

Review Article

Open Access

Epilepsy Knowledge, Attitudes and Practices of Front-Line Healthcare Workers in the City of Conakry

Bangoura MA^{1*}, Gouled HM¹, Camara IA¹, Touré ML¹, Soumah CO¹, Barry SD¹, Camara BDB¹, Traore M¹, Camara IA¹, Camara AK¹, Condé ML¹, Diallo MH¹, Doubouya I¹, Dore M¹, Cissé AB¹, Sidibé G¹, Mané MO¹, Diallo AOS¹, Camara SM¹, Diallo AT¹ and Cissé FA¹

¹Department of Neurology, CHU de Conakry, Guinea

¹Pr Cissé Amara Neurological Institute, Guinea

¹Département of Psychiatry, CHU de Conakry, Guinea

ABSTRACT

Epilepsy is a serious brain disease that affects people of all ages. Evaluating healthcare staff is a key factor in improving the care of people with epilepsy. We studied the knowledge, attitudes and practices of healthcare personnel.

Methods: This is a cross-sectional, descriptive study based on a multicenter survey running from August 1 to February 31, 2023, in six (06) medical community centers in the city of Conakry.

Including all healthcare staff who agreed to complete the questionnaire correctly, which included closed and open questions based on socio-demographic data and staff knowledge, attitude and practice.

Results: Our survey involved 382 out of 476 employees (80%). The average age was 41.12 ± 16.2 years, associated with an average seniority of 17.07 ± 6.1 years. For 47.12%, epilepsy was a contagious disease, and 37.17% considered a seizure to be a clinical sign of epilepsy with the best-known etiology infection 82.98%. The electroencephalogram confirmed the diagnosis in 52.61% of cases, 69.63% of which were never attended; 81.67% attended several seizures and 78.27% had an object put in their mouth. The most frequent types 85.60% were generalized tonic-clonic seizures, 89.79% of medical treatment was benzodiazepine with a severe prognosis in 95.02%.

Conclusion: The fight against epilepsy in Guinea must involve training and equipping healthcare personnel, as well as raising awareness and educating the population to improve patients' quality of life.

*Corresponding author

Bangoura Mohamed Asmaou, Department of Neurology, CHU de Conakry, Guinea.

Received: April 01, 2024; **Accepted:** April 04, 2024; **Published:** April 20, 2024

Keywords: Epilepsy, Health Personnel, Conakry, Republic of Guinea

Introduction

Epilepsy is one of the most common serious neurological disorders, affecting people of all ages [1-3]. Its prevalence is higher in poorer countries and rural areas [4-10].

Low socioeconomic status is a risk factor for epilepsy even in low-income subjects in high-income countries [11-13]. Almost 80% of people with epilepsy live in poor countries, where over 75% have no access to treatment [14-16].

A real deficit is evident in these countries, in terms of human and financial resources [17]. In addition, stigmatization and misconceptions which regard epilepsy as a disease caused by a "spirit", a curse or a bad spell cast [18,19].

This stigma can be profound, as it is considered contagious

and associated with witchcraft [20, 21]. Leading to the highest proportion of severe epilepsies and a higher mortality rate [22,23]. Its diagnosis is clinical, so a seizure with a unilateral onset leads to classification as a focal seizure, otherwise as a generalized seizure [24-27].

Other pathologies such as syncope, parasomnias and abnormal movements can be difficult to distinguish from seizures, but neuroimaging and electroencephalography (EEG) allow classification of seizure type and epilepsy [28-29].

The epilepsy syndrome is made up of a constant and non-random association of clinical and paraclinical signs such as seizure type, EEG and imaging, all of which are age-dependent [30- 31].

The consequences are physical and psychological, including premature death, trauma and mental disorders [32]. The etiology (infectious, structural, genetic, metabolic, immune, unknown) of epilepsy should be known from the first seizure [33].

In Africa, parasitic diseases such as *Taenia solium* neurocysticercosis and malaria are at the forefront, while others include meningitis, toxoplasmosis, trauma and stroke [34-39].

Management must be based on a variety of approaches, taking into account patients from different cultural and family backgrounds, different ages or regions and different environments [40-54]. Some studies have focused on the treatment, etiologies and burden of disease of countries in the tropics, aiming to formulate appropriate policies for epileptics [55-71].

Access to medical treatment is limited for these poor countries, with gaps in treatment either due to a lack of drugs or insufficient doses [72-76].

One reality emerges throughout this literature review: the lack of care for epileptics in poor countries. To reverse this, we assessed the knowledge, attitude and practice of front-line healthcare staff in relation to epilepsy.

