

Prevalence and Awareness Survey of Epilepsy amongst School Children in Tehsil Takht Bhai, Pakistan

Syed Muhammad Ashar^{1,3*}, Asif Hanif^{1,3}, Mujaddid ur Rehman¹, Zul Kamal², Muhammad Faheem², Syed Ahsan Abbas³, Sufia Yasmeen³

¹Department of Microbiology, Abbottabad university of Science and Technology, Havelian, Abbottabad Khyber Pakhtunkhwa, Pakistan

²Department of Pharmacy, Shaheed Benazir Bhutto University, Sheringal, Khyber Pakhtunkhwa, Pakistan

³Department of Pharmacy, Hamdard University Karachi, Islamabad Campus, Pakistan.

Email: drsmashar@gmail.com

Abstract –The study was conducted to determine the prevalence and awareness responses of epilepsy among the school children's (primary and high school) in tehsil Takht Bhai of Khyber Pukhtunkhwa in Pakistan. A cross sectional questioner based study was designed for prevalence and awareness responses of epilepsy in tehsil Takht Bhai. Survey covering the entire target population of $n= 84,570$ from the total population $n= 7,89654$ of tehsil Takht Bhai. We screened in our face to face interview mostly those school children that were epileptic. The study founds the prevalence rate of epilepsy in tehsil Takht Bhai is not too much high. Awareness responses were too much poor although this is alarming for the health authorities.

Keywords – Epilepsy, School children, Prevalence, Awareness, Takht Bhai

1. Introduction

Epilepsy is one of the most common and serious chronic neurological disorder, with over 50 million people having epilepsy worldwide. A seizure happens when abnormal electrical activity in the brain causes an involuntary change in body movement or function, sensation, awareness, or behavior. As a disorder of the brain characterized by an enduring predisposition to cause epileptic seizures. It can affect people of all ages, with maximal rates of occurrence in childrens and in the older population. Epilepsy has devastating consequences for people's lives. Some are related to injuries and a high risk of premature death, including sudden unexpected death associated with seizures. Epilepsy entails huge costs on individuals and on the general population. In the World Health Organization (WHO) European Region alone, the annual cost of epilepsy is estimated to be EUR 20 billion [1]. Epilepsy can be caused by environmental and occupational exposure to lead, carbon monoxide, and certain chemicals. Beside these use of street drugs and alcohol, Lack of sleep, anxiety, or hormonal changes, withdrawal from certain antidepressant and anti-anxiety drugs, infectious diseases such as meningitis, viral encephalitis, and AIDS, can cause epilepsy. Cerebral palsy, autism, and many others developmental and metabolic disorders can originate epilepsy. Head injuries can cause seizures. If the head injury is severe, the seizures may not commence until years later [2]. There are a number of types of epilepsy tend to run in families, and some have been traced to an abnormality in a specific gene. These genetic or hereditary abnormalities can cause delicate alteration in the way the body processes calcium, potassium, sodium, and other body chemicals. Hereditary factors are not forever a direct cause of epilepsy but may influence the disease. Genes

