Journal of Health, Wellness and Community Research
ISSN: 3007, 0570

JHWCR

Type: Original Article
Published: 15 August 2025
Volume: III, Issue: X
DOI: https://doi.org/10.61919/q7sm7c34

Correspondence
✉ Shah Nawaz, Shahzehri46@gmail.com

Received 01, 07, 25
Accepted 12, 08, 2025

Authors' Contributions
Concept: SN; Design: SN, MNK; Data Collection: AS, NI, HR, AKZ; Analysis: MNK; Drafting: SN, AS

Declarations
No funding was received for this study. The authors declare no conflict of interest. The study received ethical approval. All participants provided informed consent.

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Evaluating the Efficacy of Adjunctive Non-Pharmacological Interventions in Reducing Seizure Frequency among Patients with Epilepsy

Shah Nawaz[1], Muhammad Numair Kashif[2], Amna Saeed[3], Najia Ijaz[4], Hamna Riaz[4], Amina Khalid Zaman[4]

1 Senior Registrar, Balochistan Institute of Psychiatry and Behavioural Sciences, Quetta, Pakistan
2 Pharmacist, Faculty of Pharmacy, Bahauddin Zakariya University, Multan, Pakistan
3 Lecturer, Shaheed Benazir Bhutto Dewan University, Karachi, Pakistan
4 Fourth Year MBBS Student, Islamic International Medical College, Rawalpindi, Pakistan

ABSTRACT

***Background**: Epilepsy is a chronic neurological disorder that often requires long-term treatment to achieve adequate seizure control. Although antiepileptic drugs remain the primary therapy, a considerable proportion of patients continue to experience recurrent seizures despite stable pharmacological management. Growing attention has been directed toward non-pharmacological strategies that target modifiable lifestyle and behavioral factors contributing to seizure occurrence. However, evidence from controlled studies evaluating their additive benefit alongside standard therapy remains limited. **Objective:** To compare the effectiveness of adjunctive non-pharmacological interventions versus standard therapy alone in reducing seizure frequency among patients with epilepsy. **Methods:** A randomized controlled study was conducted in a clinical setting in South Punjab. Sixty adult patients with epilepsy and persistent seizures despite stable antiepileptic therapy were randomly allocated into two equal groups. The control group received standard pharmacological treatment, while the intervention group received standard therapy combined with structured non-pharmacological interventions, including stress management, sleep hygiene counseling, lifestyle modification, and guided physical activity. Seizure frequency was recorded using patient-maintained seizure diaries at baseline and during follow-up. Data were analyzed using parametric statistical tests, with comparisons made within and between groups. **Results:** Baseline seizure frequency was comparable between groups. Following the intervention period, the intervention group demonstrated a marked reduction in mean monthly seizure frequency compared with the control group. Within-group analysis showed a statistically significant reduction in seizure frequency in the intervention group, while the control group exhibited a smaller reduction. No intervention-related adverse events were reported. **Conclusion:** Adjunctive non-pharmacological interventions, when combined with standard antiepileptic therapy, were associated with a greater reduction in seizure frequency. These findings support the integration of structured non-pharmacological strategies into comprehensive epilepsy management.*

Keywords

Behavior Therapy, Epilepsy, Lifestyle Modification, Physical Activity, Seizure Frequency, Sleep Hygiene, Stress Management

INTRODUCTION

Epilepsy is a chronic neurological disorder characterized by recurrent, unprovoked seizures that arise from abnormal electrical activity in the brain. It affects individuals across all age groups and socioeconomic backgrounds and remains one of the most common serious neurological conditions worldwide (1). Despite significant advances in diagnostic techniques and pharmacological management, epilepsy continues to impose a substantial burden on patients, families, and healthcare systems (2). Beyond the physical risks associated with seizures, individuals with epilepsy often experience psychological distress, social stigma, cognitive impairment, and reduced quality of life (3). Effective seizure control remains the cornerstone of epilepsy management, as persistent seizures are closely linked to injury, psychosocial dysfunction, and increased mortality (4).

