3)
	Pre		Post one month		Post three months		Pre		Post one month		Post three months				
	No	%	No.	%	No	%	No	%	No.	%	No.	%			
Medication Management Subscale															
Total score	18.28± 6.07		21.22± 12.0		22.98± 9.07		16.48± 6.15		52.12± 12.41		65.86± 6.33		t=1.473 (0.144)	t= 12.655* (<0.001*)	t= 27.426* (<0.001*)
% score	20.31 ± 6.75		23.58 ± 13.34		25.53 ± 10.07		18.31 ± 6.83		57.91 ± 13.79		73.18 ± 7.03				
F (p0)	5.661* (0.007*)						458.473* (<0.001*)								
Seizure Management Subscale															
Total score	18.48 ± 7.70		21.36 ± 12.21		21.94 ± 9.16		17.16 ± 6.89		52.58 ± 11.42		64.68 ± 8.16		t=0.903 (0.369)	t= 13.207* (<0.001*)	t= 24.626* (<0.001*)
% score	20.53 ± 8.56		23.73 ± 13.56		24.38 ± 10.18		19.07 ± 7.66		58.42 ± 12.69		71.87 ± 9.07				
F (p0)	2.551 (0.092)						432.102*(<0.001*)								
Information management subscale															
Total score	12.90 ± 5.73		16.54 ± 9.40		17.26 ± 6.79		13.86 ± 7.39		39.52 ± 8.40		50.34 ± 7.92		t=0.726 (0.469)	t= 12.890* (<0.001*)	t= 22.422* (<0.001*)
% score	18.43 ± 8.18		23.63 ± 13.42		24.66 ± 9.70		19.80 ± 10.56		56.46 ± 12.01		71.91 ± 11.31				
F (p0)	7.110* (0.003*)						317.193*(<0.001*)								
Life style management subscale															
Total score	15.94 ± 5.58		19.0 ± 10.87		19.82 ± 8.22		15.44 ± 5.88		47.26 ± 8.98		57.62 ± 6.31		t=0.436 (0.664)	t= 14.172* (<0.001*)	t= 25.785* (<0.001*)
% score	19.93 ± 6.98		23.75 ±13.59		24.78 ±10.28		19.30 ± 7.35		59.08 ±11.22		72.02 ± 7.89				
F (p0)	4.420* (0.019*)						576.398*(<0.001*)								
Overall Self-efficacy scores															
Total score	65.64± 24.67		78.08± 44.39		81.26± 32.68		63.50± 25.95		193.8± 34.65		240.0± 23.28		t=0.423 (0.674)	t= 14.527* (<0.001*)	t= 27.976* (<0.001*)
% score	19.89 ± 7.47		23.66 ±13.45		24.62 ± 9.90		19.24 ± 7.87		58.72 ±10.50		72.73 ± 7.06				
F (p0)	4.350* (0.021*)						632.897*(<0.001*)								

t: Student t-test SD: Standard deviation Fr: Friedman test
F: F test (ANOVA) with repeated measures χ^2: Chi square test MC: Monte Carlo
p1: p value for comparing between the studied groups in pre period
p2: p value for comparing between the studied groups in post one month
p1: p value for comparing between the studied groups in post three month
p0: p value for comparing between the studied periods in each group   *: Statistically significant at p ≤ 0.05

Table (4): Percentage Distribution of the Control and the study Group Patients According to Level of Self-Efficacy Pre and Post Implementation of Structured Educational Package. (N =100)

Self-efficacy Subscales	Control (n =50)						Study (n = 50)						Test of sig.(p1)	Test of sig. (p2)	Test of sig. (p3)
	Pre		Post one month		Post three months		Pre		Post one month		Post three months				
	No	%	No	%	No	%	No	%	No	%	No	%			
The level of patients' self-efficacy															
Poor <60%	50	100.0	50	100.0	50	100.0	50	100.0	3	6.0	0	0.0	–	$\chi^2=$ 33.772[*] p<0.001[*]	$\chi^2=$ 100.000[*] p<0.001[*]
Fair 60% - ≤75%	0	0.0	0	0.0	0	0.0	0	0.0	27	54.0	18	36.0			
Good >75%	0	0.0	0	0.0	0	0.0	0	0.0	20	40.0	32	64.0			
Fr. (p0)	–						77.962[*](<0.001[*])								