can influence the way people process drugs or can cause areas of malformed neurons in the brain. Epilepsy can be caused by brain damage caused by other disorders [3]. Epilepsy can occasionally be stopped by treating these underlying disorders. In other cases, epileptic seizures will go on or continue after the underlying cause is treated. Brain tumors, alcoholism, and Alzheimer's disease can cause epilepsy because they modify the normal mechanism of the brain. Stroke, heart attacks, and other conditions that affect the blood delivery to the brain (cerebro-vascular diseases) can cause epilepsy by depriving the brain from oxygen. Most of the new cases of epilepsy that increase in older people are caused by cerebro-vascular diseases. If the injury is easygoing, the risk is small. In a fetus, the developing brain is subject to prenatal injuries that may take place if the pregnant mother has an infection, doesn't eat properly, smokes or abuses drugs or alcohol. These conditions may cause cerebral palsy [4-5]. Diagnosis also has need of a comprehensive medical history describing seizure characteristics and frequency. An electroencephalogram (EEG) is a test that can help diagnose or detect epilepsy. During an EEG, the electrical signals of the brain are recorded. This electrical activity is identify by electrodes or sensors, positioned on the patient's scalp and convey to a machine that records the activity or doings. As part of epilepsy treatment, Most of the doctor possibly will order a complete blood count (CBC). A CBC facilitate the doctor to establish a baseline and can recognize infections, allergies, and other abnormalities that may influence the choice of suitable anticonvulsant medications and assist to monitor the possible drug-induced side effects in the future [6-7]. There is no cure for epilepsy but symptoms of the disorder may be treated with drugs, surgery, or a special diet. Drug therapy is the most common therapeutic approaches. A

special high-fat diet known as a ketogenic diet produces a chemical condition in the body called *ketosis* that helps to prevent seizures in young children [8]. Throughout the entire globe at least 50 million people have epilepsy and round about 85% of these are the residents of developing countries. It has been predictable that 10% of the world's population who live a normal lifespan can expect to have at least one epileptic seizure [1]. Prevalence is the measurement of a disease burden in the community, which has to be viewed when planning the physical condition needs at local, regional, and national levels. Whereas knowing the level of consciousness, understanding and attitude on the way to an illness in the social order is a necessary first step in eradicating favoritism against persons with that disease [9]. Epidemiologic studies on epilepsy demonstrate extensive difference in prevalence rates (PRs) from 0.9 to 57 per 1000 population [10]. Studies of the prevalence of epilepsy from the developing world has revealed prevalence rates 2 to 25 times more than the average prevalence rate of 5 to 6 per 1,000 in urbanized countries. This variation may be featured to misdiagnosis, untrustworthy definitions of epilepsy, failure to take into account the disease activity, conflicting definition of active epilepsy and the research approaches. Whereas sometime reliability related to geographically related risk factors such as poorness, illiteracy, poor sanitation, aloofness from medical care, delivery and accident related head shock, cerebral cysticercoids' and boiling water may lead to seizure [9]. The worldwide prevalence of epilepsy is usually taken as between 5 and 10 cases per 1000 persons. A very small number of epidemiological studies of epilepsy exist from Pakistan. This topic has not been completely examined particularly in distant and tough areas. We didn't find any literature especially from Khyber Pukhtunkhwa (KPK) of Pakistan. The current estimate of populace of Pakistan go beyond 188.2 million [11]. Based on the existing data, it is predictable that 1.38 million people are suffering from epilepsy in Pakistan, which makes it one neurologist available for every 46200 victims of epilepsy [12].

Among the awareness; that can be best studied from the attitude, understanding and behavior responses of the general community as well as from the sufferers. We found a very few researches about the social responses and social unacceptability of epilepsy. Among the societal responses, epilepsy was taken to be contagious by 6.4% patients whereas 8.1% thought that it could lead to other ailments and 20.7% felt that people with epilepsy should not marry while only 3.1% endorsed their epilepsy to supernatural causes? Some people still believe that its possession by evil, spirits and demons. They believe that its supernatural curse and nuisance. Thus awareness about this disease is still a dilemma especially in the urban and rural areas of KPK. More prevalence and awareness studies are required for understanding and exploring this disease especially in the rural areas. These parameters were evaluated in this survey. Thus this study was therefore undertaken to determine the prevalence and awareness about of epilepsy among school children's in tehsil Takht Bhai, district Mardan, KPK, Pakistan.

