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EFFECT OF LEVETIRACETAM IN SERUM MAGNESIUM AND CALCIUM ELECTROLYTES IN PATIENTS WITH EPILEPSY DISORDERS

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Calcium, epilepsy, levetiracetam, magnesium

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ABSTRACT

A retrospective study of 60 patients was done in Pushpagiri medical college hospital to detect the serum calcium & magnesium level in patients receiving levitiracetam therapy. 45 (75%) patients was diagnosed to have hypomagnesia. Patients with age group of41-60 yrs ,followed by age1-20 yrs had severe hypomagnesaemia & hypocalcaemia. Hypomagnesemia & Hypocalcemia Was observed mostly patients with monotherapy(58%).

INTRODUCTION

Epilepsy is a neurological disorder characterized by recurring seizure[1]. A seizure is a sudden surge of electrical activity in the brain[2]. India is home to about 10 million people with epilepsy (prevalence of about 1%);this being higher in the rural (1.9%) as compared with urban areas .this may be because of lack of facilities, knowledge, delayed response. Most of studies depicts of epilepsy is more prone in females, compared to males. Epilepsy has been classified into generalized, partial seizure, tonic-clonic seizure, and myoclonic seizure.Electrolyte disturbances are frequently encountered in daily clinical practice. The diagnosis of these abnormal-cities is commonly made from routine laboratory findings, and they are not usually of clinical significance. However,they may sometimes lead to serious complications when overlooked or not treated appropriately. Electrolyte abnormalities may affect many organs and tissues, including the brain. Most of the clinical manifestations of these derangements are predominantly neurologic and parallel the severity of neuronal damage. Furthermore, these disorders may appear with seizures, or with rapidly Progressive neurologic symptoms and signs, and thus re-quire emergency treatment. Hypomagnesaemia is defined asa decrease in the serum magnesium concentration to a level<1.9mg/dlhypocalcaemia is defined as a plasma calcium level of<8.6 mg/dl.

Levetiracetam is a novel antiepileptic drug (AED.it was discovered in 1980.FDA approved Levetiracetam for the management of partial onset seizure. In India, Levetiracetam tablet was approved in April2005. It acts by binding to the synaptic vesicle protein SV2A, which is present on synaptic vesicles and some neuroendocrine cells. The chemical name of LEV, a single enantiomer, is (s)-alphaethyl-2-oxo-1-pyrrolidineacetamide). Its molecular formulas C8H14N2O2 and molecular weight is 170.21. The molecularstructure. It is a soluble ethyl analogue of the widely used nootropic agent piracetam. Levetiracetam possessesantiepileptic, anxiolytic, and cognitive enhancing properties. Only the S-enantiomer of LEV has anticonvulsant activity.

Levitiracetam appears to act via an unknown specific binding site in the brain. This novel binding site is the synaptic vesicleprotein, SV2A, which is an integral membrane protein presenton synaptic vesicles and some neuroendocrine cells.There are reports of other effects of LEV, including the partial inhibition of N-type voltage gated Ca2+ channels atreduction of inhibition of g-amino butyric acid (GABA) -and glycine-gated currents, induced by Zn2+ and β-carbolines. Levitiracetam is prescribed as adjuvant as well as drug of choice for myoclonic epilepsy &status epilepsy. magnesium is relevant in nervous stimulation. Blood pressure regulation. It also plays

vital role in providing immunity as well as blood sugar regulation. calcium is also essential for the muscle contraction. Depletion of these elements may induce fatigueness, immunological problems. Mood swings and seizures.

AIM&OBJECTIVES

This study was carried out to determine the serum calcium and magnesium levels in patients receiving levetiracetam therapy. It was also done to evaluate in which group of population does have hypo magnesia & hypocalcaemia . This study also aimed to find out in which types epilepsies does the drug was more prescribed.