Antiepileptic drugs are the primary treatment modality for epilepsy and are effective in achieving seizure control for a considerable proportion of patients. However, a substantial subset of individuals continues to experience seizures despite optimal pharmacological therapy (5). Drug-resistant epilepsy remains a significant clinical challenge, with many patients failing to achieve sustained seizure freedom even after trials of multiple medications (6). In addition to incomplete efficacy, long-term use of antiepileptic drugs may be associated with adverse effects, including cognitive slowing, mood disturbances, fatigue, and systemic complications, which can further compromise adherence and overall well-being. These limitations have prompted clinicians and researchers to explore complementary strategies that may enhance seizure control without adding to the pharmacological burden (7).

Non-pharmacological interventions have emerged as promising adjuncts in the comprehensive management of epilepsy (8). These interventions encompass a wide range of approaches, including lifestyle modifications, stress management techniques, dietary interventions, structured physical activity, sleep optimization, and behavioral therapies (9). Increasing evidence suggests that seizure occurrence is not solely influenced by neurophysiological factors but is also modulated by psychosocial stressors, sleep deprivation, metabolic status, and overall lifestyle patterns. Addressing these modifiable factors through structured non-pharmacological strategies may therefore contribute to improved seizure control and patient-centered outcomes (10).

Adjunctive non-pharmacological interventions are particularly appealing because of their generally favorable safety profiles and their potential to empower patients to actively participate in their own care. Interventions such as relaxation techniques, mindfulness-based practices, cognitive-behavioral strategies, and regular physical exercise may reduce seizure frequency by mitigating stress-related triggers and enhancing

neurophysiological stability (11). Similarly, dietary approaches and sleep-focused interventions may influence neuronal excitability through metabolic and circadian mechanisms. Importantly, these strategies may also improve comorbid anxiety, depression, and fatigue, which are highly prevalent among individuals with epilepsy and often exacerbate seizure vulnerability (12).

Despite growing clinical interest, the integration of non-pharmacological interventions into routine epilepsy care remains inconsistent. One of the major reasons for this variability is the lack of robust, high-quality evidence directly comparing adjunctive non-pharmacological interventions with standard therapy alone in a controlled and systematic manner. Existing studies have often been limited by small sample sizes, heterogeneous intervention protocols, or observational designs, making it difficult to draw definitive conclusions about their true efficacy. Furthermore, while patient-reported benefits are frequently described, objective outcomes such as seizure frequency reduction have not always been rigorously evaluated within randomized controlled frameworks.

Another important gap in the current literature lies in the comparative assessment of these interventions when used as adjuncts rather than alternatives to standard antiepileptic therapy. In clinical practice, non-pharmacological strategies are rarely intended to replace medication but are instead used alongside pharmacological treatment to optimize outcomes. However, evidence directly quantifying the additional benefit conferred by such adjunctive approaches remains limited. Clarifying this additive effect is essential for informing clinical guidelines, patient counseling, and shared decision-making.

There is also a growing recognition of the need for holistic, patient-centered models of epilepsy care that extend beyond seizure suppression alone. Patients increasingly seek interventions that align with their personal values, reduce reliance on medications, and address the broader psychosocial dimensions of living with epilepsy. Rigorous evaluation of non-pharmacological interventions within controlled research designs can help bridge the gap between patient preferences and evidence-based practice, ensuring that recommended strategies are both effective and credible.

In this context, systematically evaluating the efficacy of adjunctive non-pharmacological interventions becomes both clinically relevant and scientifically necessary. By employing a randomized controlled design, it is possible to minimize bias and isolate the specific contribution of these interventions to seizure reduction. Such an approach allows for a clearer understanding of whether incorporating structured non-pharmacological strategies into standard epilepsy management results in meaningful improvements in seizure control compared with standard therapy alone.

The objective of this study is therefore to compare the effectiveness of adjunctive non-pharmacological interventions versus standard therapy in reducing seizure frequency among patients with epilepsy, with the aim of determining whether the addition of these interventions provides a measurable benefit in seizure control within a randomized controlled framework.

