

Prevalence of Epilepsy in Rural Areas of Madagascar

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Abstract

To estimate the prevalence of epilepsy in the rural community of the western province of Madagascar, a door-to-door survey of the general population was carried out in the rural community of Ambolomoty in the Western province of Madagascar during September and October 2021. Cluster sampling was used with a cluster effect of 3, an expected prevalence of 5%, and a 95% confidence interval. Face-to-face interviews by trained investigator, were conducted using a structured questionnaire. Epilepsy was defined as the occurrence of at least two seizures. Two hundred and forty-one subjects were investigated. The crude prevalence of epilepsy was 9.2%. Epilepsy begins before the age of five years in 81.81%. Structural epilepsy was found in 86.36%, and motor generalized onset in 81.81%. A history of obstructed labor was reported in 59.09% with resuscitation at birth for all. In this rural community, the occurrence of epilepsy was four times higher than in other localities of Madagascar. The high frequency of birth injuries and severe structural epilepsy could be one of the causes of this situation. The reinforced strategy of epilepsy management and improved birth injury prevention should be implemented in an emergency in this locality.

Keywords: Prevalence; General Population; Birth Injuries; Developmental Disorders; Madagascar

Introduction

Epilepsy is a chronic disease characterized by a predisposition to the recurrence of seizures. According to the International League Against Epilepsy, a person is considered epilepsy if he has at least two epileptic seizures spaced at least 24 hours apart or a seizure with a high risk of recurrence or a well-defined epileptic syndrome [1,2]. Epilepsy remains a significant public health problem despite previous campaigns against the disease. According to the WHO, more than 50 million people are affected by the disease, 80% of whom live in low-income countries [2]. Sub-Saharan Africa is the

most affected by the disease, with a median prevalence of 14.2 per 1000 inhabitants [3]. Madagascar is a country with a high prevalence of the disease. Studies conducted in the early 2000s showed a prevalence of 13.48 to 23.5 per 1000 population [4-6]. According to data from the Global Burden of Disease, epilepsy remains one of the most disabling neurological diseases in sub-Saharan Africa [7,8]. In the western region of Madagascar, we do not have published data on the epidemiology of the disease. Consequently, these data would allow us to evaluate the evolution of this pathology in our population and the most effective measures to control the disease.

Materials and Methods

Study site

This study was carried out in the rural municipality of Ambolomoty. It is a rural commune located in the district of Marovoay, at Boeny region, located in the western region of Madagascar between

latitude -16.1667 and longitude 46.716°10'0' South, 46°42'0' East. It is located 99 km from the capital of the province, Mahajanga, with an area of about 30km², and a population of 22,614 inhabitants in 2020. fifty-five percent are females. It is subdivided into 10 Fokontany "neighborhoods" (Figure 1).

Figure 1: Map of the Boeny region (Madagascar), district of Marovoay, and the village of Ambolomoty.

The survey took place in the commune during September and October 2021.

Sampling and survey methods

Investigators were junior registrar in medicine. We chose a registrar in the neurology department of Mahajanga University Hospital. Training on the classification, interrogation, diagnosis of epilepsy was given to the investigator as well as on the use of the questionnaire and the principle of the survey. Any resident living in the commune for at least 12 months was included. Were excluded those who agreed to take part in the study but from whom the answers to the questions were not interpretable.

A door-to-door survey with the face-to-face interview was conducted, using a standardized questionnaire already used in previous studies in the North of Madagascar during the "EPILMAD" Project. During this project was used the questionnaire of the University of Limoges on epilepsy.

For children or those who could not explain their illness, a family member living under the same roof was interviewed to complete the questionnaire.

Epilepsy was defined as an occurrence of at least two seizures at least 24 hours apart.

We employed cluster sampling because we don't have an exhaustive list of recent households. However, each "Fokontany" was considered as a cluster. The sample size was calculated with a cluster effect of 3, an expected prevalence of 5% with a 95% confidence interval, giving a minimum number of subjects required at 220. The choice of homes to investigate was random. The most central place of the village was chosen at the level of each "Fonkontany" then a direction was chosen at random and the investigator followed the same direction until the number of subjects for each cluster.

The data was analyzed using Epi info software. Raw and specific prevalence was used to assess the purpose of the study.

Ethical statement

Prior approval was obtained from the Regional Health and Community Management before the study was carried out. Participation in the study was voluntary and oral consent was requested from each participant.

