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Review Article

Cognitive Disorders in Patients with Epilepsy Attending at Neurology Outpatient Clinics. A Multicenter Prospective Cross- Sectional Study from Burkina Faso-

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ABSTRACT

Objective: To describe cognitive disorders in patients with epilepsy attending neurology consultations in the city of Ouagadougou.

Methodology: This was a prospective cross-sectional multicenter study carried on patients with epilepsy during the period from 1er January 2018 to 30 April 2019. All the patients were screened using mini-mental state examination (MMSE).

Results: The study included 102 patients with a mean age of 33.28 ± 15.55 years. The sample was consisted of 54 (52.9%) men and 48 (47.1%) women. The majority of patients had secondary level (55.7 %). Generalized seizures were more common (74.5%). The most common causes of epilepsy was head trauma (24.5%). A great number of patients were treated by phenobarbital (49%). The overall mean MMSE score was 25.65 ± 5.07. The frequency of cognitive disorders was 61.8%, including cognitive impairment (25.5%), mild dementia (25.5%), moderate dementia (7.8%) and severe dementia (3%). The domains most affected were calculation and attention deficit (48%) followed by memory disorders (27.5%) and copying (12.8%). Head trauma and phenobarbital were significantly associated to cognitive. Cognitive disorders were less frequent in young adult aged of 26-35 years.

Conclusion: Cognitive disorders are common in adult patients with epilepsy using MMSE. Their screening in adults must be early for appropriate management.

Keywords: Cognitive disorders; Epilepsy; MMSE; Risk factors; Burkina Faso

INTRODUCTION

Epilepsy is a common neurologic disorder, with >85% of people with epilepsy living in Low-and Middle-Income Countries (LMICs), including sub-Saharan Africa [1]. Many people with epilepsy in LMICs do not seek biomedical treatment for their epilepsy [2], owing to cost or cultural beliefs [3,4]. Poor adherence to Antiepileptic Drugs (AEDs) may contribute to poor seizure control, cognitive impairment, behavioral disorders, and excess mortality [5]. Cognitive and emotional disturbances are common in patients with all forms of epilepsy [6]. Cognitive difficulties may affect multiple domains, including memory, language, attention, and executive function [7,8]. Other studies have reported the effects of epilepsy on intelligence, language, attention, executive function and psychomotor speech [7,9,10]. In Sub-Saharan Africa, most studies had showed that cognitive disorders were frequent in patients with epilepsy, particularly Nigeria [11-15], in Ethiopia [16] and in Congo [17]. In Burkina Faso, there is a lack of data concerning the cognitive disorders in patients with epilepsy. The objective of this study was de determine the frequency of cognitive disorders in patients with epilepsy and their associated risk factors in order to improve the care of people suffering from this disease.

METHODOLOGY

Participants

This study was carried on patients with epilepsy attending neurology consultations during the period from 1er January 2018 to 30 April 2019 in 4 hospitals located in the city of Ouagadougou (Burkina Faso): Yalgado Ouedraogo University Teaching Hospital (YOUTH), Bogodogo University Teaching Hospital, Hospital of Saint Camille de Ouagadougou (HOSCO) and Schiphra Hospital (SH). All patients aged 18 years and over were included in the study after informed consent.

Materials

Neuropsychological status was assessed on the Mini-Mental test evaluation (MMSE) French version. It is a 30-point questionnaire that is used to estimate the severity and progression of cognitive impairment and to follow the course of cognitive changes in an individual over time. Administration of the test takes between 5 and 10 minutes and examines functions including registration (repeating named prompts), attention and calculation, recall, language, ability to follow simple commands and orientation. The test was administered by consultant neurologist. Assessed data according to MMSE scale (total score - the state of cognitive functions) [18].

