



Ethnomedicinal Survey and Phytochemical Screening of Plants Used To Treat Epilepsy by Traditional Healers in Etche, Rivers State, Nigeria

¹SULEIMAN, M; ²ALADE, GO; ³ONU, SO; *³OLADELE, AT

¹Department of Pharmacognosy and Phytotherapy, University of Port Harcourt, Nigeria

²Department of Pharmacognosy and Herbal Medicine, Niger Delta University, Bayelsa State, Nigeria

³Department of Forestry and Wildlife Management, University of Port Harcourt, Nigeria

*Corresponding Author Email: adekunle.oladele@uniport.edu.ng

ABSTRACT: Epilepsy is one of the oldest recorded medical ailments. Ethnomedicinal survey was carried out to identify and take a detailed list of the medicinal plant species used to treat epilepsy and assess how they are used in Etche Local Government Area (LGA) of Rivers State, Nigeria. Semi-structured questionnaires were used during the survey to conduct interviews with traditional healers and other knowledgeable individuals on the use of medicinal plants in the treatment of epilepsy. Twelve communities were randomly selected while a total of 54 respondents were purposively selected. The respondents consist of 82.5% males and 12.3% females, 43.9% were above 60 years while 28.1% were between 51-60 years. Traditional medicine practitioners (TMP) formed 75.4% of the respondents, primary occupation of other knowledgeable respondents on plants used for epilepsy were civil servants (8.8%), farming and trading (3.5%). A total of 25 medicinal plant species were recorded during the survey. Phytochemical screening was carried out on five medicinal plants based on frequency of mention, the screening showed presence of alkaloids, triterpenoids, steroids, saponins, tannins, flavonoids, anthraquinones, cardenolides and carbohydrates. Plant resources employed in the local treatment of epilepsy in Etche were documented. Further research on isolation of active compounds on frequently used plants for epilepsy is encouraged to harness their potentials.

DOI: <https://dx.doi.org/10.4314/jasem.v26i2.14>

Open Access Article: (<https://pkp.sfu.ca/ojs/>) This an open access article distributed under the Creative Commons Attribution License (CCL), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Impact factor: <http://sjifactor.com/passport.php?id=21082>

Google Analytics: <https://www.ajol.info/stats/bdf07303d34706088ffffbc8a92c9c1491b12470>

Copyright: © 2022 Sulaiman *et al*

Keywords: Ethnomedicine, medicinal plants, epilepsy, Etche, phytochemical screening

Ethnomedicine deals with the ethnic explanation of health and illness as well as cultural healing systems (Pieroni *et al.*, 2005). Ethnobotanical studies are vital to drug discovery (Heinrich, 2003). It is not new that knowledge of medicinal plants use is part of various cultures worldwide but this rich knowledge is gradually going into extinct with civilization (Wanjohi, 2020). Phytochemical screening is vital to detection of different classes of chemical compounds that are contained in a medicinal plant. It's an important preliminary tool to the search for bioactive agents (Pant *et al.*, 2017). Epilepsy is a persistent non-infectious ailment of the brain which is suffered by approximately fifty million persons globally (WHO, 2019; Beghi, 2020). Its prevalence in Nigeria is reported to be 1/125 persons which is an indication of a considerable burden (Owolabi *et al.*, 2019). This health condition is distinguished by periodic seizures that are characterised by brief incidents of involuntary movement involving either a part or the entire body

(partial or generalized, respectively). They occasionally go along with loss of consciousness and bowel or bladder function control (WHO, 2019). The main symptom of epilepsy is unprovoked and uncontrollable seizures (Shneker and Fountain, 2003). Seizures are classified based on the region of the origin in the brain. Partial epilepsy responds to all antiepileptic drugs apart from ethosuximide while generalized seizures are better managed with valproate, lamotrigine, and topiramate etc. Epilepsy surgery is also a treatment option in some cases (Shneker and Fountain, 2003). The mortality rate is low but unforeseen and inexplicable deaths do occur in people having generalized tonic-clonic seizures, nocturnal seizures and drug refractory epilepsy (Beghi, 2020). Although most of the antiepileptic drugs have been effective with relatively good benefit risk ratio, in about one-fifth to three-tenth of patients, the diseases are not controlled. This may eventually result in injury, depression, anxiety among others

*Corresponding Author Email: adekunle.oladele@uniport.edu.ng

use index, use value (Relative importance) etc. Use value was obtained using the mathematical expression:

$$UV_i = \sum U_i / N_i \text{ -----Eqn.}$$

Where U_i is the number of use reports described by each informer for species i , while N_i is the total number of informers describing the specific species i .

