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## A pilot study on determination of dietary intake of geriatric epileptic patients

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### Abstract

Epilepsy, a complex neurological condition, stems from multifaceted factors, including genetic predispositions and various triggers. The elderly, a rapidly growing demographic globally, encounter an increased risk of seizures. In India, a significant population lives with epilepsy, notably more prevalent in rural areas. Moreover, malnutrition and epilepsy exhibit a complex relationship, potentially influencing each other's onset and progression. Geriatric individuals with epilepsy often face sedentary lifestyles and potential weight-related concerns due to medication. This pilot study aimed to assess the nutrient profile of geriatric patients with epilepsy. A quantitative research approach was adopted; studying 30 individuals aged 60 to 80 years at a private neurology hospital in Tamil Nadu. Data was collected through interviews and dietary assessments, including the 24-hour recall and food frequency methods. Statistical analysis using SPSS provided insights into nutrient intake among the participants. Results indicated that while certain nutrients met recommended levels, fat and carbohydrate intake exceeded the prescribed amounts. Additionally, dietary patterns varied among different types of seizures. Despite differences, no statistical significance was found. Food frequency analysis revealed varied consumption patterns, notably lower intake of fruits and vegetables among the epilepsy geriatric patients. The study emphasizes the importance of understanding the nutritional needs of individuals with epilepsy, particularly in the geriatric population, to formulate personalized dietary interventions for improved seizure management and overall health.

**Keywords:** Epilepsy; Geriatrics; Nutritional status; Dietary Assessment; Seizures and diet

### 1. Introduction

Epilepsy, a chronic nervous system disorder, manifests due to various factors like structural abnormalities, genetics, metabolism, viruses, or immune system complications [1, 6]. Although its exact cause remains elusive, approximately 60% of cases classified as idiopathic may have a genetic component [8]. The elderly, aged 60 and above, represent the fastest-growing segment globally [2] and face a heightened risk of seizure development compared to other age groups [3].

In India, about 10 million individuals live with epilepsy, with higher prevalence in rural areas (1.9%) than in urban areas (0.6%) [11, 12, 13]. Malnutrition, characterized by insufficient nutrient intake, absorption issues, or increased nutrient loss, leads to physical and mental impairments [4,6]. Epilepsy and malnutrition exhibit a potentially bidirectional relationship, where malnutrition might predispose individuals to epilepsy, and epilepsy could contribute to malnutrition [2,3,4].

Elderly individuals with epilepsy often lead sedentary lifestyles and might take medications that promote weight gain, potentially impacting energy regulation and increasing the risk of obesity [7,8,9]. Alternative treatments for drug-

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resistant epilepsy encompass surgical interventions, neuromodulation techniques, and nutritional therapy [14,19]. Deficiencies in nutrients like B vitamins, vitamin D, zinc, and selenium have been observed in individuals with epilepsy [3, 4, 7, 13]. Investigating the South Indian population offers valuable insights due to unique dietary patterns and cultural practices. Hence to assess the nutritional status of geriatric patients with epilepsy entitled as 'A Pilot Study on Determination of Dietary Intake of Geriatric Epileptic Patients'. The Aim of the study is to assess the nutritional status of geriatric patients with epilepsy. The objective of the study is to evaluate nutritional status of patients with epilepsy based on dietary intake.

## 2. Materials and methods

The present study employed a quantitative research approach, focusing on 30 patients aged between 60 to 80 years, selected through purposive sampling. Despite aiming for an approximate sample size of 18, a total of 74 samples were included, with the final collected samples amounting to 30. The research took place at Dr. Sudararajan Super Specialty Hospital in Salem District, Tamil Nadu, encompassing inpatient ward individuals seeking medical intervention and outpatients attending the hospital's OPD. Inclusion criteria comprised individuals aged above 60 years diagnosed with epilepsy, male and female, capable of communication and questionnaire participation, and willing to engage in the study. Exclusion criteria encompassed those unwilling to participate and individuals below 60 years of age. The study's duration spanned one month.

An interview schedule was utilized as a method to gather data by posing questions directly to subjects in a face-to-face setting. The questionnaire included a series of questions aimed at extracting statistically relevant information.

Dietary assessment, a crucial process in evaluating an individual's nutritional status, was conducted using the 24-hour recall method. Participants were asked to recollect, in as much detail as possible, their food intake over the previous 24 hours through interviews or questionnaire completion. Nutritional values were calculated and compared against the Recommended Dietary Allowances (RDA) outlined by the Indian Council of Medical Research (ICMR) in 2023.

