

## Prevalence of Vitamin D Deficiency in Epileptic Children on Anticonvulsant Drugs

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**Abstract:** According to WHO prevalence of epilepsy is 0.5-1%, one-fourth of the global population with epilepsy lives in developing countries like India. Vitamin d might have a role to play with regard to seizure control in epilepsy as well, the deficiency of vitamin d, which is found to be commonly prevalent among apparently healthy children, is found to be associated with epilepsy due to multiple factors. Many postulates had been suggested, including inducing cytochrome p450, and enzyme inhibition by anti-epileptic drugs. In this prospective observational study was done on children aged 2-16 years, who were on treatment for epilepsy. Both inpatients and outpatients in our hospital between august 2018 to July 2019. detailed history were taken, and a clinical examination was done. Blood samples were collected for serum vitamin d (25ohd), calcium, magnesium, phosphorus, and alkaline phosphatase. Results were the mean vitamin d was  $15.78 \pm 7.38$ . The minimum level was 3.60, and the maximum level was 34.40 in the study population (95% ci 14.02 to 17.54). 82.90% had vitamin d deficiency (less than 20 g/dl), 14.30% had insufficient vitamin d (20 to 29.9 g/dl) and remaining 2.90% had sufficient (30-100g/dl). conclusion was majority of the participants were taking enzyme-inducing drugs which are more prone to cause vitamin d deficiency, therefore as this group is at an increased risk of developing hypovitaminosis d, periodic screening needs to be done and routine vitamin d supplementation for epileptic children on anti-epileptics.

**Keywords:** Epilepsy, Vitamin D,

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### I. Introduction

Epilepsy is a common neurological disorder that affects all age groups. Globally, around 50 million people are affected with epilepsy, which corresponds to 0.5% of the global burden of all diseases<sup>(1)</sup>. In India, more than 10 million people suffer with seizures and prevalence of epilepsy is 1% in our population<sup>(2)</sup>. Multiple studies have documented the high prevalence (50-90%) of Vitamin D deficiency as well as insufficiency in the pediatric age group. In addition, childhood is the critical period of bone development. Antiepileptic drugs often have a detrimental effect on bone health. The therapy with anticonvulsants is often lifelong. As pediatric age is the common time of onset of seizures and it is also associated with an increased prevalence of Vitamin D deficiency, studies documenting the exact burden of vitamin D deficiency and the factors influencing it are the need of the hour.

### II. Aims And Objectives

1. To study the prevalence of Vitamin D deficiency in epileptic children on anticonvulsant drugs aged 2-16 years getting treatment for epilepsy in a tertiary care hospital.
2. To describe the clinical profile of children with epilepsy and vitamin D deficiency.
3. To initiate vitamin D treatment for those epileptic children identified with vitamin D deficiency.

**Study Design:** Prospective observational study

**Study Location:** GSL Medical College and General Hospital, Rajahmundry.

**Study Duration:** 1 year (August 2018- July 2019)

**Sample size:** A total number of 70 epileptic children.

### INCLUSION CRITERIA:

1. Children between 2-16 years of age with epilepsy and with or without developmental delay.
2. These children should be on regular anticonvulsant medications for a minimum of 6 months.

**EXCLUSION CRITERIA:**

1. Febrile seizures
2. Children with renal impairment, hepatic impairment and endocrine diseases.
3. Children already on Vitamin D supplements.

**PROCEDURE METHODOLOGY:**

Children aged 2-16 years, getting treatment for epilepsy (both inpatients and outpatients), satisfying both inclusion and exclusion criteria were included in the study after obtaining approval of the institutional ethical committee. A detailed history and examination was done and recorded. These children were analyzed using a standardized proforma. The proforma include demographic data, nutritional status, presence or absence of developmental delay, type of epilepsy, duration of epilepsy, type and duration of antiepileptic drugs, grading of gross motor function scale. Blood samples were sent for serum Vitamin D (25 hydroxy cholecalciferol), serum calcium, Magnesium, Phosphorus and Alkaline phosphatase .The normal values for these variables were as follows, S.Vitamin D- 30-100 ng/ml, S.calcium- 9.2-11 mg/dl, S.Magnesium- 1.7-2.1 mg/dl, S.phosphorus- 3.4-6.2 mg/dl, S.Alkaline phosphatase- 0-300 U/l. Vitamin D levels below 20 ng/ml were recorded as a deficiency and between 20 to 29.9ng/ml was recorded as insufficiency. The results of blood investigations were recorded. The various variables in the proforma were analyzed.

**STATISTICAL ANALYSIS:**

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. P value < 0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.