Fr: Friedman test   χ2: Chi square test   *: Statistically significant at $p \leq 0.05$

p1: p value for comparing between the studied groups in pre period

p2: p value for comparing between the studied groups in post one month

p1: p value for comparing between the studied groups in post three month

p0: p value for comparing between the studied periods in each group

Table (5): Mean Scores of the Patients' Drug Adherence Subscales in the Study and the Control Group Pre and Post Implementation of the Structured Educational Package (N =100).

Drug adherence subscales	Control (n =50)			Study (n = 50)			t (p₁)	t (p₂)	t (p₃)
	Pre	Post 1 month	Post 3 months	Pre	Post 1 month	Post 3 months			
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ± SD	Mean ±SD	Mean±SD			
Disease and Treatment Knowledge and Expectations subscale									
Total score	15.64 ± 5.19	15.24 ± 6.07	14.68 ± 5.86	14.86 ± 4.46	31.86 ± 5.51	34.64 ± 3.53	0.806 (0.422)	14.335* (<0.001*)	20.626* (<0.001*)
% score	23.88 ± 16.22	22.62 ± 18.98	20.88 ± 18.31	21.44 ± 13.93	74.56 ± 17.21	83.25 ± 11.04			
F (p₀)	**5.322* (0.006*)**			**341.123* (<0.001*)**					
Adherence to Medications and Clinic Appointments subscale									
Total score	16.06± 5.57	16.34 ± 5.64	16.24 ± 4.98	14.42 ± 5.26	32.72 ± 4.69	35.0± 4.31	1.513 (0.133)	15.794* (<0.001*)	20.143* (<0.001*)
% score	25.19± 17.42	26.06 ± 17.62	25.75 ± 15.56	20.06 ± 16.43	77.25 ± 14.66	84.37 ± 13.47			
F (p₀)	**0.485 (0.617)**			**426.678* (<0.001*)**					
Beliefs about Medication Efficacy subscale									
Total score	9.60 ± 2.66	9.68 ± 2.60	9.70 ± 2.85	9.66 ± 3.45	12.72 ± 1.59	12.92 ± 1.54	0.097 (0.923)	7.055* (<0.001*)	7.029* (<0.001*)
% score	55.0 ± 22.14	55.67 ± 21.65	55.83 ± 23.76	55.50 ± 28.75	81.0 ± 13.26	82.67 ± 12.80			
F (p₀)	**0.131 (0.877)**			**33.604* (<0.001*)**					
Barriers to Medication Adherence subscale									
Total score	32.86 ± 5.71	32.18 ± 4.58	31.86 ± 8.94	34.38 ± 4.55	27.36 ± 4.42	24.20 ± 11.07	1.473 (0.144)	5.358* (<0.001*)	3.806* (<0.001*)
% score	77.69 ± 17.83	75.56 ± 14.31	74.56 ± 27.94	82.44 ± 14.21	60.50 ± 13.80	50.63 ± 34.60			
F (p₀)	**0.582 (0.504)**			**26.737* (<0.001*)**					
Overall drug adherence scores									
Total score	56.44 ± 12.29	57.08 ± 14.02	56.76 ± 16.21	52.56 ± 10.26	97.94 ± 11.73	106.36± 12.09	1.713 (0.090)	15.808* (<0.001*)	17.342* (<0.001*)
% score	27.26 ± 11.38	27.85 ± 12.98	27.56 ± 15.01	23.67 ± 9.50	65.69 ± 10.86	73.48 ± 11.20			
F (p₀)	**0.045 (0.913)**			**316.010* (<0.001*)**					

t: Student t-test   F: F test (ANOVA) with repeated measures

p₁: p value for comparing between the studied groups in pre period

p₂: p value for comparing between the studied groups in after one-month period

p₁: p value for comparing between the studied groups in after three months period

p₀: p value for comparing between the studied periods in each group

*: Statistically significant at p ≤ 0.05

Table (6): Percentage distribution of the control and the study group According to Level of the Overall Drug Adherence Pre and Post Implementation of the Structured Educational Package (N=100).