Methods

We conducted a cross-sectional, descriptive study based on a multicenter survey from August 1st to February 31st 2023 in six (06) medical centers (Coléah, coronthie, matam, flamboyan, miniere, ratoma) in the city of Conakry. Including front-line healthcare personnel such as doctors, specialists (pediatrics, gyneco-obstetrics, surgery) and state-qualified nurses/midwives. The form was based on the standardized epilepsy questionnaire developed by the Institut d’Epidémiologie Neurologique Tropicale de Limoges [77]. All personnel who completed the questionnaire correctly and agreed to participate were included. The data were collected on a survey form comprising both closed and open-ended questions, based on two parts: the first relating to socio-demographic data, and the second to the knowledge and attitudes of the respondents.

Explanations on the purpose of the survey and on how to fill in the questionnaire were given during a one-to-one or group interview. Once informed consent had been obtained, the questionnaire was given to those concerned, with instructions to complete it carefully and return it after one week. The data were analyzed using Epi Info version 7.2 and SPSS (statistical package for social statisticians).

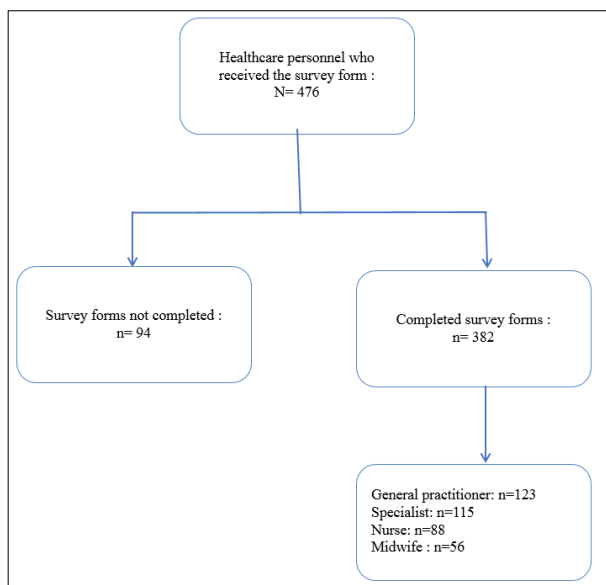


Figure 1: Inclusion flow chart

Table I: Breakdown of staff by socio-demographic data

Socio-demographic	Workforce	Percentages
Ages (years)		
[22 - 31]	60	15,70
[32 - 41]	109	28,53
[42 - 51]	150	39,27
[52- 61]	63	16,49
Seniority (years)	Mean age: 41.12 ± 16.2 years	
≤ 5	100	26,19
[6 - 10]	109	28,53
>10	173	45,28
Average seniority : : 17,07 ± 6,1 years		

Table 2: Distribution of Staff According to Knowledge of Clinical Characteristics

Knowledge of Clinical Features	Workforce (N=382)	Percentages
Definition of epilepsy		
Chronic neurological condition with	47	12,30
Enduring predisposition to seizures		
Seizure-inducing brain disease	123	32,19
Neurological disease caused by the generally spontaneous recurrence of seizures.	32	8,37
Contagious neurological disease		
Existing difference	180	47,12
Epileptic seizure is the clinical manifestation of epilepsy	142	37,17
Epileptic seizure is the set of clinical manifestations associated with hyperactivity of cortical or cortico-subcortical neurons.	64	16,75
Epilepsy is caused by epileptic seizures	145	21,72
No difference	31	8,11
Etiologies		
Infectious	317	82,98
Structural	108	28,27
Métabolic	102	26,70
Head injury	83	21,72

Table 3: Distribution of Staff by Importance of EEG in Epilepsy Diagnosis

Importance of EEG	Workforce	Percentages
Essential		
Confirming the diagnosis	171	52,61
Locating the epileptogenic region	142	37,17
EEG procedure		
Assisted	47	12,30
Never attended	266	69,63
Non-essential	69	10,20
Total	382	100,00

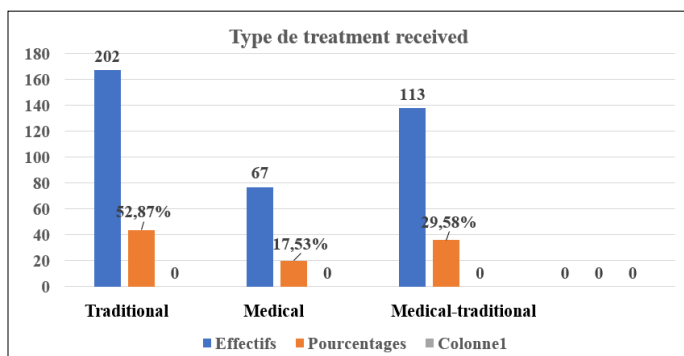


Figure 2: Distribution of Staff by type of Treatment Received by Patients Prior to Consultation