Results

Two hundred and forty-one (241) subjects were selected, 2 were excluded and 239 were included, with an average age of 25.62 years ranging from 1 to 77 years and a female predominance of 55.65%. Subjects under 20 years of age accounted for 45.6% of the study population, while single subjects accounted for 56.06% of our study population (Table 1). Twenty-two (22) persons with epilepsy were found with a crude prevalence of 9.2. The prevalence of epilepsy was 9.02% for women, and 9.44% for men. The age of onset of epilepsy was before 5 years old in 81.81% of cases, between 5 and 10 years in 13.63% of cases, and after 20 years in 4.54% of cases. Was found, 86.36% of symptomatic structural epilepsy, and 13.63% of febrile plus epilepsy syndrome that could be structural or genetic. Generalized onset seizure was found in 81.81% and focal onset in 18.18%. People with epilepsy in our study had at least one seizure per month in 68.18% including daily seizures in 36.36%, weekly seizures in 13.63%, and monthly seizures in 18.18% of the cases (Table 2). The reported seizure triggers were full moon in 27.27%, fever in 22.63%, sleep deprivation in 18.63%, the stress in 13.63%, and discontinuation of treatment in 9.09% of cases. An intake of decoction during pregnancy was noted in 68.17%. The delivery was performed in a health center in 54.54% and at home in 40.9% of cases. A history of obstructed labor was reported in 59.09% with resuscitation at birth for all. A history of abnormal psychomotor or intellectual development was reported in 77.27% of persons with epilepsy (Table 2). EEG and brain imaging were not performed in this study.

	Sample size (n)	Percentage (%)
Recruitment		
Included	241	100
Excluded	2	1,2
Restraint	239	98
Gender		
Female	133	55,65
Male	106	44,35
Age		
Mean (years)	25,62 [1-77]	
Marital Status		
Single	134	56,06
Married	90	37,65
Divorced	10	4,1
Widow	5	2

Table 1: Demography of the study population.

	Sample size (n)	Percentage (%)
Age		
0-4	1	4,54
5-9	3	13,64
10-14	1	4,54
15-19	3	13,64
20-24	2	9,09
25-29	3	13,64
30-34	8	36,36
35-39	1	4,55
40 and more	0	0
Seizure type		
Generalized onset	18	81,81
Focal onset	4	18,18
Obstructed labor		
Yes	13	59,09
No	9	40,9
Seizure frequency		
Daily	8	36,36
Weekly	3	13,63
Monthly	4	18,18
More	7	31,81

Table 2: Clinical characteristics of people with epilepsy.

Discussion

We carried out our study in the rural commune of Ambolomoty, district of Marvovoay. The results of the study helped us to gain insight into the importance of the disease in this district because the demographic and socio-economic characteristics of this commune and the whole district are comparable [9]. In this district, a project of the NGO Humanity Inclusion “ANJARATSARA” on the awareness, accompaniment, and management of epileptics was underway which could increase the population’s knowledge of the disease and could also influence our results significantly.

At the end of our study, it was found that there was a very high prevalence of epilepsy in the population of this commune. The disease affected men and women in the same way. It was found that epilepsy started early with onset before 5 years in more than 80% of cases. High seizure frequency was found. More than half had sei-

zures at least once a month with generalized seizures, intellectual and psychomotor abnormalities resulting from the disease. Furthermore, the study shows a high prevalence of birth trauma and births at home for these persons with epilepsy. Comparing with data on the prevalence of epilepsy in the general population in Madagascar, we found a prevalence of 4 times more frequent [4,5].

Compared to studies in other African countries, these results were very high. The prevalence of epilepsy ranged from 2 per 1000 to 134.5 per 1000 of the population. Only studies conducted in Côte d'Ivoire found results that could be closer or higher than ours [3,10,11] and in the area where onchocerciasis was endemic. The difference in our results with those of the literature can be partly explained by the difference between the study methodologies and by the existence of specific etiology observed in our population [12]. The majority of cases in this study with epileptic seizures had the disease before the age of 5 with a history of resuscitation at birth. This finding shows that problems during childbirth could explain this high prevalence of epilepsy. Trauma at birth is an important cause of epilepsy, especially in Africa [3,12]. Neonatal anoxia promotes the onset of epilepsy, especially in severe anoxia with APGAR scores less than 7-5 min [13,14]. This high prevalence of neonatal anoxia in epileptics has also been reported in studies conducted in the northern province of Madagascar but with proportions much lower than ours [4]. In addition to the problem at birth, other factors could serve as the causes of this high prevalence of epilepsy, such as cysticercosis, which is endemic in Madagascar [15,16].

Strengths and limitations: These results allow us to have an overview of the burden of epilepsy in this region of Madagascar. These results support our findings during the consultations carried out in the locality and which reported numerous cases of epilepsy compared to the number of inhabitants. However, these results are influenced by the environment, lifestyle and health structures in the locality and could not be generalized to all regions of Madagascar.

Conclusion

Our results suggest that epilepsy is a major health problem in Madagascar, especially in rural areas. An adaptation of the measures against the disease should be adopted, especially those improving child delivery conditions.

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Conflicts of Interest

- None of the authors has any conflict of interest to disclose.
- No funding has been received for this study.
- All the authors participated in the implementation and writing of this article.

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