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Open Access REVIEW

A Narrative Study on Antiepileptic Medication Adherence Among Patients with Epilepsy

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ABSTRACT

Medication adherence is an important determinant of treatment effectiveness in epilepsy, yet it is often overlooked when persistent seizures are evaluated. This narrative review summarizes evidence on adherence to antiseizure medications (ASMs), focusing on how adherence is measured, the factors associated with missed or discontinued doses, and the clinical implications of poor adherence. Sixteen selected studies from 11 countries were considered, covering different populations, healthcare settings, study designs, and adherence measures. Reported adherence varied substantially between studies, reflecting differences in patient characteristics, measurement methods, and adherence thresholds. Common barriers included forgetfulness, treatment complexity and polytherapy, adverse effects, negative beliefs about medicines, financial constraints, stigma, and gaps in communication or follow-up. Objective approaches such as pharmacy refill measures and electronic monitoring can provide more detailed information on medication-taking behaviour, whereas self-report tools remain practical but are vulnerable to recall and social desirability bias. Persistent seizures should not automatically be interpreted as drug-resistant epilepsy before adherence has been assessed. A patient-centred approach should combine adherence assessment with education, management of adverse effects, treatment simplification when clinically appropriate, and regular follow-up. Future studies should use more consistent adherence definitions and evaluate feasible interventions across different healthcare settings, particularly in resource-constrained environments.

Keywords: Epilepsy; antiseizure medications; medication adherence; nonadherence; drug-resistant epilepsy; patient-centred care.

INTRODUCTION

Epilepsy is a noncommunicable neurological illness that can affect persons of any age. According to the World Health Organisation, around 50 million people worldwide suffer from epilepsy, with nearly 80% living in low- and middle-income countries. With proper diagnosis and treatment, up to 70% of persons with epilepsy could become seizure-free, while there are significant treatment gaps in many settings [1]. Long-term use of antiseizure medications (ASMs), also known as antiepileptic drugs (AEDs), is essential for seizure management. Consistent medication use is critical to treatment effectiveness, although seizure outcomes are also influenced by epilepsy type, etiology, drug selection, tolerance, and the existence of drug-resistant disease [1][2].

Medication adherence is especially critical in epilepsy, as missed or irregular doses can reduce treatment exposure and increase the probability of breakthrough seizures. Beyond seizure recurrence, the effects could include emergency visits, hospitalisation, injury, reduced productivity, and higher healthcare expenses. In a large claims-based analysis, nonadherence was linked to significantly greater risks of death, emergency department visits, hospital admission, and specific injuries [4]. These findings assist in explaining why adherence should be seen as a clinical outcome in and of itself, rather than as a mere measure of patient behaviour.

The distinction between nonadherence and drug-resistant epilepsy is equally crucial in clinical practice. The International League Against Epilepsy (ILAE) defines drug-resistant epilepsy as the inability to achieve prolonged

seizure independence after trialing two well-tolerated ASM regimens [3]. Persistent seizures may indicate a lack of treatment exposure rather than pharmacological resistance. As a result, adherence should be evaluated before needless therapeutic escalation or referral to more intense treatment is contemplated

Despite its importance, adherence is difficult to assess consistently. Self-report questionnaires are simple and useful, while medication refill data and electronic monitoring can provide more objective data. Directly comparing research is problematic due to differences in methodologies, adherence levels, and study populations. This narrative review examines assessment methodologies, multidimensional determinants, clinical outcomes, and practical solutions for boosting ASM adherence.

METHODS

This narrative review used a structured literature-search approach to identify studies relevant to ASM adherence in epilepsy. The databases searched in the authors' working evidence set were PubMed, Scopus, Google Scholar, and ScienceDirect. Search terms included combinations of "epilepsy," "antiseizure medication adherence," "antiepileptic drugs," "medication adherence," "medication compliance," and "treatment adherence." Studies were considered relevant when they reported medication adherence or nonadherence, described factors associated with adherence, evaluated adherence measurement methods, or examined interventions intended to improve adherence among people with epilepsy. Editorials, case reports, and articles without a relevant adherence outcome were excluded.