Drug adherence subscales	Control (n =50)						Study (n = 50)						t (p₁)	t (p₂)	t (p₃)
	Pre		Post 1 month		Post 3 months		Pre		Post 1 month		Post 3 months				
	Mean ± SD		Mean ± SD		Mean ± SD		Mean ± SD		Mean ± SD		Mean ± SD				
Level of overall drug adherence															
Low <45	43	86.0	38	76.0	32	64.0	39	78.0	0	0.0	0	0.0	χ^2= 0.000 (1.000)	χ^2= 66.989* (<0.001*)	χ^2= 84.791* (<0.001*)
Medium 45–90	7	14.0	11	22.0	16	32.0	11	22.0	41	82.0	18	36.0			
High 90–135	0	0.0	1	2.0	2	4.0	0	0.0	9	18.0	32	64.0			

Table (7): Correlation Matrix between Drug Adherence and Self-Efficacy among Studied Patients.

		Self-efficacy					
		Control (n =50)			Study (n = 50)		
		Pre	Post 1 month	Post 3 months	Pre	Post 1 month	Post 3 months
Drug adherence	R	0.224	0.196	0.338*	0.079	0.333*	0.475*
	P	0.118	0.172	0.016*	0.584	0.018*	<0.001*

r: Pearson coefficient   *: Statistically significant at $p \leq 0.05$

DISCUSSON

Epilepsy is a lifelong condition that affect almost all aspects of person's life and his/her family as well. Physical, psychological and social dimensions of epileptic patients usually are the most significant dimensions to patient and family **Elnaser et al., (2018)**. Nursing care including patient and family education are a corner stone of management of epilepsy side by side with medication adherence. Effective self-management of epilepsy could reform patients' health outcomes as knowledge and attitude about their disease and self-efficacy as well **Lee et al., (2020)**.

Therefore, the present study was conducted to evaluate effect of the structured educational package on self‑efficacy and drug adherence

among epileptic patients. The current study results showed significant improvement of level of the self-efficacy and the drug adherence after the first and third-month post implementation of the structured educational package. The findings lead to achieving the set hypotheses, with confirmation of the effectiveness of the educational package.

The results of the present study revealed that there were no statistically significant differences in–socio-demographic and clinical data between the study and control groups which included age, gender, level of education, marital status, occupation, monthly, medical history, duration of illness, family history, presence of aura and current medication. These findings roll out the extraneous factors that might confuse the effect of

the structured educational package on self‑efficacy and drug adherence among epileptic patient.

In relation to self-efficacy subscales which included medication management, seizure management, information management and lifestyle management subscale there was statistically significant differences was observed between the control and the study group after implementation of structured educational package in favor of the study group, also, in the follow up period of the study group, there was significance differences was noted between one and three months and between initial and three months. This significant could related to the fact that medication, information and lifestyle managements are essential parts in controlling epilepsy which consequently reflecting more self-efficacy especially with the effect of the structured educational package that impels patient to have better self-efficacy.

Along the three months of the study, almost overall self-efficacy the percent score was nearly the same or slightly increased in the control group, on the other hand in the study group there were tripled after one month and get increased to fourfold after three months. This improvement may be related to the improvement the patient experience day to day after application of the educational package reflected on self-efficacy subscales.

In the same context a study conducted by **Pandey et al, (2019)** which concluded that unserved epileptic patients with intervention and education had lower self-efficacy than who are

served with comprehensive educational program which highlight the positive effect of nursing educational package on epileptic patients' self-efficacy in addition to the educational package has the advantage of continuous positive effect over time as the more education will increase the patients' self-efficacy

Concerning the level of patients' self-efficacy, no one of the control group have good level of self- efficacy along the study period but in the study group the good level was noted in more than one third after one month and increased to reach two thirds after three months with statistically significant differences between both groups. This good level of the self-efficacy in the study group could be related to the gradual effect of the educational package that the patients notice positive effect that improve self-efficacy which encourage him to be more committed to the educational package the increase self-efficacy more and more. These results were in the same line with **Elnaser et al., (2018)** who concluded that when epileptic patient understand his condition, medication effect and side effects and healthy lifestyle he will have better self-control that can improve his self-efficacy.