- 28-30 points: Norm. Impairment: no cognitive
- 24-27 points – Cognitive impairment
- 20-23 points – Dementia of mild degree
- 11-19 points – Dementia degree of moderate
- 0-10 points – Severe dementia

Analysis

The dependent variables considered were MMSE score, cognitive domains Y3 (e.g. MMSE score). The effect of the factors (gender, educational status, past medical history, seizures frequency, age at onset, seizures types, duration of epilepsy, type of treatment, types of antiepileptic treatment) were investigated through analysis MMSE score for continuous data, MMSE outcome (impaired / non impaired) for categorical data. Questionnaires were checked for the completeness of information by us. Once the information was found to be complete, then it was fed into Epi-Info version 7.2.1.0. for data analysis. *P*-value of less than 0.05 was considered to be significant association.

Ethical and ethical considerations

We obtained the authorizations of the hospital directors. Patient informed consent was obtained before any interview. Anonymity and confidentiality were respected.

RESULTS

Sociodemographic data

Our study included 102 patients with epilepsy aged 18 to 77 years. The sample was consisted of 54 (52.9%) men and 48 (47.1%) women. The mean age of the patients was 33.28 ± 15.55 years, and the mean duration of epilepsy was 6.66 ± 7.93 years with a mean age of seizure onset being 26.65 ± 17.62 years. Old patients (65 years) accounted for 7.9%. Eighty eight (86.27%) patients had educational level. Among them, 49 (55.7%) had secondary level, 20 (19.6%) primary level and 14 (13.73%) university level. Twenty three (22.6%) patients had past history of CNS infections, 25 (24.5%) had head trauma and 13 (12.7%) had perinatal disorders. History of familial epilepsy was present in 23

(22.6%) patients. Table 1 gives the distribution of patients according to their socio-demographic characteristics.

Characteristic of epilepsy

Seventy six patients with epilepsy were diagnosed with generalized epilepsy syndrome, and 26 were diagnosed with focal epilepsy syndrome. The mean age at seizure onset was 26.65 ± 17.62 years, ranges 1-71 years. The onset of seizures was between 1-20 years in 46 (45.1%) patients. The frequency of seizures was 2 ± 1 seizures on average per month with extremes of 1 and 5 seizures. Electroencephalogram was performed in 92.2% of patients (n = 94), cerebral CT in 34.31% of cases (n = 35) and brain MRI in two patients (2%). Atrophy was detected in 5 patients; calcifications in 5 patients. The causes of epilepsy was identified in 65 patients or 63.73%. Head trauma was more prevalent in 25 patients, or 38.46%. All the patients were treated by antiepileptic drugs at the time of consultation. The mean duration of the antiepileptic treatment was 5.44 ± 6.6 years. The totality of patients in this study were put on one Antiepileptic Drug (AEDs). Phenobarbital was the most commonly used AED accounting for 49%, in comparison with carbamazepine (24.5%) and sodium valproate (15.70%). The other treatments were spiritual and traditional in 50 (49%) patients and 48 (47%) patients respectively.

Cognitive performance

The mean MMSE score was 25.65 ± 5.07 points, ranges 10-29 points. The table 2 give the distribution of patients according to MMSE score. This score was respectively 25.18 points in female and 26.06 points in male patients. According to educational status, the mean score was respectively 26.45 in educated patients and 19.06 points in non-educated patients. Mean score was respectively 25.42 points in generalized epilepsy syndrome and 26.30 points in focal epilepsy syndrome. According to epilepsy duration, the mean score was respectively 24.81 points when epilepsy duration was under 5 years and 25.94 if duration was comprise 5 – 10 years. According to treatment, patients treated by phenobarbital was mean MMSE of 23.87 points, Carbamazepine of 24.94 points, sodium valproate of 25.24 points.

Table 1: Sociodemographic risk factors of cognitive disorders.

Variables	Cognitive disorders impairements		*p*-value
	Yes (n = 63)	No (n = 39)	
Age (years)			
15 -25	25(59.52)	17(40.48)	0.42
26 - 35	12(46.15)	14(53.85)	0.04
36 - 45	7(63.64)	4(36.36)	0.58
46 -55	8(72.73)	3(27.27)	0.32
56 - 65	5(83.33)	1(16.67)	0.25
66 - 75	5(100)	0	0.08
76 -80	1(100)	0	0.61
Sex			
Male	33(61.11)	21(38.89)	0.52
Female	30(62.5)	18(37.50)	0.52
Education status			
Educated in French	47(60.26)	31(39.74)	0.37
Non educated	10(71.43)	4(28.57)	0.31
Educated in Arabic	4(80)	1(20)	0.36
Out of school	2(40)	3(60)	0.28
Past medical history			
Familial history of epilepsy	15(65.22)	8(34.78)	0.44

Table 2: Epilepsy related factors of cognitive disorders.