METHODOLOGY

A three months retrospective Study was done in the Pushpagiri Medical College Hospital. 60 Patients were selected for the study. Selected patients included both males &female.Patient information regarding the demographics, disease, diagnosis, laboratory parameters measured, and drugs prescribed were collected from the respective files from the medical records department of the hospital. Study was done in outpatients, the study was done to detect electrolytes alternation caused by levitiracetam,the study also emphasized on which group of population had more prone to the alternation in electrolyte level.

Inclusion criteria

Patients diagnosed with epilepsy disease

Patients of age from 1- 60yrs

Both male & females

Patients receiving levetiracetam alone , wellas with other antiepileptics

Exclusion criteria

Patients with metabolic problems

Patients of chronic kidney disease

Patients with gastrointestinal problems

Patients with heart problems

RESULT

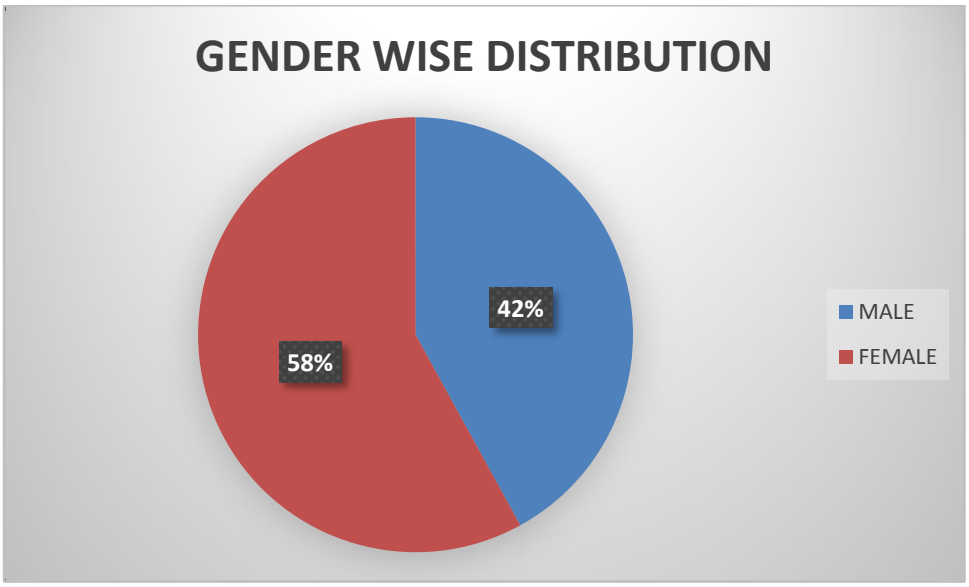


Figure 1 : depicts the gender wise distribution of epilepsy. female predominance 58% rather than males 42%.