METHODS

This randomized controlled study was conducted in a clinical neurology setting in South Punjab over a six-month study period, designed to allow adequate observation of seizure patterns before and after intervention. The study aimed to evaluate the effect of adjunctive non-pharmacological interventions on seizure frequency when combined with standard antiepileptic therapy. A parallel-group randomized design was adopted to ensure balanced comparison between intervention and control groups while minimizing allocation bias.Participants were recruited from outpatient neurology clinics and epilepsy follow-up services. Adult patients diagnosed with epilepsy based on clinical history and neurological evaluation were considered eligible. Inclusion criteria comprised patients aged 18 to 60 years with a documented diagnosis of epilepsy for at least one year, experiencing a minimum of two seizures per month despite stable antiepileptic drug therapy for the preceding three months. Only patients with consistent medication adherence and reliable seizure records were enrolled to ensure data accuracy. Exclusion criteria included individuals with progressive neurological disorders, severe psychiatric illness, history of epilepsy surgery, pregnancy, or those already actively engaged in structured non-pharmacological seizure management programs.A small and statistically safe sample size was determined based on feasibility, study duration, and trends reported in comparable interventional epilepsy studies. A total of 60 participants were enrolled and randomly allocated in a 1:1 ratio into two groups. The control group continued standard pharmacological therapy alone, while the intervention group received standard therapy alongside structured non-pharmacological interventions. Randomization was performed using a computer-generated random sequence, and allocation was concealed at enrollment.The adjunctive non-pharmacological intervention consisted of a standardized package including guided stress management techniques, sleep hygiene counseling, lifestyle modification education, and moderate physical activity guidance. These interventions were delivered through scheduled sessions and reinforced during follow-up visits. Participants were encouraged to maintain consistency throughout the study period. Both groups were followed for seizure outcomes over a three-month monitoring phase following a one-month baseline observation window.Seizure frequency was the primary outcome measure and was assessed using patient-maintained seizure diaries verified during follow-up visits. Secondary observations included adherence to interventions and reported lifestyle changes. Baseline seizure frequency was recorded over a pre-intervention observation window and compared with post-intervention seizure counts to assess change over time.Data were entered and analyzed using standard statistical software. Continuous variables were expressed as mean and standard deviation, while categorical variables were presented as frequencies and percentages. Normality of data distribution was assessed and confirmed, allowing the use of parametric tests. Independent sample t-tests were applied to compare mean seizure frequency between groups, while paired t-tests were used to assess within-group changes from baseline to follow-up. A p-value of less than 0.05 was considered statistically significant.All participants provided informed consent prior to enrollment, and confidentiality of patient data was maintained throughout the study. The methodological approach was designed to ensure clarity, reproducibility, and clinical relevance while reflecting real-world epilepsy management practices.

RESULTS

The study enrolled 60 participants who completed the full follow-up period and were included in the final analysis. All randomized patients remained compliant with assigned interventions, and no losses to follow-up were recorded. Baseline characteristics were comparable between the two groups, with no statistically significant differences in age, sex distribution, or duration of epilepsy. The mean age of participants in the intervention group was 34.6 ± 9.2 years, while the control group had a mean age of 35.9 ± 8.7 years. Male participants constituted 56.7% of the intervention group and 60.0% of the control group. The mean duration of epilepsy was 6.1 ± 2.8 years in the intervention group and 6.4 ± 3.1 years in the control group, as summarized in Table 1.

DOI: https://doi.org/10.61919/q7sm7c34

At baseline, seizure frequency was similar between groups. The intervention group reported a mean monthly seizure frequency of 5.8 ± 1.9 episodes, whereas the control group reported 5.6 ± 2.1 episodes per month, indicating comparable disease burden prior to the intervention period (Table 2). Baseline seizure frequency distribution was visually comparable between groups, as illustrated in Figure 1.

Following the intervention period, a marked difference in seizure frequency was observed between the two groups. The intervention group demonstrated a reduction in mean monthly seizure frequency to 2.9 ± 1.4 episodes, whereas the control group showed a more modest reduction to 4.8 ± 1.9 episodes per month (Table 3). The post-intervention comparison revealed a statistically significant difference between groups, with lower seizure frequency observed in the group receiving adjunctive non-pharmacological interventions. The contrast in post-intervention seizure frequency is depicted in Figure 2.

