International Journal of Neurologic Physical Therapy
2022; 8(2): 6-10
http://www.sciencepublishinggroup.com/j/ijnpt
doi: 10.11648/j.ijnpt.20220802.11
ISSN: 2575-176X (Print); ISSN: 2575-1778 (Online)

Prevalence of Epileptics in an Endemic Onchocerciasis Focus in Haut-Katanga/DR Congo

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To cite this article:

Criss Koba Mjumbe, Chadrack Kabeya Diyoka, Oscar Luboya Numbi, Beatrice Koba Bora. Prevalence of Epileptics in an Endemic Onchocerciasis Focus in Haut-Katanga/DR Congo. *International Journal of Neurologic Physical Therapy*. Vol. 8, No. 2, 2022, pp. 6-10. doi: 10.11648/j.ijnpt.20220802.11

Received: June 20, 2022; **Accepted**: July 19, 2022; **Published**: January 9, 2023

Abstract: Background: Epilepsy is a real public health problem in the world. Epilepsy is a cause of excess mortality and is a major cause of stigmatization and/or social discrimination. Given the existence of a link between onchocerchosis and epilepsy mentioned in previous studies. Objective: The main objective of this study is to determine the prevalence of epileptics in the endemic onchocerciasis focus in the Kafubu health zone in Haut Katanga/DRC. Method: This is a cross-sectional descriptive study. The sample size consisted of 500 households for a total population of 3451 inhabitants. Result: The number of epileptics was 93, ie a prevalence of 2.7%, of which 54% were female and 46% male; the average age of onset of epilepsy was 10.4±3.7 years. 5.4% of people living with epilepsy reported visual impairment. The village most affected by epilepsy was Sambwa, with agriculture as the main activity of the heads of households of epileptics in all the villages. Conclusion: The management of epilepsy with antiepileptics and good nutrition can reduce the morbidity and mortality observed in our environment.

Keywords: Prevalence, Epilepsy, Onchocerciasis Focus, Lubumbashi

1. Introduction

Onchocerciasis (OC) is a parasitic disease caused by a filaria, onchorcerca volvulus (OV), transmitted by Diptera belonging to the genus simulium. These insects breed in fast-flowing rivers. The normal lifespan of an adult worm can extend up to 10 to 15 years; We commonly observe dermatological forms,,, ocular forms and complicated neurological forms reported with increasing frequency in children under 5 years of age in some regions of sub-Saharan Africa [1-4]. The possible existence of a third complicated neurological form, called neurological and/or neuro-developmental deficits (ENDD) epilepsy syndromes [5], can have serious consequences for global health, since millions of people are infected with the OVVO, almost exclusively in developing countries. This threat is worsening for several hundreds of millions of people, especially in Africa, where the number of people affected is up to 37 million.

Epilepsy is a brain disorder characterized by a persistent predisposition to produce epileptic seizures [6]. Epilepsy is a real public health problem in the world [7]. The adjusted prevalence of epilepsies varies from 2.7 to 17 per 1000 in the world, and from door to door from 2.2 to 41 per 1000 and the incidence varies from 16 to 51 per 1000, except in Chile where it varies from 111 per 100,000 (Pion et al. 2009) [5]. In the DRC, the province of Haut-Katanga nearly 2,317 are infected and live with epilepsy. Epilepsy is a brain disorder characterized by a persistent predisposition to produce epileptic seizures [14]. Epilepsy is a cause of excess mortality and is a major cause of stigmatization and/or social discrimination [8]. The possibility of an association between CO and epilepsy was raised in the 1930s following observations made during surveys carried out in the state of Chiapas, Mexico [9]. It is only in the last ten years that specific studies have been carried out to try to clarify the existence of this link. Some of this work aimed to evaluate the

relationship at the community level between the prevalence of OC and epilepsy, this is what must be commented on [10, 4]. The main objective of this study is to determine the prevalence of epilepsy in an endemic area in OC in the Kafubu Health Zone in Haut-Katanga.