Table 4: Distribution of Staff by Attitude and Number of Crises Attended

Attitude to the crisis	Workforce	Percentages
Attitude		
Putting an object in the mouth	299	78,27
Pour water over face	95	24,86
Shaking the patient	169	44,24
Witnessing a crisis		
Never attended	04	1,02
Several times	321	81,67
At least once	66	17,28
Total	382	100,00

Table 5: Breakdown of Healthcare Personnel by Reason for Consultation and Known Treatments

Reason for consultation and known treatments	Workforce	Percentages
Generalized tonic-clonic seizure	327	85,60
Focal seizure	133	34,81
Unknown start	142	37,17
Post-critical deficit	89	23,29
Medical treatment		
Benzodiazépine	343	89,79
Carbamazépine	99	25,91

Phénytoïne	82	21,46
Phénobarbital	45	11,78
Valproate de sodium	150	39,26

Table 6: Distribution of Healthcare Personnel According to Prognosis

Prognostic Plan	Workforce (N=382)	Percentages
Pronostics		
Serious illness	363	95,02
Less serious	19	4,97
Possible after-effects		
Intellectual retardation	195	51,04
Motor deficit	30	7,85
Cognitive disorders	157	41,09

Discussion

Our observations illustrate the lack of equipment and training in this field for front-line staff, who are the pillars of epilepsy management, as well as the misperception and importance of erroneous beliefs about epilepsy already known in other regions [78-80].

This approach seems more informative, as questioning only epilepsy patients in the African socio-cultural context could only lead to biased results [81].

Questionnaires were distributed to 476 staff and only 382 completed them correctly, a rate of 80%. Our response rate is very good compared with those of other authors [82,83]. This can be explained by the active involvement of staff in the day-to-day care of patients and their desire to improve their skills.

Socio-Demographic Aspects

The age of the respondents ranged from 42 to 51 years, with an average of 41.12 years. This result corroborates that of Diallo F et al Dakar 2004 but contrasts with Alemayehu M et al, in Ethiopia in 2021 so that 45.28% of our surveys had been practising for more than 10 years, with an average of 17.07 years [84,85]. This predominance of relatively young staff can be explained by the fact that they represent the dynamic stratum of the African population, and indicates that age and seniority are not necessarily linked to knowledge of epilepsy. Although the level of knowledge influences seizure practices and our sharing of epilepsy knowledge [86].

Knowledge

Nearly half of those surveyed (47.2%) defined epilepsy as a contagious neurological disease. The same finding has been observed in several studies [87-90]. This can be explained by the socio-cultural effect of this condition, and reflects a lack of awareness of the disease, hence the need for more training. However, for (37.17%) there was a difference between epileptic seizure and epilepsy. According to the respondents, an epileptic seizure is the clinical manifestation of epilepsy.

However, the infectious etiology (82.98%) was the most widely known to our respondents. This result can be explained by the strong association of infectious pathologies with epileptic seizures, on the one hand, and by the lack of investigative resources for etiological research, on the other [91-93].

We found that for half (52.61%) of those surveyed, the EEG confirmed the diagnosis of epilepsy, although they claimed (69.63%) never to have witnessed this examination. This could be explained by the relative rarity of EEG equipment in our contexts [94-96].

Despite its important contribution to the diagnosis of epilepsy, a normal EEG does not eliminate the diagnosis of epilepsy, according to Pierre Thomas and Arzimanoglou [97].

We found that 52.87% of those surveyed received patients only after conventional treatment. Different designations of epilepsy such as “moon disease” and “spirit disease” may support beliefs and myths that traditional healers are the best people to treat epilepsy [98]. It is only the observation of several failures that motivates a hospital consultation [99-102].

Respondents' Attitudes and Practices

However, 85.60% of our respondents received generalized tonic-clonic seizures as the reason for consultation, although focal seizures are still the most common in epilepsy [103].

This made a link between the high frequency of this type of seizure and the lack of knowledge of other types, and would merit training and diagnostic resources.

As for treatment, benzodiazepine was the best-known molecule (89.79%), followed by phenobarbital (39.26%) and carbamazepine (25%). [104]. Despite the availability and average cost, especially of first-generation drugs, there is a significant deficit in developing countries, due to a lack of financial, diagnostic and therapeutic resources [105].

The majority (81.67%) of respondents said they had witnessed one or more seizures, and their attitude consisted of inserting an object into their mouth to avoid biting their tongue (78.27%). This result is identical to that of Vasco F in Mozambique in 2022 [106].

In practice, outside the medical environment, it is recommended not to put anything between the teeth because of certain risks: the vomiting reflex, the possibility of breaking the teeth, dislocation of the jaw.

Thus 95.02% of our respondents received patients with a serious prognosis, the main one being intellectual retardation in 51.04% of cases.

This is explained by the risk of physical trauma, sudden death and the onset of status epilepticus during seizures, which explains the two-fold higher mortality rate compared to the normal population.

