Deanship of Graduate Studies

Al – Quds University

Assessment of Patients' Adherence to Anti-Epileptic Drugs: A Cross-Sectional Study in Hebron, West Bank, Palestine

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M.Sc. Thesis

Jerusalem – Palestine

1446 / 2025

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This Thesis is Submitted in Partial Fulfillment to Requirements for the degree of Master of Pharmaceutical Science in the Faculty of Pharmacy, Al-Quds University.

1446 / 2025

Al-Quds University
Deanship of Graduate Studies
Pharmaceutical Sciences Program

Thesis Approval

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Jerusalem, Palestine
1446/2025

Dedication:

I dedicate this master's thesis to my respected father, Fahmi, whose unwavering support and strength have been a constant source of inspiration throughout my life. To my dear mother Myassar, whose endless encouragement and wisdom have guided me every step of the way. To my dedicated husband, Omar, whose love, motivation, and unwavering belief in me have been a cornerstone of my success. To my beloved children, Suleiman, Sarah, and Carmel, whose joy and determination inspire me to strive for excellence every day. To my dear sisters, whose constant support, wisdom, and advice have been invaluable, and to my extended family, Tayseer and Mariam (father and mother-in-law), for their love and encouragement that have uplifted me throughout this academic journey. This work reflects your constant belief in me and your enduring strength.

To Dr. Motaz Al Tamimi, whose support in facilitating data collection through his clinic in Hebron was important to this study.

Declaration

I hereby declare that this thesis, submitted in partial fulfillment of the requirements for the degree of Master, is the result of my own original research, except where otherwise indicated. I confirm that no part of this work has been previously submitted for the award of a higher degree to any other university or institution.

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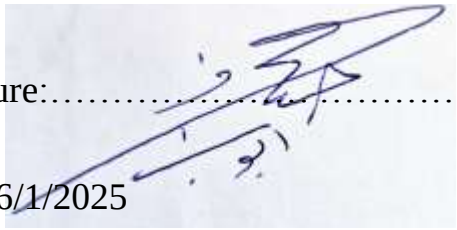

Date: 6/1/2025

Acknowledgement

First, I thank Allah the Almighty for His blessings and for guiding me through my studies and the completion of this thesis.

I am deeply grateful to my supervisor, Prof. Maysa Nabulsi, for her constant support, guidance, and helpful advice throughout my research. Your mentorship has been essential to the success of this work.

I would also like to thank all the epileptic patients who participated in my study. Your strength and cooperation were invaluable, and I hope this research will improve your quality of life.

A special thanks to my fellow master's students, Reem Natsheh and Ali Ghzawna, for their friendship and support. I appreciate the encouragement and shared experiences that made this journey more enjoyable.

I am forever thankful to my parents for their love, sacrifices, and endless support. To my husband, Omar, thank you for your love, encouragement, and understanding throughout this process. To my children, Suleiman, Sarah, and Carmel, your smiles and love inspire me every day.

Finally, to my extended family and friends, thank you for always being there for me with love and encouragement. Your support has made this journey possible.

Abstract

Background: Medication adherence is a critical factor in managing epilepsy patients, directly impacting seizure control and quality of life. Limited research exists on adherence to antiepileptic drugs (AEDs) among (0- 40) ages in Hebron, other West Bank cities, and Jerusalem. This study aims to assess adherence rates and explore factors influencing adherence.

Methods: A cross-sectional descriptive design was employed, using the validated Morisky Medication Adherence Scale (MMAS-8). The MMAS-8, along with additional questions with a reliability score of 0.842 (Cronbach's alpha), was used to assess medication adherence and treatment patterns. The questionnaire contained 30 items, divided into sections: Sociodemographic (6 questions), History of Epilepsy (4 questions), Perception toward Epilepsy (4 questions), Adherence and Dosing (6 questions), and Adherence and Side Effects Factors (2 questions), in addition MMAS (8 questions). The questionnaire was distributed electronically via Google Forms to 100 epilepsy patients. Patients were contacted by phone, and assurances of anonymity ensured full participation. Data were analyzed using SPSS, version 10, employing descriptive statistics, t-tests, and ANOVA.

Results: Adherence levels among the participants were generally moderate to low, with 41% showing low adherence, 58% demonstrating medium adherence, and only 1% exhibiting high adherence. The average Morisky Medication Adherence Scale (MMAS-8) score was 5.38. Barriers to adherence were notably high, with 83% of participants citing medication costs, 67% reporting stigma, and 55% expressing concerns about public embarrassment. Despite these challenges, 97% of respondents recognized the critical role of medication adherence in preventing seizures.

When examining adherence by specific antiepileptic drugs (AEDs), Depalept/Depalept Chrono® had the highest MMAS-8 score of 5.6, followed closely by Carbamazepine (Tegretol®) with a score of 5.5. Other commonly used AEDs, such as Diazepam (Assival®) and Levetiracetam (Keppra®), had adherence scores of 5.3 and 5.2, respectively. while Lamotrigine (Lamictal/Lamodex®) and Phenytoin (Epanutin®) had the lowest adherence scores, both averaging around 4.0. Notably, Depalept/Depalept Chrono® and Tegretol® not only demonstrated the highest adherence but were also the most frequently prescribed drugs, likely reflecting patients' or caregivers' preferences, ease of administration, and perceived effectiveness. Significant factors affecting adherence included age, educational level, age at seizure onset, and medication frequency ($p < 0.05$).

Conclusion: This study underscores the impact of socioeconomic and psychological barriers on adherence to AEDs. Targeted interventions addressing financial burdens, stigma, and patient education are essential for improving adherence rates and treatment outcomes. These findings offer critical insights for healthcare providers and policymakers to enhance the quality of life for epilepsy patients in the region**.**

Keywords: Epilepsy, Nonadherence, AEDs, West Bank, Palestine

List of abbreviations

WHO	World Health Organization
ILAE	The International League Against Epilepsy
EEG	Electroencephalogram
MRI	Magnetic Resonance Imaging
SUDEP	Sudden Unexplained Death in Epilepsy
AEDa	Antiepileptic drugs
VNS	Vagus Nerve Stimulator
CNS	Central Nervous System
MMAS	The Morisky Medication Adherence Scale
MMAS-8	Morisky Medication Adherence Scale, an eight-item measure
MPR	Medication Possession Ratio
PDC	The Proportion of Days Covered
ADHD	Attention Deficit Hyperactivity Disorder
QoL	Quality of Life
SPSS	Statistical Package for Social Sciences
OR	Odds Ratio

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Chapter One:

Introduction:

1.1 Background

1.1.1 Epilepsy and Prevalence of Epilepsy:

Epilepsy is a chronic neurological disorder characterized by recurrent, unprovoked seizures. Clinically, it is defined as having at least two unprovoked (or reflex) seizures occurring more than 24 hours apart or one unprovoked (or reflex) seizure with a high risk (at least 60%) of recurrence over the next 10 years [1]. Typically, neurons conduct electrical impulses that control various physiological processes, including emotion, muscular activity, and thought processes. Seizures, however, are the outcome of abnormalities in this signaling mechanism in epilepsy [2].

Seizures can cause momentary confusion, loss of consciousness or awareness, periods of staring into space, muscle rigidity, involuntary jerking motions of the limbs, and feelings of panic and worry. Depending on the individual experiencing the seizure and its unique features, these manifestations can differ in length and intensity [9].

Epilepsy is indeed one of the most prevalent chronic neurological disorders worldwide, impacting approximately 50 million individuals according to the World Health Organization (WHO). [3] Epilepsy is 10 times more common in less developed countries than in developed countries [4]. The median annual incidence rate of epilepsy was 50.4 per 100,000 individuals. In middle-income countries, the range of incidence rates varied from 28.0 to 239.5 cases per 100,000 individuals per year, with a median value of 81.7 cases per 100,000 individuals per year commonly cited [5].

In Arab countries, the median lifetime prevalence of epilepsy was shown to be 6.9 per 1000, and the median incidence is 89.5 per 100,000 [6] Based on the thorough study of epilepsy in the Arab world by Bhalla and colleagues that was published in 2016, the incidence rate of epilepsy in Palestinians was estimated to be 10.4–11.3 cases per 100,000 individuals [7]. In 2021, the Palestinian Ministry of Health's Annual Health Report, released in June 2022, said that the incidence rate of epilepsy in the country was approximately 7 per 100,000 people [8].

Epilepsy is increasingly regarded as a condition that can be effectively managed or potentially resolved in specific cases. According to the International League Against Epilepsy (ILAE), if a patient has been seizure-free for at least 10 years, with the last five years being off anti-epileptic drugs (AEDs), the condition may be considered "resolved." However, this designation does not guarantee immunity from future seizures, particularly in the presence of predisposing factors, such as age-related epilepsy syndromes or structural brain abnormalities [10].

The 2017 update from the International League Against Epilepsy (ILAE) changed how seizures and epilepsy are classified:

1. **Focal Motor Seizures**: These include sudden movements like jerking, muscle stiffening, or repetitive actions. Some seizures, like myoclonic (jerking), tonic (stiffening), and tonic-clonic (stiffening and jerking), were once only considered generalized, but now they are also seen as focal (starting in one area of the brain).

2. **Focal Non-Motor Seizures**: These can cause emotional changes or cause a person to stop what they're doing suddenly.

3. **Generalized Seizures**: New types include epileptic spasms and combinations like myoclonic-atonic (jerking with loss of muscle tone) and myoclonic-tonic-clonic (jerking with stiffening) [11].

1.1.2 Diagnosis and the Causes of Epilepsy:

Typically diagnosed when a person experiences at least two unprovoked (or reflex) seizures occurring more than 24 hours apart. [12]. One diagnostic tool used to identify aberrant electrical activity in the brain—frequently observed in patients with epilepsy—is the electroencephalogram (EEG). Regular EEG monitoring can help with diagnosis. Seizures can be classified, psychogenic nonepileptic seizures can be assessed, and candidates for epilepsy surgery can be assessed with video-EEG monitoring. When attempting to determine the origin of a seizure disease and its location, Magnetic Resonance Imaging (MRI) plays a crucial role [13].

During the EEG technique, tiny sensors are attached to the scalp to record the electrical impulses generated by brain cell communication. A machine then records these signals to find anomalies [14].

1.1.3 Comorbidities and Management of Epilepsy:

Patients who have epilepsy are more likely than the overall population to die young. The cause of the increased mortality is multifaceted and complex, going beyond epilepsy's etiology and related comorbidities. The spectrum of epileptic complications includes status epilepticus, Sudden Unexplained Death in Epilepsy (SUDEP). Anxiety and depression are two psychiatric comorbidities that are more common in epilepsy patients [91]. While certain types of epilepsy, particularly those that are poorly controlled or drug-resistant, can lead to long-term brain changes such as neuronal loss and cognitive decline, not all forms of epilepsy exhibit this progression. Research indicates that frequent, uncontrolled seizures, especially in conditions like temporal lobe epilepsy or epileptic encephalopathies, may contribute to brain shrinkage and cognitive impairments over time. However, well-controlled epilepsy, with effective treatment and seizure management, may not lead to such long-term neurodegeneration. [16].

In the treatment of epilepsy, various methods are available depending on the patient's condition and response to therapy [17]. Antiepileptic drugs (AEDs) remain the cornerstone of epilepsy management, aiming to reduce or prevent seizures. When medication alone is insufficient, Brain Surgery may be considered, where the portion of the brain causing seizures is surgically removed. Additionally, the Vagus Nerve Stimulator (VNS) is an alternative treatment, in which a small device is implanted in the body to send electrical pulses to the brain via the vagus nerve, helping to control seizures. Another non-pharmacological approach is the *Ketogenic Diet*, a high-fat, low-carbohydrate dietary regimen that has been found to reduce seizures in some individuals. These treatments offer a range of options for personalized epilepsy care [18].

In about 70% of patients, AEDs can control seizures, lowering the risk of potentially deadly complications such as sudden death and status epilepticus [19]. Understanding the efficacy of antiepileptic drugs (AEDs) for various seizure types is fundamental to effective epilepsy management. AEDs are categorized into narrow-spectrum and broad-spectrum agents based on their range of effectiveness across seizure types.

Narrow-spectrum AEDs are designed to target specific seizure types, such as partial (focal) seizures or absence seizures. For instance, carbamazepine is a first-line treatment for partial-onset seizures and is widely used in both the United States and Europe [22]. Gabapentin, another narrow-spectrum AED, serves as an add-on therapy for patients with partial epilepsy resistant to conventional treatment [23]. It is crucial to note that narrow-spectrum AEDs may not be suitable for all seizure types and could potentially worsen some, highlighting the need for careful diagnosis and drug selection [20].

Broad-spectrum AEDs, by contrast, are effective against a broader range of seizure types, making them suitable for patients who experience multiple seizure patterns. For example, valproic acid is widely regarded as a first-line treatment for generalized tonic-clonic, absence, and focal seizures in both pediatric and adult populations [24]. Similarly, lamotrigine is effective against absence, partial, and generalized tonic-clonic seizures, making it a versatile treatment option [25]. Levetiracetam is another broad-spectrum AED, often used as an adjunctive therapy for juvenile myoclonic epilepsy, primary generalized tonic-clonic seizures, and refractory partial-onset seizures [21].

Clonazepam serves as an adjunctive treatment for focal epilepsy, absence seizures, and myoclonic seizures, particularly in cases where other therapies are less effective or additional seizure control is needed. Its role underscores the importance of tailoring AED therapy to the specific needs of the patient based on seizure type and frequency [26]. Tables (A) and (B) summarize the AED's characteristics and the mechanism of action [27].

