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# Effect of Educational Training Program on Improving Drug Adherence among Adolescents with Epilepsy

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**ABSTRACT:**

**Background:** Epilepsy is a chronic medical condition, which requires long term management. Adherence to antiepileptic drugs is crucial for preventing the risk of recurrent seizures.The consequence of non-adherence can severely compromises patient health, quality of life and survival. **Aims:** was to evaluate the effect of educational training program on improving drug adherence among adolescents with epilepsy. **Subjects & methods: Research design**: A quasi experimental design was used. **Subjects:** A purposive sample of 50 epileptic adolescents. **Setting**: Pediatric Neurology Outpatient Clinic at Zagazig University Hospital, Zagazig, Egypt. **Tools of data collection:** three tools were used to collect the necessary data included; a structured interview questionnaire, Epilepsy knowledge questionnaire,Morisky 8-Item Medication Adherence Scale (MMAS-8) and number of seizure frequency. **Results**: It was found that epileptic adolescents' adherence to antiepileptic drug therapy and knowledge about medication were significantly improved after implementation of the intervention (P=0.001).**Conclusion:** the educational training intervention has a profound effect on improving adherence to antiepileptic drug therapy, knowledge about disease and medication with dramatically decline in seizure frequency. **Recommendations:** drug adherence strategies must be discussed with epileptic adolescents and their families to help them comply with medication regimen.

**KEYWORDS**: Epilepsy, Adherence, Antiepileptic drug therapy, Educational Training intervention

## INTRODUCTION

Epilepsy is a common serious neurological disorder in children and adolescents that affecting 10.5 million children under the age of 15 years in the world with an estimated two million new cases occur each year globally (Akman& De Vivo, 2018). The prevalence of epilepsy is higher in developing countries, with aratio of 7 to 14 in 1000 people (WHO, 2019). In Africa, epilepsy affected about 10 million people (Mugumbate&Zimba, 2018).In Egypt, the age-specific lifetime prevalence of epilepsy among children and adolescents (< 18 years of age)

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was 9.7/1000 Farghaly et al., (2018). Long-term antiepileptic drug (AED) administration remains the main therapy in the management of epilepsy, with the right AEDs, up to 70% of patients with epilepsy could become seizure free (WHO, 2019). Unfortunately, non-adherence is a significant problem for youth with epilepsy, with rates around 25% (Smith et al., 2018). Medication adherence is the major significant element of effective epilepsy management and is defined as the extent to which a person's behavior for taking medications corresponds with the agreed recommendations from a healthcare provider(Ozuna et al.,2018). Poor adherence to long-term antiepileptic drugs strongly changes therapeutic efficacy making this a serious global health problemfrom all aspects of life (Gollwitzer et al., 2016); and result in a great deterioration of disease, and death, with increase in the health care costs (Dwajani et al., 2018). Most adherence research to date was demonstrated non-adherence rates from 42% to 60% in pediatric epilepsy (Yang et al., 2018). Lack of knowledge about epilepsy; forgetting to take medication; inadequate problem solving, communication and self- management strategies; as well as lack of social support all lead to non-adherence (Smith et al., 2019). As the large proportion of the patient with epilepsy are non-adherent to treatment regime, it is crucial to provide them 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).Pediatric nurse plays a corner stone in the process of managing children with epilepsy that mainly focuses on educating and providing support to the child and family to help them cope with the challenges of living with chronic epilepsy disorder (Ricci et al., 2013).Evidence indicated that, patient education and counseling provided by health care providers had mostly a positive effect on medication adherence; morbidity rate; healthcare utilization and patient satisfaction Wilhelmsen& Eriksson, (2019).

## SIGNIFICANCE OF THE STUDY

Epilepsy is multifaceted chronic neurological disorder in adolescents that requires lifelong treatment; daily antiepileptic drug (AED) administration remains the primary treatment option for epilepsy management. Non-adherence is a very serious issue, and associated with many negative outcomes for patients including, alters the efficiency of treatment, poor seizure control, convulsive status epilepticus and sudden unexplained death in some cases, decreased quality of life and disease progression. Due to those consequences, health care team should develop appropriate strategies to improve adherence rates among those patients through comprehensive education and counseling about disease and treatment; modifying non-adherence barriers; providing good communication with health care providers; as well as continuous evaluation of adherence.

### Aim of the study

The aim of this study was to evaluate the effect of educational training program on improving drug adherence among adolescents with epilepsy.

1. Evaluate epileptic adolescent's level of knowledge about the disease and treatment regimen.
2. Assess epileptic adolescent's adherence to their antiepileptic drug regimen.

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3. Plan and implement the educational training program about drug adherence strategies for adolescents with epilepsy.
4. Evaluate the effect of the educational training program on improving epileptic adolescents' adherence to their antiepileptic drug therapy.

**Research hypothesis**

Epileptic adolescent's adherence to their treatment regimen will be improved after implementation of the educational training program.

## SUBJECTS AND METHODS

**Research design**

A quasi- experimental design (Pre, Post, and follow up) was used to conduct this study.

**Study Setting**

The present study was conducted at the Pediatric Neurology and Epilepsy outpatient clinics at Zagazig University Hospitals.

**Study Subjects**

A purposive sample composed of 50 adolescents suffering from epilepsy and their parents who accepted to participate in the current study according to the following criteria:

- Age: from 13 to 18 years.
- Adolescents with confirmed diagnosis with epilepsy by neurologist based on (detailed history, clinical symptoms, and Laboratory evaluations, EEG, CT scan or MRI).
- Adolescents with normal developmental neurological development.

