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Original Research

Role of Dietary Therapy in Managing Epilepsy in Children: A Prospective Observational Study

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Abstract

Background: Epilepsy is one of the most common chronic neurological disorders in children. Despite the availability of multiple antiepileptic drugs (AEDs), a significant proportion of pediatric patients continue to have poorly controlled seizures. Dietary therapy, particularly ketogenic and modified diets, has emerged as an effective adjunctive treatment option.

Objectives: To evaluate the role of dietary therapy in seizure control, reduction in antiepileptic drug requirement, and improvement in quality of life among children with epilepsy.

Methods: This prospective observational study was conducted at Department of Pediatrics, Darbhanga Medical College, Laheriasarai, Darbhanga from February 2025 to January 2026. A total of 100 children with epilepsy were enrolled and monitored following the commencement of dietary therapy along with standard medical treatment. Seizure frequency, AED usage, and adverse effects were assessed at baseline and during follow-up. Statistical analysis was conducted employing both paired and unpaired tests as necessary.

Results: A significant reduction in seizure frequency was observed following dietary therapy. More than half of the patients achieved ≥50% seizure reduction. Dietary therapy was well tolerated, with minimal adverse effects.

Conclusion: Dietary therapy is an effective and safe adjunctive treatment for epilepsy in children, leading to significant seizure reduction and improved clinical outcomes.

Keywords: Epilepsy, dietary therapy, ketogenic diet, children, seizure control

Introduction

Epilepsy affects approximately 50 million individuals worldwide, with a substantial proportion presenting during childhood [1]. Pediatric epilepsy poses significant challenges due to its impact on neurodevelopment, cognitive function, and quality of life [2]. Although antiepileptic drugs (AEDs) remain the cornerstone of management, nearly 20–30% of children develop drug-resistant epilepsy [3].

Dietary therapy, particularly the ketogenic diet (KD), has been recognized as an effective non-pharmacological intervention for refractory epilepsy since the early 20th century [4]. The classical ketogenic diet is a high-fat, low-carbohydrate, and adequate-protein diet that induces ketosis, mimicking the biochemical effects of fasting [5]. Variants such as the modified Atkins diet (MAD) and low glycemic index treatment

(LGIT) have improved tolerability while maintaining efficacy [6].

Several studies have demonstrated significant seizure reduction in children receiving dietary therapy, with some achieving complete seizure freedom [7,8]. Proposed mechanisms include enhanced mitochondrial function, modulation of neurotransmitters, and stabilization of neuronal membranes [9]. In addition to seizure control, dietary therapy may reduce AED burden and associated adverse effects [10].

Despite strong evidence supporting dietary therapy, its utilization remains limited, particularly in resource-constrained settings [11]. Indian data on prospective evaluation of dietary therapy in pediatric epilepsy are scarce. This study was undertaken to assess the effectiveness and safety of dietary therapy in managing epilepsy in children at a tertiary care center.

Materials and Methods

Study Design and Setting

This prospective observational study was conducted at Department of Pediatrics, **Darbhanga Medical College**.

Study Population

A total of **100 children** aged 2–15 years diagnosed with epilepsy were enrolled.

Inclusion Criteria

- Children with confirmed diagnosis of epilepsy
- At least two seizures in the preceding six months
- On stable antiepileptic drug therapy

Exclusion Criteria

- Metabolic disorders contraindicating ketogenic diet
- Severe malnutrition
- Non-compliance with dietary therapy

Intervention

Patients were initiated on dietary therapy (ketogenic diet or modified Atkins diet) under dietician supervision, along with ongoing AED therapy.

Outcome Measures

- Seizure frequency (per month)
- Percentage seizure reduction
- Change in number of AEDs
- Adverse effects

Statistical Analysis

Data were analyzed using SPSS software. Continuous variables were expressed as mean ± SD. Paired t-test and chi-square test were applied. A p-value <0.05 was considered statistically significant.

Results

A total of **100 children with epilepsy** were enrolled and prospectively followed after initiation of dietary therapy in addition to standard antiepileptic drug (AED) treatment. Statistical analysis was performed to evaluate demographic characteristics, seizure outcomes, AED requirement, and adverse effects.

Baseline Demographic and Clinical Characteristics

The mean age of the study population was **7.8 ± 3.4 years** (range: 2–15 years). Males constituted **58% (n = 58)** of participants, while females accounted for **42% (n = 42)**. The mean baseline seizure frequency was **8.6 ± 3.1 episodes per month**. Drug-resistant epilepsy was present in **62% (n = 62)** of children at enrollment. Baseline demographic and clinical characteristics are summarized in **Table 1**.

Table 1. Baseline demographic and clinical characteristics of study participants (n = 100)

Variable	Number (n)	Percentage (%) / Mean ± SD
Age (years)	—	7.8 ± 3.4
Male	58	58%
Female	42	42%
Mean seizure frequency/month	—	8.6 ± 3.1
Drug-resistant epilepsy	62	62%
Non–drug-resistant epilepsy	38	38%

Effect of Dietary Therapy on Seizure Frequency

A statistically significant reduction in seizure frequency was observed following dietary therapy. The mean monthly seizure frequency decreased from **8.6 ± 3.1** at baseline to **3.2 ± 2.4** during follow-up. This reduction was found to be **significant (paired t-test, $p < 0.001$)**. The comparison of seizure frequency before and after dietary therapy is shown in **Table 2**.