Table (1.1): Antiepileptic drug characteristics

TABLE A. ANTIEPILEPTIC DRUG CHARACTERISTICS					
Drug Daily Dose for Adults Interactions	**Daily Dose for Adults**	**Interactions**	**Protein Binding**	**Half-life (H)**	**Metabolism**
Absence Seizures					
Ethosuxamide	1500 mg/day in 2-3 doses	Present	<50%	>30	Extensive
Broad spectrum					
Clonazepam	1-20 mg/day in 3 doses	Present	>50%	30-40	Extensive
Diazepam	PR weight-based	Present	> 500.k>	30-40	Extensive
Felbamate	800-1200 mg 3 times daily	Present	<50%	10-30	50%
Lamotrigine	75-200 mg twice daily	Present	50-85%	10-30	Extensive
Levetiracetam	1500 mg twice daily	Absent	<50%	<10	30%, nonhepatic
Perampanel	4-12 mg at bedtime	Present	>85%	>30	Extensive
Primidone	100-125 mg at bedtime	Present	<50%	12 hrs	Extensive
Rufinamide	400-800 mg/day in 2 doses	Present	50-85%	<10	Extensive
Topiramate	125-200 mg in 2 dose if >38 kg	Minimal	<50%	10-30	30%
Valproate	*60* mg/kg/day in 2-3 doses I R *60* mg/kg/day in 1 dose ER	Present	>85%	10-30	Extensive
Zonisamide	400-600 mg/day	Present	<50%	>30	65%
Infantile spasms					
Vigabatrin	1500 mg twice daily	Absent	<50%	10-30	None
Narrow Spectrum					
Carbamazepine	Up to 2400 mg/day in 2 doses ER Up to 24 mg/day in 3 doses IR	Present	50-85%	10-30	Extensive
Clobazam	Up to 10 mg/day in 2 doses if s 30 kg Up to 20 mg/day in 2 doses if >30 kg	Present	>85%	10-30	Extensive
Eslicarbazepine acetate	800-1600 mg/day if > 40 kg	Present	<50%	10-30	40%
Gabapentin	600 mg 3 times daily	Absent	<500.k>	<10	None
Lacosamide	150-200 mg in 2 doses monotherapy 100-200 mg in 2 doses adjunctive	Minimal	<50%	10-30	60%
Oxcarbazepine	1200-2400 mg/day in 2-3 doses	Present	< 500.k>	<10	Extensive
TABLE A: ANTIEPILEPTIC DRUG CHARACTERISTICS					
Drug Daily Dose for Adults Interactions	**Daily Dose for Adults**	**Interactions**	**Protein Binding**	**Half-life (H)**	**Metabolism**
Phenytoin	100-200 mg/day in 2-3 doses	Present	>85%	10-30b	Extensive, nonlinear
Pregabalin	200-600 mg/day in 2-3 doses	Absent	<50%	<10	None
Tiagabine	32-56 mg/day in 2 doses	Present	>85%	<10	Extensive

Table (1.2): Antiepileptic Drug Mechanisms of Action

Table (B)|Antiepileptic Drug Mechanisms of Action	
Calcium channel blocker	
Ethosuximide	Low voltage-activated channel
Gabapentin Pregabalin	High Voltage-activated channel
Carbonic anhydrrase inhibition	
Acetazolamide	
GABAergic activity	
Barbiturates	prolongs chloride channel opening
Benzodiazepines	Increase frequency of chloride channels
Tiagbine	Blocks synaptic GABA reuptake
Vigabatrin	Inhibits GABA-transaminse
Multiple targets	
Felbamate	
Runfinamide	
Sodium Valproate	
Topiramate	
Zoisamide	
Snaptic vesicle protin 2A modulator	
Brivaracetam	
Levetiracetam	
	Sodium channel blocker
Carbamazepine	Fast-inactivated state
Eslicarbazepine	
Lamotrigine	
Oxcarbazepine	
Phenytoin	
Lacosamide	Slow-inactivated state

Table (1.3): Adverse Events of AEDs

Drug	Common adverse events	Serious adverse events
Lacosamide	Dizziness, diplopia, blurred vision, headache, nausea	PR interval prolongation, atrial fibrillation, atrial flutter, hepatitis/nephritis
Lamotrigine	Dizziness, blurred vision, insomnia, headache, rash	Stevens-Johnson syndrome, toxic epidermal necrolysis, multiorgan failure, hepatic failure
Levetiracetam	Fatigue, dizziness, somnolence, irritability, mood swings	Psychosis
Oxcarbazepine	Dizziness, diplopia, blurred vision, headache, nausea, hyponatremia	Stevens-Johnson syndrome, toxic epidermal necrolysis
Pregabalin	Fatigue, dizziness, ataxia, diplopia, weight gain, edema	None reported
Rufinamide	Somnolence, headache, dizziness, diplopia, fatigue, nausea	Shortened QT interval (no known clinical risk), multiorgan hypersensitivity
Topiramate	Drowsiness, ataxia, word-finding difficulty, difficulty concentrating, anorexia, weight loss, paraesthesia, metabolic acidosis, oligohydrosis, nephrolithiasis	Acute close angle glaucoma, heat stroke
Zonisamide	Drowsiness, ataxia, difficulty concentrating, anorexia, weight loss, nausea, nephrolithiasis, oligohydrosis, rash	Aplastic anemia, Stevens-Johnson syndrome, toxic epidermal necrolysis, heat stroke

AEDs frequently cause adverse effects that can significantly affect a patient's quality of life and result in treatment failure in as many as 40% of cases, table (C) summarizes the most common and serious side effects [28]. Adverse effects can range from moderate to severe or persistent, and they occur with all drugs. During the initial stages of treatment, adverse effects of AEDs can vary in terms of type and intensity. There are two types of issues associated with this medication: idiosyncratic responses, which are uncommon and unpredictable, and pharmacodynamic tolerance, which is frequently impacted by the dose and administration rate. Treatment retention in studies is a measure of how frequently people switch medications due to non-tolerability. While any AED might have side effects, the most common are CNS ones [29].

The occurrence of seizures despite the use of AEDs highlights the complex interplay of factors that influence treatment outcomes. Patient-specific variables, such as race, age, and adherence to AED regimens, can significantly affect the efficacy of treatment and the risk of adverse effects [31]. Additionally, inherent factors like the etiology of epilepsy, the age at seizure onset, and the location of the epileptogenic zone play a crucial role in determining the likelihood of achieving seizure control [32]. While some of these factors, such as adherence, are modifiable, others, like the underlying cause of epilepsy or the anatomical location of the epileptogenic zone, are fixed and require tailored treatment approaches. These considerations underscore the importance of individualized treatment plans to optimize seizure management and minimize the risk of breakthrough seizures [30].

1.1.4 Epilepsy in Children:

Age plays a significant role in the incidence of epilepsy, with children exhibiting a notably higher risk compared to young and middle-aged adults. The risk tends to rise again in older individuals [17]. Among children, epilepsy is the most frequent chronic neurological condition, affecting 0.5% to 1%, although incidence rates appear to be declining in high-income countries [15]. Regional variations further highlight the impact of demographic factors on epilepsy prevalence. For instance, in the southern region of Israel, the prevalence of epilepsy among Bedouin children is 4.01 per 1000, which is lower than the global estimate of 4.5–17 per 1000. This variation underscores the importance of considering socioeconomic, environmental, and healthcare accessibility factors when evaluating epilepsy prevalence in different populations and age groups [33].

Up to 5% of children have febrile seizures before the age of six, while the general prevalence of epilepsy is estimated to be 1% [34].

Empirical studies reveal the presence of a subpopulation, estimated to comprise between 10 and 25 percent of kids, who demonstrate cognitive impairment. Though psychosocial factors may also play a major role, factors that appear to increase the risk include generalized symptomatic epilepsies, frequent seizures, prolonged use of antiepileptic drugs, and early onset of epilepsy [35].

Conditions linked to a higher frequency of epilepsy are known as risk factors, and the conditions for juvenile epilepsy are not the same as those for epilepsy that develops later in life. Head injuries, prenatal insults, infections of the central nervous system (CNS), developmental deficiencies, neoplastic disorders, and genetic variables are a few known risk factors [36].

Developmental slowdown, or regression, and seizures are the initial symptoms of most severe epilepsies in early childhood. This puts the child at a significant risk of experiencing behavioral and developmental problems later in life. These challenges encompass issues related to cognitive development, adaptive behavior, motor functioning, social skills, communication skills, attention difficulties, activity levels, coordination, impulsivity, anxiety, and emotions. In comparison to the seizures themselves, these extra needs may have a bigger influence on academic performance and school life [37].

1.1.5 Management of Pediatric Epilepsy

The management of epilepsy in children presents unique challenges because of growth, developmental changes, and the impact of seizures on cognitive and psychosocial development. Epilepsy management in children often involves finding the right balance of antiepileptic medications (AEDs) to control seizures. While most children with epilepsy achieve seizure control with appropriate AEDs, around 25% to 30% do not. These cases are classified as medically intractable epilepsy, where seizures persist despite the use of effective doses and combinations of AEDs. The management of such cases presents unique challenges and requires a more tailored therapeutic approach. [38]. Children's epilepsy can be managed using the following pharmaceutical arsenal: both first-generation AEDs such as carbamazepine, clobazam, clonazepam, ethosuximide, phenobarbital, phenytoin, sulthiame, and valproic acid, as well as second-generation AEDs including felbamate, gabapentin, lamotrigine, levetiracetam, oxcarbazepine, pregabalin, tiagabine, topiramate, vigabatrin, and zonisamide. Recently approved medications, also referred to as third-

generation or newer AEDs, include eslicarbazepine acetate, lacosamide, perampanel, retigabine, rufinamide, and stiripentol. These drugs collectively form the pharmacological toolbox utilized in the treatment of pediatric epilepsy [39].

Despite the availability of effective antiepileptic drugs (AEDs), therapy failure remains a significant issue in the management of pediatric epilepsy. One of the most common causes of therapy failure in children is non-adherence to the prescribed medication regimen. Non-adherence can result from various factors, including the complexity of the treatment plan, side effects of medications, and difficulties in managing medication schedules. This issue is particularly concerning in pediatric populations, as consistent medication use is crucial for seizure control and overall cognitive development. Addressing these challenges in pediatric epilepsy treatment requires a comprehensive approach that involves both the child and their caregivers, ensuring that adherence is maintained, and therapy remains effective [40].

1.1.6 Definition of Adherence

Adherence is one of the most critical factors to consider when giving medication. Medication adherence is a significant global health concern, affecting outcomes for a wide range of chronic conditions such as epilepsy, diabetes, and hypertension. Non-adherence contributes to higher rates of disease complications, increased healthcare costs, and reduced treatment efficacy worldwide. Addressing this issue is essential for improving patient outcomes and optimizing healthcare systems globally [90]. It has always been defined as the proportion of patients who take their medications exactly as their doctors recommend [41]. World Health Organization defined the adherence as the extent to which a patient’s behaviour in taking medication corresponds with the agreed recommendations from a healthcare provider [87]. Adherence is affected by medication possession ratios, the percentage of total pills taken, and the number of days covered by prescriptions completed [42].

Adherence can be assessed using various methods, which include both direct and indirect approaches. Direct methods, such as measuring drug concentrations in blood, provide precise information but are often impractical for large-scale studies due to cost and invasiveness. Indirect methods, such as self-reported questionnaires, pill counts, and pharmacy refill records, are more feasible for evaluating adherence in clinical and research settings. Among these, self-reported adherence tools, such as the Morisky Adherence Scale, are widely used due to their simplicity and ability to capture patient-reported barriers to adherence. Other commonly used metrics include the Medication Possession Ratio (MPR) and the Proportion of Days Covered (PDC), which utilize pharmacy refill data to calculate adherence percentages [88].

The Morisky Medication Adherence Scale is a widely used tool designed to assess patients' adherence to prescribed medication regimens. Developed by Dr. Morisky and colleagues, this scale aims to identify non-adherence behaviors by asking patients about their medication-taking habits. The MMAS typically consists of four to eight questions (depending on the version used), which are designed to capture key aspects of non-adherence, such as forgetfulness, skipping doses, or not following the prescribed schedule. These questions are answered with simple "Yes" or "No" responses, and based on the answers, patients are categorized into three adherence levels: low, medium, or high. A high score indicates good adherence, suggesting that the patient is consistently following the prescribed regimen, while a low score points to potential issues with non-compliance,

which can increase the risk of treatment failure and worsen clinical outcomes. In cases where patients score in the medium or low categories, healthcare providers can use the results to design targeted interventions to improve adherence. Such interventions might include educational programs to help patients better understand their treatment, reminder systems to assist with remembering doses, or personalized strategies to address specific barriers like cost or side effects. While the MMAS is a useful and cost-effective tool for assessing medication adherence, it has some limitations, such as potential bias in self-reported answers and its inability to capture all factors influencing adherence. Despite these limitations, the MMAS remains an essential tool in clinical practice, providing valuable insights into patient behavior and helping healthcare providers optimize treatment strategies to improve therapeutic outcomes, particularly in chronic conditions like epilepsy, where adherence is crucial for managing symptoms and preventing complications [45].

Nonadherence occurs when a patient fails to use the prescribed treatment correctly, such as administering an incorrect amount of medication or administering medication at the wrong time [43]. The prevalence of Nonadherence rates among patients with epilepsy is reported to be 30%–50% [92]. It is estimated that 33–69% of all medication-related hospitalizations are because of medication nonadherence, resulting in more than $100 billion spent annually on avoidable hospitalizations in the US [44].

Non-adherence to medication can be classified into three main types: primary non-adherence, non-persistence, and non-conforming adherence. Primary non-adherence, also referred to as non-fulfillment adherence, occurs when a healthcare provider prescribes medication, but the patient never fills or initiates it. This may be due to barriers such as limited access to pharmacies, financial constraints, or a misunderstanding of the medication's necessity. Non-persistence, the second type, occurs when patients discontinue their medication after starting it without consulting a healthcare professional. This behaviour is often unintentional and typically results from poor communication between patients and providers regarding the therapeutic plan. Additional factors contributing to non-persistence include logistical challenges, such as difficulties in accessing prescriptions or managing costs, as well as individual constraints, such as forgetfulness or improper medication administration techniques. On the other hand, intentional non-persistence may arise from a lack of motivation, influenced by the patient's beliefs, attitudes, and expectations about the treatment. The third type, non-conforming adherence, encompasses a range of behaviors where medications are not taken as prescribed, such as skipping doses, taking medications at incorrect times or in incorrect doses, or overusing medications. These behaviors can be either intentional or unintentional. Unintentional non-conforming adherence often stems from capacity and resource limitations, while intentional non-adherence reflects the patient's conscious decision not to follow the prescribed regimen, influenced by factors such as fear of side effects, doubts about the medication's efficacy, or a belief that it is unnecessary. Addressing both intentional and unintentional forms of non-adherence is crucial to optimizing therapeutic outcomes, particularly in chronic conditions like epilepsy, where consistent medication use is essential for effective management [89].

1.1.7 Adherence to AED:

Patients' adherence to AEDs is significantly impacted by undesirable side effects, including neurotoxic effects such as dizziness, loss of coordination, blurry vision, and lethargy [46]. Idiosyncratic side effects, such as skin rashes and allergic reactions, can lead to therapy discontinuation [47]. Weight gain, which is associated with AEDs like phenytoin, valproic

acid, and pregabalin, is often considered a significant cosmetic concern, as highlighted by Chen et al. In addition to idiosyncratic effects such as skin rashes, other studies have also documented cognitive side effects that may complicate therapeutic management and result in high rates of therapy discontinuation [63]. Recognizing the importance of these factors in improving patient outcomes, the WHO has identified several key influences on patient adherence to AEDs, including socioeconomic, healthcare system, condition-related, therapy-related, and patient-related factors [48].

The importance of patients' adherence to AEDs is lowering hospital readmission rates and healthcare costs [49]. To convince patients to take their AEDs, they should be informed of the risks of nonadherence, which include an increased risk of mortality and morbidity. Even if the patient misses one dose, nonadherence can exacerbate the condition, resulting in a seizure and treatment failure [50]. Some of the traditional explanations for nonadherence are the complexity of the regimen and a barrier between the patient and his healthcare provider [51].

1.1.8 Adherence in Epileptic Children:

For children with epilepsy, adherence to AED regimens is crucial for optimizing seizure control and promoting overall well-being. Although AEDs remain the mainstay of treatment, 58% of children with epilepsy show signs of non-adherence to their AEDs [52].

Studies conducted on the pediatric population have demonstrated that the following factors can hinder adherence to AEDS: dislike of medicine taste, running out of medication, parent forgetfulness, refusal to take medication, difficulty swallowing medication, lower socioeconomic status, family conflict, and communication difficulties especially during adolescence [53].

However, maintaining adherence in epileptic children can be challenging, influenced by various factors that differ from those in adults. In a research study, they observed that a greater percentage of patients with non-adherence had younger onset, symptomatic epilepsy, focal seizures, presence of many types of seizures, abnormalities on brain imaging, negative EEG evolution, and unfavourable initial response to therapy [54].

Additionally, parents or caregivers play a pivotal role in administering medications, monitoring side effects, and ensuring regular medical follow-ups. children's adherence to medication is dependent on the decisions made by their parents or other caregivers regarding the proper administration of medication. There have been several reports of difficulties in parents and children's adherence to drug regimens. Some of the causes of nonadherence include parental misunderstanding of the illness, concerns about the safety and efficacy of medications, polypharmacy, and the length of therapy. Furthermore, if the child has well-controlled seizure disorders, a parent may choose to stop therapy, at least temporarily, due to side effects of antiepileptic medications [55].