RESULTS AND DISCUSSION

A total of 54 respondents were interviewed and questionnaires administered during the survey for their indigenous knowledge on antiepileptic plants. Respondents demographic data in Table 1 shows that males have higher percentage of 87.0% while females have the lowest percentage of 13.0% which indicates that traditional medicine is mostly practiced by males in the study area, this is similar to the assertion of Denise *et al.*, (2019) that majority of traditional healers in Mali comprised of men. It is also believed that men will keep the information and transfer it from one generation to the other since they don't leave the family or change their names even after getting married, this is similar to what Elufioye *et al.*, (2012) observed in Sagamu, western Nigeria. During the survey, it was observed that most females had the knowledge due to experience as nursing mothers. Majority of the respondents were above 60 years which indicates that it is mostly the old people who have knowledge about epilepsy since it's an ancient ailment, this is in line with Denise *et al.*, (2019) assertion about old people having knowledge of traditional medicine. The knowledge about epilepsy is not passed down because people hide the diseases for fear of being stigmatized and sometimes even when the information is being passed down to younger generation, they tend to forget easily due to low or lack of patronage as observed during this survey. Educational qualification of the respondents interviewed revealed that no formal education had the highest percentage (53.7%). These people are mostly above sixty years in age. The occupation of respondents showed that most of the respondents are traditional medicine practitioners (TMPs) who reside in rural and peri urban areas. The TMPs in such areas are easily accessible by members of the community at low cost in tandem with the findings of Elufioye *et al.*, (2012), traditional medicines are affordable and even free in some cases compared to modern health care. Almost all the respondents engage in farming activities for additional family income (Denise *et al.*, 2019). As shown in Fig 1, Trees were mostly used by the respondents with the highest percentage (48%), herbs (28%), climbers (16%), while shrub was least utilized (8%). This is in contrast to the report in

Ethiopia where no significant difference was observed in plant parts used for herbal medicine (Abera, 2014).

Table 1: Demographic characteristics of respondents

Sex	Frequency	Percentage (%)
Male	47	87
Female	7	13
Total	54	100
Age		
31-35	8	14.8
40-50	5	9.3
51-60	16	29.6
Above 60	25	46.3
Total	54	100
Marital status		
Married	43	79.6
Single	1	1.9
Widow	3	5.5
Widower	7	13
Total	54	100
Educational qualification		
Primary school	5	9.3
Secondary school	17	31.5
Tertiary school	3	5.5
No formal education	29	53.7
Total	54	100
Occupation		
Farming	3	5.5
Trading	2	3.7
Civil servant	5	9.3
TMP	43	79.6
Others	1	1.9
Total	54	100

Materials used in the preparation of herbal medicine used for epilepsy is revealed in Figure 2. The chart shows that plant materials are usually employed above other items. Medicinal plants have been known to be the central aspect of traditional medicine (Wachtel-Galor, 2011). Traditional medicine comprises mainly the use of plants probably because of easy accessibility (Mahomoodally, 2013). Also, minerals such as sulphur, salt, alum and prayers as well as incantations are combined in certain situations to achieve healing. The information on the medicinal plants were collected and documented mostly on plants growing in the gardens around the respondents homes with the assistance of the TMPs, this agrees to what Tuasha *et al.*, (2018) reported in Sidama zone, Ethiopia that after recording the ethnobotanical information, medicinal plants were collected from the wild and home gardens with the guidance of the traditional healers. The results in Table 2 showed the ethnobotanical information of the medicinal plants used to treat epilepsy by traditional healers in Etche and how they are being used. The plants were identified by experts in line with what Abera, (2014) reported in Southwest Ethiopia where initial identification was done and the specimens were identified using experts.