Sixteen studies were selected for detailed narrative synthesis because they directly addressed one or more of the review objectives. The evidence was organized thematically rather than statistically pooled. In keeping with the narrative-review design, no formal risk-of-bias meta-analysis was undertaken. Because the included studies differed substantially in populations, instruments, thresholds, and designs, adherence estimates were interpreted in their original study context rather than combined as a single prevalence estimate.

Metrics for Defining Medication Adherence

Medication adherence can be measured directly or indirectly, and no single method captures all elements of medication use [5,6]. When selecting a method, consider the therapeutic situation, available resources, and desired understanding of adherence behaviour.

Direct approaches involve measuring medication or metabolite concentrations in biological samples and directly observing therapy. While these methods can detect recent drug exposure, they are intrusive, resource-intensive, and may be affected by sample time. Short-term "white-coat" improvements in adherence before to a clinic appointment can also make a single biological assessment appear more comforting than typical day-to-day behaviour [5].

Pharmacy refill measurements are frequently employed in big observational studies. To calculate the Medication Possession Ratio (MPR), divide the total days of medication delivered by the observation period. The Proportion of Days Covered (PDC) method measures the proportion of days on which medication is available while avoiding double-counting overlapping supply [6]. Although a threshold of 80% is commonly employed in claims-based research, it should not be considered a universal criterion of adequate adherence in all epilepsy studies due to variations in thresholds, demographics, and study design.

Electronic Medication Event Monitoring Systems (MEMS) track medication container opening times to identify patterns such as delayed, irregular, or skipped doses [8]. The main disadvantages of these methods include high costs, restricted availability, and the fact that opening a container does not guaranty that the medication was consumed. Electronic monitoring may also alter behavior since participants are aware that their medication use is being monitored [9].

Self-report measures are still commonly utilized since they are quick and affordable. The Morisky Medication Adherence Scale (MMAS-8), 4-item Morisky scale, Morisky Adherence Questionnaire (MAQ), Medication Adherence Rating Scale (MARS), and Simplified Medication Adherence Questionnaire (SMAQ) are some examples. While these techniques can identify impediments, their accuracy may be influenced by recall and social desirability bias. As a result, where resources are available, integrating self-report with another source of information can provide a more complete picture.

Adherence in Epilepsy: Synthesis of 16 selected studies

The 16 studies included in the present narrative synthesis covered a range of countries, age groups, healthcare settings, study designs, and adherence measures. Rather than treating their estimates as directly comparable, the review considers how differences in measurement and context shape the reported findings. The review is intended to complement, rather than duplicate, broader systematic reviews by bringing together practical measurement issues, multidimensional determinants, and clinical implications in a focused narrative synthesis.

Several studies also illustrate why the method used to measure adherence matters. In the pediatric study by Modi et al., electronic monitoring identified several distinct adherence trajectories rather than a simple adherent-versus-nonadherent split; 58% of children showed persistent nonadherence during the first six months, while 42% followed a near-perfect adherence trajectory [8]. In the Nigerian study by Fadare et al., adherence was reported in three

categories—17.2% high, 38.3% medium, and 44.5% low—again showing why collapsing different study definitions into a single percentage can obscure important patterns [17].

Economic and social circumstances also differed between cohorts. Getnet et al. found that medication cost, limited health information, poor social support, perceived stigma, longer treatment duration, and adverse effects were associated with nonadherence [14]. In the predominantly low-income, ethnic-minority sample studied by Nakhutina et al., 63% of participants endorsed at least one nonadherent behaviour on the Morisky scale, with forgetfulness being the most commonly reported reason [10]. These findings suggest that nonadherence is better understood as a multidimensional problem than as a single patient-level behaviour.