Interventions to improve adherence in pediatric epilepsy may include educational programs tailored to different age groups, involving families in treatment decision-making, and utilizing child-friendly tools and technologies to facilitate medication adherence [52]. Psychosocial support and open communication between healthcare providers and families are critical components in fostering a positive treatment experience for children with epilepsy [56].

In conclusion, adherence to AEDs is crucial for children with epilepsy, as it ensures consistent seizure control, reducing the risk of breakthrough seizures and life-threatening complications such as status epilepticus. However, adherence can be challenging due to several factors. Medication side effects, cognitive or behavioral issues, and the complexities of managing epilepsy in children can significantly hinder regular medication use. Proper adherence helps protect cognitive development, preventing the negative impact frequent seizures can have on learning and brain function. Adherence reduces the risk of injuries from unexpected seizures and supports the emotional well-being of both the child and their family by minimizing the stress and unpredictability of seizure episodes. Long-term adherence also lowers healthcare costs by reducing hospitalizations and emergency visits, leading to better overall health outcomes. Therefore, addressing the challenges to adherence is essential to improving therapeutic outcomes and quality of life for children with epilepsy.

1.2 Problem Statement

The problem of adherence to antiepileptic drugs (AEDs) among epilepsy patients aged 0–40 years is multifaceted and warrants thorough investigation. Despite the availability of effective pharmacological treatments, a substantial number of individuals in this age group face difficulties in maintaining consistent adherence to their prescribed AED regimens. These challenges arise from several factors, including complex medication dosing schedules, the occurrence of adverse drug effects, socioeconomic inequalities, and psychosocial stressors affecting both patients and their support systems.

Epilepsy patients and their families frequently face obstacles such as financial limitations, restricted access to healthcare services, insufficient awareness or education regarding the importance of medication adherence, and cultural beliefs or societal stigmas associated with epilepsy and its treatment.

Consequently, non-adherence to AEDs poses significant risks, including increased frequency and severity of seizures, reduced overall treatment effectiveness, deterioration in cognitive and developmental outcomes, diminished quality of life for the patients and their families, and elevated healthcare utilization and associated costs.

This problem underscores the urgent need for targeted interventions and holistic approaches aimed at addressing the complex barriers to medication adherence in epilepsy patients. Efforts should be directed towards developing culturally sensitive, accessible, and sustainable strategies that empower patients, families, and healthcare providers to overcome these challenges and optimize treatment adherence, ultimately improving the long-term outcomes and well-being of patients living with epilepsy

1.3 Significance of the Study

Growing concern has been raised about the impact of non-adherence to antiepileptic drugs (AEDs) on individuals with epilepsy, particularly within the 0–40 age group, as the global prevalence of epilepsy continues to rise. For instance, epilepsy prevalence increased 1.5 times between 2006 and 2014, emphasizing the urgency of addressing adherence issues in its management [4].

Adherence to AEDs is critically important for effective epilepsy management, as consistent medication use plays a vital role in controlling seizures and improving the overall quality of life for individuals with epilepsy. Non-adherence undermines treatment efficacy, leading

to increased seizure frequency and severity, thereby exacerbating the burden on patients and their families.

Understanding factors that influence adherence, such as age, socioeconomic status, side effects of medication, and parental involvement, can inform healthcare providers in developing tailored interventions to improve adherence rates. Secondly, poor adherence to antiepileptic medication can lead to increased healthcare utilization, including emergency department visits and hospitalizations, highlighting the economic burden associated with non-adherence.

Medication adherence among epileptic patients and the factors influencing it remain understudied in the West Bank, particularly in Hebron, despite the critical concern surrounding non-adherence to antiepileptic drugs. Notably, the only research addressing medication adherence among adult epileptic patients in Palestine was conducted in Nablus in 2011. This underscores a significant research gap and highlights the need for comprehensive studies to evaluate adherence and its impact on epilepsy management within the 0–40 age group. By examining adherence patterns and associated factors, this study aims to provide valuable insights that can inform strategies to enhance medication adherence, ultimately improving clinical outcomes and quality of life for individuals with epilepsy.

1.4 Objectives of the study

Primary Objectives

1. Assess the level of adherence to antiepileptic drugs (AEDs) among patients diagnosed with epilepsy.
2. Identify factors influencing adherence to AED regimens in epilepsy patients aged 0-40 years.

Secondary Objectives

1. Evaluate the impact of demographic variables such as age, gender, and socioeconomic status on medication adherence.
2. Investigate the relationship between medication dosing schedules and adherence levels in epileptic patients.
3. Compare adherence rates among different types of antiepileptic medications prescribed to patients with epilepsy.

Chapter Two:

Literature Review:

There are numerous studies in various countries that explore epileptic patients' adherence to their AED, as well as the aspects and reasons that influence their adherence

- In 2021, Asghar et al. performed a retrospective cohort study in Pakistan, on 11,490 patients in all, with a mean age of 45.2 ± 15.8 years, were included in the study; 51.2% of the patients were male and 48.8% were female. Among all study participants, levetiracetam was determined to be the most prescribed AED (32.9%). Of them, 49.1% of patients adhered to the initial course of therapy that was advised. Nevertheless, 31.3% of patients discontinued the treatment, and 19.6% changed to another AED. Patients receiving levetiracetam, valproic acid, carbamazepine, lamotrigine, or lacosamide, however, are more likely to maintain compliance with the initial regimen of treatment. The degree of adherence to the initial treatment was higher in male patients (57.4%) than in female patients, whose mean age was 44.2 years. Patients with psychiatric problems, migraine, other comorbidities, advancing age, and using AEDs other than the top five prescribed greater chance of discontinuing treatment [57].

- In 2020, A. Das et al. conducted a study in India, included a sample of 100 epilepsy patients. The study found that 71% of the patients were non-adherent to their prescribed antiepileptic medications. The results highlighted that seizure severity, treatment complexity, and the frequency of medication doses were the primary factors influencing medication adherence. [58].

- In 2020, Abd Al Wahab et al. Performed a study in United Arab Emirates by found that 70.8% of patients were adherent to their prescribed medications, while the remaining patients were non-adherent. The main factor affecting adherence was forgetfulness [59].

- In 2019, M. Tilahun et al. conducted a study in Gondar, Ethiopia, found that 38% of people were non-adherent to their epilepsy medications. The study concluded that non-

adherence could be reduced by providing better health information regarding epilepsy and its management. [60].

- In 2018, Gizachew K et al. performed a study conducted in North East Ethiopia found that almost a third of the patients (34.1%) did not follow their antiepileptic drug regimens. Forgetfulness was identified as the most common reason for missing medication, accounting for 53.5% of cases [61].

- In 2016, O' Rourke et al. conducted a study that revealed a significant prevalence of non-adherence to AEDs, influenced by multiple factors. These included individual beliefs about medication, emotional challenges such as depression and anxiety, difficulties in managing medication routines, recent seizure activity, complex dosing regimens, and inadequate communication or trust between patients and healthcare providers. Additionally, limited social support emerged as a contributing factor. Non-adherence was found to compromise seizure control, which in turn had a detrimental impact on the overall quality of life for patients [62].

- In 2013, Ferrari et al. Conducted a prospective cross-sectional study in Brazil, which aimed to investigate factors associated with treatment non-adherence in patients with epilepsy. The study included 385 epilepsy outpatients. The results revealed a 66.2% non-adherence rate, which indicates a moderate-to-low level of adherence. Non-adherence was more prevalent in men, younger patients, and those with uncontrolled seizures. Furthermore, increased treatment complexity was associated with lower adherence. The study concluded that improving adherence in this population requires strategies that account for age and gender factors, as well as prescribing less complex treatment regimens to improve seizure control and adherence [63].

- In 2013, Liu et al. conducted a cross-sectional descriptive study in China that assess adherence to antiepileptic drugs and identify factors associated with non-adherence in patients with epilepsy. The study included 368 patients who had not experienced any change in their treatment regimen over the last six months. The results revealed that 48.1% of the patients were non-adherent to their AEDs. No significant demographic differences were found between adherent and non-adherent patients based on gender, age, seizure type, or rural/urban location. Adherence was positively correlated with the duration of illness. The primary reasons for non-adherence were forgetfulness or not having medication on hand (69.6%), followed by negative attitudes (12.8%), a poor patient-prescriber relationship (9.5%), side effects (5.4%), inability to buy drugs (1.9%) [64].

- In 2012, Tang et al. conducted a study in China to evaluate self-reported adherence to antiepileptic drugs and explore the reasons for non-adherence in adult epilepsy patients who had missed their medication at least once. The study included 131 patients and adherence was measured using the four-item Morisky questionnaire (Morisky-4). The results showed that 4.6% of patients had high adherence, 70.2% had medium adherence, and 25.2% had low adherence. The main reasons for non-adherence were forgetfulness (54.2%), being seizure-free for a period (48.9%), and fear of adverse drug effects (27.5%) [65].

- In 2011, Waleed M. Sweileh and colleagues conducted a cross-sectional descriptive study in Nablus, Palestine, to assess medication adherence and its relationship with treatment satisfaction, number of AEDs, and epilepsy control in Palestinian patients. The study included a sample of 75 patients, and adherence was measured using the eight-item Morisky Medication Adherence Scale (MMAS), while treatment satisfaction was measured using the Treatment Satisfaction Questionnaire for Medication (TSQM 1.4). The results revealed that 14.7% of patients had low adherence, 49.3% had medium adherence, and 36% had high adherence. Adherence was positively correlated with age and duration of illness. There were no significant differences in adherence between patients with well-controlled epilepsy and those with poorly controlled epilepsy, or between patients on monotherapy and those on polytherapy [66].

- In 2019, Yang et al. Performed a cross-sectional study in western China to evaluate medication adherence and the factors influencing adherence to antiepileptic drugs (AEDs) in children with epilepsy. The study included 399 children, with ages ranging from 0.3 to 17.8 years and a male-to-female ratio of 1.36:1. Of the participants, 57.1% had generalized seizures. The study found that 21.3% had good adherence, 51.4% had moderate adherence, and 27.3% had poor adherence. Using ordered multiclassification logistic regression, the study identified that factors such as the patient's age, type of epilepsy, total household income, and the source of drug information were associated with adherence. The findings indicated that medication adherence was not high and was influenced by multiple factors, suggesting the need for tailored approaches to improve adherence through education and behavioral interventions [67].

- In 2018, Gutierrez-Colina AM and colleagues conducted an investigation in the United States involved 77 adolescents and young adults, along with 269 caregivers. The study focused on understanding the challenges related to medication adherence and quality-of-life health in pediatric epilepsy patients. Participants were asked about difficulties in adherence across various developmental stages, from early infancy to early adulthood. The study found that issues such as intolerance to the taste of medication, forgetfulness on the part of parents, and refusal to take medicine were more prominent during specific stages of development. While barriers such as embarrassment and difficulties in visiting the pharmacy showed no significant variations among different age groups, some adherence barriers, like running out of medication, were more strongly associated with particular clinical outcomes. The study concluded that adherence difficulties varied depending on the developmental stage, impacting the ability to predict adherence, seizure management, and overall health-related quality of life [68].

- In 2019, Tayseer A. et al. performed a study at three major epilepsy management institutions in Gaza, Palestine, through a simultaneous retrospective multicenter clinical assessment. The study reviewed 190 medical records, with 61% of patients being male and the median age being 9 years, ranging from 6 to 13 years. In 31.5% of the cases, patients had multiple comorbidities. The study found that healthcare workers generally adhered to audit requirements with a modest level of compliance. However, there was a significant need to improve the documentation of seizure type, frequency, and duration, as this information was inadequate in the majority of the files (72.6%). Furthermore, the prescribing of antiepileptic drugs was found to be inconsistent and

highly unpredictable, depending on the concentration and memory of the treating physician [69].

- In 2015, Gabr WM et al. conducted a study in Riyadh, Saudi Arabia. The study included 116 patients with epilepsy, of which 94 patients (81.0%) met the inclusion criteria. The study aimed to evaluate their adherence to antiepileptic treatment. Semi-structured interviews with the patients or their parents were conducted, and medication adherence was measured using a graded multiple-choice questionnaire. The study found that 36% of respondents were nonadherent to their treatment. Key factors influencing adherence included the mother's age, number of children in the family, number of drugs administered, stability of the parent's marriage, family support, frequency of seizures, and regularity of the patient-provider relationship. The most common reason for non-adherence was forgetfulness, followed by difficulties accessing medication and fear of drug side effects [70].

- In 2011, Modi AC and colleagues performed a study in Ohio, U.S. The study included 124 children aged 2 to 12 years with newly diagnosed epilepsy. The study found that 58% of children with newly diagnosed epilepsy showed persistent nonadherence throughout the first six months of treatment. By the end of the first month, most patients had developed a consistent adherence pattern. The adherence trajectory group status was only predicted by socioeconomic status, with a lower income level being associated with a higher rate of nonadherence. [71].

- In 2020, Korkmaz MF et al. conducted a study in Spain. The study included 226 epileptic children and teenagers, along with their primary caregivers. The results showed that 47.3% of patients reported being completely adherent to their medication regimens. The primary cause of nonadherence was medication forgetfulness (33.6%). The findings from logistic regression indicated that patients in the 0–5 age group had a higher likelihood of complete medication adherence compared to patients in the 12–18 age group [72].

- In 2018, Ramsey RR and colleagues conducted a study in the USA, focusing on how adherence challenges affect the stability of AED drug adherence and seizure control in children with epilepsy over a 25-month period. While specific barriers either remained consistent or worsened over time, the total number of barriers faced by families of children with epilepsy remained stable. These barriers included difficulties with swallowing medication, medication rejection, and forgetfulness [73].

- In 2022, Mohammed H et al. conducted a study in Southwest Ethiopia. The study included 170 children with epilepsy, with 44.7% of them aged between 10 and 17 years and 54.7% being male. Overall, 54.1% of the respondents adhered to their anti-seizure medication as prescribed. Factors influencing adherence included the current marital status of the parents/caregivers, the controlled seizure state, receiving proper medical care, the caregiver's understanding, and their attitude toward epilepsy [74].

- In 2018, Chauhan and colleagues conducted a cross-sectional study in northern India on children with epilepsy aged 2 to 13 years who had started treatment with at least one AED within the previous six months. The study included 112 patients and their immediate caregivers. According to the MMAS-8 questionnaire, 44.6% of the patients

had low adherence to AEDs, 25.9% had medium adherence, and 29.5% demonstrated good adherence. Factors strongly associated with nonadherence included the child's age, duration of epilepsy, the mean number of family members, the frequency of drug administration, and the caregiver's work status [75].

- In 2017, Louis Jacob et al. conducted a retrospective study in Germany to analyze adherence to antiepileptic drugs in children and adolescents aged 2 to 17 years diagnosed with epilepsy. The study, which included 5214 patients, used the medication possession ratio (MPR) to estimate adherence, defining adherence as an MPR greater than 80%. The overall MPR was 88.8%, with 68.9% of patients considered adherent. Children aged 5 years or younger were more adherent than teenagers aged 14 to 17 years (OR=1.22). Adherence was also higher in individuals living in western Germany (OR=1.71) and among those with asthma (OR=1.59), while it was lower in patients with attention-deficit hyperactivity disorder (OR=0.81). No significant association was observed between adherence and the type of AED prescribed. [76].