S/N	Plant name	Local/ name (Etche)	Parts used	Plant form	Mode of preparation and administration mode	Frequency	Perceived Conservation status	Relative Importance
1	<i>Sansevieria liberica</i> Gerome & Labroy Dracaenaceae	Ebube-agu	Leaves	Perennial Herb	The leaves are boiled and the water taken daily The leaves are kept close to fire, squeezed and applied to the eyes	5 8 3	Abundant	2.75
2	<i>Acanthus montanus</i> (Nees) T. Anderson Acanthaceae	Agameebu	Leaves, Roots	Herb	The leaves or roots are boiled, prepared like pepper soup and taken	7	Abundant	2.40
3	<i>Sarcocephalus latifolia</i> (Sm.) E.A. Bruce Rubiaceae	Ogbarailu	Roots, Leaves, Bark	Tree	The roots, leaves or bark boiled in water and taken	6	Abundant	2.05
4	Unidentified	Ajuru	Roots	Climber	It is pounded	6	Not evaluated	2.05
5	<i>Senna occidentalis</i> (L.) Link Leguminosae -Caesalpinaceae	Orkagbara	Leaves	Shrub	The root is prepared like pepper soup and taken The leaves are held close to fire and used to flog an epileptic patient The juice is extracted and applied to the eyes and body	5	Abundant	1.71
6	<i>Elaeis guineensis</i> Jacq. Arecaceae	Nkwuojukwu	Seed	Tree	Warm the kernel oil and rub on the body The oil from the palm fruit is mixed with a cow's urine and applied to the eyes during seizure	4	Abundant	1.36
7	<i>Alchornea laxiflora</i> (Benth.) Pax & K. Hoffm. Euphorbiaceae	Nkpokirinya	Leaves	Shrub	The leaves are held close to fire and the juice squeezed and applied to the eyes Squeeze the leaves with cow's urine and apply to the eyes	4	Abundant	1.36
8	<i>Ocimum gratissimum</i> L. Lamiaceae	Nchanwu	Leaves	Herb	The leaves are held close to fire and the juice squeezed and applied to both eyes It is also boiled and taken	4	Abundant	1.36
9	<i>Asystasia gangetica</i> (L.) T. Anderson Acanthaceae	Ogbuchi	Leaves	Herbs	The leaves are heated and squeezed, the juice is applied to the eyes It is also used to flog an epileptic patient	3	Abundant	1.03
10	<i>Spondias mombin</i> L. Anacardiaceae	Ijikirika	Roots Leaves Bark	Tree	The root is boiled and taken as pepper soup The leaves are boiled and the water used to bathe an epileptic patient	3	Abundant	1.03
11	Unidentified	Ihia	Roots		The roots is boiled and taken orally	3		1.03
12	<i>Carica papaya</i> L. Caricaceae	Pawpaw	Roots	Tree	The root is boiled and taken	2	Abundant	0.68
13	<i>Secamone afzelii</i> (Roem. & Schult.) K. Schum Apocynaceae	Okashienwe	Leaves	Climber	The leaves is pounded in large quantity and the filtered juice is used to wash an epileptic patient's head	2	Abundant	0.68
14	<i>Musa paradisiacal</i> L. Musaceae	Orkirima / plantain		Shrub	The part (flower stalk) that produces the plantain is boiled and taken orally	2	Abundant	0.68
15	Unidentified	Otirojor	Leaves	Tree	The leaves are boiled and taken	2	Not evaluated	0.68
16	Unidentified	Apaolokromiri	Vine or stem	Climber	The water from the vine is taken	2	Not evaluated	0.68
17	<i>Allium cepa</i> L. Amaryllidaceae	Ayo /onion	Bulb	Bulb	It is chewed and the juice is applied to both eyes	2	Abundant	0.68
18	<i>Brassica nigra</i> (L.) K.Koch Brassicaceae	Mustard	Seeds	Tree	The seeds is cooked with honey and taken orally	1	Exotic	0.34
19	<i>Garcinia kola</i> Heckel Clusiaceae	Bitter cola	Fruits	Tree	The inner part of the fruit is chewed continuously	1	Vulnerable	0.34
20	<i>Moringa oleifera</i> Lam. Moringaceae	Moringa	Leaves	Tree	The leaves are boiled in water and taken	1	Abundant	0.34
21	Unidentified	Kamkam	Leaves	Climber	Pound the leaves, add water, then filter and warm it before giving it to the patient	1	Not evaluated	0.34
22	Unidentified	Oshishiamapu	Roots		The root is boiled and taken	1		0.34
23	<i>Heterotis rotundifolia</i> (Sm.) Jacq. Fel. Melastomataceae	Akukwo- mmbamozu	Whole plant	Herb	The whole plant is boiled and the water used to bath with red soap	1	Abundant	0.34
24	<i>Lagenaria brevifolia</i> (Benth.) Roberty Cucurbitaceae	Ntiato	Fruits	Climber	Fruit juice is used to wash patient face	1	Abundant	0.34
Total						73		