2. Materials and Methods

2.1. Study Area and Population

Tehsil Takht bhai was our study area; which is one of the persian archeological site in district Mardan, Khyber Pakhtunkhwa (KPK) Pakistan; located towards the east of Peshawar (Capital city of KPK). It was first a Zoroastrian complex which after the later arrival of Buddhism was converted into Buddhist Monoastic complex. It is the second populous tehsil of district Mardan; have a population $n=40,2706$ (according to the census 1998) but it is estimated now $n=78,9654$ in 2014 according to a survey in Mardan division. Socio-economy of the people are mostly concerns with farming, agriculture, marchentiles, and shopkeeping [20-21]. The male literacy ratio is much higher at 53.50 percent compared to 18.38 percent for female in district Mardan [22]. There are round about 300 government primary schools, 35 high schools, 5 higher secondary schools both for boys and girls. We evaluate and screened awareness-prevalence (WP) responses of epilepsy among school children within the study area by modifying the material method used by [10,16,18].

2.2. Sample Size

We targeted a sample size $n=84,570$ of school children (both primary and high school); among which $n=52,004$ were male and $n=32,566$ female students (Query form District and Tehsil Education Officer, March 2015). Among this targeted population epileptic children will be sorted out and interviewed for the desire findings and prevalence's.

2.3. Questionnaire

The inspection or survey questionnaire consists of 23 questions; among which some questions were designed in such a way that to cover the essential acquire questions about epilepsy prevalence's and awareness. This was developed by the authors (accessible on demand). Mostly closed end questions were asked with "yes", "no" responses. The questionnaire had been field-tested for the first time in this archeological region of Takht Bhai. For awareness; we roughly share out $n=246$ questioners among epileptic children at primary and high schools. During the verbal interviews the criteria for diagnosis were questioned in detail for verification of epilepsy cases.

2.4. Survey

We conducted face to face interview about prevalence and awareness of epilepsy from epileptic children from March to July 2015. In the targeted population several contact was made at primary and high schools. Questions related to epilepsy were asked during in a local language Pushto. The visitor intervened only to clarify a question, if required. No attempt was made to incite the responder by signifying answers in straight line.

2.5. Data analysis

Data were typically estimated through descriptive statistics by using Microsoft office excels 2007 and Graphpad prism 5.00. We used simple mean and percentages were always pertinent.

3. Results and Discussion

As most of the children at primary and high school level were in the age range of 5-20 years in Pakistan. So among the target population $n= 84,570$; we screened out near about $n= 246$ (0.29%) epileptic children's. Table 1; shows age and sex specific prevalence percentages of epilepsy at school level in tehsil Takht Bhai; whereas Figure 1; shows graphical presentation of age and sex prevalence's percentages. Among positive responders, $n= 141$ were male (57.31%) and $n=105$

were female (42.6%). Similarly age ranges were divided into three main categories; 5-10, 11-15 and 16-20; among these high prevalence were recorded in the age range of 11-15 which is 45.93% (male =51.77%, female =38.09%). Similarly per thousand populations were graphically represented in Figure 2; which shows 2.71/1000 among male, 3.22/1000 among female, while overall 2.90/1000 of the target population.

Table 1: Age and Sex specific prevalence percentages of epilepsy at school level in Tehsil Takht Bhai ($n= 84,570$)

Age (Year)	Male $n= 52,004$ n (%)	Female $n=32,566$ n (%)	Total $n= 84,570$ n (%)
5-10	44 (31.20)	49 (46.66)	93 (37.80)
11-15	73 (51.77)	40 (38.09)	113 (45.93)
16-20	24 (17.02)	16 (15.23)	40 (16.26)
Total	141 (57.31)	105 (42.68)	246 (0.29)
Per thousand population	2.71	3.22	2.90