- In a 2014, Nazziwa R. et al. in Uganda, adherence to antiepileptic drugs (AEDs) was assessed in 122 children using both self-reporting and serum drug levels. The age range of participants was 6 months to 16 years, with a male-to-female ratio of 1.3:1. 62.3% had generalized seizures. The study found that AED adherence was 22.1% based on drug levels and 79.5% based on self-report. Both adherent and non-adherent children reported taking insufficient treatment. Non-adherence was higher in children whose caregivers were employed. The study highlighted the discrepancy between self-reported adherence and actual drug levels. It also pointed out that caregiver employment may impact medication adherence in children. These findings emphasize the importance of evaluating adherence using multiple methods [77].

- In 2015, Kholoud Z. Qoul and colleagues performed a study in Jordan. 112 pediatric epileptic patients, aged 2 to 14 years. These patients had no developmental abnormalities or coexisting chronic illnesses that required daily medication. Medication adherence was assessed using self-reporting questionnaires, employing the Morisky Medication Adherence Scale, an eight-item measure. Among the patients, 56 (50%) had medium adherence, 33 (29.4%) had strong adherence, and 23 (20.5%) had low adherence. The top reasons for non-adherence were forgetting to take medication (52.2%), experiencing drug side effects (33.8%), and having periods of improvement without seizures (30.4%). The least common reason for non-adherence was a child's refusal to take their medication (13.1%) [78].

- In a 2018, Beyene A. et al. in Ethiopia, a retrospective hospital-based cohort analysis was conducted with 210 participants. The study used a systematic interviewer-administered questionnaire along with document review. Most responders (aged 5–10 years) were female, making up about half of the sample. The most commonly prescribed medication was phenobarbital, and 13% of patients were in the treatment escalation phase. Poor adherence to the treatment regimen was observed in 8% of participants, while around 6% experienced uncontrollable seizures. The study found that excellent adherence to anti-epileptic treatment and being a female child were significantly correlated with better treatment outcomes [79].

- In a 2016 study by Shetty J. and colleagues in Scotland, the level of adherence to AEDs was assessed in a cohort of 320 children with epilepsy, all aged 16 years or

younger. The median age at the time of the study was 10 years, with 57% more males than females. Of the children, 25% were taking two or more AEDs, while 75% were receiving monotherapy. Approximately 30.9% (n=99) of the families adhered to the treatment plan by taking their AEDs more than 90% of the time. Adherence decreased with advancing age, and no significant correlations were found between adherence and clinical factors such as sex, duration of epilepsy, coexisting medical conditions, other regular medications, or seizure frequency [80].

- In a 2022 study by Jarad S. and colleagues in Jordan, the impact of education provided by a clinical pharmacist on pediatric epileptic patients' adherence to AEDs was assessed. The study also examined AED efficacy and safety, caregiver satisfaction with AED information, and patient quality of life (QoL). The intervention group received a 30-minute educational interview with a clinical pharmacist for the parent or caregiver, in addition to the usual medical care, while the control group received only standard care. Outcomes were measured at baseline and after an eight-week follow-up. At follow-up, there was a significant difference between the two groups. While no significant differences were found regarding AED effectiveness ($P > 0.05$) or safety ($P = 0.08$), the intervention group showed an increase in adherence, while the control group did not. The intervention group also demonstrated improved QoL ($P < 0.05$) and greater satisfaction with the information provided ($P < 0.0001$). The study concluded that pediatric epilepsy patients responded positively to clinical pharmacist-led education, resulting in better adherence, effectiveness, safety, satisfaction with AED knowledge, and quality of life [81].
- The reviewed studies identified several common factors contributing to non-adherence to AEDs in epilepsy patients. Forgetfulness was the most frequent cause, often linked to complex dosing regimens and the patient's age. Side effects of AEDs, such as cognitive issues and allergic reactions also led to treatment discontinuation. Psychiatric conditions like depression and anxiety were prevalent in non-adherent patients, particularly adolescents. Patients with poor seizure control were more likely to miss doses or switch medications. Socioeconomic factors, such as caregiver employment and income, also impacted adherence by limiting access to medications. Age played a significant role, with children demonstrating better adherence than adults, who showed more resistance to taking medications. The patient-provider relationship and lack of communication were contributing factors, with gaps in education and support leading to non-adherence. Overall, improving adherence requires addressing these multifaceted issues through tailored interventions, better healthcare communication, and support for patients and their families.

Chapter Three:

Methodology:

3.1 Study Design

This descriptive, cross-sectional, quantitative study aims to assess medication adherence and treatment patterns among epilepsy patients aged 0 to 40 years in the West Bank, specifically focusing on Hebron. Data will be collected using a structured questionnaire to evaluate adherence levels, treatment regimens, and factors influencing adherence.

3.2 Study Population

This study was conducted on epileptic patients aged 0 to 40 years attending a private neurology clinic, primarily in Hebron City, West Bank. A smaller number of questionnaires were distributed in Jerusalem, Nablus, Tubas, and Tulkarem. The data collection period spanned from June 2023 to July 2024.

3.3 Inclusion Criteria

The study included both male and female with a range of ages from infancy to adulthood (aged 0 to 40 years), participants from different cities in the West Bank, all participants were diagnosed with epilepsy, regardless of the type of epilepsy, Participants had not changed their antiepileptic drug (AED) therapy in the previous three months and had been on treatment for more than three months. Epileptic patients received follow-up care from a private neurological clinic in Hebron, led by Dr. Motaz Altamimi, every month.

3.4 Exclusion Criteria

Patients who were pregnant or those without drug treatment were excluded from the study.

3.5 Data Collection

Initially, the study involved face-to-face interviews with patients. We conducted visits to multiple outpatient clinics in Nablus and Jerusalem hospitals, and a private pediatric clinic in Hebron (Dr. Motaz Altamimi's pediatric neurology clinic). However, due to the war in Gaza, it became increasingly difficult to access clinics in the West Bank. Therefore, the paper questionnaire was converted into an electronic format. With Dr. Motaz Altamimi's assistance, we contacted epilepsy patients via phone. Each conversation lasted between 10 to 15 minutes. During these conversations, we explained the purpose of the study and assured the patients that their responses would remain anonymous. We obtained agreement to participate in this study from the patients or their parents, and many were proactive in helping by sharing the questionnaire with other patients, either by sending it to their friends or providing me with their contact numbers.

The questionnaire used in the study was developed and validated following a thorough review of the literature, incorporating information from the Morisky 8-Item Medication Adherence Scale (MMAS-8). It contained 30 questions divided into the following sections: Sociodemographic (6 questions), History of Epilepsy (4 questions), Perception toward Epilepsy (4 questions), Adherence and Dosing (6 questions), Adherence and Side Effects Factors (2 questions), in addition to MMAS (8 questions). The questionnaire was initially written in English, translated into Arabic, and back translated into English to ensure the preservation of meaning. It was pretested on seven respondents with similar characteristics to the study subjects to identify any potential issues.
The sample size for this study was determined using the Sample Size Formula for Proportions, which is commonly used for estimating population proportions. The formula is as follows:

n = (Z^2 * p * (1 - p)) / E^2

Where n represents the required sample size, Z is the Z-score corresponding to the desired confidence level (1.96 for 95% confidence), p is the estimated population proportion (0.5 was used to provide the maximum sample size), and E is the margin of error (set at 0.05 or 5%). Using this formula, the calculated sample size was 250. However, a convenient sample size of 100 participants was chosen to balance statistical reliability with practical considerations, such as time, resources, and accessibility of participants.

3.6 Interviews with Neurologists

Following the questionnaire, face-to-face interviews were conducted with four neurologists from different cities, including Dr. Motaz Altamimi (private pediatric neurology clinic in Hebron), Dr. Aneis Mansour (outpatient clinic at Al Makassed Hospital, Jerusalem), Dr. Fadi Kuffri (outpatient clinic in ST.Luke's Hospital al Injily in Nablus, West Bank), and Dr. Adel Misk (private neurology clinic, Jerusalem).

3.7 Data Analysis

Reliability of the Questionnaire and Statistical Methods:
The collected data were analysed using the Statistical Package for Social Sciences (SPSS), version 10, employing descriptive statistics, including frequencies, proportions, and averages. The reliability of the questionnaire was assessed using Cronbach's alpha

coefficient across five domains. To assess differences between variables, the following statistical methods were applied:

1. Independent sample t-test for variables with two categories.
2. ANOVA for variables with more than two categories.
3. Reliability analysis for the questionnaire.

If the P-value is equal to or less than 0.05, the result is considered significant with 95%, confidence interval.

3.8 Ethical Committee Approval

Ethical approval was obtained from the Research Ethics Committee at Al-Quds University.

For data collection, approval to perform the study was obtained from the Palestinian Ministry of Health in Ramallah. (Appendix 3).

Before each participant's admission to the study, their informed consent to participate was obtained.

Chapter Four:

Study Results:

This chapter presents the findings from the analysis of data collected through the questionnaire assessing adherence to antiepileptic drugs among patients aged (0-40) in Hebron, other cities in the West Bank, and Jerusalem, with a primary focus on Hebron. The study employed a comprehensive purposive sampling method, targeting the entire study population from a specified category. The questionnaire was distributed across all subjects within this category, facilitating in-person visits to ensure participant comprehension and to address any inquiries. A total of 100 questionnaires were completed and recovered.

4.1 Reliability of the Questionnaire and statistical methods

The questionnaire's stability was assessed using Cronbach’s alpha coefficient across five domains. The calculated reliability coefficient was 0.842, indicating a high level of internal consistency.

Table 4.1: Cronbach's Alpha Coefficient of Reliability of the Questionnaire

Domains	Alpha value
18 questions	0.842

4.2 Demographic and Socioeconomic Characteristics of the Study Sample

The characteristics of the study sample are summarized in Table (4.2) below. The data indicate that 57% of respondents were male, while 43% were female. The study included participants aged 0 to 40, with 69% of them being under the age of 18. Specifically, 33% of participants were in the 0–5-year age group, and 36% were aged 6–18 years. The remaining participants were adults, aged 19 to 40. In terms of marital status, 84.5% of the sample reported being single, with only 15.5% married. Regarding educational attainment, 28.8% of participants were uneducated, 38.8% had completed basic education, 20% had secondary education, and 12.5% had pursued university education. Most respondents were from the Hebron governorate (77%). Figure 1 shows the socioeconomic characteristics.

Table 4.2: Demographic and Socioeconomic Characteristics of the Study Sample

Demographic & Socioeconomic		Number	Column N%
Sex	Male	57	57.0%
	Female	43	43.0%
Age in years	0-5	33	33.0%
	6-18	36	36.0%
	18-25	16	16.0%
	25-30	6	6.0%
	Older than 30	9	9.0%
Marital status	Single	60	84.5%
	Married	11	15.5%
Educational level	Uneducated	23	28.8%
	Basic level learner	31	38.8%
	Secondary level learner	16	20.0%
	University education	10	12.5%
Job	Employee	7	16.3%
	Unemployed	20	46.5%
	Housewife	16	37.2%
Cities	Hebron	77	77.0%
	Jerusalem	8	8.0%
	Tubas	2	2.0%
	Tulkarm	4	4.0%
	Nablus	9	9.0%

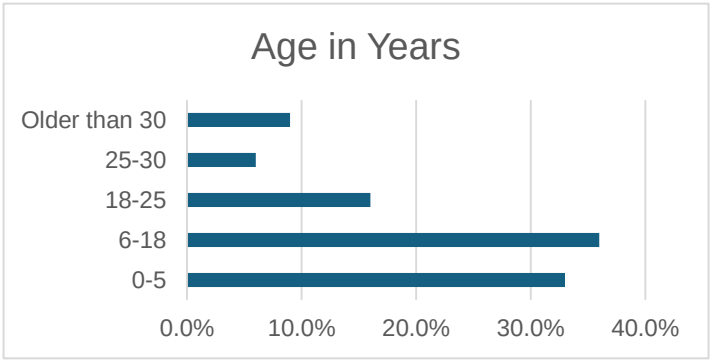

Figure 1. Socioeconomic Characteristics (Age in Years)

4.3 Basic Information about Seizures

The findings reveal that 61% of respondents experienced the onset of seizures between the ages of 0-5 years, with 23% reporting onset between 5-11 years. Furthermore, 53% of participants received a diagnosis of seizures at age 0-5 years, and 75% of the sample reported taking their medication twice a day. Table (4.3) summarizes the findings.

Table 4.3: History of Epilepsy

Your age when the seizure started?	0 – 5 years	61.0%
	5 – 11 years	23.0%
	12 One year or older	16.0%
	the total	100.0%
When were you diagnosed with seizure?	0 - 5 years	53.0%
	5 – 11 years	27.0%
	12 One year or older	20.0%
	the total	100.0%
Number of times to take the medication per day	Once	5.0%
	Twice	75.0%
	More	20.0%
	The Total	100.0%

4.4 Morisky Adherence Scale Analysis

The average score on the Morisky scale, which assesses adherence to antiepileptic medication table 4.4.1, Based on the table, the adherence level among patients can be categorized as **moderate adherence** for the following reasons:

1. **Mean (5.38):**
The mean adherence score is 5.38, which indicates that the overall adherence level of most patients falls closer to the moderate adherence range (6 to <8) based on Table D.

2. **Median (6):**
The median score is 6, which represents the midpoint of the data. This implies that half of the patients have an adherence score of 6 or higher, placing them in the moderate adherence category.

3. **Mode (6):**
The mode, which reflects the most frequently occurring score, is also 6. This further supports the conclusion that the majority of patients are in the moderate adherence range.

Based on the statistical analysis presented in the table, the overall adherence level of the study population can be classified as moderate adherence. Figure 2 shows Adherence level according to MMAS-8.

Table 4.4: Morisky Medication Adherence Scale

Adherence Status	Score
High adherence	(score = 8)
Medium adherence	(6 to < 8)
Low adherence	(0 to < 6)

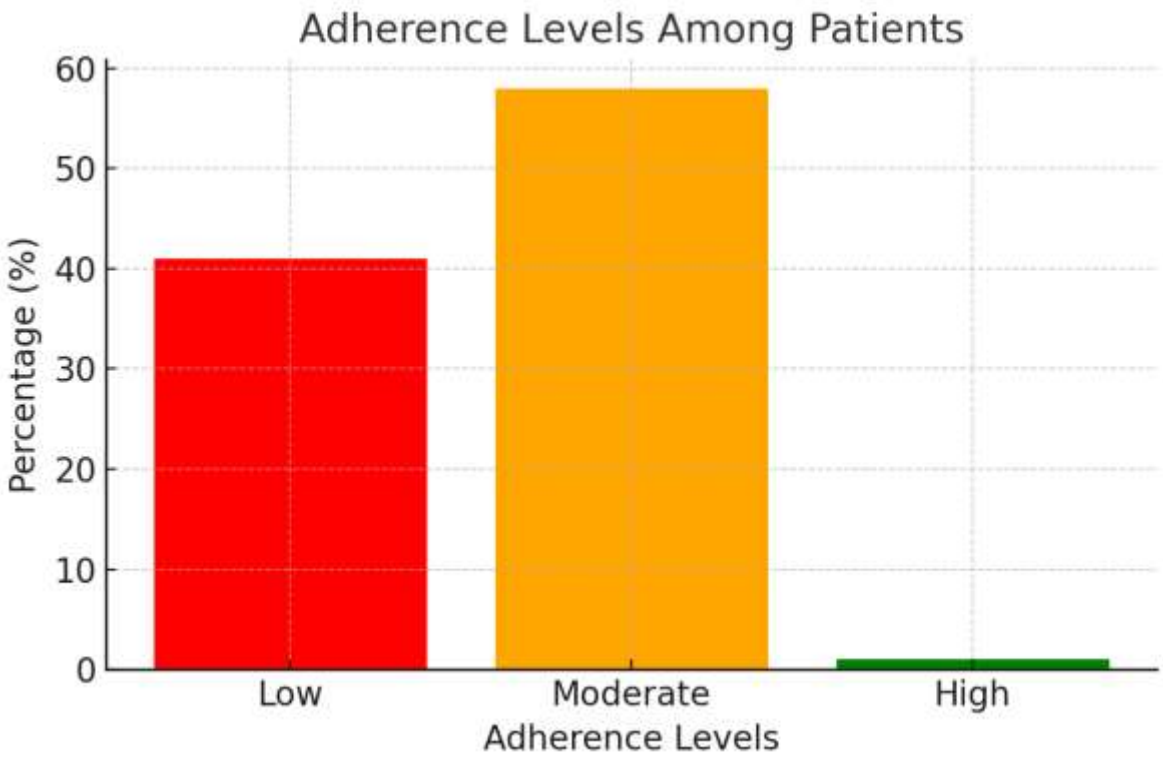

Figure 2: Adherence Level According to MMAS-8

Table: 4.5 Morisky variable statistics

Morisky variable statistics	Score
The mean	5.38
The median	6
Mode	6

Table (4.5) revealed that 41% of participants exhibited low adherence to their medication regimen, while 58% demonstrated medium adherence. Only 1% of respondents were classified as having high adherence as shown below.