Conclusion

This study highlights the lack of training and equipment for front-line epilepsy staff, and the need for staff training with a focus on public awareness and education.

Conflict of Interest: None

References

1. Neligan A, Hauser WA, Sander JW (2012) The epidemiology of epilepsy. *Handb Clin Neurol* 107: 113-133.
2. Ettore Beghi, Giorgia Giussani, Emma Nichols, Foad Abd-Allah, Jemal Abdela, et al. (2019) World, regional, and national burden of epilepsy, 1990-2016: a systematic analysis

- for the Global Burden of Disease Study 2016. *Lancette Neurol* 18: 357-375.
3. Newton CR, Garcia H (2012) Epilepsy in poor regions of the world. *Lancette* 380: 1193-1201.
4. Ibinda F, Mbuba CK, Kariuki SM, Chengo E, Ngugi AK, et al. (2014) Evaluation of the Kilifi epilepsy education program: a randomized controlled trial. *Epilepsy* 55: 344-352.
5. Mateen F (2019) A cascade of care for people with epilepsy: learning from HIV/AIDS 90-90-90. *Gates Open Res* 3: 1502.
6. Debrock C, Preux Pm, Houinato D (2000) Estimation of the prevalence of epilepsy in the Benin region of Zinvié using the capture recapture method. *Int J Epidemiol* 29: 330-335.
7. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, et al. (2012) Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 380: 2197-2223.
8. Diallo F, Sarr MM, Genton P, Szepetowski P, Diarra A, et al. (2004) Epilepsy in Senegal: setting up a genetic study. *Epilepsies* 16: 153-159.
9. Ngugi AK, Bottomley C, Kleinschmidt I, Sander JW, Newton CR (2010) Estimating the burden of active and lifelong epilepsy: a meta-analytic approach. *Epilepsy* 51: 883-890.
10. Fiest KM, Sauro KM, Wiebe S, Patten SB, Kwon CS, et al. (2017) Prevalence and incidence of epilepsy: a systematic review and meta-analysis of international studies. *Neurology* 88: 296-303.
11. Hesdorffer DC, Tian H, Anad K (2005) Socioeconomic status is a risk factor for epilepsy in Icelandic adults but not in children. *Epilepsy* 46: 1297-1303.
12. Beghi E, Hesdorffer D (2014) Prevalence of epilepsy: an unknown quantity. *Epilepsy* 55: 963-967.
13. Kaiboriboon K, Bakaki PM, Lhatoo SD, Koroukian S (2013) Incidence and prevalence of treated epilepsy in unhealthy, low-income Americans. *Neurology* 80: 1942-1949.
14. World Health Organization. The world health report, 2019: mental health: new understanding, new hope. 20 Avenue Appia CH-1211 Geneva 27 Switzerland: World Health Organization.
15. Scheffer IE, Berkovic S, Capovilla G, Connolly MB, French J, et al. (2017) ILAE classification of epilepsies: position statement of the ILAE Commission on Classification and Terminology. *Epilepsy* 58: 512-521.
16. Fisher RS, Cross JH, French JA, Higurashi N, Hirsch E, et al. (2017) Operational classification of seizure types by the international league against epilepsy: position statement of the ilae Classification and Terminology Commission. *Epilepsy* 58: 522-530.
17. Belhocine M, de Boer H, Mandlhate C (2004) World Health Organization. In: epilepsy in the who african region. Geneva.
18. Domgmo L, Mbonda E, Motsoj, Mbede J (1994) Infantile epilepsy in Yaoundé: Analyse de 174 cas. Second Congress of Tropical Neurology 11: 124.
19. Farnarier G, Diop S (2000) Onchocerciasis and epilepsy: Epidemiological survey in Mali. *Bull Soc Path Exot* 83: 123-193.
20. Mushi D, Hunter E, Mtuya C, Mshana G, Aris E, et al. (2011) Sociocultural aspects of epilepsy in the Kilimanjaro region, Tanzania: knowledge and experience of patients and caregivers. *Epilepsy Behavior* 20: 338-343.
21. Viteva E (2013) Impact of stigma on the quality of life of patients with refractory epilepsy. *Crise d'épilepsie* 22: 64-69.
22. Kaddumukasa M, Kaddumukasa MN, Buwembo W (2018) Epilepsy misconceptions and stigma reduction interventions

