

**Role of Dietary Therapy in Managing Epilepsy in Children**Hena Zafar<sup>1</sup>, Nupur Kumari<sup>2</sup>, Alka Singh<sup>3</sup><sup>1</sup>MBBS, MD, Senior Resident, Department of Pediatrics, Nalanda Medical College & Hospital, Patna, Bihar, India<sup>2</sup>MBBS, MD, Senior Resident, Department of Pediatrics, Nalanda Medical College & Hospital, Patna, Bihar, India<sup>3</sup>MD, MRCP (U.K), Professor, Department of Pediatrics, Nalanda Medical College & Hospital, Patna, Bihar, India

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Conflict of interest: Nil

**Abstract:****Background:** Epilepsy is a common neurological disorder in children, characterized by recurrent seizures. Traditional antiepileptic drugs (AEDs) often fail to achieve complete seizure control and may cause adverse effects. Dietary therapy, particularly ketogenic and modified Atkins diets, has emerged as a promising adjunctive treatment to manage epilepsy in children.**Aim:** This research aims to assess the effectiveness and safety of dietary interventions in managing pediatric epilepsy for the duration of a year and to identify the potential benefits and limitations of these dietary interventions.**Methods:** A comprehensive review of clinical trials, observational studies, and meta-analyses was conducted in Department of Pediatrics, NMCH Patna, Bihar on 100 patients to assess the impact of dietary therapy on seizure frequency and severity in children with epilepsy. Data were collected from multiple databases, focusing on studies involving ketogenic and modified Atkins diets. The outcomes were compared to standard AED treatments in terms of seizure reduction, cognitive function, and quality of life.**Results:** The study involved 100 participants divided equally into dietary therapy and control groups, with comparable age, gender, and baseline seizure frequency. The dietary therapy group showed a significant reduction in seizure frequency at all follow-up points compared to the control group ( $p < 0.001$ ), with a 60% reduction at 12 months versus 15% in the control group. Quality of life scores, measured by the PedsQL, also improved significantly more in the dietary therapy group, with a 25-point increase compared to a 5-point increase in the control group ( $p < 0.01$ ). Side effects in the dietary therapy group included manageable issues like constipation (20%), nausea (10%), and lethargy (15%), with no severe adverse events reported.**Conclusion:** Dietary therapy, particularly ketogenic mode of diet is a viable option for managing epilepsy in children, especially those who are refractory to standard AEDs. While the benefits are substantial, careful consideration of potential side effects and ongoing monitoring is essential.**Recommendations:** It includes the incorporation dietary therapy as part of a comprehensive treatment plan for pediatric epilepsy. Provide education and support to families and caregivers to ensure adherence and manage potential side effects. Utilization of multidisciplinary team, including dietitians and neurologists, to optimize treatment outcomes. Conduct long-term studies to evaluate the sustainability of dietary therapy and its impact on growth and development. Tailor dietary interventions to individual patient needs, considering potential dietary restrictions and preferences.**Keywords:** Pediatric Epilepsy, Dietary Therapy, Ketogenic Diet, Atkins Diet, SeizureThis is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Epilepsy is a long-term neurological condition marked by recurring, unprovoked seizures, impacting almost 0.6% of children worldwide. Despite advancements in pharmacological treatments, about one-third of pediatric patients continue to experience seizures that are resistant to medication. This refractory epilepsy poses significant challenges not only for the patients but also for their families, affecting the quality of life and overall well-being.

Given these challenges, there has been growing interest in alternative therapies that can effectively manage seizures in pediatric patients [1].

One such promising alternative is dietary therapy, which includes regimens like the ketogenic diet (KD) and the modified Atkins diet (MAD). These high-fat, low-carbohydrate diets have been used for nearly a century in the management of epilepsy, particularly in cases where conventional medica-

tions fail to provide adequate seizure control. The underlying mechanism of these diets is believed to involve the production of ketone bodies, which serve as an alternative energy source for the brain, potentially stabilizing neuronal activity and reducing seizure frequency [2].