Table 1. Summary of 16 included clinical studies on antiseizure medication adherence across international cohorts

Study	Country / setting	Design	n	Adherence measure	Main finding relevant to adherence
Shallcross et al. [9] (2015)	USA; socioeconomically diverse adults	Cross-sectional	55	MMAS-8	36% reported poor adherence; perceived social support was associated with better adherence.
Yang et al. [7] (2014)	China; epilepsy outpatients	Validation / cross-sectional	111	MMAS-8	79.2% met the study adherence criterion; higher adherence was associated with lower seizure frequency and fewer adverse effects.
Machado-Alba et al. [28] (2016)	Colombia; national health-system sample	Retrospective cross-sectional	373	Adherence survey / medication use data	Among all AED users, 35.1% were nonadherent, 32.4% adherent, and 32.4% had insufficient adherence data; epilepsy represented 47.7% of indications.
Gabr & Shams [12] (2015)	Saudi Arabia; adolescents with idiopathic epilepsy	Cross-sectional	94	Structured interview	38.3% were nonadherent; forgetfulness was the most common reported reason.
Moura et al. [31] (2016)	USA; academic neurology clinics	Observational cohort / abstract	62	MMAS-4	Source reported 45% adherent and 55% nonadherent; conference abstract should be verified before submission.
Liu et al. [13] (2013)	China; stable ASM therapy	Cross-sectional	368	Self-report survey	48.1% were nonadherent; forgetfulness or not having medication available were leading reasons.
Govil et al. [16] (2021)	India; adults below poverty line	Cross-sectional	88	MARS	30.7% were classified as adherent and 69.3% as nonadherent in the source dataset.
Getnet et al. [14] (2016)	Ethiopia; tertiary hospital outpatients	Cross-sectional	450	Morisky scale	37.8% were nonadherent; payment for medication, limited information, poor social support, stigma, long treatment duration, and side effects were associated with nonadherence.
Modi et al. [8] (2011)	USA; children with newly diagnosed epilepsy	Prospective longitudinal	124	Electronic monitoring	Five adherence trajectories were identified; 58% showed persistent nonadherence and 42% followed a near-perfect trajectory during six months.
Hasiso & Desse [15] (2016)	Ethiopia; adult epilepsy clinic	Cross-sectional	194	MMAS-8	32% were adherent; forgetfulness was the most commonly reported reason for nonadherence.
Werida et al. [20] (2025)	Egypt; neurological outpatients receiving sodium valproate	Quasi-experimental pretest-posttest	600 prescriptions at baseline	SMAQ / prescription and adherence assessment	Adherence increased from 8.3% to 67.1% after three months of pharmacist education; the sample was broader than epilepsy alone.

Nakhutina et al. [10] (2011)	USA; predominantly low-income ethnic-minority adults	Cross-sectional	72	MMAS-4 and self-rating	63% endorsed at least one nonadherent behaviour; forgetfulness was the most frequent reason.
Jannah et al. [19] (2026)	Indonesia; tertiary epilepsy outpatient clinic	Cross-sectional; two study periods	175	MAQ + Liverpool Adverse Event Profile	Adherence was 50.88% and 55.70% across the two periods; adverse drug reactions were associated with nonadherence.
Farrukh et al. [18] (2021)	Malaysia; adult epilepsy patients	Cross-sectional	100	Established adherence tools	68% were nonadherent; complementary and alternative medicine use was significantly associated with nonadherence.
Fadare et al. [17] (2018)	Nigeria; tertiary healthcare facilities	Cross-sectional	126	Morisky scale	17.2% had high, 38.3% medium, and 44.5% low adherence.
Chapman et al. [27] (2014)	UK; primary care patients with epilepsy	Cross-sectional survey	398	Self-report + MPR	36.4% were classified as nonadherent; concerns about adverse effects and beliefs about medicines were associated with adherence.

Clinical Consequences of Poor Adherence

The immediate clinical concern associated with missed ASM doses is loss of seizure control. Nonadherence can reduce treatment exposure enough to permit breakthrough seizures, and in some patients recurrent seizures may progress to status epilepticus. The relationship between adherence and clinical outcomes is not only theoretical. In the RANSOM study, nonadherent treatment periods were associated with more than a threefold higher mortality risk, as well as higher rates of emergency department visits, hospital admissions, motor-vehicle accident injuries, and fractures [4]. These findings support the view that adherence is closely linked to the safety and effectiveness of long-term epilepsy treatment.

The consequences of breakthrough seizures may also extend into everyday life. Seizure-related injuries, restrictions on driving, interruption of employment or education, and reduced confidence in social participation can add to the burden of epilepsy. Poor adherence may therefore create a cycle in which missed medication leads to seizures, seizures increase disruption and anxiety, and further disruption makes regular medication use even more difficult.