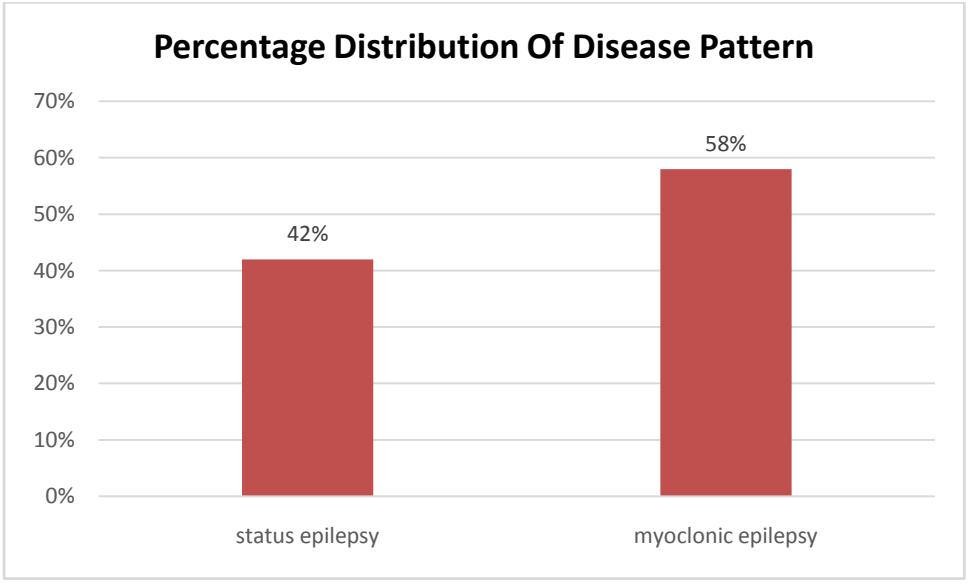


Figure 1.2 : Most Of The Patients(58%) Suffered From Myoclonic Seizures

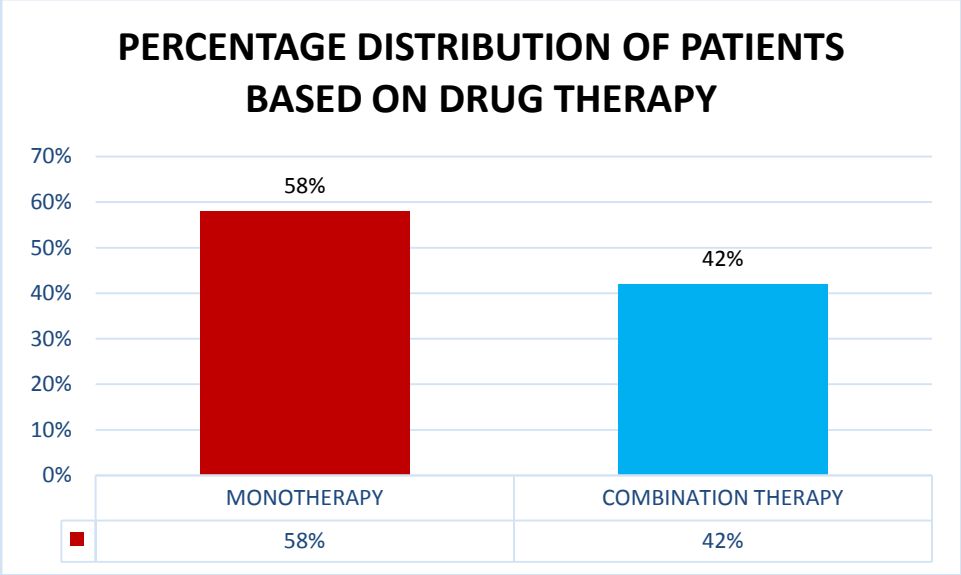


Figure 1.3 depicts 35 patients 35(58%) patients was on levetiracetam therapy. 25 patients on levetiracetam with other antiepileptics(42%).