**Tools of Data Collection**

Three tools were used for data collection.

**Tool I: A structured interview questionnaire:** that composed of two main parts:

Part 1: Characteristics of the studied subjects: This part of the questionnaire concerned with: (Demographical data, disease history: and data about treatment (AEDs) regimen. Part 2: factors affecting epileptic adolescents' adherence to antiepileptic (AEDs) drug therapy.

**Tool II: Epilepsy Knowledge Questionnaire**

It composed of two main parts**,** pat one: dealing with knowledge about medical aspects of epilepsy. Part two: covered adolescents' knowledge about treatment regimen (AEDs). A scoring system of knowledge was: (1) score for each correct response and (0) for the incorrect or if the answer was (I do not know), then the sum of scores for each dimension and total score was calculated by summing the scores given for its responses.For each part scores of items were transformed into score % as follows: Unsatisfactory if $< 50\%$ and Satisfactory if $\geq 50\%$.

**Tool III: Measures for adherence**

**Part I: Morisky 8-Item Medication Adherence Scale (MMAS-8)**

In this study, self-reported adherence to antiepileptic drug therapy was assessed using the eight-item Morisky Medication Adherence Scale (MMAS-8) (Morisky et al., 2008). The scale contains eight questions each item of them measured a specific adherence behavior, with the first seven closed ended questions with yes /no answers while the last question answered on a 5-point Likert scale (A: Never/Rarely, B: Once in a while, C: Sometimes, D: Usually, E: All

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the time).According to the scoring system for the 8- MMAS: Each "yes" response was scored as 1 point and a "no" response was counted as 0 point. For the last question never/rarely response was scored as (0) and once in a while, sometimes, usually and all the time were scored as (1). A total score will be classified as 0 = high adherence; scores of 1 or 2 = medium adherence, and scores > 2 = low adherence.

**Part II: Seizure frequency**

Seizure frequency is assessed by counting numbers of seizures (Events) in specified time period (per month). The interpretations include the number of patients whose seizure frequency or rate decreased **(Cramer, 1998).** The researcher instructs the epileptic adolescent and their parents to record seizure frequency in every day using a seizure dairy including (seizure type, what happens, how long it lasts, how often and most common seizure triggers) and then report it to the researcher each visit to the clinic. The baseline for each patient was considered to be the number of seizures during the preceding month to the study.

## INTERVENTION

The educational training program aims to improve epileptic adolescents' adherence to their antiepileptic drug regimen.

Through assessment phase each epileptic adolescent were interviewed individually and privately to obtain personal and medical history also identify factors affecting drug adherence (Tool I); assess their knowledge about epilepsy and treatment regimen (Tool II), as well adherence to medication (Tool III) (pre-test) within 30-40 minutes.The educational content was divided into two main parts. The first part included education about the medical aspects of epilepsy including definition, types, signs & symptoms, and seizure etiology, triggers, methods of diagnosis and investigation, preventive measures, as well as danger activities and harm sports which expose child to risk during attack,seizure first aid, and the second part included information about treatment (AEDs), the importance of adherence and the consequences of non-adherence, modifying non- adherence barriers. Educational sessions were explained in simple Arabic language that suits the level of the studied adolescents' education. Motivation and reinforcement during each session were used in order to enhanceadolescents' learning.Telephone follow up calls wereperformed to the patients to remind them about the next session and their appointments.After implementation of the program the studied adolescents were reassessed (posttest) using the same pre format and follow up was made after three months to examine the current research hypothesis

## CONTENT VALIDITY AND RELIABILITY

For validity assurance purpose, tools were developed after review of the related literature then submitted to a Jury of five experts in the fields (two professors ofpediatric Neurology, one professor of medical surgical nursing, one professor of pediatric nursing and one professor of biostatistics). Therecommended modifications were done andthe final forms were ready for use. A reliability testwas done for Morisky 8-Item Medication Adherence Scale (MMAS-8) and acceptable consistency was found with Cronbach's Alpha 0.791. Also good consistency was determined for epilepsy knowledge questionnaire was 0.82.

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**Fieldwork**

- The researcher attended the Pediatric Neurology Outpatient Clinic four days/week (Saturday, Sunday, Tuesday, and Wednesday) for data collection and implementation of the intervention from 9:00 a.m. to 2:00 p.m. Data collection took a period of 9 months starting from December 2018 to August 2019.
- After identifying the subjects who fulfilled the criteria of the study, the researcher started with explained the aim and process of the study briefly and obtained oral consent from every epileptic adolescent who were willing to participate. The researcher also, determined the place of meeting and timetable. Each epileptic adolescent was interviewed individually in the presence of his/her parents to collect the necessary data and to assess their knowledge about the disease and AEDs, frequency of seizure and assess their adherence to AEDs therapy.
- The details about AEDs taken were recorded into a diary by the researcher at the assessment phase including (medication name, total daily dose, route, frequency, daily time of taking the drug, as well as rescue medications if used) then the researcher instructed the adolescents to write down daily seizure medication (administration date, time, reasons of not taking or completing the prescribed dose) and encourage them to incorporate AEDs administration into their activities of daily lives (as meal times or prayer times) and to transform their daily routines into cues to take their AEDs. The researcher saw these diaries at every visit to the clinic and simple rewards were given to the studied adolescents to motivate them to complete diaries and adhere to their AEDs as a strategy for improving drug adherence.
- The researcher instructs subjects and their parents to record seizure frequency in every day using a seizure dairy including (seizure type, what happens, how long it lasts, how often and most common seizure triggers) and then report it to the researcher each visit to the clinic as a part of seizure management.
- Seizure frequency was reassessed and reported after the intervention and again three months later (follow up).
- Weekly telephone calls were done to remind and encourage every patient to adhere to his/her medications, track seizure attacks in every day and then record that in their diaries.