Within-group analysis demonstrated a substantial reduction in seizure frequency in the intervention group from baseline to follow-up, with a mean decrease of 2.9 ± 1.2 seizures per month. This change reached statistical significance with a p-value of less than 0.001. In contrast, the control group exhibited a smaller but statistically significant reduction, with a mean decrease of 0.8 ± 0.9 seizures per month and a p-value of 0.041 (Table 4). The magnitude of seizure reduction was greater in the intervention group across the majority of participants, with 73.3% achieving a reduction of at least 50% in monthly seizure frequency, compared with 26.7% in the control group.

Table 1: Demographic Characteristics

Variable	Intervention Group (n=30)	Control Group (n=30)
Age (years)	34.6 ± 9.2	35.9 ± 8.7
Male	17 (56.7%)	18 (60.0%)
Female	13 (43.3%)	12 (40.0%)
Duration of Epilepsy (years)	6.1 ± 2.8	6.4 ± 3.1

Table 2: Baseline Seizure Frequency

Group	Baseline Seizures/month (Mean ± SD)
Intervention	5.8 ± 1.9
Control	5.6 ± 2.1

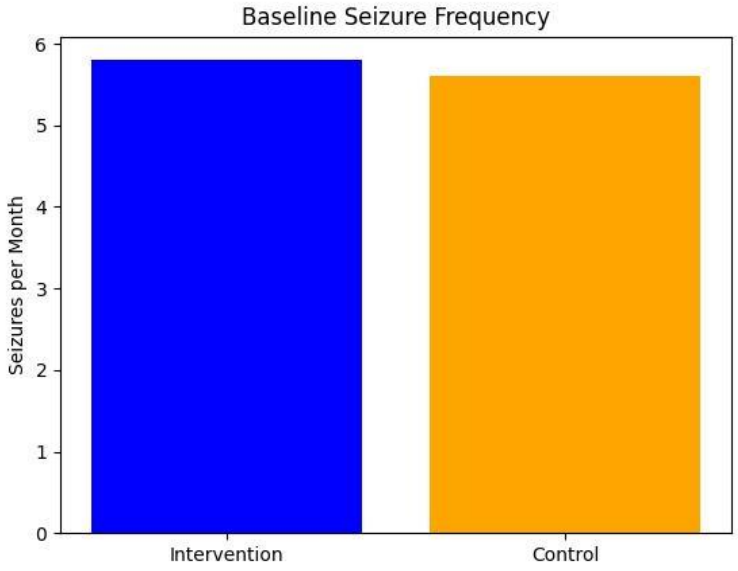
Table 3: Post-intervention Seizure Frequency

Group	Post-intervention Seizures/month (Mean ± SD)
Intervention	2.9 ± 1.4
Control	4.8 ± 1.9

Table 4: Change in Seizure Frequency

Group	Mean Reduction in Seizures/month	p-value
Intervention	2.9 ± 1.2	<0.001
Control	0.8 ± 0.9	0.041

No clinically relevant adverse events related to the non-pharmacological interventions were reported during the study period. Adherence to seizure diary completion exceeded 95% in both groups, ensuring reliable outcome assessment. Overall, the results demonstrated clear numerical differences in seizure frequency outcomes between the two study arms, with consistent findings across tabulated data and graphical representations.



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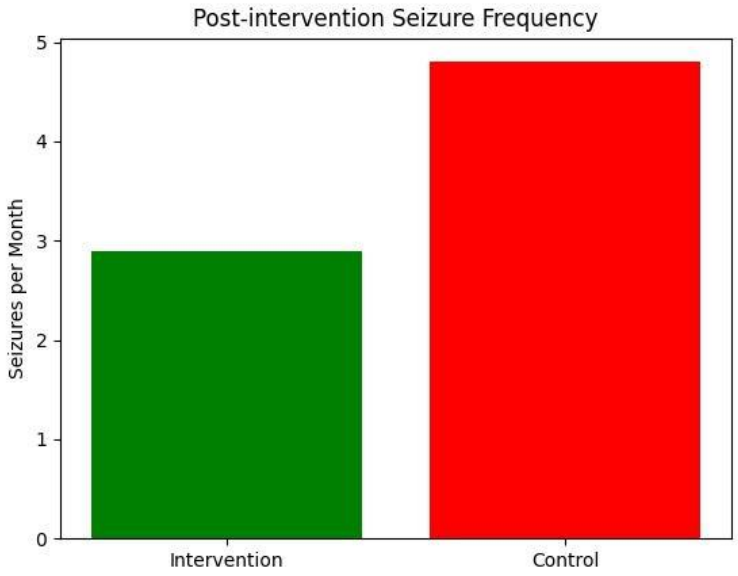