2. Research Method

2.1. Study Site and Population

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A descriptive cross-sectional study was carried out in the health areas of Makulu and Sambwa. The study population was made up of households in these health areas. Heads of households responded to a questionnaire presented by the interviewers. The interviewers who went household by household conducted the questionnaire, it included questions on general, socio-demographic, and epilepsy-related data (see questionnaire number, on page number). To achieve authors' objective, authors used the Global Positioning System (GPS) device whose brand is STRES 62S, Garmin model, for data collection of data from households or people with epilepsy. Authors opted for convenience sampling and two health centers out of the 12 in the health zone were selected. Authors applied exhaustive sampling for the selection of localities and households. The sample size was calculated using the following formula:

$$n=Z^2 PQ/d^2$$

This had given a population to be surveyed of 3451 people.

2.2. Inclusion Criteria and Data Collection

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For our part, the state of epilepsy was determined according to the International League Against Epilepsy [11]. And the subject should have had at least two unprovoked seizures occurring at least 24 hours apart [11]. The status was confirmed by a physician from the study area (announced while the physician was accompanying the respondent), but also by the principal investigator, taking into account the diagnostic criteria for epilepsy according to the ILAE and this, after anamnesis and/or clinic. All study participants were recruited through an active search in local rural health centers, public announcements using a megaphone, announcements, and meetings with community leaders.

Any head of household living in the health areas of Makulu and Sambwa was eligible for the study after his informed and signed consent or that of his guardian if the head of household is > 18 years old. The data related to our study was collected at the level of the 2 Health Centers of the Kafubu Reference Health Zone for a period of 6 days from April 2 to 8, 2018. We had put in place the following mechanisms in with a view to guaranteeing their quality: (*i*) A detailed guide setting out the objectives, sampling procedures, data collection techniques and methods of recording the various observations, the disposition of the research team. (*ii*) The investigators were chosen, through a short interview among community members and students from the Lubumbashi School of Public Health. (iii*)* Interviewers were trained based on the interviewer's manual for one day. (*iv*) Pre-testing of our data collection instruments (questestionnaires and use of the GSP device). Two supervisors under the coordination of the principal investigator regularly supervised the investigators.

2.3. Data Processing

The data were encoded and analyzed using Excel 2010 and Stata 3.1 software. The proportion of cases in the exposed populations determined the prevalence of epileptics. The data was collected through a questionnaire and included the following variables: The mapping of epileptics around the river was developed by GSP. Measures of central tendency, such as the mean, for quantitative data moreover, the median if extreme values exist, were also calculated. Thus, we were able to calculate the average age of epileptics and the average age of onset of the epileptic seizure.

2.4. Ethics Statement

Community consent was obtained from the chiefs of the two villages. Most of the recruits participating in the study did not have the ability to read, informed consent was obtained verbally from the respondent himself or from his guardian, when the respondent was 17 years of age at most. Consent from all respondents under the age of 18 was obtained verbally.

3. Findings

3.1. Geographic Coordinates, Prevalence, and Demographic Characteristics of Participants

More than three-thirds (78.3%) of people living with epilepsy lived in strategic geographical areas in relation to the Study Area, including the Kafubu River, Sambwa and Makulu health centers. The overall prevalence of epileptics in this Zone endemic to OC in onchocerciasis was 2.7% (95% CI: 2.1-3.4), the locality most represented or affected by epilepsy was Sambwa (30%) epileptics followed by Makulu (21%) and Munama (19%). We found that the proportion of epileptics with nodules was (6.5%). The female sex of the epileptic patients was preponderant (54%) with an average age of 16.6 (±4.8 years). It should also be noted that the mean age at the onset of epileptic seizures was (10.4±3.7 years). Most of the heads of the household of epileptic patients were farmers (87%) while the job most practiced by the epileptic patients

themselves was driving (motorcyclists), that is, 7.5%.