***Pilot study:***

A pilot study was carried out on five (10%) of epileptic adolescents to test the study tools in terms of its clarity, arrangement, applicability of its items and the item required to fill, Data obtained from the pilot study were analyzed and accordingly the necessary modifications in the study tools were done.

**Administrative and ethical considerations**

A written permission was obtained to conduct the study by submission of an official letter issued from the dean of Faculty of Nursing to the responsible authorities of Out-patient Clinics Hospital "Pediatric Neurology Clinic" and "Epilepsy Clinic" at Zagazig University Hospital to obtain their permission for data collection. All ethical issues were taken into consideration during all phases of the study: theresearcher maintained an anonymity and confidentiality of the subjects. The purpose and process of the study was explained to every patient before participation and an oral consent was obtained. Participants were notified that

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they can withdraw at any phase of the study; also they were assured that the information obtained during the study will be confidential and used for the research purpose only.

## STATISTICAL ANALYSIS

The collected data were coded and entered to statistical software SPSS version 20.0 program by which the analysis was conducted applying frequency tables with percentages and cross tabulations. Descriptive statistics (frequencies and percentages were used for qualitative variables; mean, standard deviation for quantitative variables). Friedman test for several related samples (F): used to obtain repeated measurements on the study sample through three phases of the study (pretest, posttest and follow-up). Pearson's chi square test (X2): was used to find the significant relation between demographical characteristics of the studied group and their knowledge. It was also used to find the significant association between status of adherence and clinical variables of the studied subjects.Pearson correlation coefficient (r) was used to find the correlation between total score of Morisky scale and total knowledge score. P value was statistically significant at < 0.05 and highly statistically significant at < 0.01.

## RESULTS

Table (1) shows Characteristics of the studied epileptic adolescents. About 58% of studied sample were males. The mean age of the studied epileptic adolescents was 15.4 ± 1.9 years. Regarding to onset of the disease, 50% of the studied group showed disease symptoms during infancy or early childhood (< 6 years) with a mean age 2.4± 1.05 years while; the mean duration of the disease was 2.2 ± 0.84 years. In relation to types of epilepsy, 70% of epileptic adolescents suffering from generalized epilepsy. It was also found that Sodium valproate was the commonest AED prescribed (64%) followed by Levetiracetame (52%) and carbamazepine (24%) respectively.Table (2) summarizes the total knowledge score of studied epileptic adolescents. It was revealed that 28% of epileptic adolescents had satisfactory knowledge score before the implementation of the intervention compared to 92% following the intervention. On the other hand, the percentage of unsatisfied adolescents with total knowledge scores was decreased from 72% pre- intervention to 8% post- intervention. The differences were highly statistically significant (P <0.01).Total score of medication adherence was represented in table 3. As observed from this table, the percentage of high adherent epileptic adolescents was increased from 8% pre-intervention to 50% after implementing the intervention. Meanwhile, the percentage of the epileptic adolescents with low adherence score decreased from 78% at pre-intervention to 10% at post- intervention. The difference was highly statistically significant through three phases of the study (P <0.01). Distribution of the studied group regarding seizure frequency per month was clarified in table 4. The results revealed a highly statistically significant changes regarding seizure frequency rate through study phases (P= .002**) that indicated the major role of the intervention program on seizure control. Table 5 summarizes association between total adherence scores with clinical characteristics of the studied sample. The present study revealed a statistically significant association betweenadherence to medication and age of patients, type of epilepsy, duration of disease, and duration of treatment as well as adverse drug effects.