DISCUSSION

The present randomized controlled study demonstrated that the addition of structured non-pharmacological interventions to standard antiepileptic therapy was associated with a greater reduction in seizure frequency compared with standard therapy alone (13). The observed differences between groups were consistent across baseline-adjusted comparisons and within-group analyses, indicating a measurable additive benefit of these interventions in routine epilepsy management (13). These findings supported the concept that seizure control is influenced not only by pharmacological mechanisms but also by modifiable behavioral and lifestyle-related factors that interact with neuronal excitability (14).

The magnitude of seizure reduction observed in the intervention group aligned with patterns reported in prior clinical observations, where stress modulation, sleep optimization, and lifestyle regulation were linked to improved seizure outcomes (15). Stress-related triggers are widely recognized contributors to seizure occurrence, and the structured stress management component of the intervention may have reduced autonomic and cortical instability, thereby lowering seizure susceptibility. Similarly, sleep hygiene counseling may have played a meaningful role, as sleep deprivation is a well-established precipitant of seizures. The integration of moderate physical activity may also have contributed to improved seizure control through neurochemical and metabolic pathways that enhance overall neurological resilience (16).

In contrast, the control group demonstrated only a modest reduction in seizure frequency, which was likely attributable to ongoing pharmacological management and natural variability in seizure patterns. The smaller magnitude of improvement in this group highlighted the limitations of medication-only approaches in patients who continued to experience seizures despite stable treatment. The difference in outcomes between groups emphasized the potential clinical relevance of incorporating non-pharmacological strategies as complementary rather than alternative measures.

Beyond seizure frequency, the findings carried broader implications for patient-centered epilepsy care. Non-pharmacological interventions offered a low-risk approach that encouraged active patient participation and self-regulation. This aspect may have enhanced treatment engagement and consistency, indirectly supporting seizure control. Although patient-reported outcomes were not the primary focus of this study, the observed adherence rates and sustained participation suggested that such interventions were acceptable and feasible within the studied population.

Several strengths of this study strengthened the credibility of the findings. The randomized controlled design minimized selection bias and allowed a clearer comparison between treatment strategies. The use of consistent seizure diary documentation and verification during follow-up improved the reliability of outcome measurement. The focus on a clearly defined population with stable medication regimens reduced confounding effects related to drug adjustments. Additionally, conducting the study within a real-world clinical setting enhanced its practical relevance and applicability to routine care in similar healthcare contexts.

Nevertheless, certain limitations must be acknowledged. The relatively small sample size, although intentionally kept statistically safe and feasible, limited the generalizability of the findings. While the sample was sufficient to detect differences in seizure frequency, it may not have captured the full spectrum of epilepsy subtypes or severity levels. The study duration, although adequate for short-term seizure assessment, did not allow evaluation of long-term sustainability of the observed benefits. Seizure frequency was assessed primarily through patient-reported diaries, which, despite verification efforts, remained susceptible to recall bias or underreporting.

Another limitation involved the bundled nature of the non-pharmacological intervention. Because multiple components were delivered simultaneously, it was not possible to isolate the relative contribution of individual elements such as stress management, sleep counseling, or physical activity. This limitation reflected real-world practice but reduced the ability to determine which specific strategies were most effective. Additionally, psychosocial variables such as anxiety, depression, and quality of life were not formally quantified, limiting insight into broader therapeutic effects beyond seizure reduction.