For clinicians, another important consequence is diagnostic uncertainty. Persistent seizures in a person who is taking medication inconsistently can be mistaken for pharmacological treatment failure. The result may be unnecessary escalation of therapy, greater polypharmacy, additional adverse effects, and avoidable cost. Before treatment is intensified, clinicians should therefore ask directly about missed doses, access to medication, adverse effects, beliefs about treatment, and difficulties with the dosing schedule.

Factors Influencing ASM Adherence

The factors identified across the reviewed studies can be considered within four interacting domains: therapy-related, patient and psychological, socioeconomic and cultural, and healthcare-system factors. This multidimensional view is consistent with the WHO approach to adherence, which emphasizes that medication-taking behaviour is shaped by more than patient motivation alone [26].

Medication and Therapy-Related Factors

Treatment complexity was a recurring theme across the reviewed evidence. Multiple daily doses, polytherapy, and a high pill burden can make medication-taking difficult to fit into ordinary routines. In the Chinese MMAS-8 validation study, the number of ASMs was associated with adherence, while the Nigerian and Indonesian studies also highlighted treatment burden and adverse effects [7,17,19]. These findings are clinically relevant because some adherence barriers can be addressed by reviewing whether the regimen is as simple as is safely possible.

Adverse effects were another consistent barrier. Patients may miss, reduce, or stop doses because of somnolence, fatigue, cognitive complaints, weight changes, or other treatment-related problems. The Indonesian study by Jannah et al. found a significant association between adverse drug reactions and nonadherence, reinforcing the importance of asking specifically about tolerability rather than assuming that a prescription is being taken as intended [19].

Long treatment duration can create a different type of barrier. Once seizures have been controlled for a prolonged period, some patients may feel that continued treatment is no longer necessary. This is especially important when the person is asymptomatic and views the medication as burdensome. Counselling should therefore explain the purpose of maintenance therapy in a way that is understandable and relevant to the patient's own seizure history.

Patient-Related and Psychological Factors

Forgetfulness was one of the most frequently reported barriers across the included studies. In Nakhutina et al., half of the participants specifically endorsed forgetfulness, while Hasiso and Desse and Liu et al. also identified forgetting or not having medication available as common reasons for missed doses [10,13,15]. These are often classified as unintentional nonadherence, but the underlying causes may be diverse, including disrupted routines, cognitive symptoms, competing responsibilities, or uncertainty about what to do after a missed dose.

Medication beliefs also matter. Chapman et al. showed that concerns about the negative effects of AEDs were related to nonadherence, while Nakhutina et al. found that lower adherence was associated with stronger concerns about medications and beliefs that medicines could be harmful or less beneficial [10,17]. This pattern is consistent with the Health Belief Model and with broader adherence research: patients are more likely to follow treatment when they understand the expected benefits, perceive the risks of non-treatment, and do not view treatment-related barriers as overwhelming.

Psychological comorbidity may further complicate adherence. Depression and anxiety can affect motivation, attention, and routine, although the strength of this relationship varies between studies. It is therefore preferable to screen for psychological distress and consider it as one component of adherence assessment rather than assuming that poor adherence is simply a matter of forgetfulness or motivation. In a Chinese study, higher depression and anxiety scores were significantly associated with lower MMAS-8 adherence, supporting the value of considering psychological distress during adherence assessment [29].

Table 2. Multidimensional determinants of antiseizure medication adherence and their clinical impacts categorized according to the World Health Organization.