The ketogenic diet, introduced in the 1920s, has demonstrated significant success in lowering seizure frequency among pediatric patients. Nonetheless, its stringent regimen and possible side effects frequently restrict its long-term application. As a result, the modified Atkins diet, a less restrictive variant, has gained popularity. Both diets require careful monitoring and adherence, often necessitating the involvement of a multidisciplinary team, including neurologists, dietitians, and primary care providers, to ensure safety and efficacy [3].

Despite the historical use and anecdotal success of dietary therapies, there remains a need for rigorous scientific evaluation through controlled clinical trials. Previous studies have indicated varying degrees of success, with some patients achieving complete seizure freedom while others experience only modest improvements. Therefore, understanding the precise impact of these diets on seizure control and quality of life in a structured and methodical manner is crucial. Moreover, the implementation of dietary therapy requires careful planning and monitoring by a multidisciplinary team, including neurologists, dietitians, and primary care providers. This comprehensive approach ensures that the dietary interventions are safe, nutritionally adequate, and sustainable over the long term. It also allows for the early identification and management of potential side effects, thereby improving adherence and outcomes [4].

This study sought to address this gap by performing a randomized controlled trial to evaluate the effectiveness of dietary therapy in managing pediatric epilepsy. By comparing seizure occurrence and life quality between patients receiving dietary therapy and those on standard pharmacological treatment, this research provides valuable insights into the potential benefits and challenges of incorporating dietary interventions into routine clinical practice for pediatric epilepsy management. This study also contributes to the growing body of evidence supporting the use of dietary therapies as viable adjunctive treatments for epilepsy, potentially offering new hope for children and families affected by this challenging condition.

### Methodology

**Study Design:** This study was a retrospective cohort study designed to evaluate the effectiveness of dietary therapy in the management of pediatric epilepsy. The study span was for a year, from January 2023 to December 2023.

**Study Setting:** The research was done in Department of Pediatrics, NMCH Patna, Bihar. The facility provided comprehensive epilepsy management, including dietary interventions such as the ketogenic diet.

### Participants

The study included 100 pediatric patients diagnosed with epilepsy who were managed with dietary therapy.

### Inclusion Criteria

1. Children aged 1 to 18 years.
2. Diagnosed with epilepsy by a pediatrician
3. Initiated on dietary therapy (e.g., ketogenic diet, modified Atkins diet) between January 2019 and December 2021.
4. Had at least six months of follow-up data available.

### Exclusion Criteria

1. Patients with less than six months of follow-up.
2. Patients with incomplete medical records.
3. Children with other metabolic or genetic disorders that could affect seizure control independently of dietary therapy.

**Bias:** To reduce selection bias, all patients who met the inclusion criteria during the study period were included. Data collection bias was minimized by employing a standardized data extraction form.

### Variables

- **Independent Variable:** Type of dietary therapy (ketogenic diet, modified Atkins diet).
- **Dependent Variables:** Seizure frequency, seizure severity, adverse effects, and compliance with dietary therapy.
- **Covariates:** Age, sex, type of epilepsy, and duration of epilepsy.

### Data Collection

Data gathered included patient demographics, clinical characteristics, details of dietary therapy, seizure frequency, seizure severity, adverse effects, and compliance data.

### Procedure

1. Patients were identified using the hospital's medical record.
2. Data were extracted using a standardized form.
3. Each patient's seizure frequency and severity were recorded at baseline (before dietary therapy) and at six months and one year after initiating therapy.

4. Adverse effects and compliance were also documented at each follow-up visit.

**Statistical Analysis:** Data were analyzed using SPSS version 21.0. Descriptive statistics (mean, standard deviation, frequencies) were used to summarize the data. Paired t-tests compared seizure frequency and severity before and after dietary therapy. Chi-square tests analyzed categorical variables such as adverse effects and compliance. A

p-value of  $<0.05$  was considered statistically significant.

## Results

**Participant Demographics:** Out of 100 participants, 50 were assigned to the dietary therapy group and 50 to the control group. The groups were comparable in terms of age, gender, and baseline seizure frequency (Table 1).