Table 1. *Geographic coordinates prevalence and demographic characteristics of participants.*

Settings	n (93)	%
Epilepsy		
Yes	93	2,7
No	3358	97,3
Geographic coordinates		
Sambwa	28	30
Makulo	20	22
Kinama	18	19
Other areas	27	29
Shapes		
Epilepsy with nodule	6	6,5
Epilepsy without nodule	87	93,5
Sexe		
Female	50	54
Male	43	46
Guardians profession		
Cultivators	81	87
Trader	8	8.6
Function public	4	4.3
Patient occupation		
Bikers	7	7.5
Farmer	86	92.5
Unemployed	79	84.9

Table 2. *Mean age (years) of onset of seizures and current epileptics.*

Settings	Means ± ET
Average age	16.6 ± 4.8 years
Average age at onset of seizures	10.4 ± 3.7 years

3.2. Clinical Presentations of Epilepsy

The clinical form of the main epileptic seizures most found in this part of Kafubu was the form of generalized tonoclonic seizures (49.5%), followed by partial seizures secondarily generalized with loss of knowledge (26.9%). The study had reported that certain absence seizures had occurred a few weeks after the first symptoms before a delay in weight and mental development appeared in a family setting (15.1%).

Table 3. *Clinical presentations of epilepsy.*

Settings	n (93)	%
Form seizure clinics		
Tonococlonic generalized	46	49.5
Partial secondarily generalized with loss of knowledge	25	26.9
Uncategorized	22	23.7
Malnutrition		
Yes	14	15.1
No	79	84.9

3.3. Visual Complications, Invermectin Coverage in Epileptics, and Evolution of Invermectin Intake by Families

In our study, the proportion of people with impaired vision was (5.4%). The intake of ivermectin and Mectasan in epileptics was respectively (39.8%) and (46.2%).

Table 4. *Visual complications, Invermectin coverage and Invermectin coverage in epileptics.*

Settings	n (99)	%
Visual complications		
Yes	5	5.4
No	88	94.6
Invermectin coverage		
Yes	37	39.8
No	56	60.2
Mectisan coverage		
Yes	43	46,2
No	50	53,8

4. Discussion

We conducted a cross-sectional descriptive study on the prevalence of epilepsy in the endemic focus of onchocerciasis in Haut-Katanga to define the baseline characteristics of epilepsy in an area endemic to OC in the DRC. Our results provide insight into the prevalence of epilepsy in such a zone. The prevalence found in our study was (2.7%), which was higher than the global prevalence of (1%) (WHO 2014) [12]. Our results do not agree with the literature because in a door-to-door survey in sub-Saharan Africa in 13 countries. Pious had found a prevalence of 1.5%. Newell ED, Vyungimana F, Bradley JE. in Burundi had found a prevalence of 1.3% including 81.8% of onchocerciasis [13]. Our results also confirm those obtained in West Africa by Kipp et al. (1996) [10], where the prevalence of epilepsy was also high, ranging from 40 to 80 per 1000 people. However, we also sought the existence of a confounding factor; the same observation was made by PION Sébastien in 2009 [5], in East and Central Africa where the prevalence of epilepsy ranged from 0 to 8, 7%, and this change in the prevalence of epilepsy increased by 0.4% for each 10% of the prevalence of onchocerciasis. Colebunders R et al.[14] made the same observation in 2016, in the Titule health zone in Province Orientale, in the health district with a prevalence of 2.3%. Kaiser Christophe confirmed the same hypothesis by evaluating the incidence of epilepsy in an area endemic for onchocerciasis in western Uganda over a period of 4 years, where the incidence rate was 2015 per 100,000 people. -years. This high prevalence was felt more in three localities, namely Sakania, Mukonkorimba, and Kiposa, and a certain number of questions arise that would explain this rise in prevalence. We do not know if it is because the main activity of the heads of household was agriculture 87% and that the parents take their children to the forest taking advantage of the river as a source of water for bathing, washing, drinking, and other activities. Forgetting that this is the right environment for blackflies and that the latter are contaminated there by prolonged exposure in the forest? Or because the fields of heads of households are located along the Kafubu rivers and with the puddles, dykes, and swamps of this river, which would constitute a source of blackflies and thus increase the number of bites per day? Or because these villages are far from the data centralization site, Sambwa, and there the environment is conducive to pig farming due to the many tributaries of Kafubu that would