Table 4.6: Morisky Scale Adherence Categories

Morisky adherence level	Percentage (%)
Low	41.0
Medium	58.0
High	1.0

Table (4.6) illustrates the adherence to antiepileptic medications as assessed by the Morisky Medication Adherence Scale. The results revealed that 16% of participants reported occasionally forgetting to take their antiepileptic medications, while 14% admitted missing doses on certain days within the past two weeks. Additionally, 12% of respondents indicated that they sometimes forget to bring their medications when traveling or leaving home.

Notably, 16% of participants acknowledged discontinuing their medication when they feel better, and an equal percentage reported feeling burdened by the need to take their medication daily. Furthermore, 20% expressed difficulties in consistently remembering to take all prescribed medications.

Despite these challenges, 95% of participants confirmed taking their medication the previous day, reflecting a general effort to adhere to their regimen. Moreover, only 4% admitted to reducing or stopping their medication without consulting their doctor due to feeling worse when taking it, suggesting a positive level of awareness about the risks of non-adherence.

While these findings indicate a moderate level of adherence overall, they also highlight specific areas—such as forgetfulness, psychological burden, and occasional lapses—that require attention to enhance adherence rates and improve patient outcomes.

Table 4.7: Assessment of Antiepileptic Medication Adherence Using the Morisky Medication Adherence Scale Among Epilepsy Patients aged (0-40) years mainly in Hebron

Morisky adherence questions	Yes (0 Point)	No (1 point)
Q.1 Do you sometimes forget to take the anti-epileptic medications?	16%	84%
Q.2 Over the past two weeks, were there any days when you did not take the anti-epileptic medication? If Yes, how many days you did not take	14%	86%
Q.3 Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse when you took it?	4%	96%
Q.4 When you travel or leave home, do you sometimes forget to bring along the anti-epileptic medication?	12%	88%
Q.5 Do you take your AEDs yesterday?	95%	5%
Q.6 When you feel good, do you sometimes stop taking the anti-epileptic drug?	16%	84%
Q.7 Taking medication every day is a real inconvenience for some, people, do you ever feel hassled about sticking to your anti-epileptic drug?	16%	84%
Q.8 How often do you have difficulty remembering to take all the anti-epileptic medication? -Once, sometimes, usually, (0 point) -Never/Rarely (1 point)	20%	80%

4.5 Participant Perceptions

The data shown in Table (4.8), that financial burdens, stigma, and public embarrassment are primary factors influencing medication adherence among epilepsy patients in Hebron, with 83% reporting medication costs as too high and 67% avoiding disclosure of their condition. Social discomfort (49%) and embarrassment in taking medication publicly (55%) also contribute significantly to non-adherence. Forgetfulness, however, appears minimal (16%), suggesting external factors play a larger role in adherence challenges. Interventions focusing on financial assistance and stigma reduction may thus enhance adherence, ultimately improving treatment outcomes and quality of life for epilepsy patients in this community. Figure 3 shows the main factors affecting adherence to AEDs.

Table 4.8: Patients' Perspectives on Seizure Medication Costs, Social Perceptions, and Adherence Challenges

Question	Yes	No	the total
Do you think your seizure medications are too expensive?	83.0%	17.0%	100.0%
Do you feel that some people are uncomfortable because of your seizures?	49.0%	51.0%	100.0%
Do you avoid telling people that you have seizures?	67.0%	33.0%	100.0%
Do you sometimes feel embarrassed when taking medicine in front of others?	55.0%	45.0%	100.0%
Do you sometimes forget to take your seizure medication?	16.0%	84.0%	100.0%
During the past two weeks, have there been days when you did not take your seizure medication? (continue below)	14.0%	86.0%	100.0%

For the previous question (last question), if the answer was ‘Yes,’ (the number of days the medication was not taken)

The responses are as follows (from 15 participants):

Table 4.9: Days Medication Was Missed

Number of Days	Responses	Percentage
2 days	1	6.7%
3 days	1	6.7%
4 days	1	6.7%
1 week	2	13.3%
Every day	2	13.3%
Every other day	1	6.7%
1 day	3	20%
2 weeks	2	13.3%

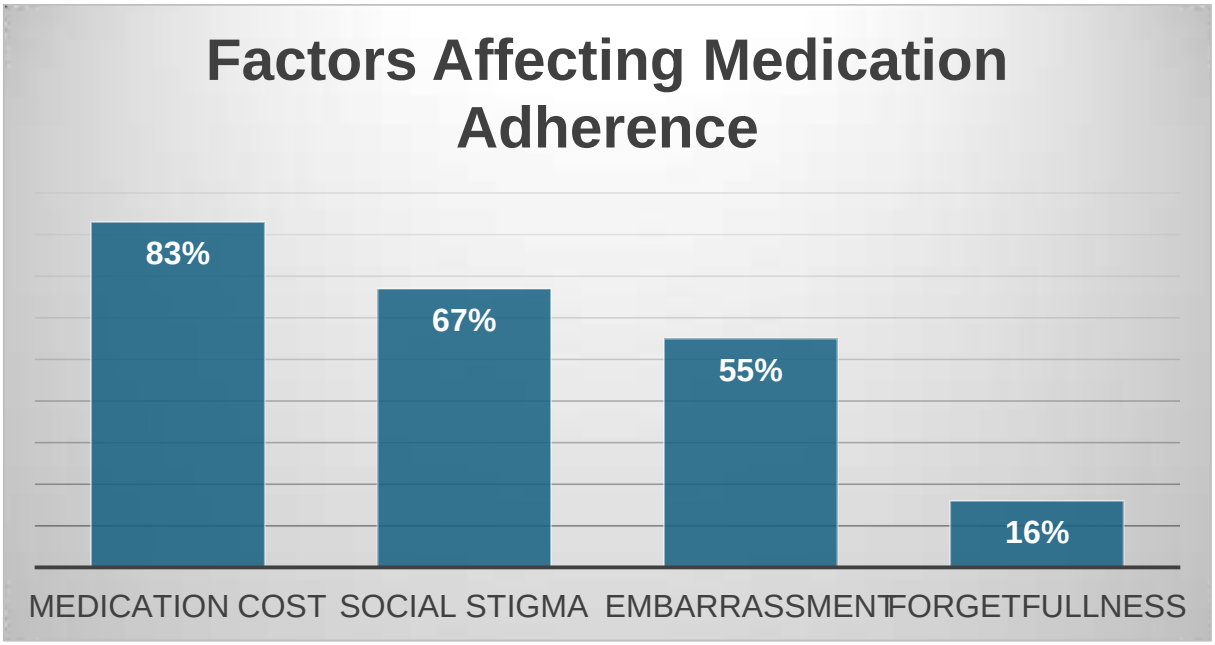

Figure 3: Factors Affecting Medication Adherence.

4.6 Adherence and Dosing regimen

In table (4.10), 46% of the respondents reported that the doctor changes the medication frequently, while 42.6% reported that the last medication change was 1-3 months ago. 40.4% reported that it was 3-6 months ago, and 61% of the respondents reported that they had suffered seizures during the past four weeks, while 16% of them reported that they had been transferred to the hospital during the past six months.

Table 4.10: Frequency and Timing of Treatment Changes by Doctor

Question		Ratio
Does your doctor change treatment frequently?	Yes	46%
	No	54%
When was the last change in treatment?	1 - 3 months	43%
	3 - 6 months	40%
	6 - 12 months	17%

4.7 Overview of Seizure Activity and Hospitalization

In table (4.11) discuss that, In the past four weeks, 61.0% of patients experienced seizures, with 39.0% reporting no seizures. Regarding the frequency of seizures, 34.9% of patients had one seizure, another 34.9% had two, and 30.2% had more than two seizures. Additionally, only 16.0% of patients were hospitalized in the past six months, while 84.0% reported no hospitalizations during this period.

Table 4.11: Overview of Seizure Activity and Hospitalization

Question		Ratio
Have you had seizures in the past four weeks?	Yes	61%
	No	39%
How many seizures did you have?	Once	35%
	Twice	38%
	More	30%
Have you been hospitalized in the past six months?	Yes	16%
	No	84%

4.8 Medication Adherence, Side Effects, and Self-Adjustment of Dosage

In table (4.12), Ninety-five percent of the respondents reported taking their medication the previous day, while 86% indicated that anticonvulsant medications caused feelings of fatigue and laziness. Additionally, 11% of participants admitted to reducing their medication dose or stopping it altogether without consulting their doctor, as they felt their condition worsened when taking the medication.

Table 4.12: Medication Adherence, Side Effects, and Self-Adjustment of Dosage

Question	Yes	No
Did you take your seizure medication yesterday?	95%	5%
Do your seizure medications make you feel tired and sluggish?	86%	14%
Have you reduced the dose of the medication or stopped taking it without informing the doctor because you felt your condition deteriorated when taking it?	11%	89%

4.9 Inferential analysis

In Table (4.13), The survey results showed that the average Morisky scale score for medication adherence was 5.3 for males and 5.5 for females. An Independent Sample T-test was conducted to examine any differences in adherence between the two groups. The test revealed no statistically significant differences in the Morisky Adherence Index based on gender, as indicated by a P-value of 0.586, which is greater than the significance threshold of 0.05. This result suggests that gender does not have a significant impact on medication adherence in this sample.

Table 4.13: Independent Sample T-Test Analysis of Morisky Index by Gender

Sex	N	Morisky scale	Standard deviation	Standard error of mean	Sig. (2-tailed)	T
Male	57	5.31	1.31	0.17371	0.586	-0.547
Female	43	5.46	1.4	0.21399		

In Table (4.13), The analysis using an Independent Sample T-test suggests that there is no statistically significant difference in Morisky Index scores between bachelor and married participants. The mean adherence score is 5.23 for bachelors (SD = 1.24) and 4.64 for married participants (SD = 2.20). The p-value of 0.204 (greater than 0.05) indicates that marital status does not have a significant impact on medication adherence in this sample.

Table 4.14: Difference analysis of the Morisky index according to the marital status variable using independent sample T-test

The condition Social	N	Morisky scale	Standard deviation	Standard error of mean	Sig. (2-tailed)	T
Single	60	5.2333	1.2401	0.1601	0.204	1.28
Married	11	4.6364	2.2033	0.66432		

In Table (4.14), The ANOVA test reveals a statistically significant difference in Morisky Index scores across different age groups, with a p-value of 0.000 (less than 0.05) and an F-value of 8.61. This indicates that age is a significant factor affecting medication adherence, with younger age groups generally showing higher adherence scores. The mean adherence score is highest in the 0-5 age group (6.03) and decreases with increasing age, reaching the lowest mean in the "greater than 30" group (3.67). This suggests that adherence may decline as age increases in this sample. Figure 4 shows the adherence to age group according to MMAS-8.

Table 4.15: ANOVA Test Analysis of Morisky Index by Age Group

Age group	N	Morisky scale	Standard deviation	Standard error of mean		
					F	Sig.
0-5	33	6.0303	0.80951	0.14092	8.61	0
6-18	36	5.5278	97060	0.16177		
18-25	16	4.75	1.48324	0.37081		
25-30	6	5.1667	0.75277	0.30732		
Greater than 30	9	3.6667	2.29129	0.76376		
the total	100	5.38	1.34675	0.13468		

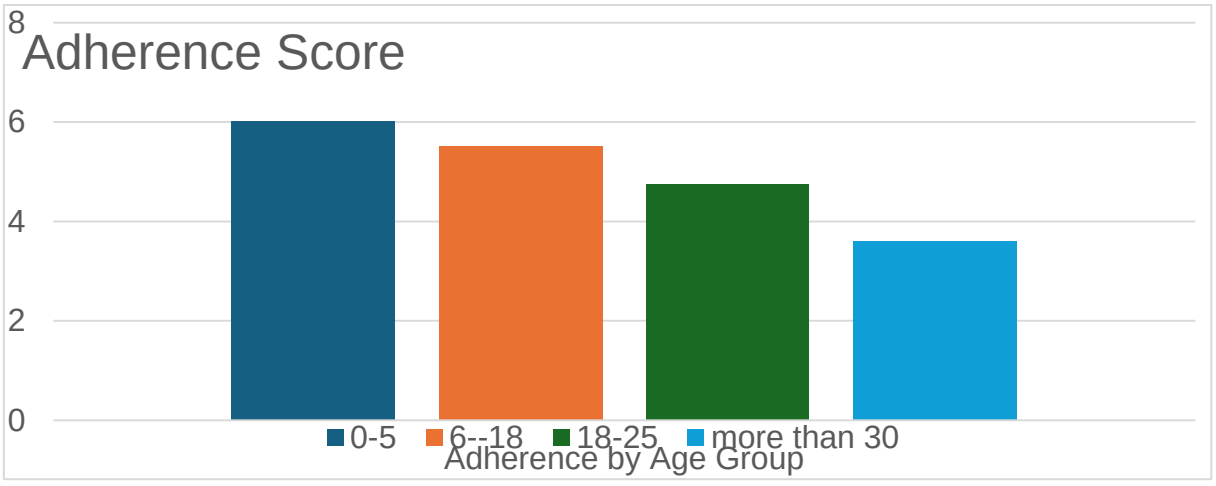

Figure 4: Adherence by Age Group According to MMAS-8

In Table (4.15), The ANOVA test shows statistically significant differences in Morisky Index scores across various educational levels, with a p-value of 0.000 (less than 0.05) and an F-value of 7.45. These results suggest that educational level significantly influences medication adherence. Specifically, the highest mean adherence score was observed among those with no formal education (5.96), while those with university education had the lowest mean adherence score (3.80). This finding may imply that higher educational levels are associated with lower adherence rates in this sample, possibly due to increased skepticism or lifestyle factors among more educated individuals.