Variables	Cognitive disorders		*p*-value
	Yes (n = 63)	No (n = 59)	
Seizures frequency			
monthly	22(62.86)	13(37.14)	0.52
daily	19(70.37)	8(29.63)	0.2
annual	18(56.25)	14(43.75)	0.28
weekly	4(50)	4(50)	0.36
Age at seizures onset (years)			
1 -10	5(41.67)	7(58.33)	0.11
11 -20	21(61.76)	13(38.24)	0.58
21 -30	15(57.69)	11(42.31)	0.39
31- 40	4(50)	4(50)	0.36
41- 50	7(63.64)	4(36.36)	0.58
51- 60	4(100)	0	0.14
61 - 70	5(100)	0	0.08
> 70	2(100)	0	0.37
Type of seizures			
Generalized	43(56.58)	33(43.42)	0.05
Focalized	20(76.92)	6(23.08)	0.05
Epilepsy duration (Years)			
1 - 10	53(66.25)	27(33.75)	0.06
20-Nov	8(44.44)	10(55.56)	0.08
21 - 30	1(50)	1(50)	0.62
31- 40	0	1(100)	0.38
41 - 50	1(100)	0	0.61
Type of treatment			
Medical treatment	63(61.76)	39(38.24)	0.06
Spiritual	29(58)	21(42)	0.28
Traditionnal	27(56.25)	21(43.75)	0.19
AED subtype			
Phenobarbital	32(64)	18(36)	0.01
Carbamazepine	14(56)	11(44)	0,33
Sodium Valproate	9(56.25)	7(43.75)	0.39
Lamotrigine	2(28.57)	5(71.43)	0.22
Clonazepam	0	4(100)	0.06

Cognitive disorders and risk factors

Regarding grades of cognitive decline, cognitive disorders in 63 (61.8%) patients including cognitive impairment (25.5%), mild dementia (25.5%), moderate dementia (7.8%) and severe dementia (3%). The domains most affected were calculation and attention deficit in 49 (48%) patients, memory disorders (27.45%) and copying (12.75%) The mean age of patients affected by cognitive disorders was 35.93 years. Male and women accounted respectively for 52.4% and 47.6%. Table I presents the sociodemographic risk factors of cognitive disorders. There was significant relationship between phenobarbital (*p*-value = 0.01), cranial trauma (*p*-value = 0.04), and presence of cognitive disorders. The age group between 26 and 35 years was less exposed to the occurrence of cognitive disorders (*p*-value = 0.04). Table 2 presents epilepsy related factors of cognitive disorders.