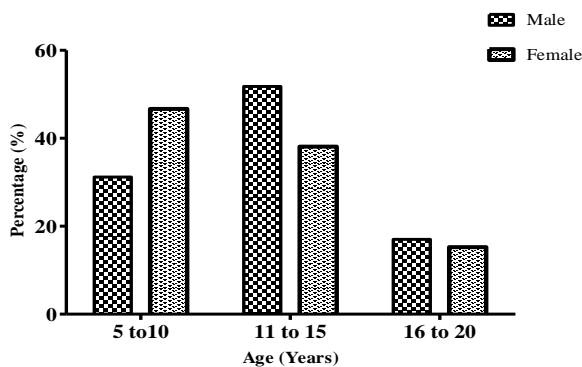


Figure 1: Age wise prevalence percentages of epilepsy at school level in tehsil Takht Bhai

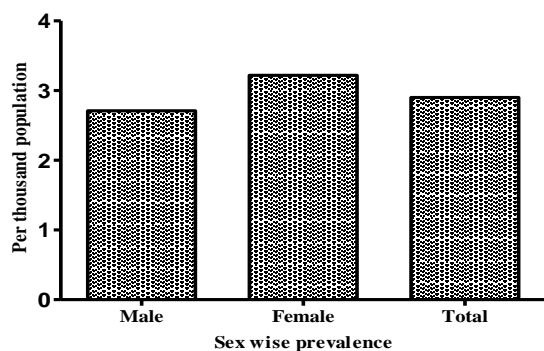


Figure 2: Sex wise per thousand population prevalence's of epilepsy

Similarly Table 2; reflects awareness responses of epileptic children about their disease status. Q1-9; are those questions which are about the understanding, that how much the children understand their diseases. When we put forward Q-1; "are you suffering from epilepsy?" we got 93.90% closed responses in "yes"; while 44.71% of the children were also aware about their concurrent ailments. It was too much astonished that 23.17% of the children are not taking any anti-seizure medications. Similarly about 59.34% children's replied that they properly visit their doctors along with their parents. Fifty

percent of the children getting hospitalization for seizure control. Similarly 72.35% children replied that they have no knowledge about epilepsy. Similarly credible social and environmental causative factor were evaluate in Q 10-13; the results were graphically represented in Figure 3.

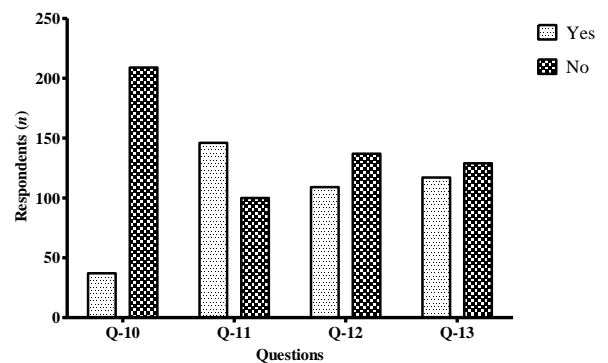


Figure 4: Graphical Presentation of Credible Social and Environmental causative Factors of Epilepsy. Q-10 Do you use narcotics (drugs)? Q-11 Cousin Marriage occurred among your parents? Q-12 Do you have Midwife (Dhaye) in your communities? Q-13 Do they (Midwives) are involved in maternity health cares?

Discouraging outcome and intractability is a blazing concern for both patients and personnel dealing with epilepsy. This study was conducted to search the factors that sometime connected directly or indirectly with stigmatization, false beliefs, attitude and understanding the disease situation. Early recognition of these factors would help in early management, arrangement and intervention. Data on the epidemiology of epilepsy in a rural, semi-urban, urban community in a developing country would be of value in planning a deconcentrate management of this sickness in its early stages to appropriate with available local resources [12].

In our study the active epilepsy prevalence was found to be 0.29% among the screened populations which makes 2.9/1000 population (male= 2.71/1000, female= 3.22/1000). Our findings were too much lower than the other reported in developed as well as developing countries. The average prevalence rate in 32 studies from different parts of the world has been estimated at

5.16/1000^[14]. In Pakistan this is 11.1 (an average in urban and rural areas) [12], While some studies reported 9.8^[23-24], 6.7–8 in different regions of Ecuador, 6.54 in Saudi Arab, 5.7–6.8 in USA, 5.6 in Turkey, 5.3 in Nigeria, 4.8 in China, 4.8 among the Parsi community in India and 3.6 in Tunisia [10,25]. As we screened a specific age range (5-20 years); mostly comprised of school children's; excluded the general population, that's why we gets too much low prevalence as compared to the other studies reported from other region of Pakistan.