**Table 1:**

Characteristic	Dietary Therapy (n=50)	Control (n=50)
Age (years, mean $\pm$ SD)	10.4 $\pm$ 3.6	10.7 $\pm$ 3.8
Gender (M/F)	28/22	26/24
Baseline seizure frequency	15.2 $\pm$ 4.8	14.9 $\pm$ 5.1

**Seizure Frequency:** There was a significant reduction in seizure frequency in the dietary therapy group compared to the control group at all follow-up points ( $p<0.001$ ). The mean reduction in seizure frequency at 12 months was 60% in the dietary therapy group compared to 15% in the control group (Table 2).

**Table 2:**

Time Point	Dietary Therapy (mean $\pm$ SD)	Control (mean $\pm$ SD)	p-value
Baseline	15.2 $\pm$ 4.8	14.9 $\pm$ 5.1	0.78
3 months	9.8 $\pm$ 3.2	13.5 $\pm$ 4.6	$<0.001$
6 months	7.4 $\pm$ 2.9	12.7 $\pm$ 4.2	$<0.001$
9 months	6.3 $\pm$ 2.5	12.1 $\pm$ 3.9	$<0.001$

**Quality of Life:** Quality of life scores improved significantly in the dietary therapy group compared to the control group. The mean PedsQL score increased by 25 points in the dietary therapy group, whereas the control group saw an increase of only 5 points at the end of the study period ( $p<0.01$ ) (Table 3).

**Table 3:**

Time Point	Dietary Therapy (mean $\pm$ SD)	Control (mean $\pm$ SD)	p-value
Baseline	45.3 $\pm$ 8.7	46.1 $\pm$ 8.9	0.65
12 months	70.3 $\pm$ 10.2	51.2 $\pm$ 9.1	$<0.01$

**Side Effects:** Participants in the dietary therapy group reported manageable side effects, including constipation (20%), nausea (10%), and lethargy (15%). No severe adverse events were recorded.

## Discussion

In this study both groups were similar in age, gender, and baseline seizure frequency, ensuring a balanced comparison. The dietary therapy group experienced a significant reduction in seizure frequency compared to the control group at all follow-up points. By the 12-month mark, the dietary therapy group saw a 60% reduction in seizure frequency, while the control group only saw a 15% reduction. Quality of life scores, measured using the PedsQL scale, improved significantly more in the dietary therapy group compared to the control group.

Over 12 months, the dietary therapy group's mean score increased by 25 points, whereas the control group's score increased by only 5 points. Participants in the dietary therapy group reported manageable side effects, including constipation (20%), nausea (10%), and lethargy (15%). No severe adverse events were recorded.

Many such similar studies were conducted. A study reviewed the clinical efficacy of the ketogenic diet (KD) in treating refractory epilepsy in children. It showed significant seizure reduction in a substantial number of patients and highlighted the diet's role as a viable alternative when conventional treatments fail. It compared the Modified Atkins Diet (MAD) with the classic ketogenic diet for children with intractable epilepsy. Results indicated that both diets are effective, with the MAD providing a more flexible dietary option while still achieving substantial seizure control [5]. The Indian Journal of Pediatrics published a consensus guideline highlighting the use of dietary therapies, such as the ketogenic diet and the Modified Atkins Diet, in managing West Syndrome after the failure of conventional treatments which underscored the potential of dietary interventions in improving seizure control in challenging cases. Research on dietary therapy for infantile spasms in children, particularly focusing on the ketogenic diet, found that early initiation and careful monitoring could lead to significant seizure reduction. This study emphasized the importance of inpatient initiation and the role of dietitians in managing dietary therapy for young children [6]. Likewise the Indian Epilepsy

Society examined the Low Glycemic Index Treatment (LGIT) in children with tuberous sclerosis complex. The results demonstrated that LGIT effectively reduced seizure frequency and provided a less restrictive dietary option compared to the classic ketogenic diet [7].

### Conclusion

These findings indicate that dietary therapy is an effective and manageable treatment option for pediatric epilepsy, offering significant improvements in both seizure control and overall quality of life. The manageable side effects, including constipation, nausea, and lethargy, did not detract from the overall benefits of the therapy. Therefore, dietary therapy should be considered a viable alternative or adjunct to conventional anti-seizure medications for children with epilepsy.

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