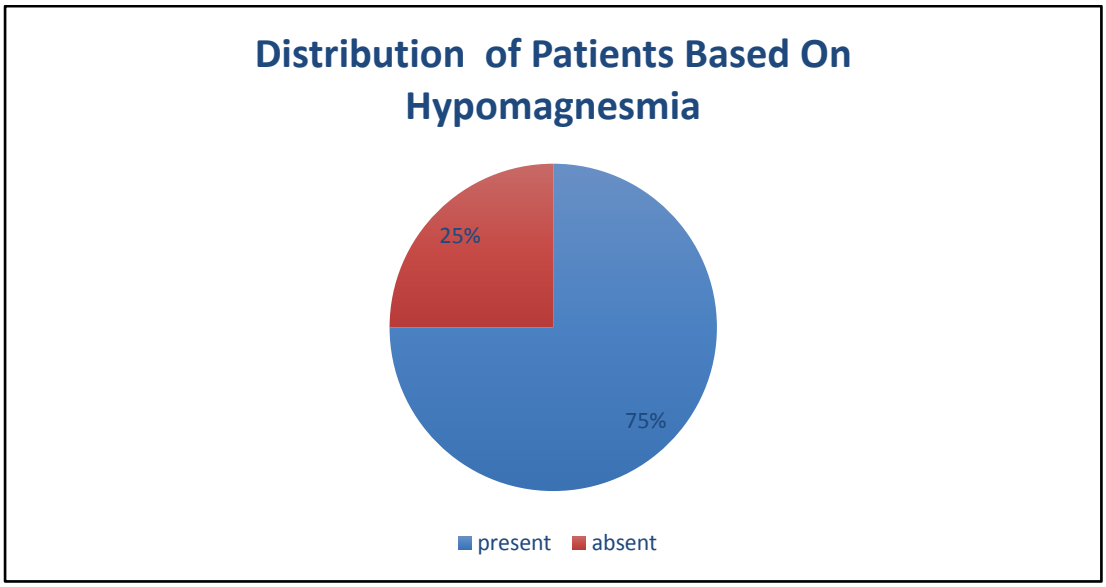
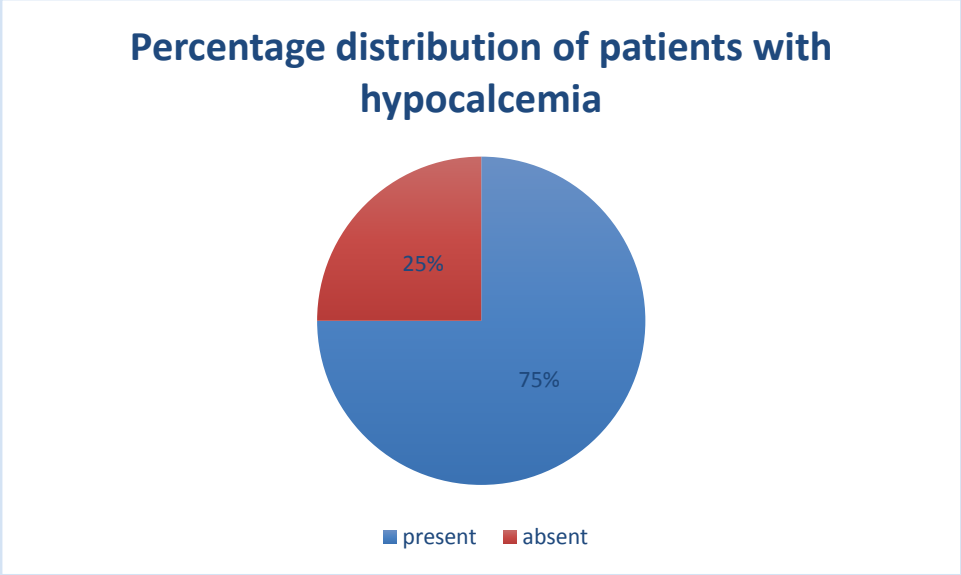


Figure 1.4 : magnesium leve<1.9mg/dl is observed as hypomagnesmia. 45patients (75%) was detected to have hypomagnesemia