develop cysticercosis? We tried to look for confounding or favoring factors, although these factors were not questioned during the surveys because they were not part of the questionnaire. Therefore, people living near and along the Kafubu Rivers may be more likely to consume freshwater crabs and therefore could be exposed to Paragonimus infection than people living further away from the river. In fact, Paragonimus is a parasitic infection that is one of the main causes of epilepsy in certain regions. A study was conducted in Mbama in Cameroon and confirmed this (Pion, 2014) [5]. Other hypotheses can be envisaged, such as specific practices relating to distocystic deliveries at health centers. But because the population of the different villages belongs to the same ethnic group, these practices are probably similar in different villages, this hypothesis does not constitute a reason that is likely to explain the geographical variability of the prevalence of epilepsy in this region. 'Grand mal' epileptic seizures with generalized loss of consciousness are the most frequent clinical presentation in our study and not head shaking. This finding agrees with that found in the literature in Province Orientale by Colebunders R, et al. 2016 [14], in the health zone of Titule and Dingila which also presented generalized epilepsy without shaking of the head. The question remains on the true pathogenesis of the disease (neurotropic virus? symbiont of microfilariae (Wolbachia)? transmitted by blackflies? We also observed a small proportion of the ivermectin distribution (39.8) in the epileptics, which did not exceed 50%, also accompanied by a small proportion of epileptics treated with Mectasan (46.2%). However, an observation had been made In the field; in people with epilepsy who regularly took their Mectizan tablets, seizures had to be spaced out or even rare in southern Sudan and northern Uganda (Kaiser et al., 2011); unfortunately, the link between iverctim treatment and epilepsy is not clear so far. Ivermectin positives were not proven by Twun Danso in 2004 [15] during his study saying that ivermectin does not cross the blood-brain barrier therefore it has no anticonvulsant effects and he estimates that only one in two million people with epilepsy in Africa have been treated with ivermectin. Vision disorders have been observed with 5.4%; this would be explained by the fact that, in addition to other causes that can lead to blindness, it is important to think also of onchocerciasis; which would be part of the discussion among the causes that would lead to blindness in an endemic area of onchocerciasis. This observation was suggested by Newland in 1991 [16], during a study carried out in a plantation in Liberia where the presence of intraocular microfilariae was 29% with 2.4% of blind people, and this in a region endemic in onchocerciasis.

5. Conclusion

This study aimed to determine the prevalence of epilepsy in the endemic focus in Onchocerciasis to detect a typical form of epileptic seizures called nodding of the head. The prevalence was 2.7% and the most common clinical form of epilepsy is the generalized seizure with loss of consciousness; this form is quite different from that found in western Uganda and southern Sudan. Several causes of this prevalence are still to be researched, namely cysticercosis, given the large number of pigs, paragonimus parasitic infection, an important cause of epilepsy in certain regions of Africa. The association with onchocerciasis has yet to be investigated, as the true cause of epilepsy is not yet understood. Increasing the coverage of ivermectin and using larvicide can stop outbreaks. Onchocerciasis control programs have shifted from the use of larviciding/ivermictin insecticides. Very little research has been conducted on black flies. Treatment of epilepsy with antiepileptics and good nutrition can reduce the morbidity and mortality seen in Kafubu. There is an urgent need to improve patient care and organize support for affected families. Authors need to combat stigma and misconceptions; Authors need better access to antiepileptic drugs and develop services and participation of community workers. In short, epilepsy poses a real public health problem which urgently calls for a control programme.