DISCUSSION

This study showed a high frequency of cognitive disorders (61.76%) in patients with epilepsy by using MMSE. The Mini-Mental State Examination (MMSE) is a widely used screening tool for detecting cognitive deficits, especially since it may be completed quickly and is user-friendly. In epilepsy, MMSE is used to detect cognitive impairment and determine the effects of antiepileptic drugs [19,20]. The overall mean MMSE score was 25.65 ± 5.07. This performance was similar in the study of Panday (25.14 ± 015.31) [21] but lower than in the study of Takhirovna in India (26.10 ± 1.1 points) [22]. According to gender, female had lower MMSE score than male: 25.18 versus 26.06 points, similar than in the study of Merkena in Ethiopia who found respectively 27.31 for male and 26.57 for female [16]. Controversially, Pandey had found that women had best score than men: 27.1 versus 25.8 points [21]. Patients who had educated had better MMSE score than non-educated patients: 26.45 versus 19.06 points. This result was in line with literature which reported that populations with low schooling level present a worse performance in this test [23]. The performance of patients with generalized epilepsy syndrome was lower than in the patients with focal syndrome (25.42 v 26.30). A study from Ethiopia, Merkena et al. had found a higher score for generalized epilepsy than focal epilepsy (27 v26.79) [16]. Generalized tonic–clonic seizures are associated with a greater cognitive impairment than partial seizures [24]. According to treatment, patients treated by phenobarbital had lower performance than patients treated by carbamazepine or valproate sodium. This finding was observed by Merkena in Ethiopia for monotherapy [16]. Regarding grades of cognitive decline, cognitive disorders was observed in 61.8% of patients with epilepsy including cognitive impairment (25.5%), mild dementia (25.5%), moderate dementia (7.8%) and severe dementia (3%). On the contrary many previous studies did not mention the prevalence about cognitive dysfunctions. In this study, 37% of patients had MMSE score ≤ 24, in line with Kumar J et al. who reported 36% [25]. This high frequency of cognitive disorders could be explained by the fact the long duration of epilepsy and Treatment. In addition, most of patients with epilepsy did not take correctly the treatment. Memory impairment, mental slowing, and attentional deficits are the most frequent cognitive disorders associated with epilepsy [26,27]. The domains most affected were calculation and attention (48%). Memory troubles were reported in 27.45% of patients, in concordance with the study of Berg [28] who had reported a frequency of 25-55%. Helmstaedter study [29] had reported that memory decline goes hand in hand with chronic epilepsy. A variety of clinical epilepsy factors contribute to Cognitive Adverse Effects (CAE) of epilepsy, including underlying brain pathology, age at seizure onset, seizure type and severity, antiepileptic medications, and other factors [30-32]. In our study, only 2 risk factors were identified: cranial trauma (p-value = 0.04) and phenobarbital in monotherapy (p-value = 0.01). Of AED, phenobarbital appears to have the highest risk of cognitive and behavioral toxicity [33]. In contrast, patients aged of 26-35 years had less cognitive disorders than the others (p-value = 0.04). The situation could be explained that the young age at seizures onset: 45.1% of seizures occurred at the age 1- 20 years. Indeed, the mean age of patients affected by cognitive disorders was 35.93 years.

Study limitations

This multicenter study had showed a high frequency of cognitive disorders in patients with epilepsy by using Mimi mental state evaluation. This study had several limitations. First, the use of a single test has not been able to test all areas of cognition and not underestimate these disorders. The inclusion of out-of-school patients and patients with other comorbidities such as anxiety and depression may also overestimate the results.

CONCLUSIONS

Cognitive disorders are common among patients with epilepsy in Burkina Faso. Head trauma and the use of phenobarbital play an important role in the occurrence of these disorders, which affect the quality of life of patients.