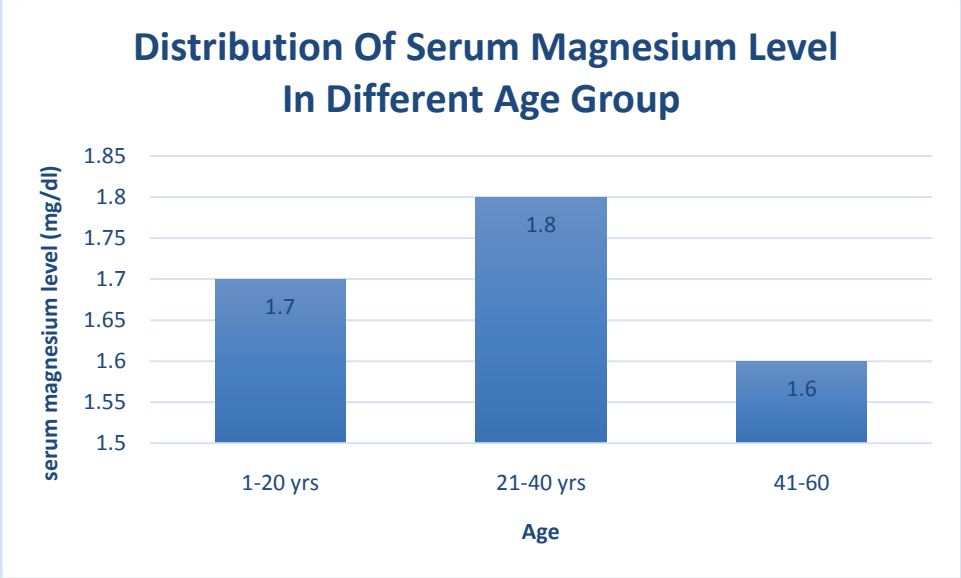
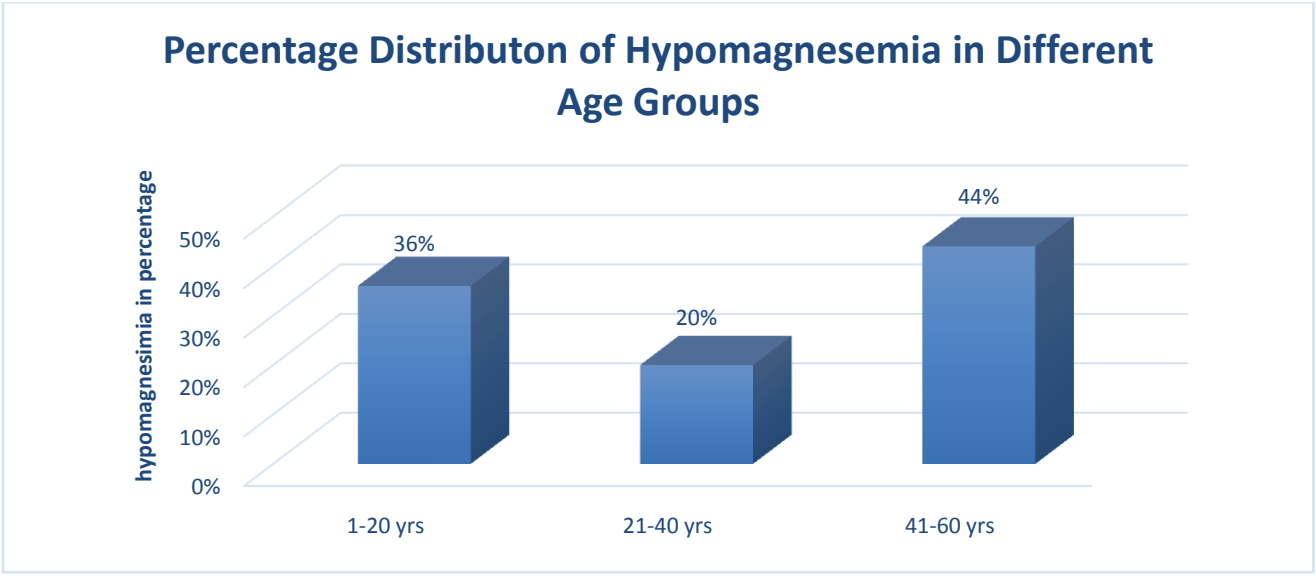