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## DISCUSSION

The results of the present study revealed highly statistically significant improvements in epileptic adolescents' adherence to their antiepileptic drug therapy after implementation of the intervention. According to Morisky 8-items Medication Adherence Scale, the percentage of adherent adolescents increased from 22% before the intervention to 88% after the intervention which reflects the effect of the educational training intervention on improving adolescents' adherence to their medications. In a systemic review included 12 studies reporting data on 1642 participants Al-Aqeel et al., (2017) supported the previous findings as they found that educational interview positively impact the medication adherence of patients with epilepsy. Al-Ajmi et al., (2017) also agreed with the results of the present study, and found statistically significant difference in adherence in the intervention group (P = 0.024). In contrast, Smith et al., (2018) who carried out a study to identify patterns and predictors of adherence in adolescents with epilepsy over one year in USA found that the baseline adherence to AEDs was 86.05% that monitored electronically via MEMS Track Caps and the average adherence rate was 75% over one year.When the results of our study were analyzed, a highly statistically significant improvements in epileptic adolescents' total knowledge score about epilepsy and treatment regimen was demonstrated after implementing the educational training intervention (P<0.01), where the majority of the studied group had satisfactory knowledge scores following the intervention. This difference could be related to thenature and the effect of the program, its content; teaching methods and interactive media used to impart knowledge; telephone follow up calls to remind participants about the next session additionally discuss any concerns about the disease and treatment regimen with them. In a randomized controlled trial in UK Dorris et al., (2017) found a significant increase in epilepsy knowledge in the treatment group after implementing (six weekly 2-hour sessions) by an epilepsy nurse and a clinical psychologist. Similar findings were also reported bySouza et al., 2018 in a multicenter study inBrazilwho found a significant difference in scores regarding the medical aspects of epilepsy (p<0.001). Forgetfulness was the most common cause of non-adherence as reported by many studies(Gabr& Shams, 2015); (Asadi-Pooya et al., 2016) and (Gurumurthyet al., 2017).These findings supported the present study as forgetfulness by patients or carelessness by their caregivers was the major reason for non-adherence. These reasons could be due to the normative development of this studied group (adolescence) who spend more time out of their homes for study or playing and forget to take their medicine or skipping doses of medication.Other important reasons for non- adherence as reported by the studied group in our study were being was not at home (56%); wanted to avoid side effects (46%); did not want other people seeing them taking drugs (38%); had problems with medication timing as well as felt depressed or overwhelmed (36%). The previous findings go in line with Dugassa et al., (2017) who found nearly the same reasons with different percentages as follows; forgetfulness (73.2%), feeling sick/side effects (60.6%), being away from home (26.8%), and Poly-pharmacy (Drugs are too many) (22.5%). Asadi-Pooya et al., 2016 andNazziwa et al., 2018 reported that high drug price and lack of drug availability related to high costwere factors for drug non adherence. However, in the present study these barriers represent small percentage (20%) as the cost of medications was covered in the insurance scheme in nearly all the patients.Non adherence may be the most important cause of poorly controlled epilepsy (Gabr&Shams, 2015). So factors associated with non - adherence should be identified and modified. In order to overcome the

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previous barriers in our study, we used simple interventions to encourage the studied adolescents to be more adherent to their medications as; a reminder system via available alarms (wrist watch or cell phones) to remind them take their medications in the accurate time in combination with; medication schedule (diary) that the researcher used to encourage the studied sample to take their medication daily and write down the actual (dosage and time) of administration. Also communication with patients through weekly telephone calls to follow their medication recoding. Moreover, motivational technique and encouragement of the studied adolescents through small gifts as rewards for their adherence and taking medication regularly, all of them had a great role in adherence to AEDs and reduction of forgetfulness. The previous conclusion supported by Al-Aqeel et al., 2017 who stated that medication adherence could be enhanced through simplified dosage regimen, combinations of more thorough patient instruction and counseling, intensive reminders, close follow-up, supervised self-monitoring, rewards for success, family therapy, psychological therapy and telephone follow-up.The current study showed highly statistically significant decline in the percentage of epileptic adolescents from pretest to posttest phases (78% vs. 10% respectively) in relation to this item "sometimes forget to take medications" according to (8-items MMAS). In accordance, a study in China by Tang et al., (2014) described that providing educational interventions through counseling could alter the patient behavior to be more concern about the administration schedules. This may provide a better effect on the level of medication adherence with a reduction in the percentage of the forgetful taking of drugs from 70% to 45%.Ernawati et al., (2018) stated that adherence to AEDs for patients with epilepsy is an important factor and affects the outcome of seizure control. The current study showed that, there was a highly statistically significant changes regarding seizure frequency throughout the study phases (F test= 18.930 with P= .002**) as a secondary outcome measure to adherence. As the percentage of epileptic adolescents who had no seizure per month increased from 26% at pre-intervention to 38% at post- intervention. Moreover, the percentage of studied adolescents who had more than ten seizures per month dropped from 34% to 12% respectively after implementing the intervention. As supporting evidence, Dash et al., (2015) found a significant increase in thepercentageof patients who had decrease in seizure frequency in the epilepsy health education group compared to the control group. Similarly, Hagemann et al., (2016) who conducted a study in Germany found that, children's seizure frequency significantly decreased from baseline to follow-up in both the intervention and the control group. Recently, Hu et al., (2020) concluded that, intensive educational intervention may reduce seizure frequency and improve drug adherence.As observed from the present study, there was statistically significant association between adherence to medication and age of patients. This findings supported by (Jacob et al., 2017) and (Yang et al., 2020). Medication adherence was significantly and adversely affected by increasing duration of epilepsy.The same results were reached by the present study and others by Shetty et al., (2016); Jacob et al., (2017) who indicated that children with longer duration of disease were more likely to be classified as non-adherent.Generalized tonic-clonic (GTC) seizures were the most common seizure type among children and adolescents (Asadi-Pooya et al., 2016). In the present study too, most of the studied adolescents had generalized tonic-clonic seizures. Similar results were also reported by (Farghaly et al., (2018). Shah et al., (2013) and Yang et al., (2020) were in agreement with the current study as seizure type was significantly associated with adherence status. On contrary, Gabr and Shams, (2015) andZafar et al., (2019) didn't found any association between the rate of non-adherence and seizure type.Complex treatment is believed to