Our studies revealed high prevalence per thousand of population among female children (3.22/1000); though we screened a small population of the female ($n= 32,566$) as compared to the male ($n= 52,004$). As socio-economic, education and cultural ritual of our population area reflects male dominancy and discrimination. Though there were so many studies that did not show any significant gender difference [26]. Some studies shows high prevalence percentages in male; which presumed the contribution of etiologic factors such as head trauma known to be more frequent in males [10,27]. We found that high prevalence percentage in female (46.66%) within the age range of 5-10; while these ratios were higher in male children (51.77%) within the age range of 11-15. It is possible that epilepsy in female gender was under-reported due to various social and cultural factors [28]. The overall result shows high prevalence's percentages among male children as compared to female.

In developing countries mostly the people are unaware and having poor understanding about their disease status. Knowledge and understanding a disease is very much necessary for all communities. Awareness about disease can avoid social stigmatization, false belief, negative attitudes, non-compliance and ignorance that may create complexities in the rational management approaches. Qs 1-9 gives us indications that how much the epileptic respondents understand epilepsy. Most of the children (93.90%) were aware about this that they having a disease called "meerge" (local language name of epilepsy). Some children called them phantasm while the other insanity. But 6.09% of the children didn't know; what happened to him. Similarly 44.71% respond that they have concurrent ailments along with epilepsy, 76.82% were adhering to their medication which shows remarkable concordance and compliances. Similarly 90.65% of the epileptic respondents show that they can feel symptoms before and after the convulsions. Poor responses were seen in 40.65% of the respondents about their regular clinical visits; 40.49% of epileptic children respond that when they got severity or complications; then their parents like to visit a physician. Similarly 58.53% respondent's shows that they were ever never admitted in a hospital for their seizure control neither for proper treatment; 44.71% of them show severity in the disease status with the passage of time. Referred to Q 9; 79.35% of the epileptic respondents shows that they have no extensive knowledge about epilepsy. Though it's a common feature in all societies that most of the parents keeping the children unaware about their diseases status. Social stigmatization, loneliness and solitudes' in epileptic peoples begin at very early stage. Children's suffering from epilepsy is also considered and

treated as a special child in most of the school; which may also create social deprivation and stigmatization. Though we just survey to find out that how much of school children's are aware about their diseases.

Due to unavailability of sufficient health facilities at door step in tehsil Takht Bhai; like magnetic resonance imaging (MRIs) and computer tomography (CT) scan, many of symptomatic epilepsies might have been missed or probably classified as idiopathic. Previous studies reported that 65-70% of epilepsies having no clear etiology. While among these studies 57% reported in Arab [25] were due to pre or perinatal fixed encephalopathy, which was too much higher than the 4.8% reported from Rochester, USA [29] or even the 10% reported from Tunisia [30]. Surprisingly, perinatal fixed encephalopathy was not reported as a cause of epilepsy in either China or Pakistan^[14]. Head injury, central nervous system infections, birth trauma, cerebro-vascular disease, cerebral palsies, strokes, cerebral tumors, consanguineous marriages were the most causative factors reported in developed as well as in developing countries [14,29,31-32]. In most of the children pediatric intracranial infection was the second most common causative factor in so many cases with a frequency of 4% similar to the 35% reported from other places except Pakistan where it constituted almost 10% of the cases [14]. We for the first time attempt on credible social and environmental causative factors (mentioned in Q 10-13) that may not be ignored; which need further extensive researches and exploration. We just expose drug abuse, cousin marriages and local midwives involved in maternity health caring through closed end questions. We found that most of the high school children replied without any hesitation that their parents are cousin to each other; but the primary school children feel shy; even didn't answered to the question; though most of them were pause to the responses. Child drug abuse is a global issue; which is more prevailed in under developed countries. Beside social issues they are also concerned with health and diseases especially with neurological disorders. We found that 15.04% of the children are drug abusers; which may be an alarming sign. Beside that midwives; that are called "dhaye" or "maasee" in local language Pashtu language. They are mostly untrained and are actively involved in maternity health and child births. Non-technicality and mishandling during births may lead to minor to major head injuries which may appear later on in the form of fits and seizures. Question reflects that dhaye are still doing their duties and are still found in high percentages. They should be properly trained and educated regarding child health.