- in sub-Saharan Africa, a systematic review. *Epilepsy Behavior* 85: 21-27.
23. (2020) Institute for Health Measurement and Evaluation (IHME), University of Washington. Global burden of disease outcome tool. Seattle, Washington.
 24. Cheffer IE, Berkovic S, Capovilla G (2017) ILAE classification of epilepsies: position statement of the ILAE Commission for Classification and Terminology. *Epilepsy* 58: 512-521.
 25. Fisher RS, Cross JH, French JA, Norimichi Higurashi, Edouard Hirsch, et al. (2017) Operational classification of seizure types by the International League Against Epilepsy: position statement of the ilae Classification and Terminology Commission. *Epilepsy* 58: 522-530.
 26. Winkler AS, Schaffert M, Schmutzhard E (2008) The epilepsy scheme in a rural African hospital - an approach adapted to local circumstances. *Trop Doct* 39: 44-47.
 27. Moshe L, Douglas R Nordli, Emilio Perucca, Torbjorn Tomson, Samuel Wiebe, et al. (2017) (ILAE) Classification of Epilepsies: Document establishing the position of the ILAE Commission for Classification and Terminology. *The International League Against Epilepsy* 1-10.
 28. Mushi D, Hunter E, Mtuya C, Mshana G, Aris E, et al. (2011) Sociocultural aspects of epilepsy in the Kilimanjaro region, Tanzania: knowledge and experience of patients and caregivers. *Epilepsy Behavior* 20: 338-343.
 29. Ba Diop A, Marin B, Druet Cabanac M, Ngoungou EB, Newton CR, et al. (2014) Epidemiology, causes and treatment of epilepsy in sub-Saharan Africa. *Lancette Neurol* 13: 1029-1044.
 30. (1985) Commission on Classification and Terminology of the International League Against Epilepsy. Proposal for classification of epilepsies and epileptic syndromes. *Epilepsia* 26: 268-278.
 31. Robert S Fisher, Walter van Emde Boas, Warren Blume, Christian Elger, Pierre Genton, et al. (2005) Epileptic seizures and epilepsy: definitions proposed by the International League Against Epilepsy (ILAE) and the International Bureau for Epilepsy (IBE). *Epilepsy* 46: 470-472.
 32. Nabbout R (2013) FIRES and IHHE: Delimitation of syndromes. *Epilepsy* 6: 54-56.
 33. Ingrid E Scheffer, Samuel Berkovic, Giuseppe Capovilla, Mary B Connolly, Jacqueline French, Laura Guilhoto, Edouard Hirsch, Satish Jain, Gary W. Mathern, Solomon
 34. Edgard Brice Ngoungou, Olivier Dulac, Belco Poudiougou, Michel Druet Cabanac, Alassane Dicko, et al. (2006) Epilepsy secondary to cerebral malaria in a malaria-endemic area of Mali, West Africa. *Epilepsy* 47: 873-879.
 35. Wilmshurst JM, Cross JH, Newton C, Kakooza AM, Wammanda RD, et al. (2013) Children with epilepsy in Africa: recommendations from the International Association of Child Neurology/African Association of Child Neurology workshop. *J Infant Neurol* 28: 633-724.
 36. Oguni H, Otsuki T, Kobayashi K, Inoue Y, Watanabe E, et al. (2013) Clinical analysis of catastrophic epilepsy in infancy and early childhood: results from the Far East Asian Catastrophic Epilepsy (FACE) Study Group. *Brain Development* 35: 786-792.
 37. Assadeck H, Toudou Daouda M, Mamadou Z, Moussa Konate M, Hassane Djibo F, et al. (2019) Clinical and etiological characteristics of epilepsy in the elderly: a hospital study of a tertiary care referral center in Niamey, Niger. *J Neurosci Pratique Rurale* 10: 571-575.
 38. Bongomin F, Katabira E, Sajatovic M, Kaddumukasa M (2021) Epilepsy in the elderly in sub-Saharan Africa: a systematic review. *Treatment of neuropsychiatric disorders* 17: 2309-2314.