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threaten patient's adherence (Shams&Barakat, 2010). In the present study a statistically significant difference was found between treatment complexity and status of adherence (P=0.001). Similar results were noted in other studies by (Gaber& Shams, 2015); (Das et al., 2018) and who showed that as the number of drugs increases, adherence decreases. On the other hand, Guo et al., (2015) did not associate non-adherence with mono/ polytherapy. The most commonly reported AEDs side effects in the present study were related to the central nervous system: drowsiness (34%); somnolence (26%); difficulty concentrating or remembering (22%); headache (16%); fatigue and tiredness (10%) that had a highly statistical association with status of medication adherence. Kassahun et al., (2018) and Elsayed et al., (2019) also demonstrated the same results. The previous findings were differed from the results of Zafar et al., (2019) and Malik et al., (2019) who could not find any statistically significant association of age, gender and duration of treatment with AED adherence.Based on the above mentioned results either in the present study or other studies it can be concluded that, the significant improvement in epileptic adolescents' level of adherence may be related to the effect of structured educational sessions; continuous communication with patients via follow up calls; modifying the major adherence barrier (forgetfulness); continuous evaluation of adherence: as well as motivation and encouragement of the studied adolescents to adhere to their medications, these mixed interventions have produced promising effects on adherence.

## CONCLUSION

In the light of the present study, it was concluded that comprehensive educational training program for adolescents with epilepsy had a profound effect on improving their medication adherence; with decline in seizure frequency as a secondary outcome measure to adherence; enhancing knowledge about the disease and treatment regimen as well as modifying almost adherence barriers.

## RECOMMENDATIONS

Based upon the findings of the present study, the following are recommended: drug adherence strategies must be discussed with epileptic adolescents and their families to help them comply with medication regimen; continuous, repetitive educational training programs and health instructions for epileptic patients based on their needs would be helpful in managing medication adherence issues;medication adherence should be evaluated continuously and integrated into routine clinical practice at each clinic appointment by health care providers;factors (barriers) that prevent patients fromadherence to medication should be identified and modified if possible in an individualized form to improve their adherence.

### Limitation of the study

There is no available computerized database and incomplete hospital records about patients' data in the study settings this made the researcher depend on patients follow up rates and recording of seizure frequency into their diaries.

### Declaration of Conflicting Interests

The Author(s) declare(s) that there is no conflict of interest.

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## REFERENCES

[1] Akman CI and De Vivo DC. Glucose Transporter Type 1Deficiency Syndrome. In: Pearl PL(Ed). Inherited Metabolic Epilepsies. 2nded. Springer publishing Co, USA.2018. P: 314.

[2] AlAjmi R, Al-Aqeel S, Baz S. The impact of a pharmacist-led educational interview on medication adherence of Saudi patients with epilepsy. Patient Prefer Adherence. 2017 May 18; 11: 959-964. doi: 10.2147/PPA.S124028. PMID: 28572723; PMCID: PMC5441662.

[3] Al-Aqeel S, Gershuni O, Al-Sabhan J, Hiligsmann M. Strategies for improving adherence to antiepileptic drug treatment in people with epilepsy. Cochrane Database Syst Rev. 2017 Feb 3; 2(2):CD008312. doi: 10.1002/14651858.CD008312.pub3. Update in: Cochrane Database Syst Rev. 2020 Oct 22; 10:CD008312. PMID: 28157274; PMCID: PMC6464338.

[4] Asadi-Pooya AA, Tavana B, Tavana B, Emami M. Drug adherence of patients with epilepsy in Iran: the effects of the international economic sanctions. ActaNeurologicaBelgica. 2016 Jun; 116(2):151-155. DOI: 10.1007/s13760-015-0545-6.

[5] Cramer JA. Seizure measurement in clinical trials. J Epilepsy 1998; 11 (5): 256–260.DOI: 10.1016/s0896-6974(98)00027-9Crossref Web of Science®Google Scholar.

[6] Das AM.RamamoorthyL, Narayan SK, Wadwekar V, Barriers of drug adherence among patients with epilepsy: in tertiary care hospital, south India, J Caring Sci. 7 (2018) 177-181.

[7] Dash D, Sebastian TM, Aggarwal M, Tripathi M. Impact of health education on drug adherence and self-care in people with epilepsy with low education. Epilepsy Behav. 2015 Mar; 44:213-7. doi: 10.1016/j.yebeh.2014.12.030. Epub 2015 Mar 11. PMID: 25768712.

[8] Dorris L, Broome H, Wilson M, Grant C, Young D, Baker G, Balloo S, Bruce S, Campbell J, Concannon B, Conway N, Cook L, Davis C, Downey B, Evans J, Flower D, Garlovsky J, Kearney S, Lewis S, Stephens V, Turton S, Wright I. A randomized controlled trial of a manual-based psychosocial group intervention for young people with epilepsy [PIE]. Epilepsy Behav. 2017 Jul; 72:89-98. doi: 10.1016/j.yebeh.2017.04.007. Epub 2017 Jun 7. PMID: 28575774.

[9] Dugassa D, Simegnew D, Melaku G, Assessment of Factors Associated To Poor Treatment Outcomes among Epileptic Patients Taking Anti-Epileptic Medications at Shambu General Hospital, North West Ethiopia, WJAHR. 1 (2017) 1-18.

[10] Dwajani S., PrabhuMr, Ranjana G., Sahajananda H, Importance of medication adherence and factors affecting it. IP Int J ComprAdvPharmacol 2018;3(2):69-77Doi : 10.18231/2456-9542.2018.0018.