Adherence domain	Key determinants	How the factor may affect adherence	Representative studies
Therapy-related	Multiple daily doses; polytherapy; high pill burden; adverse effects; long treatment duration.	Complex regimens increase dosing burden; adverse effects and treatment fatigue may lead to dose reduction or discontinuation.	Yang [7]; Fadare [17]; Jannah [19]
Patient and psychological	Forgetfulness; disrupted routines; medication beliefs; depression and anxiety.	Missed doses may be unintentional, while concerns about medicines or psychological distress can reduce confidence and motivation.	Nakhutina [10]; Liu [13]; Chapman [27]; Guo [29]
Socioeconomic and cultural	Medication cost and poverty; transport barriers; stigma; complementary medicine use.	Financial and access barriers can interrupt refills; stigma and alternative practices may reduce consistent ASM use.	Getnet [14]; Govil [16]; Farrukh [18]
Healthcare-system and provider	Communication; follow-up; medication counselling; medicine availability.	Clear instructions, medication review, and continued follow-up can help identify and address reversible adherence barriers.	Gabr [12]; Getnet [14]; Werida [20]

Socioeconomic Factors

Financial barriers were particularly visible in studies from resource-constrained settings. Getnet et al. reported that patients who paid for their ASMs had higher odds of nonadherence, while the Indian cohort examined by Govil et al. highlighted the vulnerability of people living below the poverty line [14][16]. Even when medication itself is affordable, transport costs, travel time, missed work, and interruptions in medicine supply can make long-term treatment difficult to maintain.

Stigma can affect adherence in a less visible way. Patients who fear disclosure may avoid taking medication in front of others, may conceal their condition, or may be reluctant to discuss their concerns with healthcare professionals. Stigma and misconceptions about epilepsy have been documented across settings, and the evidence suggests that social support and clear education can help reduce their impact [1][10][14]. These findings are important because shift attention from the individual patient to the social environment in which medication-taking occurs. The use of complementary and alternative medicine can also influence treatment behaviour. Farrukh et al. found a high prevalence of nonadherence among Malaysian patients and reported an association between complementary and alternative medicine use and nonadherence [18]. Rather than treating such practices as a reason to blame patients, clinicians should ask about them routinely and discuss potential benefits, limitations, and interaction risks in a non-judgmental manner.

Healthcare-System Factors

Adherence is also shaped by the quality and accessibility of healthcare. Short consultations, inconsistent follow-up, limited opportunity for questions, and poor communication about medication instructions may leave patients unsure about the purpose of long-term treatment or how to manage practical problems such as missed doses. In the studies reviewed here, the patient-provider relationship appeared repeatedly as a factor that could either support or undermine adherence [12][13][17].

Pharmacists can contribute by reviewing medication regimens, identifying barriers, reinforcing key instructions, and helping patients establish practical medication-taking routines. The 2025 study by Werida et al. reported a marked improvement in adherence after a pharmacist-led educational intervention, although the study involved a broader neurological population rather than an epilepsy-only sample [20]. This distinction is important when interpreting the evidence, but the study still provides supportive evidence for the role of structured pharmacist involvement in medication management.

Clinical Interventions and Strategies

Because the causes of nonadherence are varied, a single intervention is unlikely to work for everyone. The first step is usually to identify whether the main problem is unintentional, intentional, or access-related. Once the barrier is clear, intervention can be matched to the patient's needs.

Regimen simplification can be useful when clinically appropriate. Reducing unnecessary dosing complexity and avoiding avoidable polytherapy may make regular medication use easier. However, once-daily dosing or extended-release formulations should be selected on the basis of the individual ASM, seizure type, pharmacokinetics, tolerability, and clinical indication rather than used solely as an adherence strategy. Education and counselling should focus on practical questions as well as disease information. Patients benefit from knowing why the medication is being continued, what common adverse effects to expect, when to seek help, and what to do after a missed dose. The Cochrane review of adherence interventions found that educational and behavioural approaches can be helpful, but also emphasized heterogeneity between interventions and measurement methods; therefore, the evidence supports targeted approaches rather than a single universal programme [21]. For patients whose main problem is forgetfulness, reminders, pill organisers, medication diaries, and appropriately designed digital tools may be useful. These approaches are most likely to help when they are integrated into the patient's routine and accompanied by follow-up. Technology should be viewed as a support for behaviour rather than as a substitute for communication and clinical review.

Finally, adherence assessment should be incorporated into routine epilepsy review. A short, non-judgmental conversation about missed doses may identify a reversible reason for poor seizure control before additional medicines are prescribed. This is particularly important when there are warning signs of pseudo-resistance, including frequent breakthrough seizures despite a regimen that should otherwise be effective.