Table 2: Medicinal Plants Used in the Treatment of Epilepsy



Fig 1: Plant Forms of Medicinal plants used in treatment of Epilepsy

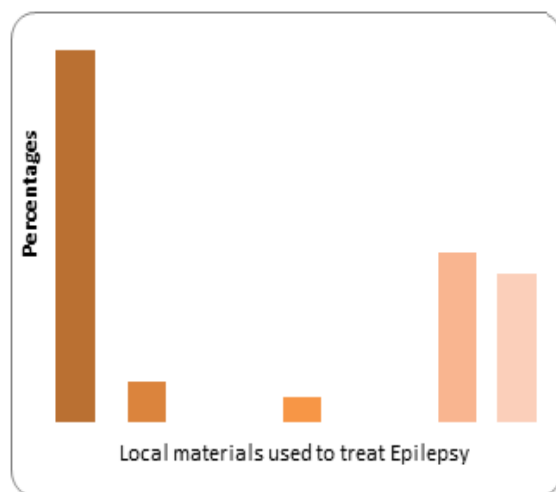


Fig 2: Materials Used by TMPs in the Treatment of Epilepsy

A total of 24 plants were cited for the treatment of Epilepsy in this study. 18 out of the 24 plants were scientifically identified and belong to 17 families. *S. liberica* has the highest use index (2.75), *A. montanus* (2.40), *S. latifolius* (2.05) and *S. occidentalis* (1.71) among others (Table 2). Literature search on these frequently cited plants revealed that they have been validated pharmacologically (Adeyemi *et al.*, 2007; Ngo *et al.*, 2009; Liu *et al.*, 2017; Singh *et al.*, 2019) but none has reached clinical trial stage neither has the chemical constituents attributable to the anti-epileptic activity been isolated. The extract of the leaf of *A. montanus* has been reported to show inhibition of strychnine, picrotoxin and as well as inhibition of maximal electroshock-induced seizures and prolongation of the onset time of isonicotinichydrazide acid induced convulsions (Liu *et al.*, 2017). In this study, leaves and roots were mentioned but only the effect of the leaf has been evaluated by other researchers and documented. The

use of the root bark of *S. latifolius* as an epileptic drug has also been evaluated in mice and showed to protect the animal against maximal electroshock-, pentylenetetrazol-, and strychnine-induced seizures (Ngo *et al.*, 2009). From our study, stem bark and the leaf were also mentioned but only the use of the root bark has been justified. The anticonvulsant potential of the ethanol seed extract of *S. occidentalis* on pentylenetetrazole (PTZ) and maximal electroshock induced seizures has been reported to be dose dependent (Singh *et al.*, 2019) However, leaf was mentioned in this study but it is the seed that is reported currently. The anticonvulsant effect of the aqueous root extract of *S. liberica* in strychnine, picrotoxin, bicuculline and pentylenetetrazole-induced seizures in animal model exhibited dose-dependent prolongation of onset to seizures and a complete protection at 400 mg/kg (Adeyemi *et al.*, 2007), whereas, the anti-epileptic activity of the root was performed, leaf of *S. liberica* was cited in the present survey. The results in Table 3 shows that triterpenoids are present in all the plants samples that have been selected based on high use index for phytochemical screening which could mean that they are anticonvulsant agents as reported by Chaturvedi *et al.*, (1974) and Nsour *et al.*, (2000) that plant coumarins and triterpenoids have shown anticonvulsant activities. Yanqiong *et al.*, (2016) also confirmed that triterpenes acid from the genus *Poriacocos* have antiepileptic activity. Alkaloids are also present in *S. occidentalis*, Abdollahi and Shojaii (2013) confirmed that alkaloids present in *Piper genus* have anticonvulsant activity. Similarly, saponins and tannins present in the bark, fruits and roots of *Tetrapleura tetraptera* (Schum. & Thonn.) Taub (Mimosaceae) also showed anticonvulsant activity while flavonoids and anthraquinones present in the leaves of *Bryophyllum pinnatum* (Lam.) Oken (Crassulaceae) can be used to treat convulsions (Bum *et al.*, 2011). These plant constituents identified in the selected plant samples (Table 3) may be implicated for the anti-epileptic properties of the plants and this can serve as a template or lead in anti-epileptic drug discovery.