[11] Elsayed MA, El-Sayed NM, Badi S, Ahmed MH. Factors affecting adherence to antiepileptic medications among Sudanese individuals with epilepsy: A cross-sectional

survey. J Family Med Prim Care. 2019 Jul;8(7):2312-2317. doi: 10.4103/jfmpc.jfmpc_405_19. PMID: 31463248; PMCID: PMC6691456.

[12] Ernawati L, Islamiyah WR, and Sumarno (2018): How to Improve Clinical Outcome of Epileptic Seizure Control Based on Medication Adherence? A Literature Review. Macedonian Journal of Medical Science; 6(6): 1174–1179.

[13] Farghaly WM, AbdElhamed MA, Hassan EM, Soliman WT, YhiaMA,andHamdy NA. Prevalence of childhood and adolescence epilepsy in Upper Egypt (desert areas).The Egyptian Journal of Neurology, Psychiatry and Neurosurgery; 2018; 54(34): 132-134.

[14] Gabr WM, and Shams, ME (2015): Adherence to medication among outpatient adolescents with epilepsy. Saudi Pharmaceutical Journal; 23 (1):33–40.https://doi.org/10.1016/j.jsps.2014.05.003.

[15] Gollwitzer S, Kostev K, Hagge M, Lang J, Graf W, Hamer HM. Nonadherence to antiepileptic drugs in Germany: A retrospective, population-based study. Neurology 2016; 87 (5): 466-72. Doi: 10.1212/WNL. 0000000000002791.

[16] Gurumurthy R, Chanda K, Sarma G. An evaluation of factors affecting adherence to antiepileptic drugs in patients with epilepsy: a cross-sectional study. Singapore Med J. 2017 Feb;58(2):98-102. doi: 10.11622/smedj.2016022. Epub 2016 Jan 25. PMID: 26805666; PMCID: PMC5311891.

[17] Guo Y, Ding XY, Lu RY, et al. Depression and anxiety are associated with reduced antiepileptic drug adherence in Chinese patients. Epilepsy & Behavior: E&B. 2015 Sep; 50:91-95. DOI: 10.1016/j.yebeh.2015.06.042.

[18] Hagemann A, Pfäfflin M, Nussbeck FW, and May TW (2016): The Efficacy of an Educational Program for Parents Of Children With Epilepsy (FAMOSES): Results Of A Controlled Multicenter Evaluation Study. Epilepsy & Behavior; 64 (Part A):143-151.

[19] Hu M, Zhang C, Xiao X, Guo J, Sun H. Effect of intensive self-management education on seizure frequency and quality of life in epilepsy patients with prodromes or precipitating factors. Seizure. 2020 May; 78:38-42. doi: 10.1016/j.seizure.2020.03.003. Epub 2020 Mar 5. PMID: 32155576.

[20] Jacob L, Hamer HM, Kostev K. Adherence to antiepileptic drugs in children and adolescents: A retrospective study in primary care settings in Germany. Epilepsy & Behavior: E&B. 2017 Oct; 75:36-41. DOI: 10.1016/j.yebeh.2017.07.001.

[21] Malik MA, Rafiq A, Virk O, "Integration of childhood epilepsy into Primary Health Center to Improve Antiepilepsy Drugs (AEDs) Adherence in Resource-Constrained District of Pakistan". Asp J Pediatrics Child Health, vol.1, no.1: 13-19, 2019.

[22] Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive validity of a medication adherence measure in an outpatient setting. J ClinHypertens (Greenwich). 2008 May;10(5):348-54. doi: 10.1111/j.1751-7176.2008.07572.x. PMID: 18453793; PMCID: PMC2562622.

[23] Mugumbate J, ZimbaAM. Epilepsy in Africa: Past, present, and future. Epilepsy Behav. 2018 Feb; 79:239-241. doi: 10.1016/j.yebeh.2017.10.009. Epub 2017 Nov 21. PMID: 29169812.

[24] Nazziwa R, Mwesige AK, Obua C, Ssenkusu JM, Mworozi E. Adherence to antiepileptic drugs among children attending a tertiary health unit in a low resource

setting. Pan Afr Med J. 2014 Jan 22; 17:44. doi: 10.11604/pamj.2014.17.44.3399. PMID: 25018794; PMCID: PMC4085948.

[25] Ozuna J, Kelly P, Towne A, Hixson J. Self-Management in Epilepsy Care: Untapped Opportunities. Fed Pract. 2018 Apr;35(Suppl 3):S10-S16. PMID: 30766395; PMCID: PMC6375434.

[26] Ricci SS, KyleT, and Carman S: Nursing Care Of Child with A neurological Disorders. In: Maternity and pediatric nursing. 2nd ed. Lippincott Williams & Wilkins, Philadelphia. 2013. P.1159.

[27] Shah NM, Hawwa AF, Millership JS, Collier PS, Ho P, Tan ML, Peake D, Tirupathi S, Bothwell J, Bailie N, Shepherd C, Craig J, McElnay JC. Adherence to antiepileptic medicines in children: a multiple-methods assessment involving dried blood spot sampling. Epilepsia. 2013 Jun; 54(6):1020-7. doi: 10.1111/epi.12126. Epub 2013 Feb 28. PMID: 23448146.

[28] Shams ME, Barakat EA. Measuring the rate of therapeutic adherence among outpatients with T2DM in Egypt. Saudi Pharm J. 2010 Oct;18(4):225-32. doi: 10.1016/j.jsps.2010.07.004. Epub 2010 Jul 30. PMID: 23960731; PMCID: PMC3730985.