DISCUSSION

The evidence reviewed here suggests that adherence to ASMs is better understood as a behaviour shaped by treatment burden, beliefs, daily routines, social circumstances, and the healthcare system. The estimates reported across the 16 selected studies varied widely, but that variation is itself informative because the studies differed in the people studied and in how adherence was defined and measured. A 2026 systematic review similarly found substantial heterogeneity across a much larger evidence base, reinforcing the need to interpret adherence estimates in their methodological and clinical context [25].

Measurement choice is particularly important. Self-report tools are convenient and can reveal intentional barriers, but they may overestimate adherence. Refill-based measures capture access to medication rather than actual ingestion, while electronic monitoring provides a more detailed view of dosing behaviour but is less feasible in routine practice. Rather than asking which single measure is "best," clinical teams should consider which combination of measures provides the most useful information for a particular patient and setting.

The reviewed evidence also suggests that the most persistent barriers are not confined to one region. Forgetfulness, treatment burden, adverse effects, and medication beliefs appeared across different countries, while financial and access barriers were especially evident in resource-limited settings. Recent qualitative syntheses in children with epilepsy have similarly emphasized formulation difficulties, adverse effects, communication problems, stigma, and the importance of family and social support [23]. This convergence across different evidence types strengthens the case for multidimensional adherence assessment.

A further implication concerns clinical decision-making. Because nonadherence can mimic treatment failure, adherence assessment should precede major treatment escalation when clinically feasible. This does not mean that every breakthrough seizure is caused by missed medication, nor does it delay necessary treatment when seizures are uncontrolled. Instead, adherence should be assessed alongside seizure type, diagnosis, drug selection, dose, tolerability, interactions, and other causes of poor control. Because adherence is also related to patient-reported quality of life in recent evidence, improving medication-taking behaviour may have benefits beyond seizure control alone [30].

The current evidence also highlights the potential role of pharmacists within multidisciplinary epilepsy care. Pharmacist-led education, medication reconciliation, refill support, and identification of adverse effects can address several adherence barriers at the same time. However, the intervention literature remains heterogeneous, and stronger prospective studies are still needed to determine which components produce the most durable benefits in routine care [20][21]. A large U.S. learning-health system study likewise identified forgetting, side effects, and perceptions of treatment effectiveness among important adherence barriers [22].

Limitations and Future Directions

This review has several limitations. First, it is a narrative review rather than a systematic review or meta-analysis, and study selection may therefore be influenced by author judgment. Second, the included studies differed in age group, healthcare setting, country, study design, adherence instrument, and adherence threshold. These differences prevent direct pooling of adherence rates and limit simple comparisons between studies. Third, many studies relied on self-reported adherence, which is vulnerable to recall and social desirability bias. Fourth, one of the included intervention studies involved a broader neurological population rather than an epilepsy-only sample, so its findings should be interpreted cautiously when applied to epilepsy care [20].

Future studies should use clearer and more consistent adherence definitions, report the exact instrument and threshold applied, and distinguish unintentional from intentional nonadherence. Prospective designs that combine self-report with refill data, electronic monitoring, or clinically relevant treatment outcomes would provide stronger evidence. Research in low- and middle-income settings should also address medicine affordability, availability, transport, and health-system barriers rather than focusing only on patient education. Digital interventions may be promising, but they need to be tested for feasibility, equity, sustained use, and clinical benefit in real-world epilepsy care.

CONCLUSION

Medication adherence is an important part of long-term epilepsy management, but the available evidence shows that missed or discontinued doses are rarely explained by a single factor. Across the studies reviewed, forgetfulness, treatment complexity, polytherapy, adverse effects, medication beliefs, financial constraints, stigma, and gaps in healthcare communication appeared repeatedly. Differences in measurement methods also contributed to the wide range of reported adherence estimates. Clinicians should therefore assess adherence before interpreting persistent seizures as evidence of drug-resistant epilepsy and should address modifiable barriers before escalating treatment when clinically appropriate. A patient-centred, multidisciplinary approach that combines education, management of adverse effects, practical adherence support, appropriate regimen simplification, and regular follow-up is more likely to address the different barriers encountered in routine care.

CONFLICT OF INTEREST

Authors declare for none conflict of interest.

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