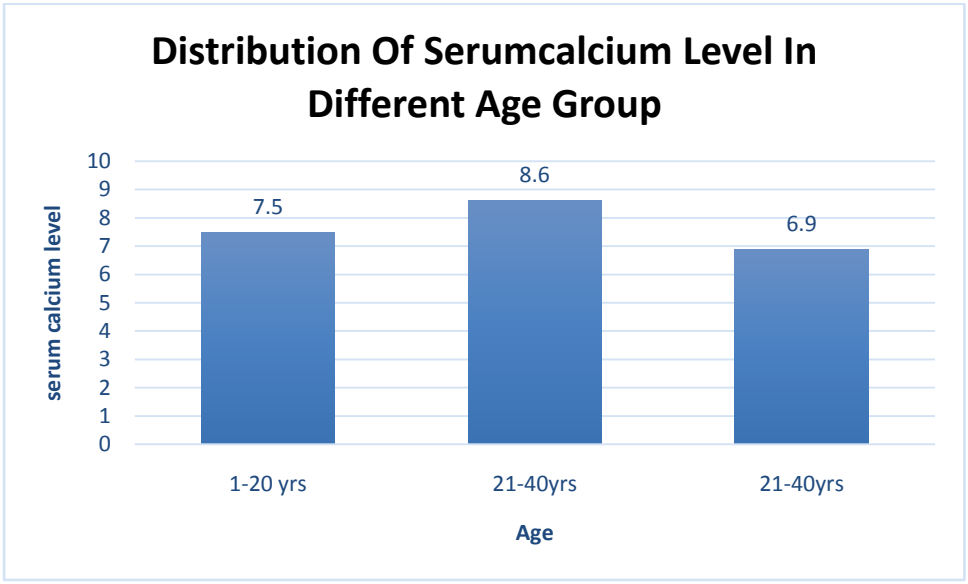
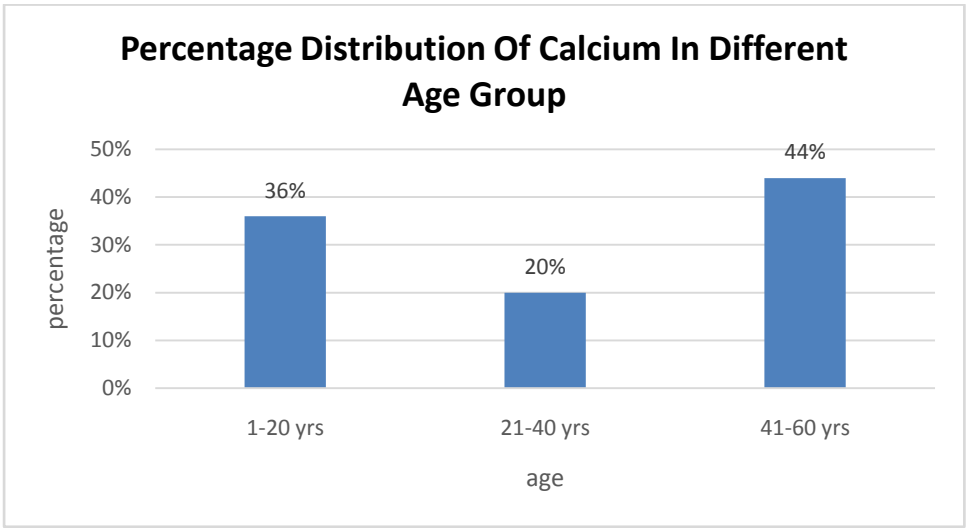