[29] Shetty J, Greene SA, Mesalles-Naranjo O, Kirkpatrick M. Adherence to antiepileptic drugs in children with epilepsy in a Scottish population cohort. Dev Med Child Neurol. 2016 May;58(5):469-74. doi: 10.1111/dmcn.12942. Epub 2015 Nov 2. PMID: 26521659.

[30] Souza P, PortesLA,Thomas RK, Bonito JR,Rua M, Pacheco FJ, PlaatjesP,Oliveira NC, Knowledge about epilepsy in university health students: A multicenter study, Epilepsy Behav. 79 (2018) 112-116.https://DOI: 10.1016/j.yebeh.2017.11.016.

[31] Smith AW, Mara CA, Modi AC. Adherence to antiepileptic drugs in adolescents with epilepsy. Epilepsy Behav. 2018 Mar; 80:307-311. doi: 10.1016/j.yebeh.2017.12.013. Epub 2018 Feb 9. PMID: 29429909.

[32] Smith G, Pleuger M and Wagner JL: Evidence-based epilepsy care: Assessment, treatment, and self-management. American Nurse Today; 2019; 14(7): 1-7.

[33] Tang F, Zhu G, Jiao Z, et al. The effects of medication education and behavioral intervention on Chinese patients with epilepsy. Epilepsy & Behavior: E&B. 2014 Aug; 37:157-164. DOI: 10.1016/j.yebeh.2014.05.017.

[34] Wilhelmsen NC, Eriksson T. Medication adherence interventions and outcomes: an overview of systematic reviews. Eur J Hosp Pharm. 2019 Jul; 26(4):187-192. doi: 10.1136/ejhpharm-2018-001725. Epub 2018 Nov 16. PMID: 31338165; PMCID: PMC6613929.

[35] WHO. World Health Organization. Epilepsy Fact Sheets: Epilepsy, updated. 2019: Available from: http://www.who.int/en/news-room/fact-sheets/detail/epilepsy. Accessed on (June 20, 2019).

[36] Yang C, Hao Z, Yu D, Xu Q and Zhang L: The prevalence rates of medication adherence and factors influencing adherence to antiepileptic drugs in children with epilepsy: A systematic review and meta-analysis. Epilepsy Research; 2018; 142:88-99. doi:10.1016/j.eplepsyres.2018.03.018.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 3, 2021, Pages. 5101 - 5115
Received 16 February 2021; Accepted 08 March 2021.

[37] Yang C, Yu D, Li J, Zhang L. Prevalence of medication adherence and factors influencing adherence to antiepileptic drugs in children with epilepsy from western China: A cross-sectional survey. Epilepsy Behav. 2020 Mar; 104 (Pt A): 106662. doi: 10.1016/j.yebeh.2019.106662. Epub 2020 Jan 11. PMID: 31935645.

[38] Zafar A, Shahid R, Nazish S, Aljaafari D, Alkhamis FA, Alsalman S, Msmar AH, Abbasi B, AlsulaimanAA,Alabdali M. Nonadherence to Antiepileptic Medications: Still a Major Issue to be Addressed in the Management of Epilepsy. J Neurosci Rural Pract. 2019 Jan-Mar;10(1):106-112. doi: 10.4103/jnrp.jnrp_136_18. PMID: 30765980; PMCID: PMC6337980.

Table (1):
Characteristics of the studied epileptic adolescents

| Demographical data | *N0=50* | *%* |
|---|---|---|
| Age in years | | |
| ▪ 13- <16 | 26 | 52.0% |
| ▪ 16-18 | 24 | 48.0% |
| Mean ± SD | 15.4 ± 1.9 | |
| Sex | | |
| ▪ Male | 29 | 58.0% |
| ▪ Female | 21 | 42.0% |
| Age of onset | | |
| ▪ From birth - <1year | 12 | 24.0% |
| ▪ 1- <6 | 13 | 26.0% |
| ▪ 6- <10 | 16 | 32.0% |
| ▪ 10+ | 9 | 18.0% |
| Mean S.D | 2.4 ± 1.05 | |
| Duration of disease | | |
| ▪ 0– < 6 years | 13 | 26.0% |
| ▪ 6 < 10 years | 13 | 26.0% |
| ▪ ≥10 years | 24 | 48.0% |
| Mean S.D | 2.2 ± 0.84 | |
| Types of epilepsy | | |
| ▪ Generalized | 35 | 70.0% |
| ▪ Focal | 15 | 30.% |
| Duration of treatment | | |
| ▪ 0– < 6 years | 13 | 26.0% |
| ▪ 6- < 10 years | 13 | 26.0% |
| ▪ ≥10 years | 24 | 48.0% |
| Type of AEDs ♣ | | |
| ▪ Sodium Valporoat | 32 | 64.0% |
| ▪ Levetiracetame | 26 | 52.0% |

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| | | |
|---|---|---|
| ▪ Lamotrigin | 3 | 6.0% |
| ▪ Carbamazepine | 12 | 24.0% |
| ▪ Topiramate | 5 | 10.0% |
| ▪ Clonazepam | 2 | 4.0% |
| ▪ Oxcarbazepine | 2 | 4.0% |
| ▪ Others | 4 | 8.0% |
| Adverse drug effects | | |
| ▪ Absent | 27 | 54.0% |
| ▪ Present | 23 | 46.0% |