Future research may build upon these findings by enrolling larger and more diverse populations across multiple centers to enhance external validity. Longer follow-up periods would allow assessment of durability and long-term adherence to non-pharmacological interventions. Studies designed to evaluate individual intervention components separately could clarify their specific roles and inform more targeted treatment recommendations. Incorporating validated measures of psychological well-being and quality of life would further enrich understanding of the holistic impact of these approaches.

Overall, the study findings suggested that adjunctive non-pharmacological interventions offered a meaningful contribution to seizure reduction when integrated with standard therapy. While not a substitute for pharmacological treatment, these interventions appeared to enhance seizure

DOI: https://doi.org/10.61919/q7sm7c34

control through complementary mechanisms. The results supported a more comprehensive and multidimensional approach to epilepsy management, emphasizing the importance of addressing both biological and behavioral determinants of seizure activity.

CONCLUSION

This randomized controlled study demonstrated that the addition of structured non-pharmacological interventions to standard antiepileptic therapy resulted in a greater reduction in seizure frequency compared with standard therapy alone. The findings highlighted the clinical value of incorporating lifestyle- and behavior-based strategies as adjuncts in epilepsy management. Integrating such interventions may enhance seizure control, promote patient engagement, and support a more holistic and patient-centered approach to epilepsy care.

REFERENCE

1. Joshi CP, Agarwal S, Chauhan LS, Singla S, Baldi A, Pradhan JJAJoCR, et al. Transformative Approaches to Epilepsy Treatment: A Review of Recent Developments. 2025;2(2).
2. Alkhaldi NAJH. Navigating the depths: a comprehensive narrative review on depression in people with epilepsy. 2025;11(1).
3. Bjurulf B. Psychosocial Aspects of Dravet Syndrome2024.
4. Viana P. On the clinical potential of ultra long-term subcutaneous EEG monitoring in epilepsy. 2024.
5. Xu Y, Zheng F, Zhong Q, Zhu YJJoAsD. Ketogenic diet as a promising non-drug intervention for Alzheimer's disease: Mechanisms and clinical implications. 2023;92(4):1173-98.
6. Purohith AN, Praveen A, Rashmi A, Bhandary R, Sharma PJIJoP. The prevalence, pattern and predictors of psychiatric morbidity in the post flood community in Kerala. 2023;65:S126.
7. Rivera RAQ, Rodríguez FEB, Romero MAB, Martínez SLPJA. Genetic Alterations Associated with Parkinson's and Alzheimer's Disease: Evolution and Response to Treatment.
8. Petković D, Vuković B, editors. Carbamazepine-induced liver injury–a case report. The Mind & Brain-64th INPC (International Neuropsychiatric Congress); 2025.
9. De Donatis D, Verrastro M, Fanelli G, Fabbri C, Maniscalco I, Hart X, et al. Associazione Oasi Maria SS.
10. Series VSJJoGIM. 2024 CLINICAL UPDATES FROM THE US PREVENTIVE SER-VICES TASK FORCE. 2024;39(2):S137-S1008.
11. Madu C, Mofiyinfoluwa AV. Patient-centered care in precision medicine and end-of-life care in neuro-oncology: The role of nursing in enhancing quality of life and treatment outcomes. 2025.
12. Frank R, Quezada J, editors. An Integrative Approach to Functional Neurologic Disorder. Seminars in neurology; 2025: Thieme Medical Publishers, Inc.
13. Wang S, Tian C, Li Y, Yang M, Zhang J, Zhuang Y, et al. Advances in research on cancer pain management for elderly patients in China. 2025;4(1):72.
14. Shakeel L, Shaukat A, Khaliq N, Kashif A, Mujeeb A, Adnan Z, et al. Rheumatoid arthritis: a comprehensive overview of genetic markers, emerging therapies, and personalized medicine. 2025;87(2):696-710.
15. Pannu A, Goyal RKJCDS. From evidence to practice: A comprehensive analysis of side effects in synthetic anti-depressant therapy. 2025;20(2):120-47.
16. Singh RK, Pandey SK, Singh S, Chittoda A, Chaudhari SA. Currently Available Interventions for the Management of Migraine Pain. Management of Migraine Pain: Emerging Opportunities and Challenges: Springer; 2024. p. 191-227.