 39. Colebunders R, Kaiser C, Basáñez MG, Olliaro P, Lakwo T, et al. (2022) Reducing onchocerciasis-associated morbidity in onchocerciasis-endemic foci with high ongoing transmission: focus on children. *Int J Infecter Dis* 116: 302-305.
 40. Tsega SS, Yazew BG, Mekonnen K (2021) Sleep quality and associated factors in adult epilepsy patients attending follow-up care at referral hospitals in the Amhara region, Ethiopia. *Plos One* 16: e0261386.
 41. Kaddumukasa M, Kakooza A, Kayima J, Kaddumukasa MN, Ddumba E, et al. (2016) Community knowledge and attitudes towards epilepsy in rural and urban Mukono district, Uganda: a cross-sectional study. *Epilepsy Behavior* 54: 7-11.
 42. Josué SP, Mahapatra AK (2013) Epilepsy in the tropics: an Indian perspective. *J Neurosci Pratique Rurale* 4: 171-175.
 43. Zheng G, Li F, Chen Y, Liu H, Wang S, et al. (2021) An epidemiological survey of epilepsy in rural tropical China. *Open Epilepsy* 6: 323-330.
 44. Quet F, Rafael F, Ngoungou EB, Diagana M, Druet-Cabanac M, et al. (2011) Epilepsy survey in Africa: 10 years of data collection using a standardized questionnaire from 2,269 people with epilepsy. *Epilepsy* 52: 1868-1876.
 45. Gilkinson C, Kinney M, Olaniyan T, Murtala B, Sipilon M, et al. (2022) Perceptions about mental health care for people with epilepsy in Africa. *Epilepsy Behavior* 127: 108504.
 46. Bruno E, Bartoloni A, Zammarchi L, Strohmeier M, Bartalesi F, et al. (2013) Epilepsy and neurocysticercosis in Latin America: a systematic review and meta-analysis. *Plos Négl Trop Dis* 7: e2480.
 47. Medina MT, Durón RM, Martínez L, Osorio JR, Estrada A, et al. (2005) Prevalence, incidence and etiology of epilepsy in rural Honduras: the Salamá study. *Epilepsy* 46: 124-131.
 48. Mond C, Duke T, Vince J (2019) Epilepsy in Papua New Guinea: a longitudinal cohort study. *Arch Dis Infant* 104: 941-946.
 49. Winkler AS, Blocher J, Auer H, Gotwald T, Matuja W, et al. (2009) Epilepsy and neurocysticercosis in rural Tanzania - An imaging study. *Epilepsy* 50: 987-993.
 50. Suryani G, Jehosua SY, Herlyani K, Zhi Jien C, Kheng-Seang L (2021) Attitudes towards epilepsy in Indonesia. *Epilepsy Behavior* 123: 108244.
 51. Pomeroy SL, Holmes SJ, Dodge PR, Feigin RD (1990) Convulsions and other neurologic sequelae of bacterial meningitis in children. *N Engl J Med* 323: 1651-1657.
 52. Tollman SM, Kahn K, Sartorius B, Collinson MA, Clark SJ, et al. (2008) Implications of mortality transition for primary health care in rural South Africa. *Lancette* 372: 893-901.
 53. Muchada IF, Wilmshurst JM, Laing N, Haf Davies E, Fieggen K (2021) A qualitative study exploring caregivers' experiences, perspectives and expectations of precision medicine in epilepsy in South Africa. *Epilepsy Behavior* 117: 107873.
 54. Sengxeu N, Dufat H, Boumediene F, Vorachit S, Chivorakoun P, et al. (2020) Availability, affordability and quality of essential antiepileptic drugs in Lao PDR. *Open Epilepsy* 5: 550-561.
 55. Owolabi LF, Owolabi SD, Adamu B, Jibo AM, Alhaji ID (2020) Epilepsy treatment gap in sub-Saharan Africa: meta-analysis of community studies. *Acta Neurol Scand* 142: 3-13.
 56. Chin JH (2012) Epilepsy treatment in sub-Saharan Africa: closing the gap. *Afr Santé Sci* 12: 186-192.
 57. Winkler AS (2012) Measuring the epilepsy treatment gap in sub-Saharan Africa. *Lancette Neurol* 11: 655-657.
 58. Nau AL, Mwape KE, Wiefek J, Schmidt K, Abatih E, Dorny P (2018) Cognitive impairment and quality of life in people