In another study by **Yildirim & Yildiz, (2022)** who found that epilepsy self-efficacy scale had increased with statistical significance in epileptic patient who received information regarding their condition and their medications. In accordance, **Lee et al, (2020)** stressed on effect on controlling physical and psychological aspects of epileptic patients mainly seizure management and lifestyle management had positive effect of their

self-efficacy. Also**, Rabiei et al., (2022)** emphasize the significant effect of the educational program for epileptic patients in improving their self-efficacy.

As regard drug adherence subscales, the current study stated that there was statistically significant improvement of all drug adherence subscales which included epilepsy and treatment knowledge and expectations, adherence to medications and clinic appointments, barriers to medication adherence and beliefs about medication efficacy post implementation of the structured educational package. Concerning to overall drug adherence scores the present study revealed that statistically significant increase in the mean percentage in overall drug adherence subscales and the mean percentage approximately doubled after three months among study group. On the contrary, in the control group the mean percent score was nearly the same with no improvement pre, after one and three months.

High level of overall drug adherence subscales was found in only four percent of the control group after three months, on the contrary, it was present in about two thirds of the study group at three months post implementation of the structural educational package. **Dash, et al., (2015),** in their study found that application of the educational program for six months increasing scores of medication adherence which is in harmony with the results of the current study. Both studies proved that educational program has a positive impact on increasing epileptic patients' adherence to his medications which enables him to cope which his chronic condition and has more

722

contentedness to his condition. The same results were illustrated by **Seethalakshmi, et al., (2015**), who highlight the effect of educational program on different aspect of epileptic patient management including medications. Similarly, another study conducted by **Hu, et al., (2020)** who found that drug adherence among the study group increased post attendance epilepsy education program and mean score showed statistically significant.

The current study found that a significant positive correlation between drug adherence and self-efficacy among the study group patients after one month of implementation of the structured educational package. A higher significant correlation in the study group than in the control group was noted after three months of the study. In congruence with this result, a study by **Adadıoglu & Oguz, (2019)**; **Ali, (2019)** concluded that increasing self-efficacy of epileptic patients can improve their control of epilepsy including self-care and adherence to medications and added that education can be used to create positive change in attitude and self-efficacy, this education should focus on medications, monitoring seizures and self-management activities.

Another significant positive correlation was mentioned by **Mersal, (2021)** in his study after applying evidence-based guidelines as an educational tool for epileptic patients in pre, post and follow up evaluation. In the same line a study by **Leenen et al., (2018)** also illustrated that there was positive significant difference on self-efficacy and drug adherence among other aspects in their study of multi study group on his study of Effectiveness of a multicomponent self-

management intervention for adults with epilepsy.

This finding is congruent with **Martos-Méndez, (2015)** who proved that low self-efficacy was associated with non-adherence to health recommendations including medications, on the other hand epileptic patients with positive self-efficacy will more adherence to medication and vice versa. Comprehensive assessment of epileptic patients enables nurse to plan and implement nursing educational package for these patients to enhance their adherence to prescribed medications thus effectively increase their control of the disease.

CONCLUSION

The structured educational package for epileptic patients had a positive effect on increasing the self-efficacy and adherence to medications, that means the more the patient adhere to the treatment program the more he can cope with disease and mange his life efficiently that improves patient's self-efficacy which indicate the approval and acceptance of the study hypotheses.

RECOMMENDATIONS

- Engage the structured educational package in the treatment plan of epileptic patients' side by the with the traditional treatment.
- Consider the self-efficacy as an important aspect of epileptic patient assessment, planning, implementation and follow up plan.
- Provide well designed manual handouts for epileptic patients containing simple explanations about epilepsy and self-

management with each follow up visit.

- Using mass media as educational tool about epilepsy, risk factors, manifestations and treatment program for epileptic patients and the whole community.
- Conduct additional research to identify the factors influencing the self-efficacy and drug adherence among epileptic patients.