And Figure 5 below, clarify the educational level and the adherence score

Table 4.16: ANOVA Test Analysis of Morisky Index by Educational Level

Educational Level	**N**	**Morisky scale**	**Standard deviation**	**Standard error of mean**		
					F	**Sig.**
uneducated	23	5.9565	0.56232	0.11725	7.45	0
Basic Education Stage	31	5.0645	1.34004	0.24068		
Secondary Education Stage	16	5.25	0.93095	0.23274		
University Education	10	3.8	2.09762	0.66332		
Total	**80**	**5.2**	**1.36317**	**0.15241**		

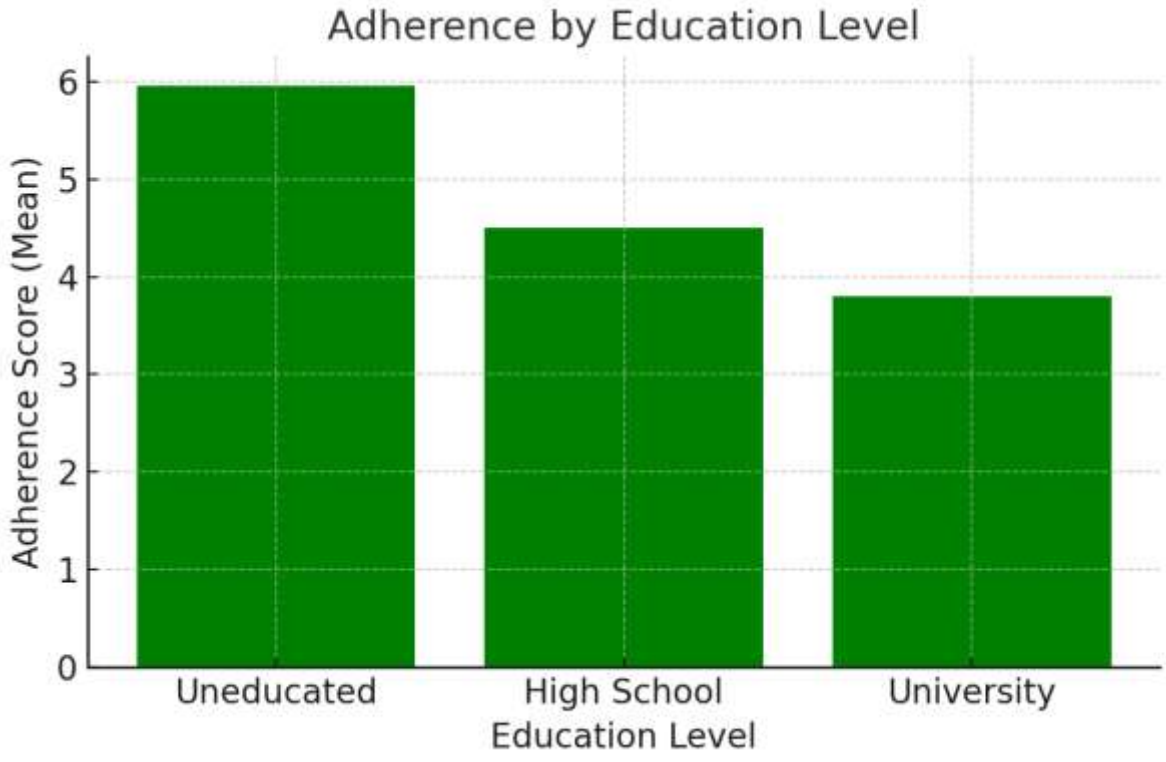

Figure 5: Adherence by Educational Level According to MMAS-8

Table (4.16), The ANOVA test indicates significant differences in Morisky Index scores based on work status, with a p-value of 0.000 (less than 0.05) and an F-value of 14.50. This suggests that work status significantly affects medication adherence.

The analysis reveals that employees have the lowest mean adherence score (2.71), while housewives have the highest mean score (5.88). The mean score for non-employed individuals are 5.00. This disparity may indicate that being employed could be associated with lower adherence to medication, possibly due to work-related stress or time constraints that affect the ability to consistently take medications as prescribed.

Table 4.17: ANOVA Test Analysis of Morisky Index by Work Status

Employment Status	N	Morisky scale	Standard deviation	Standard error of mean		
					F	Sig.
employee	7	2.7143	2.28869	0.86504	14.5	0
Unemployed	20	5	1.07606	0.24061		
Housewife	16	5.875	0.95743	0.23936		
the total	**43**	**4.9535**	**1.66123**	**0.25334**		

In Table (4.17), the ANOVA test reveals statistically significant differences in Morisky Index scores based on the age at the onset of seizures, with a p-value of 0.000 (less than 0.05) and an F-value of 8.35. This indicates that the age at which seizures begin significantly influences medication adherence.

- The analysis shows that individuals with an onset of seizures between 0 - 5 years have the highest mean adherence score (5.79), while those with an onset between 5 - 11 years have a lower mean score (4.65), and those 12 years and above have a mean score of 4.88. This trend suggests that younger individuals may be more likely to adhere to their medication regimen compared to those who experience seizures at an older age, possibly due to factors such as caregiver involvement and awareness of treatment importance at an early age.

Table 4.18: ANOVA Test Analysis of Morisky Index by Age Group at Onset of Seizures

Age Group at Onset of Seizures	N	Morisky scale	Standard deviation	Standard error of mean		
					F	Sig.
0-5 years	61	5.7869	0.81884	0.10484	8.35	0
5-11 years	23	4.6522	1.94489	0.40554		
12 years and above	16	4.875	1.40831	0.35208		
Total	100	5.38	1.34675	0.13468		

In table (4.18), The ANOVA test indicates significant differences in Morisky Index scores based on the time of diagnosis of Seizures, with a p-value of 0.000 (less than 0.05) and an F-value of 9.35. This result suggests that the timing of diagnosis significantly affects medication adherence.

Specifically, individuals diagnosed with Seizures at (0 – 5) years have the highest mean adherence score (5.89), while those diagnosed between (5 – 11) years have a lower mean score (4.78), and those diagnosed (12 years and above) have a mean score of 4.85. This pattern implies that earlier diagnosis may correlate with better medication adherence, potentially due to increased caregiver support and education about the importance of medication management at a younger age.

Table 4.19: ANOVA Test Analysis of Morisky Index by Time of Diagnosis of Seizure

Time of Diagnosis	N	Mean	Standard deviation	Standard error of mean		
					F	Sig.
0-5 years	53	5.8868	0.86958	0.11945	9.35	0
5-11 years	27	4.7778	1.78311	0.34316		
12 years and above	20	4.85	1.22582	0.2741		
Total	**100**	**5.38**	**1.34675**	**0.13468**		

In table (4.19), The ANOVA test reveals significant differences in Morisky Index scores based on the frequency of medication intake, with a p-value of 0.000 (less than 0.05) and an F-value of 17.6. This indicates that the number of times medication is taken significantly influences adherence levels.

The analysis of the Morisky Index by the frequency of medication intake in table (4.9.8) highlights significant differences in adherence levels between patients taking their medication twice daily and those taking it more than twice daily. Patients with a twice-daily regimen had a higher mean Morisky scale score (5.76 ± 0.99784) compared to those with a more frequent regimen (4.45 ± 1.35627). This suggests that a simpler dosing schedule, such as twice daily, is associated with better adherence. The ANOVA test confirmed a statistically significant difference between the groups (F = 17.6, p = 0.000), emphasizing the impact of medication frequency on adherence.

Table 4.20: ANOVA Test Analysis of Morisky Index by Frequency of Medication Intake

Frequency of Medication Intake	N	Morisky scale	Standard deviation	Standard error of mean		
					F	Sig.
Time	5	3.4	2.40832	1.07703	17.6	0
Twice	75	5.76	0.99784	0.11522		
More	20	4.45	1.35627	0.30327		
Total	**100**	**5.38**	**1.34675**	**0.13468**		

Frequency of Antiepileptic Drug Use:

The study collected data on the types and frequency of AEDs used among epileptic patients (aged 0-40 years).

The most used medication was Valproic acid and sodium Valproate (Depalept/Depalept Chrono®), utilized by 60% of the patients, followed by Carbamazepine (Tegretol®) at 49%, and Levetiracetam (Keppra®) at 33%, Diazepam (Assival®) was used by 13% of the patients, while Lamotrigine (Lamictal/Lamodex®) was reported by 10%. Other AEDs, such as Clobazam (Firisium®) (5%), Topiramate (Topimax®) (6%), and Phenytoin (Epanutin®) (6%) were used less frequently. Medications with usage rates below 2% included Pregabalin (Lyrica®), Clonazepam (Clonex®), Carbamazepine CR 400 (Tegretol 400 CR®), Epitam, Valproic Acid, and Phenobarbital.

- These findings indicate that Valproic acid and sodium Valproate (Depalept/Depalept Chrono®) and Carbamazepine (Tegretol®) are the most prescribed AEDs within this patient population, suggesting a preference for these drugs in the management of epilepsy among patients in the region.

MMAS-8 Adherence Scores by Antiepileptic Drug

- The Morisky Medication Adherence Scale (MMAS-8) scores were analyzed for each AED to evaluate adherence levels. (Depalept/Depalept Chrono®) achieved the highest adherence score, with a mean MMAS-8 score of 5.6, followed closely by Carbamazepine (Tegretol®) with a score of 5.5. Diazepam (Assival®) and Levetiracetam (Keppra®) had adherence scores of 5.3 and 5.2, respectively. Adherence was moderate for Clobazam (Firisium®) (5.0) and Topiramate (Topimax®) (4.8), while Lamotrigine (Lamictal/Lamodex®) and Phenytoin (Epanutin®) had the lowest adherence scores, both averaging around 4.0.

- These scores suggest that Depalept/Depalept Chrono® and Tegretol® are not only the most frequently used drugs but also demonstrate the highest adherence levels among the patients, possibly reflecting caregiver preference, ease of administration, or perceived effectiveness.

- To better understand the relationship between drug frequency and adherence, Table (4.10) below provides a comparison of the average adherence scores alongside the percentage of patients using each AED.

4.21 Summary Table: Combined Frequency and Adherence Scores

Drug	MMAS-8 Adherence Score	Frequency of Use (%)
Valproic acid and Sodium Valpoate (Depalept/Depalept Chrono®)	5.6	60
Carbamazepine (Tegretol®)	5.5	49
Diazepam (Assiva®l)	5.3	13
Levetiracetam (Keppra®)	5.2	33
Clobazam (Firisium®)	5.0	5
Topiramate (Topimax®)	4.8	6
Lamotrigine (Lamictal/Lamodex®)	4.1	10
Phenytoin (Epanutin®)	4.0	6

- The results suggest that adherence tends to be higher for more commonly prescribed drugs, especially Depalept/Depalept Chrono® and Tegretol®. This correlation may indicate a preference among caregivers and physicians for medications that are more manageable and perceived to be more effective. Drugs with lower usage frequencies and adherence scores, such as Phenytoin (Epanutin®) and Lamotrigine (Lamictal/Lamodex®), may present greater challenges in adherence due to factors such as side effects, dosing schedules, or patient-specific considerations. Figure 6 shows the frequency of drug use and adherence score.

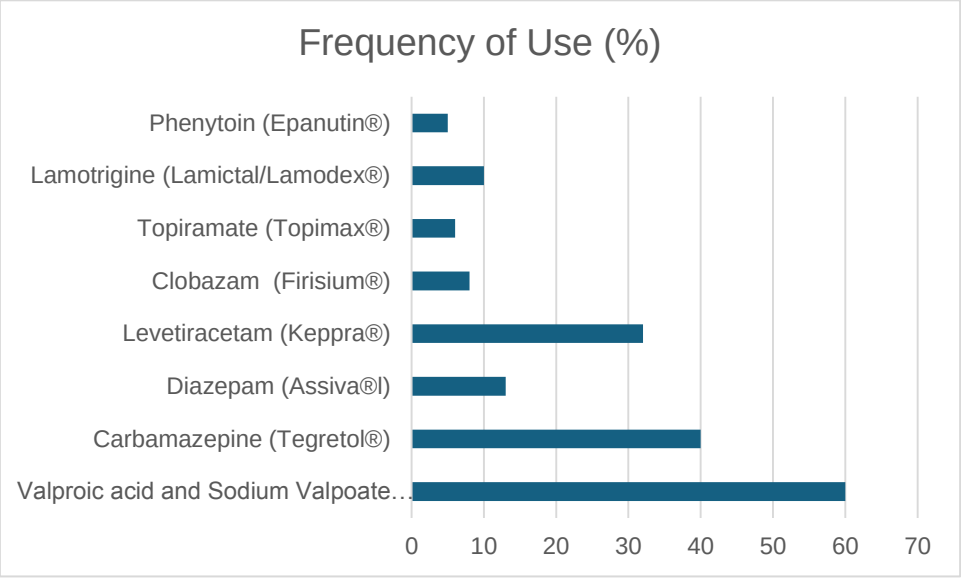

Figure 6: Combined Frequency and Adherence Scores

Chapter Five:

Discussion

The present study aimed to explore factors influencing the adherence to AEDs in epilepsy patients aged 0- 40 years in Hebron, West Bank. The research focuses on nonadherence and socio-economic variables mainly in Hebron. Given the absence of extensive research on adherence patterns in this population, particularly in regions like the West Bank. This study offers valuable insights into the barriers and facilitators of AED adherence in a context marked by political instability, financial constraints, and social stigma. The following discussion will investigate the implications of the findings, critically analyzing their relevance and potential impact on improving adherence in this context.

5.1 Demographic Factors and Adherence

The demographic characteristics of the study sample, including age, gender, education, and socioeconomic background, provide essential context for understanding adherence patterns to antiepileptic drugs (AEDs). In this study, the majority of participants were children under the age of 18, with a notable predominance of males. This male predominance is consistent with patterns observed in similar studies globally. For instance, research conducted in Gaza, Palestine, revealed that 61% of epilepsy patients were male [69]. A study in Southwest Ethiopia reported a similar trend, where 54.7% of participants were male [74]. In Uganda, a 2014 study documented a male-to-female ratio of 1.3:1 among epilepsy patients [77], while research in Scotland highlighted a 57% higher prevalence of males compared to females [80].

These gender disparities in epilepsy populations could be attributed to several factors, including biological susceptibility, health-seeking behaviors, and potential diagnostic biases. Some studies suggest that epilepsy may be slightly more prevalent in males due to genetic and hormonal factors [15], though the underlying mechanisms remain a topic of ongoing research. Additionally, cultural factors might influence the diagnosis and management of epilepsy, with families more likely to seek medical attention for male children compared to females in certain regions, including the Middle East.

Despite the observed gender imbalance, this study did not find a significant direct impact of gender on adherence rates. This aligns with prior research suggesting that other factors, such as caregiver involvement, family support, and the psychological burden of epilepsy, may play a more substantial role in shaping adherence behaviors than gender alone.

- Age emerged as a significant determinant of adherence to antiepileptic drugs in this study, revealing a clear disparity in adherence rates across different age groups. Younger participants, particularly those in the 0–5 age group, exhibited notably higher adherence rates. This is likely attributable to the intensive involvement of caregivers or parents who oversee and manage medication routines for this age group. The role of caregivers in ensuring timely and consistent medication intake cannot be overstated, as children depend entirely on them for healthcare decisions. Findings from Spain and Germany align with this trend, where children in the 0–5 age group demonstrated better adherence than adolescents or adults [76]. Caregiver awareness during early childhood appears to offset common adherence barriers, such as forgetfulness or lack of understanding, thereby fostering better outcomes.

- However, this positive trend in adherence diminishes as children grow older. Adolescents and adults, often navigating increased independence, experience greater challenges in maintaining consistent medication adherence. Factors such as academic or work responsibilities, social engagements, and peer pressures frequently contribute to missed doses or non-adherence. Studies conducted in Ethiopia and Germany corroborate this observation, indicating that as children mature, the responsibility for managing their medication shifts from caregivers to the individuals themselves, leading to an increased likelihood of non-adherence [79], [76]. This transition underscores the complexity of medication management in adolescence, where developmental and psychosocial changes play a critical role in shaping adherence behaviors.