Conclusion: Plants have been sources of medicine since time immemorial and are still in use especially in rural areas since it is relatively affordable and accessible compared to orthodox drugs. The 24 plants recorded during the ethnomedicinal survey are being used to treat epilepsy by traditional healers in Etche. Four plants with the highest use index showed the presence of phytochemicals that could further be studied biologically and isolated for possible development of novel drugs.

Table 3: Phytochemical screening of selected medicinal plants used in the treatment of epilepsy in the study area

Plant constituents	<i>Acanthus montanus</i>	<i>Senna occidentalis</i>	<i>Sansevieria liberica</i>	<i>Sarcocephalus latifolia (bark)</i>	<i>Sarcocephalus uslatifolia (leaves)</i>
Alkaloids	-	+	-	-	-
Triterpenoids	+	+	+	+	+
Steroids	-	-	-	+	+
Saponins	-	-	-	+	-
Tannins	-	+	-	-	+
Flavonoids	+	-	-	-	-
Anthraquinones	-	+	-	-	-
Cardenolides	-	-	+	+	+
Cyanogenic glycosides	-	-	-	-	-

Legend: negative/absent (-), positive/present (+)

REFERENCES

- Abdollahi, FM; Shojaii, A (2013). Efficacy of Iranian traditional medicine in the treatment of epilepsy vol 2013/article ID 692751.
- Abera, B. (2014). Medicinal plants used in traditional medicine by Oromo people, Ghimbi District, Southwest Ethiopia. *J. Ethnobiology Ethnomedicine* 10: 40
- Adeyemi, OO; Yemitan, O; Adebisi, OO. (2007). Sedative and anticonvulsant activities of the aqueous root extract of *Sansevieria liberica* Gerome & Labroy (Agavaceae), *J. Ethnopharmacol* 113(1):111-4
- Aiyelaja, AA; Unaeze HC (2013). Adaptive mechanisms of rural farmers to climate change on crop productivity in Etche Local Government Area, Rivers state, Nigeria. *J. Sust. Develop Afr.* 15(1): 1-12
- Beghi E. (2020). The Epidemiology of Epilepsy. *Neuroepidemiology*. 54(2):185-191.
- Bum, EN; Taiwe, GS; Moto, FCO; Ngoupaye, GT; Vougat, RRN; Sakoue, VD; Gwa, C; Ayissi, ER; Dong, C; Rakotonirina, A; Rakotonirina, SV (2011). Antiepileptic Medicinal Plants used in Traditional Medicine to Treat Epilepsy, Clinical and Genetic Aspects of Epilepsy, ZaidAfawi, IntechOpen, Available from: <https://www.intechopen.com/chapters/19739>
- Chaturvedi, AK; Parmar, SS; Bhatnagar, SC; Misra, G; Nigam, SK (1974). Anticonvulsant and inflammatory activity of natural plant coumarins and triterpenoids. *Res. Commun. Chem. Path*, 9: 11-22
- Chima, UD; Adedeji, GA; Uloho, KO (2013). Preliminary assessment of the impact of charcoal production on physico-chemical properties of soil in Rivers state, Nigeria. *Ethiop. J. Environ. Stud. Manag*, 6(3): 286-293
- Denise, BM; Moussa, BD; Angele, GA; Emilien, J; Brigitte, PC (2019). Socio-demographic characteristics of traditional healers and their knowledge of Noma: A descriptive survey in three regions in Mali. *Int. J. Environ. Res. Public Health*, 6(22): 4587.
- Elufioye, TO; Oladele, AT; Cyril-Olutayo, CM; Agbedahunsi, JM; Adesanya, SA (2012). Ethnomedicinal study and screening of plants used for memory enhancement and antiaging in Sagamu, Nigeria. *European J Med Plants* 2 (3): 262-275
- Harbone JB; Phytochemical methods. Chapman and Hall London. 3rd Edition 1998pg 61
- Heinrich M. (2003). Ethnobotany and natural products: the search for new molecules, new treatments of old diseases or a better understanding of indigenous cultures? *Curr. Top. Med. Chem.* 3(2):141-54
- Khan AU; Akram M; Daniyal M; Akhter N; Riaz M; Akhter N; Shariati MA; Anjum F; Khan SG; Parveen, A; Ahmad, S (2020). Awareness and current knowledge of epilepsy. *Metab Brain Dis.* 35(1):45-63.
- Liu, W; Ge, T; Pan, Z; Leng, Y; Lv, J; Li, B. (2017). The effects of herbal medicine on epilepsy. *Oncotarget*. 8(29), 48385–48397
- Mahomoodally, M.F. (2013). Traditional Medicines in Africa: An Appraisal of Ten Potent African Medicinal Plants. *Evidence-Based Complementary and Alternative Medicine* 2013 / Article
- Muazu, J; Kaita, AH. (2008). A review of traditional plants used in the treatment of epilepsy amongst