4. Conclusion

It is concluded that the prevalence rate of epilepsy in tehsil Takht Bhai is not too much higher as compared to the other studies rarely reported from Pakistan. As awareness responses were too much poor. Though this is alarming for the health regulatory authority and health ministry of the state that they should keep eye vigilance about stigmatization, education, attitude and understanding of epilepsy in our community. So for this we should

properly educate every that person that interacts with epileptic patients. Parents, teachers, students, non-professional health care volunteers, dhaye, etc.

References

- [1] R. Mameniskiėne, E. Sakalauskaite-Juodeikiėne, V. Budrys, "People with epilepsy lack knowledge about their disease", *Epilepsy Behav.*, 46:192-7, 2015.
- [2] P. Grandjean, P. J. Landrigan, "Neurobehavioural effects of developmental toxicity", *The Lancet Neurology* ., 13:330-338, 2014.
- [3] J. Aicardi, "Syndromic classification in the management of childhood epilepsy", *Journal of child neurology*., 9:2S14-12S18, 1994.
- [4] R. Van Reekum, T. Cohen, J. Wong, "Can traumatic brain injury cause psychiatric disorders?", *The Journal of neuropsychiatry and clinical neurosciences.*, 12:316-327, 2000.
- [5] M. E. Charness, "Brain lesions in alcoholics. Alcoholism", *Clinical and Experimental Research.*, 17:2-11, 1993.
- [6] C.D.Binnie, H. Stefan, "Modern electroencephalography: Its role in epilepsy management", *Clinical Neurophysiology* ., 110:1671-1697, 1999.
- [7] A. K. Desai, G.T. Grossberg, "Psychiatric consultation in long-term care", *A guide for health care professionals.* JHU Press., 2010.
- [8] A. Wahab, "Difficulties in treatment and management of epilepsy and challenges in new drug development", *Pharmaceuticals.*, 3:2090-2110, 2010.
- [9] K. Radhakrishnan, J. Pandian, T. Santhoshkumar, S. Thomas, T. Deetha, P. Sarma, D. Jayachandran, E. Mohamed, "Prevalence, knowledge, attitude, and practice of epilepsy in kerala, south india", *Epilepsia* ., 41:1027-1035, 2000.
- [10] A. Aydin, A. Ergor, G. Ergor, E. Dirik, "The prevalence of epilepsy amongst school children in izmir, turkey", *Seizure.*, 11:392-396, 2002.
- [11] N. Razi, "Theological extremism and its effects: Pakistan perspective", *Journal of Social Science for Policy Implications.*, 2:59-72, 2014.
- [12] I. Khatri, S. Iannaccone, M. Ilyas, M. Abdullah, S. Saleem, "Epidemiology of epilepsy in pakistan: Review of literature", *Journal of the Pakistan Medical Association.*, 594-597, 2004.
- [13] B. H. Buhr, "Active epilepsy & its therapeutic pattern in baghdad/al-amen city.
- [14] S. Al Rajeh, A. Awada, O. Bademosi, A. Ogunniyi, "The prevalence of epilepsy and other seizure disorders in an arab population: A community-based study", *Seizure.*, 10:410-414, 2001.
- [15] C. L. Morgan, H. Baxter, M. P. Kerr, "Prevalence of epilepsy and associated health service utilization and mortality among patients with intellectual disability", *Journal Information.*, 108, 2003