Figure 1.5 depicts severity of hypomagnesnmia. Patients with age varying from 41-60 yrs. had severe hypomagnesia.


Percentage Distributon of Hypomagnesemia in Different Age Groups
hypomagnesimia in percentage
50%
40%
30%
20%
10%
0%
36%
20%
44%
1-20 yrs
21-40 yrs
41-60 yrs


Distribution Of Serumcalcium Level In Different Age Group
serum calcium level
10
9
8
7
6
5
4
3
2
1
0
7.5
8.6
6.9
1-20 yrs
21-40yrs
21-40yrs
Age


Percentage Distribution Of Calcium In Different Age Group
percentage
50%
40%
30%
20%
10%
0%
36%
20%
44%
1-20 yrs
21-40 yrs
41-60 yrs
age

DISCUSSION

In this retrospective Study it was found that epilepsy is more prone in female(58%) population. This positively correlates with study conducted by Chavanv.D, B et.al35(58%)Patients have been reported with myoclonic epilepsy.25 patients (42%)was found to have status epilepsy. out of 60 patients receiving levetiracetam therapy45 patients were detected to have hypomagnesia.this positively correlates with study of Raffaele Nardone et.al "Acute Symptomatic Seizures Caused by Electrolyte Disturbances".

This positively correlates with study of chavanav et.al.44% of patients had magnesium level 1.6mg/dl. this was quietly observed in 41-60 yrs. Followed by36% in 1-20 yrs. With serum magnesium level1.7mg/dl.44% of patients suffered from hypocalcaemia. This was observed in 41-60yrs yrs., followed by 36%of hypocalcaemia in 1-20 yrs. 25(42%)patients received levetiracetam combination therapy. 35(58%)received levetiractammonotherapy.

CONCLUSION

The study ended with conclusion stating that levetiracetam could alter electrolyte level in the body. hypomagnesia was observed in 75% of patients receiving Levetiracetam therapy. Hypocalcaemia was observed in these patients. This was more in females (58%) than males. hypomagnesaemia mostly observed in adults followed by adolescents compared to others. the levitiracetam itself one of the best medicine for indicated for various epilepsy. It was mostly prescribed for myoclonic epilepsy and for status epileptics.. This study provided relevant information on varying magnesium& calcium levels different age group of epilepsy patients. in these drug therapy. Magnesium and calcium are vital elements needed. Magnesium helps to boost immune system &improving nervous system function.

Patient education and prescribing vitamin supplements rich in calcium and magnesium could improve the quality of life of epilepsy patients More research studies should be done on these magnesium & calcium monitoring parameters. As these could help in reducing seizure frequency &improving effectiveness of levetiracetam therapy.

REFERENCES

1. Levetiracetam a drug review Kavita Krishna, Asawari L Raut, Kushal H Gohel, Priti Dave JAPI October 2011 Vol; 59 pgno652-654.
2. Increased Seizurefrequency Hypomagnesia Chavanv.D, Bhagawat Vr,Natheniel Sthe Indian Practitioner March 2004 Volume 57 Issue 3 Pgno;155.
3. Shinnar S, Pellock JM. Update on the epidemiologyprognosis of pediatric epilepsy. J Child Neurol.2002;17(1):4-17.
4. CDC. targeting epilepsy: improving the lives owith one of the nation's most commonconditions. 2011. Available from:://www.cdc.gov/chronicdisease/resources/public/AAG/epilepsy.htm. Accessed on 23 January2013.

5. French JA, Kanner AM, Bautista J. Efficacy andof the new antiepileptic drugs II:treatment of refractory epilepsy: report of theand technology assessmentand quality standards subcommitteethe American academy of neurology and theAmerican epilepsy society. Neurology.2004;62(8):1261-73.
6. Beydoun A. Monotherapy trials of new antiepileptic. Epilepsia. 1997;38(9):21-31.
7. Chadwick DW. Monotherapy clinical trials of newantiepileptic drugs: design, indication andcontroversies. Epilepsia. 1997;38(9):16-20.
8. Garza JE, Nordli DR, Rating D. Adjunctivelevetiracetam in infants and young children withrefractory partial-onset seizures. Epilepsia.;50(5):1141-9.
9. Perry MS, Benatar M. Efficacy and tolerability of levetiracetam in children younger than 4 years: aretrospective review. Epilepsia. 2007;48(6):1123-7.
10. Pellock JM. Drug treatment in children. In: Engel J,Pedley TA eds. Epilepsy: a comprehensive textbook.Philadelphia:Lippincott-Raven;1997:1205-10.
11. Berger MI. Economic analysis of health caretechnology; A report on principles. Ann Intern Med.1995;122;61-70.
12. Cereghino JJ, Biton V, Abou-khalil B.Levetiracetam for partial seizures: results of adouble blind, randomized clinical trial. Neurology.;55:236-42.
13. Shorvon SD, Janz D, Lowenthal A. Multicenterblind randomized, placebo-controlled trial oflevetiracetam as add-on therapy in patient withrefractory partial seizures. Epilepsy.2000;41:1179-86.
14. Ben ME, Falter U. Efficacy and tolerability ofLevetiracetam 3000 mg/day in patient with refractory partial onset seizures: a multicenter,double blind, responder-selected study evaluatingmonotherapy. Epilepsia. 2000;41:1276-83.