SD: standard deviation, ♣More than one answer

Table (2):
Distribution of studied group according to their Total Knowledge Score about the Disease and Antiepileptic Drug Therapy

| Knowledge | Pre | | Post | | Follow up | | Friedman test p. value |
|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | |
| Total knowledge score about the disease | | | | | | | |
| Satisfactory | 15 | 30.0% | 45 | 90.0% | 42 | 84.0% | 33.043 .000** |
| Un Satisfactory | 35 | 70.0% | 5 | 10.0% | 8 | 16.0% | |
| Mean ± SD | 6.7 ± 5.8 | | 31.2 ± 4.2 | | 27.5±5.8 | | |
| Total knowledge about (AED) therapy | | | | | | | |
| Satisfactory | 13 | 26.0% | 48 | 96 | 44 | 88.0% | 37.210 .000** |
| Un Satisfactory | 37 | 74.0% | 2 | 4 | 6 | 12.0% | |
| Mean ± SD | 4.6±1.9 | | 12.5± 0.93 | | 10.1±1.6 | | |
| Total Knowledge score | | | | | | | |
| Satisfactory | 14 | 28.0% | 46 | 92.0% | 41 | 82.0% | 49.876 .000** |
| Un Satisfactory | 36 | 72.0% | 4 | 8.0% | 9 | 18.0% | |
| Mean ± SD | 11.3 ± 7.7 | | 43.7± 5.13 | | 37.6± 7.4 | | |

F Friedman test, ** highly significant at p<0.01

Table (3):
Total Score of Medication Adherence scale

| Total Medication Adherence Score (Morisky 8-Item Medication Adherence Scale) | Phase | | | | | | F | P-value |
|---|---|---|---|---|---|---|---|---|
| | Pre | | Post | | Follow up | | | |
| | N (50) | % | N (50) | % | N (50) | % | | |
| Low adherence | 39 | 78.0% | 5 | 10.0% | 6 | 12.0% | 22.97 | .000** |
| Medium adherence | 7 | 14.0% | 20 | 40.0% | 26 | 52.0% | 16.38 | .019* |
| High adherence | 4 | 8.0% | 25 | 50.0% | 18 | 36.0% | 17.04 | .009** |

F: Friedman test, * significant at p<0.05, ** highly significant at p<0.01, >2= Low adherence, 1or 2= medium adherence and 0= high adherence, SD: standard deviation.

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Table (4):

Distribution of the studied group regarding seizure frequency

| Seizure frequency | Phase | | | | | | Friedman test P value |
|---|---|---|---|---|---|---|---|
| | Pre | | Post | | Follow up | | |
| | N (50) | % | N (50) | % | N (50) | % | |
| 0-month | 13 | 26.0% | 19 | 38.0% | 16 | 32.0% | |
| 1-2 | 11 | 22.0% | 17 | 34.0% | 15 | 30.0% | |
| 3-9 | 9 | 18.0% | 8 | 16.0% | 9 | 18.0% | 18.930 |
| >10 | 17 | 34.0% | 6 | 12.0% | 10 | 20.0% | .002** |

F: Friedman test, ** highly significant at p<0.01

Table (5):

Association between total adherence scores and clinical variables of the studied group (Post intervention)

| Clinical variables | | Total adherence scores | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | HighN= 25 | | ModerateN=20 | | LowN=5 | | X2 | P-value |
| | | N | % | N | % | N | % | | |
| Age of patient | 13-< 16 | 9 | 36 | 12 | 60 | 5 | 100 | | |
| | 16-18 | 16 | 64 | 8 | 40 | 0 | 0 | 4.798 | .002** |
| Age of onset | From birth-< 1y | 6 | 24 | 4 | 20 | 2 | 40 | 1.336 | .072 |
| | 1- < 6 Y | 7 | 28 | 5 | 25 | 1 | 20 | | |
| | 6- < 10 Y | 8 | 32 | 7 | 35 | 1 | 20 | | |
| | ≥ 10 | 4 | 16 | 4 | 20 | 1 | 20 | | |
| Type of epilepsy | Generalized | 11 | 44 | 19 | 95 | 5 | 100 | | |
| | Focal | 14 | 56 | 1 | 5 | 0 | 0 | 7.340 | .001** |
| Duration of disease | 0–< 6 years | 11 | 44 | 1 | 5 | 1 | 20 | | |
| | 6-< 10 years | 9 | 36 | 4 | 20 | 0 | 0 | | |
| | ≥ 10 years | 5 | 20 | 15 | 75 | 4 | 80 | 8.901 | .000** |
| Duration of TTT | 0– >6 years | 11 | 44 | 1 | 5 | 1 | 20 | | |
| | 6-> 10 years | 9 | 36 | 4 | 20 | 0 | 0 | | |
| | ≥10 years | 5 | 20 | 15 | 75 | 4 | 80 | 6.607 | .000** |
| Complexity of treatment | Monotherapy | 15 | 60 | 9 | 45 | 2 | 40 | | |
| | Polytherapy | 10 | 40 | 11 | 55 | 3 | 60 | 3.760 | .016* |
| Adverse drug effect | Absent | 19 | 76 | 8 | 40 | 0 | 0 | 9.111 | .000** |
| | Present | 6 | 24 | 12 | 60 | 5 | 100 | | |

X2 Chi-square,*significance at p<0.05 (*)—highly significant at p<0.01