- with epilepsy and neurocysticercosis in Zambia. *Epilepsy Behavior* 80: 354-359.
59. Nsengiyumva G, Druet-Cabanac M, Ramanankandrasana B, Bouteille B, Nsizabira L, et al. (2003) Cysticercosis as a major risk factor for epilepsy in Burundi, East Africa. *Épilepsie* 44: 950-955.
60. Elliott I, Jerome A, Angwafor SA, Smith ML, Takougang I, et al. (2013) Epilepsy and cysticercosis in northwest Cameroon: a serological study. *Epilepsy crisis* 22: 283-296.
61. Mbuba CK, Ngugi AK, Newton CR, Carter JA (2008) the epilepsy treatment gap in developing countries: a systematic review of magnitude, causes, and intervention strategies. *Epilepsy* 49: 1491-1503.
62. Sahlu I, Carabin H, Ganaba R, Preux PM, Cissé AK, et al. (2019) Estimation of the association between cysticercosis seropositivity and the prevalence of epilepsy and severe chronic headache in 60 rural villages of Burkina Faso. *Plos Négl Trop Dis* 13: e0007101.
63. Carrizosa Moog J, Kakooza-Mwesige A, Tan CT (2017) Epilepsy in the tropics: emerging etiologies. *Epilepsy crisis* 44: 108-112.
64. 2005 OPL136 Indigenous and isolated epilepsy in tropical Australia. *J Neurol Sci* 238: S80-S81.
65. Deresse B, Shaweno D (2016) Knowledge, attitudes and practices of the general public towards people with epilepsy in southern Ethiopia: a community-based comparative cross-sectional study. *Epilepsy Behavior* 58: 106-110.
66. Mbelesso P, Luna J, Yangatimbi E, Mboukou C, Preux PM (2019) Sociocultural representations of epilepsy in the Central African Republic: a door-to-door survey. *Epilepsy crisis* 67: 23-26.
67. Molla A, Mekuriaw B, Habtamu E, Mareg M (2021) Knowledge and attitudes towards epilepsy among rural residents of southern Ethiopia: a cross-sectional study. *Public Health BMC* 21: 420.
68. Wagner RG, Norström F, Bertram MY, Tollman S, Forsgren L, et al. (2021) Community health workers to improve antiepileptic medication adherence in rural South Africa: is it cost-effective?. *Epilepsy* 62: 98-106.
69. Adebisi A, Lagunju I, Ogunniyi A (2017) Epilepsy in transition from childcare to adult services: a missing link in sub-Saharan Africa. *Trop Doct* 47: 273-275.
70. Nkole KL, Kawatu N, Patel AA, Kanyinji C, Njobvu T, et al. (2020) Ketogenic diet in Zambia: management of drug-resistant epilepsy in a low- and middle-income country. *Epilepsy Behavior Representative* 14: 100380.
71. Acevedo C (2015) Latin American strategic plan for the prevention and treatment of epilepsy. *J Neurol Sci* 357: 503.
72. Ngugi AK, Bottomley C, Kleinschmidt I, Sander JW, Newton CR (2010) Estimating the burden of active and lifelong epilepsy: a meta-analytic approach. *Epilepsy* 51: 883-890.
73. Fredrick Ibinda, Peter Odermatt, Symon M Kariuki, Angelina Kakooza Mwesige, Ryan G Wagner, et al. (2017) Magnitude and factors associated with non-adherence to antiepileptic drug treatment in Africa: a multisite cross-sectional study. *Open Epilepsy* 2: 226-235.
74. Dolo H, Mandro M, Wonya' Rossi D, Ngave F, Fraeyman J, et al. (2018) Community perceptions of epilepsy and its treatment in an onchocerciasis-endemic region in Ituri, Democratic Republic of Congo. *Infecting poverty* 7: 115.
75. Alexandra Cameron, Amit Bansal, Tarun Dua, Suzanne R Hill, Solomon L Moshe, et al. (2012) Mapping the availability, price and affordability of antiepileptic drugs in 46 countries. *Epilepsy* 53: 962-969.
76. Cameron A, Roubos I, Ewen M, Mantel Teeuwisse AK, Leufkens HG, et al. (2011) Differences in the availability of medicines for chronic and acute conditions in the public and private sectors of developing countries. *World Health Organization Bull* 89: 412-421.
77. Preux P, Druet Cabanac M, Debrock C, Tapie P, Dumas M (2000) the Comité de Recherche sur l'Épilepsie de l'Institut d'Épidémiologie Neurologique et de Neurologie Tropicale de Limoges Questionnaire d'investigation de l'épilepsie dans les pays tropicaux. *Bull Soc Pathol Exot* 93: 276-278.
78. Watts AE (1989) A model for managing epilepsy in a rural community in Africa. *British Medical Journal* 298: 805-807.
79. WHO (2000) Global Campaign Against Epilepsy; Bringing epilepsy out of the shadows in Africa. Geneva 20-35.
80. OMS (2001) Epilepsy: social consequences and economic aspects. Geneva WHO 1-166.
81. Maiga Y, Napon C, Dicko F, Fofana T, Traore B, et al. (2008) Connaissances A propos De l'épilepsie Et Attitudes Des Parents d'enfant Au Mali. *Revue Neurologique I64*: A49-A91.
82. Jack Ide IO, Maliki AE, Onasoga O (2015) Community members' perception of epilepsy and their attitude towards persons living with epilepsy disorders in a rural Community of Bayelsa State, Nigeria 4: 161-167.
83. Babikar SE, Abbas IM (2011) Epilepsy knowledge, practices and attitudes among primary and secondary school teachers in South Gezira locality, Gezira State, Sudan. *J Fam Communauté Med* 18: 17.
84. Diallo F, Sarr MM, Genton P, Szeptowski P, Diarra A, et al. (2004) Epilepsy in Senegal: setting up a genetic study. *Epilepsies* 16: 153-159.
85. Alemayehu Molla, Birhanie Mekuriaw, Endashaw Habtamu, Moges Mareg (2021) Knowledge and attitudes towards epilepsy among rural residents of southern Ethiopia. a cross-sectional study *Public Health BMC* 21: 420.
86. Ofhani Prudence Musekwa, Lufuno Makhado, Angelina Maphula (2023) Knowledge, attitudes and practices (KAP) of caregivers and family members towards epilepsy in rural Limpopo and Mpumalanga. *South Africa Int J Environ Res Public Health* 20: 5222.
87. Millogo A, Etienne D, Traore ED (2001) Etude des connaissances en matière d'épilepsie en milieu scolaire à Bobo-Dioulasso (Burkina-Faso). *Epilepsies* 13: 103-119.
88. Ojinnaka NC (2002) Teachers' perception of epilepsy in Nigeria: a community-based study. *Seizure* 11: 386-391.
89. Akhtar SW, Aziz H (2004) Perception de l'épilepsie dans l'histoire musulmane; avec le scénario actuel. *Neurology Asia* 9: 59-60.
90. Rambe AS, Sjahrir H (2000) Awareness, attitude and understanding toward epilepsy among school teachers in Medan, Indonesia. *Neurol J Southeast Asia* 5: 55-60.
91. Mbelesso Pascal, Sénékian Vincent de Paul, Yangatimbi Emmanuel, Tabo André, Iya Julien (2015) Epilepsy knowledge, attitudes and practices of frontline healthcare workers in Bangui (Central African Republic). *North African and Middle East Epilepsy Journal* 4.
92. Yang C, Kang B, Mao Y, Xu Q, Yu D, et al. (2020) Anxiety among caregivers of children with epilepsy in western China: a cross-sectional survey. *Medicine* 99: e19237.
93. Muchada IF, Wilmshurst JM, Laing N, Davies EH, Fieggen K (2021) A qualitative study exploring caregivers' experiences, perspectives and expectations of precision medicine in epilepsy in South Africa. *Epilepsy Behavior* 117: 107873.
94. Samanta D, Elumalai V, Hoyt ML, Modi AC, Sajatovic