REFERENCES:

Abdel-Whahed, W. Y., Shaheen, H. A., Thabet, S. H., & Hassan, S. K. (2022). Epidemiology of Epilepsy in Fayoum Governorate, Egypt: A Community-based Study. The Egyptian Family Medicine Journal, 6(1), 19-33.

Adadıoglu, O., & Oguz, S. (2019). Impact of self-efficacy on epilepsy management. *Int J Health Sci Res*, *8*(5), 393-7.

Ali, B. R. M. (2019). Impact of Self-Efficacy of Patients' with Epilepsy on Self-Care in Al-Najaf Al-Ashraf City, Kufa Journal for Nursing Sciences, 9(2).

Badawy, G., Abusaad, F., & Hashem, S. (2018). Effect of an educational program for adolescents with epilepsy on their quality of life and self-management skills. *Mansoura Nursing Journal*, 5(1), 41-53.

Baker, C. (2017). Quantitative research designs: Experimental, quasi-experimental, and descriptive. Evidence-based practice: An integrative approach to research, administration, and practice, 155-183.

Beghi, E., Giussani, G., Nichols, E., Abd-Allah, F., Abdela, J., Abdelalim, A., ... & Murray, C. J. (2019). Global, regional, and national burden of epilepsy, 1990–2016: a systematic analysis

for the Global Burden of Disease Study 2016. *The Lancet Neurology*, *18*(4), 357-375.

Bell, G.S., and Liu, R.S. (2016). Provision of clinical services for people with epilepsy. UCL Institute of Neurology, National Hospital for Neurology and Neurosurgery; chapter 57 Available at: https://www.epilepsysociety.org.uk/sites/defaul t/files/attachments/Chapter57BellLiu2015.pdf

Carbone, L., Zebrack, B., Plegue, M., Joshi, S., & Shellhaas, R. (2013). Treatment adherence among adolescents with epilepsy: what really matters? *Epilepsy & Behavior*, *27*(1), 59-63.

Das AM.RamamoorthyL, Narayan SK, Wadwekar V, (2018). Barriers of drug adherence among patients with epilepsy: in tertiary care hospital, South India. *Journal of Caring Sciences*, *7*(4), 177.

Dash, D., Sebastian, T. M., Aggarwal, M., & Tripathi, M. (2015). Impact of health education on drug adherence and self-care in people with epilepsy with low education. *Epilepsy & Behavior,* 44, 213-217.

Dilorio, C., & Yeager, K. (2001). The epilepsy self-efficacy scale. *Measurement of nursing outcomes*, *3*, 40-51.

Edward, K. L., Cook, M., & Giandinoto, J. A. (2015). An integrative review of the benefits of self-management interventions for adults with epilepsy. *Epilepsy & Behavior,* 45, 195-204.

Elnaser, A., Gamal, M., Abd Allah, E. S., Ali, H. H., & Metwally, S. M. (2018). The Effect of Nursing Intervention Program on Self-Management and Social Support of Adult Epileptic Patients. Zagazig Nursing Journal, 14(2), 134-152.

Hu, M., Zhang, C., Xiao, X., Guo, J., & Sun, H. (2020). Effect of intensive self-management education on seizure frequency and quality of life in epilepsy patients with prodromes or precipitating factors. *Seizure*, *78*, 38-42.

Lee, S. A., Kim, S. J., & Korean QoL in Epilepsy Study Group. (2020). Self-efficacy in seizure management differentially correlated with quality of life in persons with epilepsy depending on seizure recurrence and felt stigma. *Seizure*, *81*, 91-95.

Leenen, L. A., Wijnen, B. F., Kessels, A. G., Chan, H., de Kinderen, R. J., Evers, S. M., ... & Majoie, M. H. (2018). Effectiveness of a multicomponent self-management intervention for adults with epilepsy (ZMILE study): a randomized controlled trial. *Epilepsy & Behavior*, *80*, 259-265.

Martos-Méndez, M. J. (2015). Self-efficacy and adherence to treatment: the mediating effects of social support. *Journal of Behavior, Health & Social Issues*, *7*(2), 19-29.