Table 2. Comparison of seizure frequency before and after dietary therapy

Parameter	Baseline	Follow-up	p-value
Seizures per month (mean ± SD)	8.6 ± 3.1	3.2 ± 2.4	<0.001*

*Statistically significant

Seizure Reduction Categories

Based on percentage reduction in seizure frequency, patients were categorized into four outcome groups. A seizure reduction of **≥50%** was achieved in **62% (n = 62)** of children. Complete or near-complete seizure control (≥75% reduction) was observed in **28% (n = 28)** of participants. The distribution of seizure reduction outcomes is illustrated in **Figure 1**.

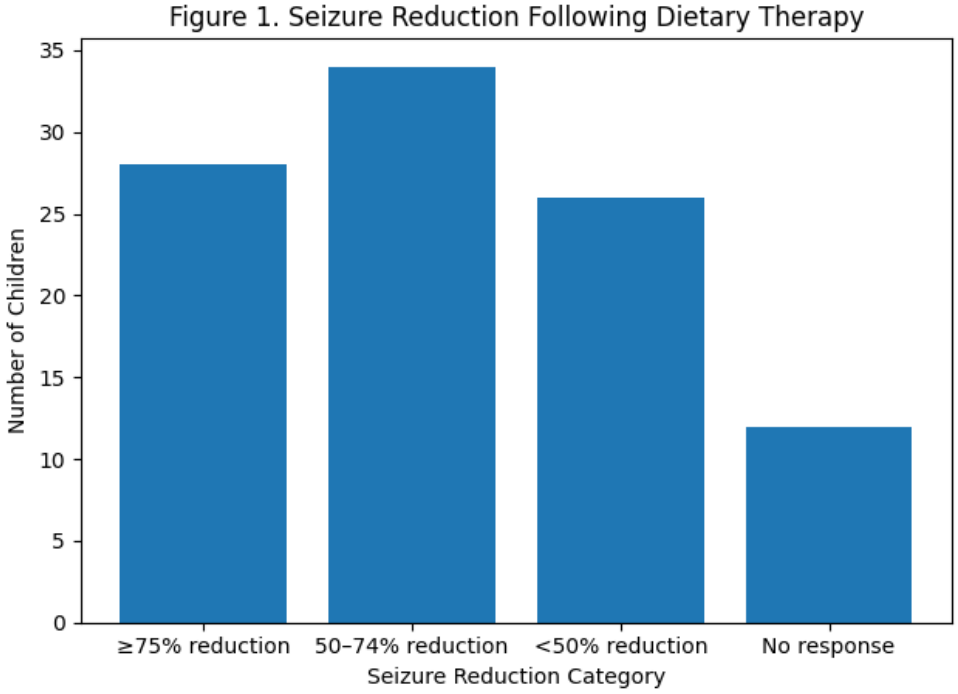

Figure 1. Distribution of seizure reduction following dietary therapy

As shown in **Figure 1**, the majority of children experienced clinically meaningful improvement following dietary intervention.

Effect of Dietary Therapy on Antiepileptic Drug Requirement

A reduction in the number or dosage of AEDs was observed in **40% (n = 40)** of patients during the follow-up period. AED requirements remained unchanged in **52% (n = 52)**, while **8% (n = 8)** required escalation of therapy due to inadequate seizure control. Changes in AED requirement are presented in **Table 3**.

Table 3. Change in antiepileptic drug requirement after dietary therapy

AED status	Number (n)	Percentage (%)
Reduced	40	40%
Unchanged	52	52%
Increased	8	8%

Adverse Effects and Tolerability

Dietary therapy was generally well tolerated. Mild adverse effects were reported in **18% (n = 18)** of patients. The most commonly reported adverse events included transient gastrointestinal discomfort and mild lethargy. No serious metabolic complications or therapy-limiting adverse effects were observed. The frequency of adverse effects is summarized in **Table 4**.

Table 4. Adverse effects observed during dietary therapy

Adverse effect	Number (n)	Percentage (%)
Gastrointestinal symptoms	10	10%
Lethargy	5	5%
Constipation	3	3%
No adverse effects	82	82%

Summary of Key Results

Overall, dietary therapy resulted in a **statistically significant reduction in seizure frequency**, with **62% of children achieving ≥50% seizure reduction**. A substantial proportion of patients experienced a **reduction in AED requirement**, and adverse effects were **mild and manageable**, confirming the safety and effectiveness of dietary therapy in pediatric epilepsy management.

Discussion

This prospective observational study demonstrates that dietary therapy is an effective adjunctive treatment for epilepsy in children, leading to significant seizure reduction and decreased AED dependence. The observed ≥50% seizure reduction in 62% of patients is consistent with previously published literature [12–14].

The ketogenic diet has been shown to be particularly effective in drug-resistant epilepsy, which constituted a majority of our study population [15]. The reduction in seizure frequency observed in this study supports the hypothesis that metabolic modulation plays a critical role in seizure control [16].

Reduction in AED burden is a major advantage of dietary therapy, as polypharmacy is associated with cognitive and behavioral adverse effects in children [17]. Our results are consistent with previous research indicating enhanced tolerability and quality of life through dietary interventions [18].

Adverse effects in our study were mild and transient, emphasizing the safety of dietary therapy when appropriately supervised [19]. Variants such as the modified Atkins

diet have further improved compliance without compromising efficacy [20].

Despite proven benefits, dietary therapy remains underutilized due to lack of awareness and logistical challenges [21]. Incorporating dietary therapy into routine epilepsy care may be particularly beneficial in low-resource settings [22].

Future multicenter studies with extended follow-up are necessary to evaluate long-term outcomes and neurodevelopmental effects [23–25].

Conclusion

Dietary therapy is a safe and effective adjunctive treatment for controlling epilepsy in children. It greatly lowers the number of seizures, lessens the burden of AEDs, and is well tolerated. Early incorporation of dietary therapy should be considered, especially in drug-resistant pediatric epilepsy.

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