- M (2022) A qualitative study of barriers and facilitators to epilepsy self-management among black children and caregivers in Arkansas. *Epilepsy Behavior* 126: 108491.
95. Lamine Thiam, Ndiogou Seck, François Niokhor Diouf, Djibril Boiro, Babacar Niang, et al. (2020) Clinical and paraclinical aspects of childhood epilepsy at the Hôpital de la Paix de Ziguinchor: a literature review. *Pan Afr Med J* 37: 387.
96. Camara O (2006) Prise en charge et recherche de facteurs parasitaires d'épilepsie dans le cadre d'une recherche action en réseau sur l'épilepsie à Markacoungo à propos de 317 cas. Thèse Med Dakar Cheikh Anta Diop University 1-112.
97. Kaputu Kalala Malu C (2016) Epilepsy and acute seizures in children in sub-Saharan Africa: challenges and hopes. *Pan Afr Med J* 23: 58.
98. Thomas P, Arzimanoglou A (2003) *Epilepsie Abregés de médecine* 3eme ed Paris. Masson.
99. Langa AP, Gouveia ML, Nhantumbo B, Andrassone P, Nhabinde A, et al. (2012) Département de Saúde Mental. Maputo Mozambique.
100. Danesi MA, Adetunji JB (1994) Use of alternative medicine by patients with epilepsy: a survey of 265 epileptic patients in a developing country. *Epilepsia* 35: 344-351.
101. Dale JR, Ben Tovim DI (1984) Modern or traditional? A study of treatment preference for Neuropsychiatric disorders in Botswana. *Br J Psychiatry* 145: 187-192.
102. Adotevi F, Stephany J (1984) Cultural representations of epilepsy in Senegal (Cape Verde and Cap-Vert et du Fleuve). *Med Trop* 41: 283-288.
103. Aka Anghui Diarra Evelyne, Assi Berthe, Folquet Amorrissani Madeleine (2015) Kadjo Annick North African and Middle. *East Epilepsy Journal* 4.
104. Persefoni Ioannou, Daniella L Foster, Josemir W Sander, Sophie Dupont, Antonio Gil Nagel, et al. (2022) The burden of epilepsy and unmet needs in people with focal seizures *Brain Behavior*. September 12: e2589.
105. Espinosa Jovel C, Toledano R, Aledo Serrano Á, García Morales I, Gil Nagel A (2018) Epidemiological profile of epilepsy in low-income populations. *The Journal of the British Epilepsy Association* 56: 67-72.
106. Joyce A Cramer, Zhixiao J Wang, Eunice Chang, Annette Powers, Ronda Copher, et al. (2014) Health care utilization and costs in adults with stable, uncontrolled epilepsy. *Epilepsy and Behavior* 31: 356-362.
107. Vasco Francisco Japissane Cumbe, Claire Greene, Afonso Mazine Tiago Fumo, Hélder Fumo, Dirceu Mabunda, et al. (2022) Knowledge, attitudes and practices of community health workers towards epilepsy in Sofala. central Mozambique. *Int J Environ Res Santé Publique* 19: 15420.