**III. Results**

A total of 70 children were included in the analysis

**Table 1:** Descriptive analysis of age group in the study population (N=70)

Age group	Frequency	Percentage
2 to 5	29	41.40%
6 to 10	20	28.60%
11 to 15	16	22.90%
Above 15	5	7.10%

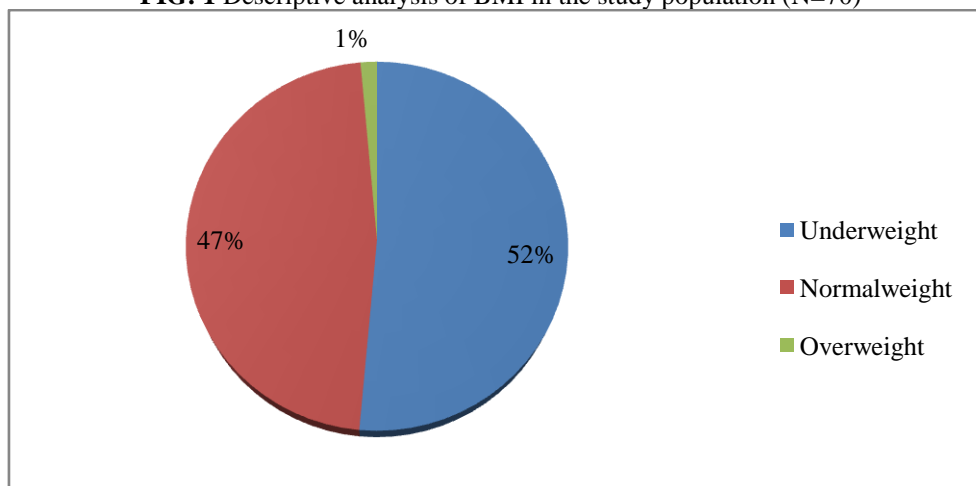
Among the study population, 29(41.40%) participants were aged between 2 to 5years, 20 (28.60%) were aged between 6 to 10 years, 16 (22.90%) were aged between 11 to 15 years, 5 (7.10%) were aged above 15.

**Table 2:** Descriptive analysis of gender in the study population (N=70)

Gender	Frequency	Percentages
Male	49	70.00%
Female	21	30.00%

Among the study population male participants were 49 (70.00%), remaining 21 (30.00%) were female participants.

**FIG: 1** Descriptive analysis of BMI in the study population (N=70)



**Table 3:** Descriptive analysis of seizure type in the study population (N=70)

Seizure type	Frequency	Per cent
GTCS	44	62.80%
Focal	22	31.40%
Myoclonic epilepsy	2	2.90%
Frontal lobe epilepsy	1	1.40%
Multifocal	1	1.40%

**Table 13:** Descriptive analysis of vitamin D level (g/dl) in study population (N=70)

Vitamin D level (g/dl)	Frequency	Percentages
Deficiency (less than 20)	58	82.90%
Insufficiency (20 to 29.9)	10	14.30%
Sufficient (30 to 100)	2	2.90%

Among the study population 58(82.90%) people had vitamin D deficiency (less than 20 g/dl), 10(14.30%) people had insufficient vitamin D (20 to 29.9 g/dl) and remaining 2(2.90%) people had sufficient vitamin D (30 to 100 g/dl).

#### IV. Discussion

Among the study population, MALE (70%) children are most commonly affected, belonging to the age group of 2-5 YEARS (41%), Using SINGLE (74%) ENZYME INDUCING (71%) drug, For GTCS (63%) type of seizures, With the Vitamin-D levels belonging to DEFICIENT (83%) range.

#### V. Conclusion

This estimate is much higher than those found in previous studies indicating the need for routine vitamin D supplementation for epileptic children and periodic screening for vitamin D levels.

#### LIMITATIONS

The sample size was not adequate to analyse the risk factors for vitamin D deficiency in this study group. Serum parathyroid hormone level and DEXA could not be checked due to high cost.

#### FUTURE IMPLICATIONS

Routine vitamin D supplementation for epileptic children on anti-epileptic drugs at the beginning of the treatment with periodic screening is required. Health education to the parents regarding the dietary intake of Vitamin D, calcium along with adequate physical activity and optimal sunlight exposure needs to be given.

#### References

- [1]. Chaudhuri JR, Mridula KR, Rathnakishore C, Balaraju B, Bandaru VS. Association of 25-Hydroxyvitamin D Deficiency in Pediatric Epileptic Patients. *Iran J Child Neurol.* 2017; 11(2):48–56.
- [2]. Santhosh NS, Sinha S, Satishchandra P. Epilepsy: Indian perspective. *Ann Indian Acad Neurol.* 2014; 17(Suppl 1):S3–11.
- [3]. Lazzari AA, Dussault PM, Thakore-James M, Gagnon D, Baker E, Davis SA et al. Prevention of bone loss and vertebral fractures in patients with chronic epilepsy-antiepileptic drug and osteoporosis prevention trial. *Epilepsia.* 2013; 54:1997–2004.
- [4]. Yu-Jin lee, park, Young Mi km .Longitudinal change of vitamin D status in children with epilepsy on antiepileptic drugs: prevalence and risk factors, 2015; 52(2):153-159.
- [5]. Nettekoven S, Strohle A, Trunz B, Wolters M, Hoffmann S, Horn R, et al. Effects of antiepileptic drug therapy on vitamin D status and biochemical markers of bone turnover in children with epilepsy. *Eur J Pediatr.* 2008 Dec; 167(12): 1369-77.

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