Additionally, the Food Frequency Method was employed, involving inquiries (via interviews or checklists) about the frequency of consuming specific food items (daily, weekly, monthly, never). This method encompassed all major food groups, including cereals, pulses, meat, fish, dairy products, green leafy vegetables, other vegetables, roots, tubers, fruits, nuts, and oils.

The quantitative data which were collected from the questionnaire was coded and analyzed by the SPSS programme.

## 3. Results and discussion

**Table 1** Description of macronutrient intake of the selected samples

24- hour recall	Mean	Std. Deviation	RDA and EAR (2023) for 60 years and above	Interpretation
Energy	1930.770	503.95	Male - 1700 kcal Female - 1500 kcal	Increased intake
Protein	51.6570	19.38	Male - 54g Female - 46 kcal	Slight decreased intake
Fat	46.97	17.47	20 g (food sources)	High increased intake
Carbohydrate	315.50	99.5	100 - 130 g	Increased intake

The above Table 1 demonstrates the mean of the energy and nutrients of 24 hour recall of the selected samples. The mean energy (kcal) of the samples was 1930.7707 with [503.95]. The mean protein (g) was 51.6570 with [19.38178], mean fat was 46.9780 with [17.47447], mean carbohydrate was 315.5 with [99.58231] respectively. As per RDA & EAR ICMR 2023, the energy requirements for elderly population male ( 1700 kcal/day ) and female (1500 kcal/day ), the protein requirement for elderly population male 54 g/day and female 46 g/day , the carbohydrate requirement for elderly population 100-130 g and fat (food sources) requirement for elderly population 20 g. The mean nutrient requirements met the RDA & EAR ICMR 2023 nutrient requirements, the mean fat and mean carbohydrate intake was higher when compared to the RDA & EAR ICMR 2023 recommendation.

Our study participants consume more carbohydrates compared to protein, exceeding the recommended levels (ICMR - NIN, 2023). This finding aligns with Rania Shehata Ismail et al.'s study in 2021[1], which observed unbalanced macronutrient intake among 150 epilepsy patients, characterized by excessive consumption of carbohydrates and proteins, while fat intake remained within the recommended levels. Similarly, our study's results resonate with a Brazilian study conducted by de Azevedo Fernandez et al. in 2015 [3], revealing heightened carbohydrate and protein intake in individuals with epilepsy, surpassing the recommended levels by two to four times.

**Table 2** Descriptive statistics of 24 hour recall and type of epilepsy

Type of epilepsy	(N)	Energy (Kcal)		Protein (g)		Carbohydrate (g)		Fat (g)	
		Mean	Std.d	Mean	Std.d	Mean	Std.d	Mean	Std.d
Absence seizure	8	1823.7188	537.16373	56.7763	31.89129	293.0825	85.18630	47.5438	14.87219
Tonic-clonic seizure	9	1878.8300	473.84513	48.8578	12.94076	295.8222	113.94024	41.7622	13.97208
Atonic seizure	4	1803.1000	600.53450	40.3925	13.41750	324.2350	125.97944	39.7975	15.79955
Complex partial seizure	2	1718.0250	369.64007	47.6200	12.43094	260.7200	76.67866	50.8900	2.78600
Simple partial	7	2253.6357	470.68656	56.9957	10.95753	377.1043	80.68107	56.0229	25.59874
Total	30								
P value		0.434		0.635		0.509		0.416	

Note: Statistical significance was tested by independent t test; p value less than 0.05 are statistically significant.

The above Table 2 demonstrates the mean of the energy and nutrients of 24 hour recall of the selected samples based on type of epilepsy. These values and their fluctuations might indicate potential correlations or differences in dietary patterns among individuals experiencing different seizure types.

The mean energy (kcal) of the samples with Absence seizure was 1823.71 with [537.16]. The mean protein (g) was 56.77 with [31.89], mean fat (g) was 47.54 with [14.87], and mean carbohydrate (g) was 293.08 with [99.58231] respectively.

The mean energy (kcal) of the samples with Tonic clonic seizure was 1878.83 with [473.845]. The mean protein (g) was 48.85 with [12.94], mean fat (g) was 41.76 with [13.9], mean Carbohydrate (g) were 295.8222 with [113.9] respectively.

The mean energy (kcal) of the samples with Atonic seizure was 1803.10 with [600.53]. The mean protein (g) was 40.39 with [13.41], mean fat (g) was 39.79 with [15.79], mean carbohydrate (g) were 324.2350 with [125.97] respectively.