Mersal, F. A. (2021). Impact of Applying Evidence-Based Guidelines for Epileptic Patient on Their Knowledge, Self-Efficacy, Drug Adherence and Quality of Life. *EC Nursing and Healthcare*, *3*, 40-54.

Michaelis, R., Niedermann, C., Reuber, M., Kuthe, M., & Berger, B. (2018). "Seizures have become a means of somehow learning things about myself"—A qualitative study of the development of self-efficacy and mastery during a psychotherapeutic intervention for people with epilepsy. *Epilepsy & Behavior*, 84, 152-161.

Mohammed, A., & Abou Zed, S. A. (2020). Effect of Educational Program on Frequency of Epileptic Attacks and Self-Efficacy for Adolescents. *Egyptian Journal of Health Care*, *11*(2), 1-19.

Morrison, G. R., Ross, S. J., Morrison, J. R., & Kalman, H. K. (2019). Designing Effective Instruction John Wiley & Sons. *Inc., United States*.

Moursy, A. M. E., & Mekky, G. F. (2015). Effect of self-management guidelines for adult patients with epilepsy on their health practices. *Life Science Journal*, 12(4), 77-64.

Mugumbate, J., & Zimba, A. M. (2018). Epilepsy in Africa: past, present, and future. *Epilepsy & Behavior*, *79*, 239-241.

Pandey, D. K., Levy, J., Serafini, A., Habibi, M., Song, W., Shafer, P. O., & Loeb, J. A. (2019). Self-management skills and behaviors, self-efficacy, and quality of life in people with epilepsy from underserved populations. *Epilepsy & Behavior*, *98*, 258-265.

Patel, R. S., Elmaadawi, A., Mansuri, Z., Kaur, M., Shah, K., & Nasr, S. (2017). Psychiatric comorbidities and outcomes in epilepsy patients: an insight from a nationwide inpatient analysis in the United States. *Cureus*, *9*(9).

Rabiei, L., Lotfizadeh, M., Karimi, Z., & Masoudi, R. (2022). The effects of self-management education and support on self-efficacy, self-esteem, and quality of life among patients with epilepsy. *Seizure*, *102*, 96-104.

Seethalakshmi, A., Shankar, V., & Samson, R. (2015). Effectiveness of an epilepsy education programme on the self-management among patients with epilepsy. IOSR Journal of Nursing and Health Science, 4(5), 33-54.

Singh, A., & Trevick, S. (2016). The epidemiology of global epilepsy. *Neurologic clinics*, *34*(4), 837-847.

Smith, G., Plueger, M., & Wagner, J. L. (2019). Evidence-based epilepsy care: Assessment, treatment, and self-management. American Nurse Today, 14(7), 6-12.

Sridhar, S. P. (2019). A Study on Clinical and Biochemical Correlation between Various Types of Seizures and Pseudo seizures (Doctoral dissertation, Stanley Medical College, Chennai).

Stafstrom, C. E., & Carmant, L. (2015). Seizures and epilepsy: an overview for neuroscientists. *Cold Spring Harbor perspectives in medicine, 5(6), a022426.*

WHO, World Health Organization, Epilepsy Fact Sheets: Epilepsy updated, (2019a). Available at: http://www.who.int/en/news-room/fact-sheets/detail/epilepsy.

WHO, World Health Organization, (2019b) *Epilepsy: a public health imperative*. World Health Organization, Available at https://apps.who.int/iris/bitstream/handle/10665/325293/9789241515931-eng.pdf.

Yildirim, M. S., & Yildiz, E. (2022). Determination of self-efficacy of patients diagnosed with epilepsy. *Neurological Sciences*, *43*(4), 2709-2715.

Zafar, A., Shahid, R., Nazish, S., Aljaafari, D., Alkhamis, F. A., Alsalman, S., ... & Alabdali, M. (2019). Nonadherence to antiepileptic medications: Still a major issue to be addressed in the management of epilepsy. *Journal of neurosciences in rural practice*, *10*(01), 106-112.

Zullig, L. L., & Bosworth, H. (2017). Engaging patients to optimize medication adherence. *NEJM Catalyst*, *3*(3).