- Interestingly, this general decline in adherence with age is not universally observed. A study by Dr. Waleed Sweileh in Nablus, Palestine, revealed a positive correlation between age and adherence, with older participants exhibiting higher adherence rates [66]. This anomaly could be explained by cultural or contextual factors, such as greater family involvement in healthcare decisions for older individuals or a heightened sense of responsibility and understanding of the condition among older patients in the Palestinian setting. However, a study by Gutierrez-Colina and colleagues in the USA found no significant differences in adherence rates across age groups, suggesting that other contextual factors, such as healthcare accessibility, family dynamics, or educational interventions, may mitigate the impact of age on adherence [68].

- The variability in findings highlights the multifaceted nature of age as a determinant of adherence. While children benefit from the hands-on involvement of caregivers, adolescents, and adults require tailored interventions to address unique barriers. Strategies such as educational programs to improve self-management skills, mobile reminders, or structured support systems from families or healthcare providers could bridge the adherence gap as patients transition from childhood to adulthood. Understanding these age-specific challenges and implementing context-sensitive solutions is crucial for optimizing long-term adherence to AEDs across all age groups.

5.2 Socioeconomic Barriers to Adherence

- The findings of this study align with the research conducted in Ohio, which reported that lower income was associated with reduced adherence to AEDs [72]. In both cases, financial barriers emerge as a critical factor influencing adherence. This study revealed that 83% of participants found the cost of AEDs prohibitive, leading to inconsistent medication use or discontinuation of treatment. Similarly, the Ohio study reinforces the connection between socioeconomic challenges, such as low income, and the inability to maintain regular medication regimens.

- Both studies underscore that the financial burden of managing epilepsy extends beyond direct medication costs to include transportation to healthcare facilities, follow-up visits, and additional supportive care. Families facing economic hardships are often forced to make difficult choices, prioritizing other essential expenses over healthcare, which exacerbates nonadherence rates. These parallels highlight the universal nature of socioeconomic barriers in impacting epilepsy management and adherence.

- In Palestine, socioeconomic barriers to medication adherence are further compounded by unique logistical and geopolitical challenges. Beyond the prohibitive costs of AEDs, patients and their families face significant obstacles related to restricted mobility caused by security checkpoints, road closures, and enforced detours. These factors contribute substantially to the financial burden by increasing transportation costs and extending travel times required for accessing healthcare facilities and pharmacies for medication refills or follow-up appointments. As a result, families may be forced to delay or forgo medication refills and necessary medical visits, which increases the risk of nonadherence and associated health complications. These compounded difficulties further exacerbate the challenges of epilepsy management, placing additional strain on families already facing economic hardship, and subsequently compromising medication adherence and continuity of care.

- The study emphasizes the profound role that social stigma surrounding epilepsy plays in shaping medication adherence, particularly in socio-cultural contexts like that of the Middle East, including Palestine. 67% of participants in the current study reported experiencing discomfort when disclosing their epilepsy diagnosis, while 55% expressed feelings of embarrassment when taking their medication in public. These figures suggest that epilepsy is not merely viewed as a medical condition but is often perceived through a lens of social exclusion and fear of stigmatization. This fear of judgment and societal rejection significantly impacts treatment-seeking behaviors and adherence to prescribed medication regimens. Individuals may avoid necessary medical consultations, delay treatment initiation, or discontinue their medications altogether, not necessarily due to lack of access or resources, but because of the anxiety associated with public disclosure of their condition.

- This finding is particularly relevant in the context of cultural perceptions that prevail in many Middle Eastern countries, where epilepsy is frequently linked to supernatural explanations, such as possession by spirits or "jinn." These misconceptions further deepen the social stigma, as epilepsy is viewed not just as a

neurological disorder but as a condition tainted by societal stigma. The cultural stigma surrounding epilepsy thus leads to silence and secrecy, with patients and their families opting not to seek help due to the fear of discrimination or ostracism. Consequently, medication adherence becomes secondary to concerns over social acceptance.

- Moreover, the social stigma surrounding epilepsy in such regions has far-reaching consequences on both individual well-being and public health outcomes. It contributes to delayed diagnosis, as many individuals may avoid medical visits or only seek care when the condition has escalated. This delay often results in more severe health consequences, including increased seizure frequency and prolonged periods of non-adherence, which in turn leads to deteriorating quality of life and increased healthcare costs. Research conducted in other parts of the Middle East aligns with these findings, showing that cultural barriers, including the fear of stigma and misinterpretation of the disease, are crucial factors in determining medication adherence in epilepsy patients. Addressing these cultural and social issues is, therefore, essential to improve adherence rates and achieving better epilepsy management in these regions.

- In Palestine, these beliefs significantly influence healthcare-seeking behavior, resulting in delayed diagnosis and treatment. For example, in the case of a 37-year-old female participant, her epilepsy was ignored for years because her father believed seeking medical care for such a condition would bring shame to the family. As a result, her condition deteriorated due to a lack of intervention. This illustrates how societal and cultural attitudes can obstruct access to care, leading to more severe health outcomes. This is just one example among many where the fear of social judgment and stigmatization impacts health-seeking behavior and adherence to medical advice.

- In school settings, children and adolescents with epilepsy often face additional challenges due to societal stigma, lack of awareness, and the potential for embarrassment regarding their condition. These factors can significantly affect their ability to engage fully in educational activities, leading to social isolation, reduced participation in school events, and lower self-esteem. In some cases, students may avoid disclosing their diagnosis to teachers or peers out of fear of being treated differently or excluded. The lack of understanding about epilepsy among classmates and teachers can also lead to misconceptions about the condition, resulting in instances of bullying, teasing, or unfair treatment, which can further exacerbate feelings of isolation and stress.

- For parents, caregivers, and educators, it is essential to create a supportive and inclusive school environment where children with epilepsy feel safe and encouraged to disclose their condition if needed. Educational programs aimed at raising awareness among students and staff about epilepsy and its management can reduce stigma and promote empathy. In addition, schools can establish clear protocols to ensure that students with epilepsy receive appropriate medical care and accommodations, such as adjusted physical activities or extra time for exams if necessary. This approach can not only enhance academic success but also support the overall well-being of children and adolescents with epilepsy, fostering a more inclusive and understanding school culture.

- These cultural attitudes not only hinder access to care but also delay diagnosis, treatment, and adherence. To address this, there is an urgent need for community education to challenge misconceptions about epilepsy, alongside the implementation of culturally sensitive healthcare approaches. This approach is crucial to improving both medical adherence and the overall quality of life for individuals with epilepsy in similar socio-cultural contexts.

5.3 Medication Regimen and Adherence

- The type of medication prescribed, and the complexity of the regimen were significant factors influencing medication adherence in this study. Valproic acid and Sodium Valproate (Depalept/Depalept Chrono®) were used by 60% of patients, while Carbamazepine (Tegretol®) was used by 49%. These medications emerged as the most prescribed AEDs and were associated with higher adherence rates among patients. This suggests that these medications might be more tolerable, both in terms of side effects and ease of administration. For example, Depalept Chrono® is a sustained-release formulation, which simplifies dosing regimens and reduces the frequency of administration, potentially minimizing the chances of missed doses. This finding is consistent with literature indicating that once-daily regimens generally improve adherence compared to more complex dosing schedules [83].

- On the other hand, AEDs like Lamotrigine (lamodex®) and Phenytoin (Epanutin ®) were associated with lower adherence rates. This could be due to various factors, such as side effects, frequency of dosing, or patient perceptions of the drug's effectiveness. Lamotrigine, for instance, has been associated with serious side effects like skin rashes, (Stevens-Johnson syndrome) a rare side effect of lamotrigine. It causes flu-like symptoms, followed by a red or purple rash that spreads and forms blisters [84], these severe reactions necessitate immediate cessation of the medication to prevent further health complications. Similarly, Phenytoin requires precise monitoring due to its narrow therapeutic range (between 10-20 mg/L.) [85], which may discourage patients from adhering to the prescribed regimen due to the fear of potential side effects or complications.side effects such as dizziness, gum overgrowth, and ataxia (lack of coordination). These side effects can significantly impact a patient's daily life, leading to discomfort and embarrassment, which may result in patients choosing to skip doses or stop taking the medication altogether. For example, a patient may omit doses to avoid the visible side effect of gum overgrowth, which they perceive as socially stigmatizing. This decision to reduce or discontinue treatment reflects non-adherence, as the patient prioritizes managing the side effects over maintaining consistent seizure control, potentially leading to an increased risk of seizure recurrence and complications.

- The impact of dosing frequency on medication adherence is critical, with evidence showing that patients on twice-daily regimens tend to demonstrate higher adherence compared to those on more frequent dosing schedules. This underscores the importance of simplifying drug regimens, as fewer doses per day are more manageable for both children and caregivers. The complexity of a regimen is a well-documented barrier to adherence, and interventions aimed at dose simplification are consistently effective in improving medication adherence. Research has shown that reducing the

number of doses per day enhances treatment compliance and reduces the likelihood of missed doses, especially in children populations where managing complex regimens can be challenging for caregivers [86].

- One of the examples observed during the questionnaire process involved a 21-year-old male patient with a complex medication regimen for epilepsy. Due to the challenging side effects associated with the prescribed medications, the patient chose to omit his doses. Consequently, this non-adherence resulted in a recurrence of epileptic seizures after missing a single dose. This case illustrates how complex regimens can significantly impact medication adherence, leading to potential adverse health outcomes.

5.4 The Role of Caregiver Involvement

Caregiver involvement is crucial for ensuring adherence to medication regimens, especially for children. However, this study highlights that caregivers' role extends beyond childhood, influencing adherence across the entire 0–40 age group. Adults also showed improved adherence when they received support from engaged caregivers. For younger adults and adolescents, the presence of caregivers—especially those who are more available at home—was associated with better adherence. Parents and caregivers, particularly those who remain at home, often help ensure consistent adherence to the medication regimen. This aligns with research conducted in Uganda, which found that children with employed caregivers were more likely to be non-adherent. Although adults bear more responsibility for managing their medication independently, challenges such as forgetfulness, lack of motivation, or external distractions can affect adherence. As individuals transition from childhood to adulthood, the absence of continuous caregiver support can contribute to a decline in adherence rates, highlighting the need for ongoing support systems even among those in their 20s and early 30s [77].

5.5 Implications for Future Interventions

- The findings of this study have several important implications for future interventions aimed at improving AED adherence in epilepsy patients. Given the multifaceted nature of adherence, interventions should target not only the clinical aspects of epilepsy treatment but also the socioeconomic and cultural factors that influence adherence.

- **Financial Support Programs**: Policymakers and healthcare providers should explore options for subsidizing AED costs or offering more affordable treatment alternatives. This could alleviate the financial burden on families and improve adherence, as the cost was one of the most significant barriers identified in this study.

- **Simplified Medication Regimens:** Reducing the frequency of dosing and utilizing sustained-release formulations may help improve adherence, as simpler regimens are easier for patients and caregivers to follow. In addition, healthcare providers should strive to optimize treatment regimens based on patient needs, considering side effects and ease of administration.

- **Social Stigma Reduction:** Community education programs aimed at reducing the stigma associated with epilepsy could encourage families to seek help and follow treatment plans without fear of discrimination. These programs should focus on dispelling myths and promoting awareness about epilepsy as a treatable medical condition.

- **Caregiver Education**: Providing caregivers with comprehensive education on the disease and treatment options is essential for ensuring effective medication management. Training caregivers in strategies for improving adherence and recognizing the importance of routine medication intake could lead to better outcomes.

5.6 The Role of the Pharmacist

The pharmacist plays a pivotal role in the comprehensive management of epilepsy, particularly in promoting medication adherence and optimizing therapeutic outcomes. In this study, pharmacists were instrumental in supporting patients throughout their treatment journey, offering personalized counseling on the proper use of antiepileptic drugs, addressing concerns about potential side effects, and emphasizing the importance of consistent medication adherence. As the most accessible healthcare professionals, pharmacists serve as key educators, helping patients and caregivers navigate the complexities of medication regimens. Through these interactions, pharmacists not only assist in identifying barriers to adherence—such as confusion regarding dosing schedules or worries about side effects—but also collaborate closely with healthcare teams to ensure that treatment plans are tailored to each patient's needs. In community settings, pharmacists provide ongoing support, reinforcing the critical role of adherence in managing epilepsy effectively. Their involvement fosters a partnership with patients and caregivers, empowering them to make informed decisions and improving overall treatment adherence and outcomes.

5.7 Limitations and Future Research

While this study offers valuable insights into the factors influencing AED adherence in epilepsy patients 0-40 age years in Hebron, there are several limitations that must be acknowledged. First, the sample size was limited due to the challenging circumstances of data collection during the Gaza conflict. The difficulties posed by restricted movement within the West Bank and Gaza severely impacted participant recruitment. Originally, the goal was to collect more than 250 samples, but many potential participants declined to complete the questionnaire.

Second, the cross-sectional nature of the study design restricts the ability to draw conclusions about causality between the observed variables. Additionally, reliance on self-reported data introduces the potential for recall bias, which could affect the accuracy of adherence reports. Future research could benefit from the use of objective adherence measures, such as pill counts or electronic monitoring systems, to corroborate self-reported data.

Furthermore, future studies should explore longitudinal patterns of medication adherence to understand how adherence evolves over time, particularly as children transition into adolescence and adulthood. Such research could help identify age-specific barriers to adherence and inform the development of targeted interventions to support consistent medication management throughout the lifespan.

Chapter Six

Conclusion

6.1 Conclusion

In conclusion, this study provides an in-depth understanding of the complex factors influencing AEDs adherence among epilepsy patients aged 0-40 years in Hebron, West Bank. The findings highlight the importance of socioeconomic factors, caregiver involvement, medication regimen complexity, and social stigma in shaping adherence behaviors. Interventions aimed at addressing these barriers, including financial support, simplified drug regimens, stigma reduction, and caregiver education, are essential for improving adherence and, consequently, the health outcomes of epilepsy patients in this region.

6.2 Recommendations

Recommendations based on Areas (Cities).

1. Hebron

- Establish local epilepsy support groups to provide patients and caregivers with a platform for sharing experiences and strategies.
- Enhance access to specialized neurology clinics in rural areas surrounding Hebron to improve patient follow-up and adherence monitoring.
- Partner with local organizations to subsidize the cost of antiepileptic drugs for economically disadvantaged families.

2. Jerusalem

- Develop awareness campaigns within Jerusalem to address the stigma associated with epilepsy, particularly in underserved communities.

- Ensure the availability of AEDs in pharmacies across the city, especially for newer generations of medications.

- Promote collaboration between neurologists and general practitioners in Jerusalem to provide integrated care for epilepsy patients.

3. Other West Bank Cities

- Expand telemedicine services in cities like Nablus, Tulkarm, and Jenin to overcome transportation barriers and ensure regular patient consultations.

- Provide training for healthcare providers in smaller cities to enhance their ability to manage epilepsy effectively.

- Introduce school-based programs in cities like Ramallah and Bethlehem to educate teachers and students about epilepsy and support children with the condition.

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Appendices

Appendix 1: Questionnaire English Form

جامعة القدس
Al-Quds University

الموافقة على المشاركة في بحث علمي

عنوان البحث: تقييم مدى التزام المرضى بالأدوية المضادة للصرع في منطقة الضفة الغربية والقدس الشرقية.

اسم الباحث الرئيسي: صابرين فهمي ابوسنينة

اسم المشرف على البحث: د. ميساء النابلسي

اخي \ اختي المتطوع (ة) هذا البحث هو أحد الأبحاث الطبية التي تقوم بها كلية الصيدلة في جامعة القدس للحصول على درجة الماجستير ويهدف الى تحسين نوعية حياة المرضى.