The mean energy (kcal) of the samples with Complex partial seizure was 1718.02 with [369.64]. The mean protein (g) was 47.62 with [12.43], mean fat (g) was 50.89 with [2.78], mean carbohydrate (g) were 260.7200 with [76.67866] respectively.

The mean energy (kcal) of the samples with Simple partial seizure was 2253.6357 with [470.68]. The mean protein (g) was 56.99 with [10.95], mean fat (g) was 56.02 with [25.59], and mean carbohydrate (g) was 377.1043 with [80.68] respectively.

Although Individuals with different types of seizures appear to have distinct dietary patterns, indicating potential differences in nutritional needs or preferences related to these conditions, this difference did not reach statistical significance.

**Table 3** Description of food frequency of the selected samples

Variables	Options	Frequency	(%)
Cereals	Daily	30	100.00
Millets	Weekly	7	23.3
	Monthly	11	36.6
	Never	12	40
Pulses	Daily	30	100
Other Vegetables	Daily	10	33.3
	Weekly	9	30
	Monthly	11	36.6
Green Leafy Vegetables	Daily	12	40
	Weekly	3	10
	Monthly	12	40
	Never	3	10
Fruits	Daily	9	30
	Weekly	12	40
	Monthly	6	20
	Never	3	10
Fish, Chicken, Meat	Daily	4	13.3
	Weekly	16	53.3
	Monthly	5	16.6
	Never	5	16.6
Egg	Daily	6	20
	Weekly	12	40
	Monthly	6	20
	Never	6	20
Nuts	Daily	4	13.3
	Weekly	9	30
	Monthly	6	20
	Never	11	36.6
Milk and Milk products	Daily	30	100

The above table 3 represents the food frequency of the selected epilepsy geriatric patients.

The cereal consumption patterns among the Epilepsy geriatric patients were recorded as follows: all of them (100%) consumed cereals on a daily basis. Additionally, 23.3% of these patients consumed millets weekly, 36.6% consumed them monthly, and 40% never consumed millets. Regarding pulse consumption, all of the Epilepsy geriatric patients (100%) consumed pulses regularly.

In terms of vegetable consumption, 33.3% of the selected patients consumed other vegetables on a daily basis, 30% consumed them weekly, and 36.6% consumed them monthly. As for green leafy vegetables, 40% of the patients consumed them daily, 10% consumed them weekly, 40% consumed them monthly, and 10% never consumed them.

Fruit consumption habits varied among the patients, with 30% consuming fruits daily, 40% consuming them weekly, 20% consuming them monthly, and 10% never consuming fruits.

Regarding fish, chicken, and meat consumption, 13.3% of the Epilepsy geriatric patients consumed them on a daily basis, 53.3% consumed them weekly, 16.6% consumed them monthly, and 16.6% never consumed these food items.

Egg consumption was reported as follows: 20% of the patients consumed eggs daily, 40% consumed them weekly, 20% consumed them monthly, and 20% never consumed eggs.

Nuts consumption among the selected patients showed that 13.3% consumed nuts daily, 30% consumed them weekly, 20% consumed them monthly, and 36.6% never consumed nuts.

Milk and milk products were consumed on a daily basis by all of the Epilepsy geriatric patients (100%).

In the present study of geriatric epilepsy patients showed that consumption of fruits and vegetables are lesser. Which in accordance with the study kamilaszalwinska et.al. (2021)[4] Showed epilepsy patients consumed lesser of fruits and vegetables and sugar sweetened soda.

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#### **4. Conclusion**

Epilepsy involves unpredictable seizures due to abnormal brain activity. This disorder often accompanies mental and social challenges. Medications for epilepsy might affect appetite and digestion, potentially leading to malnutrition. Increased energy needs from frequent and severe seizures can compound this issue.

Understanding the link between nutrition and epilepsy is crucial for managing seizures and public health efforts. Focusing on South Indian dietary habits offers unique insights. A study revealed potential dietary concerns among participants, with fat and carbohydrate intake surpassing recommended levels.

Addressing nutritional needs and implementing proper management strategies are crucial for individuals with epilepsy. Geriatric epilepsy patients particularly benefit from a balanced diet, sufficient calories, and hydration to prevent malnutrition. Personalized dietary plans and regular assessments are vital to meet their nutritional requirements and enhance seizure control.

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#### **Compliance with ethical standards**

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No conflict of interest was declared by the authors.

##### *Statement of ethical approval*

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##### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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