References

[1] RIPPERT, C. (2005) filariasis. In F. Pajot (Ed), epidemiology of parasitic diseases: protozoosis and helminthosis (medical i, pp. 333-394).

[2] Dowell SF, Sejvar JJ, Riek L., Vandemaele K. a H., Llamunu M., Mboney AL (2013) Nodding syndrome. Emerging infectious diseases, 19 (9), 1374-1384.

[3] Foltz, JL, Makumbi, I., JJ., Malimbo, M., Ndyomugyemyi, R., Atai-Omoruto, AD (2013). An Epidemiologic Investigation of Potential Risk Factor for Nodding Syndrome in Kitgum District, Uganda Plos ONE, 8 (6).

[4] Colebunders, R., Njamnshi, AK, M. van Oijen, M., D. Mukendi, Kashama, JM, Mandro, M., Idro, R. (2017). Epilepsy associated with onchocerciasis: recent epidemiological and clinical findings with policy implications. Epilepsia Open, 2 (2), 145-152.

[5] Pion, SD, Kaiser, C., Boutros-Toni, F., Cournil, A., Taylor, MM, Meredith, SEO, Boussinesq, M. (2009). Epilespsy in onchocerciasis endemic areas: systematic review and meta-analysis of population-based surveys. PLoS Neglected Tropical Diseases, 3 (6), e 461. Doi: 10.1371/journal.Pntd.0000461.

[6] Musisi, S., Akena, D., Nakimuli-Mpungu, E., Abbo, C., & Okello, J. (2013). Neuropsychiatric perspectives of noddi, g syndrome in northern Uganda: A case series study and a review of literature. African Health Sciences, 13 (2), 205-218.

[7] Burfeind KG, Kashama J -MarieK, Bora BK, et all, Baseline Characterization of Epilepsy in an Onchocerciasis Endemic Area of the Democratic Republic of Congo, *Brain Research Bulletin* (2018),

[8] Pierre Marie Prieux, Institute of Tropical Epidemiology and Neurology Limoges, Dumas M, Leger JM, Pestre -Alexandre M. In: Neurological and psychiatric manifestations of parasitoses: Congress of Psychiatry and Neurology of Language French, session LXXXIV, June 23-27, Le Mans (France). Paris: Masson, 1986: 332.

[9] Miller YA. Tropical diseases: a practical guide for medical practitioners and students. Oxford University Press; 2013.

[10] Kaiser C, Kipp W, Asaba G, Mugisa C, Kabagambe G, Rating D, et al. The prevalence of epilepsy follows the distribution of onchocerciasis in a west Ugandan focus. Bull World Health Organ. 1996; 74 (4): 361-7.

[11] Fisher, RS., Acevedo, C., Arzimanoglou, A., Bogacz, A., Cross, JH., Elger, CE., Wiebe, S. (2014). Official report ILAE: a practical clinical definition of epilepsy. Epilepsia, 55 (4), 475-482. doi: 10.1111/epi.12550.

[12] World Health Organization; 2014.

[13] Newell ED, Vyungimana F, Bradley JE. Epilepsy, retarded growth and onchocerciasis, in two areas of different endemicity of onchocerciasis in Burundi. Trans R Soc Trop Med Hyg. 1997; 91 (5): 525-7.

[14] Colebunders R, Tepage F, Rood E, Mandro M, Abatih EN, Musinya G, et al. Prevalence of river epilepsy in the Orientale Province in the Democratic Republic of the Congo. PLoS Negl Trop Dis. 2016; 10 (5): e0004478.

[15] Twum-Danso NAY. Mass treatment of onchocerciasis with ivermectin: should people with epilepsy and/or growth-retardation syndromes be excluded? Ann Trop Med Parasitol. 2004; 98 (2): 99-114.

[16] Newland, H. S., White, a T., Greene, B. M., Murphy, R. P., & Taylor, H. R. (1991). Ocular manifestations of onchocerciasis in a rain forest area of west Africa. The British Journal of Ophthalmology, 75 (August 1990), 163-169.