ارجو ان ابين ما يلي:

ان مشاركتك في هذا البحث طوعية تماما، ومن شأنها افادة المجتمع وعملية البحث العلمي بشكل عام، وافادة مرضى الصرع بشكل خاص.

في حال مشاركتك بالبحث، سيبقى اسمك طي الكتمان، ويحق لك الانسحاب متى شئت من دون أي أثر يذكر عليك.

يجدر الإشارة ان لجنة البحث العلمي في جامعة القدس قد وافقت على اجراء البحث، وتعتبر هي اللجنة المؤسسية والمرجعية للبحوث والدراسات.

تتكون الاستبانة من (30) سؤال مقسمة الى خمسة اقسام. رجاء الالتزام بالإجابة على جميع الأسئلة لضمان دقة التعامل مع البيانات الموجودة.

التاريخ: .....

جامعة القدس
Al-Quds University

Deanship of Graduate Studies

Master of Pharmaceutical Sciences

Research Title

Assessment of Patients' Adherence to Anti-Epileptic Drugs:

A Cross-Sectional Study in Hebron, West Bank, Palestine

M.Sc. Thesis Proposal

Prepared by: Sabreen Fahmi Abu Sneineh

Student number: 22011971

Supervised by: Maisa Al Nabulsi, Ph.D.

2025

Sociodemographic Characteristic

This section of the questionnaire contains many questions related to your *socio-demographic characteristics*, please put a tick (✓) on your answer:

Sociodemographic Characteristics		**Gender Male**	**Gender Female**
Age (years)	**0-5**		
	6-18		
	18 and above		
Marital status	**Single**		
	Married		
Educational level	**Illiterate**		
	Primary		
	Secondary		
	University		
Employment	**Student**		
	Employed		
	Unemployed Housewife		

History of Epilepsy

This section is designed to tell us *some information about your epilepsy*, please answer these questions:

The age of seizure onset:	0-5 years	5-11 years	12 <
The age of epilepsy diagnosis:			
Seizure type if possible:			
What is\are antiepileptic drugs are you taking these days	**1.Phenytoin (Epanutin)** **2. Lamotrigine (Lamictal/ Lamodex)** **3.Carbamazepine (Tegretol)** **4. Levetiracetam (Keppra)** **5. Gabapentin (Neurontin)** **6. Pregabalin (Lyrica)** **7. Valproic acid (Depalept/Depalept Chrono)** **8. Topiramate (Topimax)** 9. Others ……	**Frequency**	**(Once, Twice, or More)**

Perception toward Epilepsy

This section of the questionnaire finds out some questions regarding your *Perception toward Epilepsy*. Please put a Check Mark (✓) at the answer that best suits you.

Perception toward Epilepsy			
QUESTION NUMBER	**QUESTION**	**YES**	**NO**
1.	**Do you think that your anti-epileptic medications are too expensive?**		
2.	**Do you think you're treated differently by some people because of your epilepsy?**		
3.	**Do you feel that some people are uncomfortable with you because of your epilepsy,?**		
4.	**Do you avoid telling people that you have Epilepsy?**		
5.	**Do you feel that some people are uncomfortable around you because of your epilepsy?**		
6.	**Do you ever feel embarrassed to take your medication in front of others?**		

Adherence and Dosing regimen

This section of the questionnaire finds out some questions regarding your *adherence to your epilepsy medication*. Please put a Check Mark (✓) at the answer that best suits you.

Adherence and Dosing regimen			
QUESTION NUMBER	**QUESTION**	**YES**	**NO**
1.	**Do you sometimes forget to take the anti-epileptic medications?**		
2.	**Over the past two weeks, were there any days when you did not take the anti-epileptic medication?** **If yes, how many days you did not take ……**		
3.	**When you travel or leave home, do you sometimes forget to bring along the anti-epileptic medication?**		
4.	**When you feel good, do you sometimes stop taking the anti-epileptic drug?**		
5.	**Taking medication every day is a real inconvenience for some, people, do you ever feel hassled about sticking to your anti-epileptic drug?**		
6.	**How often do you have difficulty remembering to take all the anti-epileptic medication?**		
7.	**Are you careless at times about taking the anti-epileptic medications?**		
8.	**Do you take anti-epileptic medications only when you are sick?**		
9.	**By staying on anti-epileptic medication, can prevent getting sick?**		
10.	**Do you skip anti-epileptic medications before you go to the doctor?**		
11.	**Does the doctor frequently change your therapy?** **If yes, when was the last time: 1-3 months 3-6 months 6-12 months.**		
12.	**Have you experienced Epilepsy during the past 4 weeks?** **If yes, how many seizures have you had: Once Twice, or more?**		
13.	**Have you been hospitalized within the past six months?**		
14.	**People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks were there any days when you didn't take your anti-epileptic medication?**		
15.	**Did you take your anti-epileptic medication yesterday?**		

Adherence and Side Effects Factors

This section of the questionnaire aims to find out *the extent to which the side effects of epilepsy medications affect your commitment to taking them properly*. Your answers are important to help us understand the reasons why you may not adhere to your epilepsy medications.

Adherence and Side Effects Factors			
QUESTION NUMBER	**QUESTION**	**YES**	**NO**
1.	**Do antiepileptic medications make you feel tired and sluggish?**		
2.	**Do you stop taking your medication because you are afraid of drug dependence?**		
3.	**Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse when you took it?**		

Optional question

Finally, we would like to know your ideas to deal with the obstacles of your non-adherence to taking your epilepsy medications.

1- …….

2- ……..

3……..

Thanks for your valuable participation.

Appendix 2: Questionnaire Arabic Form

الخصائص الاجتماعية الديموغرافية

يحتوي هذا القسم من الاستبيان على العديد من الأسئلة المتعلقة الخصائص الاجتماعية الديموغرافية التي تخصك, الرجاء ضع اي إشارة (✓) عند الإجابة التي تخصك

الخصائص الاجتماعية الديموغرافية		الجنس ذكر	الجنس أنثى
العمر (بالسنوات)	0-5		
	6-18		
	18 فما فوق		
الحالة الاجتماعية	أعزب		
	متزوج		
المستوى التعليمي	غير متعلم		
	متعلم مرحلة أساسية		
	متعلم مرحلة ثانوية		
	تعليم جامعي		
الوظيفة	طالب		
	موظف		
	غير موظف		
	ربة بيت		

اعتقادات المريض باتجاه ادوية الصرع

1) هل تعتقد أن الأدوية المضادة للصرع التي تتناولها باهظة الثمن؟

أ) نعم ب) لا

2) هل تشعر أحيانًا أنك لا تريد أن يراك الآخرون وأنت تتناول دواءك الخاص بالصرع؟

أ) نعم ب) لا

3) هل تشعر أن بعض الناس يفضلون تجنبك لأنك تعاني من مرض الصرع؟

أ) نعم ب) لا

4)هل تشعر أن بعض الناس يعاملونك كشخص أدنى منهم لانك تعاني من مرض الصرع؟

أ) نعم ب) لا

5) هل تشعر أن بعض الناس غير مرتاحين معك لأنك تعاني من مرض الصرع؟

أ) نعم ب) لا

6)هل تتجنب اخبار الأشخاص من حولك بأنك تعاني من مرض الصرع؟

أ) نعم ب) لا

إذا كانت الإجابة بنعم. ارجو التكرم بوضع السبب .....

علاقة التزام المريض والجرعات الخاصة بأدوية الصرع

هذا القسم من الاستبيان يطرح بعض الأسئلة المتعلقة بالتزامك بأدوية الصرع الخاصة بك. من فضلك ضع دائرة حول الاجابة التي تناسبك

1) هل تنسى أحيانا" تناول الادوية المضادة للصرع؟

أ) نعم ب) لا

2) خلال الأسبوعين الماضيين، هل كانت هناك أي أيام لم تتناول فيها دواء الصرع؟

أ) نعم ب) لا

إذا كانت اجابتك بنعم، كم عدد الأيام التي لم تتناول فيها دوائك.. يوم يومان فأكثر

3) عندما تسافر أو تغادر المنزل، هل تنسى أحيانًا إحضار دواء الصرع الخاص بك؟

أ) نعم ب) لا

4) عندما تشعر بتحسن، هل تتوقف أحيانًا عن تناول الأدوية المضادة للصرع؟

أ) نعم ب) لا

5) إن تناول الأدوية كل يوم هو مصدر إزعاج حقيقي لبعض الناس، فهل شعرت يومًا بالضيق حيال الالتزام بأدوية الصرع الخاصة بك؟

أ) نعم ب) لا

6) كم مرة تجد صعوبة في تذكر تناول جميع الأدوية المضادة للصرع؟

أ) نعم ب) لا

7) هل تتجاهل أحيانًا تناول الأدوية المضادة للصرع؟

أ) نعم ب) لا

8) هل تتناول الأدوية المضادة للصرع فقط عندما تكون مريضاً؟

أ) نعم ب) لا

9) من خلال الاستمرار في تناول الأدوية المضادة للصرع، هل تتوقع انه يمكنك منع الإصابة بنوبة الصرع ؟

أ) نعم ب) لا

10) هل ممكن ان تتجاوز اخذ الأدوية المضادة للصرع قبل أن تذهب إلى الطبيب؟

أ) نعم ب) لا

11) هل يغير طبيبك علاجك بشكل متكرر؟

أ) نعم ب) لا

اذا كانت اجابتك بنعم، متى كانت اخر مرة تم تغيير دواؤك , منذ : 1-3 شهور 3-6 شهور 6-12 شهر

12) هل تعرضت لنوبة صرع خلال الأسابيع الأربعة الماضية؟

أ) نعم ب) لا

اذا كانت اجابتك بنعم، كم عدد النوبات التي تعرضت لها خلال الأسابيع الأربعة الماضية: واحدة اثنتين فأكثر

الآثار الجانبية للأدوية المضادة للصرع وتأثيرها على التزام المريض

يهدف هذا القسم من الاستبانة إلى معرفة مدى تأثير الآثار الجانبية لأدوية الصرع على التزامك بتناولها بشكل صحيح.
إجاباتك مهمة لمساعدتنا على فهم أسباب عدم التزامك بأدوية الصرع

1) هل سبق لك أن قلصت أو توقفت عن تناول دوائك دون إخبار طبيبك لأنك شعرت بسوء عندما تناولتها؟

أ) نعم ب) لا

2) هل تتوقف عن تناول أدويتك لأنك تخشى الإدمان على الدواء الخاص بعلاج الصرع؟

أ) نعم ب) لا

3) الأدوية المضادة للصرع تجعلك تشعر بالتعب والكسل؟

أ) نعم ب) لا

وأخيرا هذا السؤال اختياري : نود أن نعرف مقترحاتك للتعامل مع عوائق عدم التزامك بتناول ادويتك الخاصة بعلاج الصرع؟

1.).....

2.).....

3.).....

شكراً على مشاركتك القيمة

Appendix 3: Request Letter to Conduct Research

State of Palestine
Ministry of Health
Education in Health and Scientific Research Unit

دولة فلسطين
وزارة الصحة
وحدة التعليم الصحي
والبحث العلمي

Ref.: ....
Date:....................

الرقم: [illegible]
التاريخ: [illegible]

عطوفة الوكيل المساعد المدير التنفيذي لمجمع فلسطين الطبي المحترم،،،

عطوفة الوكيل المساعد لشؤون الصحة العامة وصحة الاسرة المحترم،،،

تحية واحتراماً...

<u>الموضــوع: تسهيل مهمة بحث</u>

يرجى تسهيل مهمة **الطالبة: صابرين فهمي ابو سنينة – ماجستير صيدلة/ جامعة القدس**، وباشراف د. ميساء النابلسي، في عمل بحث بعنوان:

'Assessment of Patients' Adherence to Anti-Epileptic Drugs: A Cross-Sectional Study at three hospitals in East Jerusalem'

من خلال السماح للطالبة بجمع معلومات عن طريق تعبئة استبانة الدراسة من قبل المرضى بعد اخذ موافقتهم، وذلك في:

- مجمع فلسطين الطبي

– مديريات الصحة في (الصحة النفسية/حلحول – الصحة النفسية /نابلس/ المخفية)

على ان يتم الالتزام باساليب واخلاقيات البحث العلمي، وعد التعرض للمعلومات التعريفية للمرضى.
على ان يتم تزويد الوزارة بنسخة PDF من نتائج البحث، التعهد بعدم النشر لحين الحصول على موافقة الوزارة على نتائج البحث.

مع الاحترام...

د. عبد الله القواسمي
رئيس وحدة التعليم الصحي والبحث العلمي

نسخة: مشرفة الدراسة المحترمة/ جامعة القدس

Telfax.:09-2333901 scientificresearch.dep@gmail.com الفاكس: 09-2333901

تقييم التزام المرضى بتناول الأدوية المضادة للصرع: دراسة مقطعية في الخليل، الضفة الغربية، فلسطين

إعداد: صابرين فهمي عزات ابوسنينة

المشرف: د. ميساء النابلسي

الملخص

الالتزام بتناول الأدوية المضادة للصرع (AEDs) يُعدّ عنصرًا أساسيًا في إدارة مرضى الصرع، حيث يؤثر بشكل مباشر على التحكم في النوبات وتحسين جودة الحياة. تعاني منطقة الخليل ومدن الضفة الغربية الأخرى من نقص في الأبحاث المتعلقة بالالتزام بالأدوية بين مرضى الصرع الذين تتراوح أعمارهم بين 0–40 عامًا. تهدف هذه الدراسة إلى تقييم معدلات الالتزام واستكشاف العوامل المؤثرة عليه.

تم استخدام تصميم وصفي مقطعي واعتمدت الدراسة على مقياس الالتزام بالأدوية(MMAS-8) ، إضافة إلى أسئلة إضافية بموثوقية (كرونباخ ألفا = 0.842). اشتملت الاستبانة على 30 سؤالًا تغطي الجوانب الديموغرافية، تاريخ المرض، التصورات تجاه الصرع، الالتزام وتكرار الجرعات، والعوامل المرتبطة بالآثار الجانبية. تم توزيع الاستبانة إلكترونيًا عبر Google Forms على 100 مريض بالصرع، مع التواصل معهم هاتفيًا لضمان المشاركة.

أظهرت النتائج أن مستويات الالتزام كانت منخفضة إلى متوسطة، حيث كان 41% من المرضى ضمن فئة الالتزام المنخفض، و58% ضمن فئة الالتزام المتوسط، و1% فقط ضمن الالتزام العالي، بمتوسط درجة (MMAS-8) يبلغ 5.38. أبرز العوائق كانت ارتفاع تكلفة الأدوية (83%)، الوصمة الاجتماعية (67%)، والخوف من الإحراج العام (55%). ومع ذلك، أكد 97% من المرضى أهمية الالتزام بالأدوية في الوقاية من النوبات.

بالنسبة للأدوية المستخدمة، أظهرت أدوية Depalept/Depalept Chrono® و Carbamazepine (Tegretol®)أعلى درجات الالتزام (5.6 و5.5)، بينما سجلت Lamotrigine (Lamictal®)و Phenytoin (Epanutin®) أدنى درجات الالتزام (حوالي 4.0). كانت العوامل المؤثرة على الالتزام تشمل العمر، المستوى التعليمي، عمر بداية النوبات، وتكرار الجرعات.($p < 0.05$)

تؤكد الدراسة على أهمية معالجة العوائق الاقتصادية والنفسية والاجتماعية لتحسين الالتزام بالأدوية ونتائج العلاج. وتقدم النتائج رؤى قيمة لمقدمي الرعاية الصحية وصناع القرار لتعزيز جودة حياة مرضى الصرع في المنطقة.