- [16] F. Anjum, S. Ghayas, T. Ali, N. Jahan, H. Qadeer, A. Arshad, "Awareness of epilepsy in pharmacy students in different universities of karachi, Pakistan", *African Journal of Pharmacy and Pharmacology.*, 8:278-283, 2014.
- [17] M. A. Malik, R. M. Akram, M. A. Tarar, A. Sultan, "Childhood epilepsy", *J Coll Physicians Surg Pak.*, 21:74-78, 2011.
- [18] H. Aziz, S. W. Akhtar, K. Z. Hasan, "Epilepsy in pakistan: Stigma and psychosocial problems. A population-based epidemiologic study", *Epilepsia.*, 38:1069-1073, 1997.
- [19] N. Khan, B. Jehan, A. Khan, H. Khan, "Audit of 100 cases of epilepsy in a tertiary care hospital", *Gomal Journal of Medical Sciences* ., 9, 2010.
- [20] I. Hussain, H. N. Lakhkar Khan, W. S. Baig, "Determinants of fertility (a case study of district mardan khyber pakhtunkhwa)", *9th International Conference on Statistical Sciences.*, 183, 2012.
- [21] M. Khan, S. Musharaf, "Ethnomedicinal and conservation status of plant species in tehsil takht bhai, district mardan, pakistan.", *International Letters of Natural Sciences.*, 37, 2015
- [22] Website: www.yespakistan.com/HDF/mardan/Mardan.asp; viewed on 13 November, 2015
- [23] T. L. Mac, D. S. Tran, F. QuetF, P. Odermatt, P.M. Preux, C. T. Tan, "Epidemiology, aetiology, and clinical management of epilepsy in asia: A systematic review", *The Lancet Neurology.*, 6:533-543, 2007.
- [24] H. Aziz, S. Ali, P. Frances, M. Khan, K. Hasan, "Epilepsy in pakistan: A population-based epidemiologic study", *Epilepsia.*, 35:950-958, 1994.
- [25] A. A. Rajeh, O. Bademosi and A. Ogunniyi, "The prevalence of epilepsy and other seizure disorders in an arab population: A community-based study", *Seizure.*, 10:410-414, 2001.
- [26] A. Gaitatzis, K. Carroll, A. Majeed, J. W. Sander, "The epidemiology of the comorbidity of epilepsy in the general population", *Epilepsia.*, 45:1613-1622, 2004.
- [27] J. F. Annegers, J. D. Grabow, R.V. Groover, E. R. Laws, L. R. Elveback, L. T. Kurland, "Seizures after head trauma a population study", *Neurology.*, 30:683-683, 1980.
- [28] A. E. Adem Aydin, Gul Ergor and Eray Dirik, "The prevalence of epilepsy amongst school children in Izmir, turkey", *Seizure* ., 11:392-396, 2002.
- [29] W. A. Hauser, L. T. Kurland, "The epidemiology of epilepsy in rochester, minnesota, 1935 through 1967", *Epilepsia.*, 16:1-66, 1975.
- [30] N. Attia-Romdhane, A. Mrabet, M.B. Hamida, "Prevalence of epilepsy in kelibia, tunisia", *Epilepsia.*, 34:1028-1032, 1993.
- [31] M. Placencia, S. Shorvon, V. Paredes, C. Bimos, J. Sander, J. Suarez, S. Cascante, "Epileptic seizures in an andean region of Ecuador", *Brain* ., 115:771-782, 1992.
- [32] A. F. Haerer, D.W. Anderson, B.S. Schoenberg, "Prevalence and clinical features of epilepsy in a biracial united states population", *Epilepsia.*, 27:66-75, 1986.