- the Hausa/Fulani tribes of northern Nigeria. *Afr. J. Trad. Comp. Altern. Medic.* 5(4), 387–390.
- Ngo BE; Taiwe GS; Moto FC; Ngoupaye GT; Nkantchoua GC; Pelanken MM; Rakotonirina SV; Rakotonirina A. (2009). Anticonvulsant, anxiolytic, and sedative properties of the roots of *Nauclea latifolia* Smith in mice. *Epilepsy Behav.* 15(4):434-40.
- Nsour, WN; Lau, CBS; Wong, ICK (2000). Review on phytotherapy in epilepsy. *Seizure* 9: 96-107
- Owolabi LF; Owolabi SD; Taura AA; Alhaji ID; Ogunniyi, A (2019). Prevalence and burden of epilepsy in Nigeria: A systematic review and meta-analysis of community-based door-to-door surveys. *Epilepsy Behav.* 92:226-234.
- Pant, DR; Pant, ND; Saru, DB; Yadav, UN; Khanal, DP. (2017). Phytochemical screening and study of antioxidant, antimicrobial, antidiabetic, anti-inflammatory and analgesic activities of extracts from stem wood of *Pterocarpus marsupium* Roxburgh. *J. Intercult. Ethnopharmacol.* 6(2), 170–176.
- Pieroni, A; Price, LL; Vandebroek, I (2005). Welcome to Journal of Ethnobiology and Ethnomedicine. *J. Ethnobiol. Ethnomedicine*, 1, 1-4.
- Rabiei, Z. (2017). Anticonvulsant effects of medicinal plants with emphasis on mechanisms of action, *Asian Pac. J. Trop. Biomed.*, 7(2):166-172
- Schmidt, D. (2009). Drug treatment of epilepsy: options and limitations. *Epilepsy Behav.* 15(1):56-65
- Shneker BF; Fountain NB (2003). Epilepsy. *Dis Mon.* 49 (7):426-78.
- Singh VV; Jain J; Mishra AK (2019). Evaluation of Anticonvulsant and Antioxidant Activity of *Senna occidentalis* Seeds Extracts, *J. Drug Deliv. Ther.* 9(2):183-187
- Sofowara, A (1993). Medicinal plants and traditional medicine in Africa. 3rd Edition 1993pp 134-156. Spectrum Books, Ibadan
- Tuasha, N; Petros, B; Zemedu, A (2018). Medicinal plants used by traditional healers to treat malignancies and other human ailments in Dalle district, sidama zone. *J. Ethnobiol. Ethnomedicine.* 14(15)
- Wachtel-Galor S; Benzie IFF. (2011). Herbal Medicine: An Introduction to Its History, Usage, Regulation, Current Trends, and Research Needs. In: Benzie IFF, Wachtel-Galor S, editors. Herbal Medicine: Biomolecular and Clinical Aspects. 2nd edition. Boca Raton (FL): CRC Press/Taylor & Francis; 2011. Chapter 1. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK92773/>
- Wanjohi, BK; Sudoi, V; Njenga, EW; Kipkore, WK. (2020). An Ethnobotanical Study of Traditional Knowledge and Uses of Medicinal Wild Plants among the Marakwet Community in Kenya, *Evidence-Based Complementary and Alternative Medicine*, Volume 2020 |Article ID 3208634
- WHO, (2019). <https://www.who.int/news-room/fact-sheets/detail/epilepsy>. Accessed December 2021
- World Health Organization (2003). Traditional medicine fact sheet. No. 134
- Yanqiong, G; Hua, Y; Ruirui, J; Peng, L (2016). Antiepileptic activity of total triterpenes isolated from *Poria cocos* is mediated by suppression of aspartic and glutamic acids in the brain. *Pharm. Biol.*, 54:11, 2528-2535.