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REFERENCES

1. Ngugi AK, Bottomley C, Kleinschmidt I, Sander JW, Newton CR. Estimation of the burden of active and life-time epilepsy: a metaanalytic approach. Epilepsia. 2010; 51: 883-890. https://bit.ly/35T30FG
2. Meyer AC, Dua T, Ma J, Saxena S, Birbeck G. Global disparities in the epilepsy treatment gap: a systematic review. Bull World Health Organ. 2010; 88: 260-266. https://bit.ly/2MvNGXS
3. Ngugi AK, Newton CR, Carter JA. The epilepsy treatment gap in developing countries: a systematic review of the magnitude, causes, and intervention strategies. Epilepsia. 2009; 50: 1293-1294. https://bit.ly/2Bw7LXQ
4. Mbuba CK, Ngugi AK, Fegan G, Ibinda F, Muchohi SN, Nyundo C, et al. Risk factors associated with the epilepsy treatment gap in Kilifi, Kenya:a cross-sectional study. Lancet Neurol. 2012; 11: 688-696. https://bit.ly/33XO5s7
5. Kariuki SM, Abubakar A, Holding PA, Mung'ala-Odera V, Chengo E, Kihara M, et al. Behavioral problems in children with epilepsy in rural Kenya. Epilepsy Behav. 2012; 23: 41-46. https://bit.ly/2J4N9Kg
6. Aldenkamp AP, Bodde N. Behaviour, cognition and epilepsy. Acta Neurol Scand. 2005; 112: 19-25. https://bit.ly/2p187CV
7. Hermann B, Seidenberg M, Jones J. The neurobehavioral comorbidities of epilepsy: can a nature history be developed. Lancet Neurol. 2008; 7: 151-160. https://bit.ly/2W0qrbx
8. Baker GA, Taylor J, Aldenkamp AP; SANAD group. Newly diagnosed epilepsy: cognitive outcome after 12 months. Epilepsia. 2011; 52: 1084-1091. https://bit.ly/2VXBIcJ
9. Cahn-Weiner DA, Wittenberg D, McDonald C. Every cognition in temporal lobe and frontal lobe epilepsy. Epileptic Disord. 2009; 11: 222-227. https://bit.ly/2N1n93t
10. Oddo S, Solís P, Consalvo D, Giagante B, Silva W, D'Alessio L, et al. Mesial temporal lobe epilepsy and hippocampal sclerosis: cognitive function assessment in Hispanic patients. Epilepsy Behav. 2003; 4: 717-722. https://bit.ly/31xEZkb
11. Ogunrin O, Adamolekun B, Ogunniyi AO, Aldenkamp AP. Cognitive Function in Nigerians with Newly Diagnosed Epilepsy. Can J Neurol Sci. 2000; 27: 148-151. https://bit.ly/35RJRDV
12. Sunmonu T, Ogunrin O, Komolafe AM. Seizure variables and cognitive performance in patients with epilepsy. AJNS. 2008; 27: 86-94. https://bit.ly/2J7PfsJ
13. Arinzechi EO, Ogunrin OA, Nwosu CM, Nwani PO, Enwereji KO, Asomugha LA, et al. A community-based case–control study of prevalence and pattern of cognitive impairments in patients with epilepsy residing in South-Eastern Nigeria. J Neurosci Rural Pract. 2016; 7: 405-411. https://bit.ly/2P4dj3z
14. Ogunrin O, Adamolekun B, Oguniiyi A. Cognitive effects of anti-epileptic drugs in Nigerians with epilepsy. AJNS. 2015; 24: 18-24. https://bit.ly/2MyxWU3

15. Lagunju IO, Adeniyi YC, Olukolade G. Cognitive function in Nigerian children with newly diagnosed epilepsy: a preliminary report. Pan Afr Med J. 2016; 24: 113. https://bit.ly/2P5WUMe

16. Merkena MD. Prevalence of cognitive adverse outcomes in epileptic outpatients. J Neurol Stroke. 2016; 4: 00155. https://bit.ly/2J7QcBj

17. Matonda-ma-Nzuzi T, Miezi SMM, Mpembi MN, Mvumbi DM, Aloni MN, Malendakana F, et al. Factors associated with behavioral problems and cognitive impairment in children with epilepsy of Kinshasa, Democratic Republic of the Congo. Epilepsy Behav. 2018; 78:78-83. https://bit.ly/33FKrCW

18. Orinski P, Meador KJ. Cognitive side effects of antiepileptic drugs. Epilepsy Behav. 2004; Suppl 1: S60-S65. https://bit.ly/2MUEFXg

19. Wu T, Chen CC, Chen TC, Tseng YF, Chiang CB, Hung CC, et al. Clinical efficacy and cognitive and neuropsychological effects of levetiracetam in epilepsy:an open-label multicenter study. Epilepsy Behav. 2009; 16: 468-474. https://bit.ly/2MyaHt3

20. Huang CW, Hsieh YJ, Tsai JJ, Pai MC. Cognitive performance in cryptogenic epilepsy. Acta Neurol Scand. 2005; 112: 228-323. https://bit.ly/2MUEKKy

21. Pandey S. Correlates of cognitive adverse outcomes among epileptic patients. J Health Sci. 2018: 5:100-102.

22. Takhirovna M, Gafurovich G. Peculiarities of cognitive disorders in adult patients with epilepsy. BJMMR 2016, 13: 1-7. https://bit.ly/35WbVpZ

23. Tombaugh TN, McIntyre NJ. The mini-mental state examination: a comprehensive review. J Am Geriatr Soc. 1992; 40: 922-935. https://bit.ly/2BzyEtD

24. Dodrill CB. Correlates of generalized tonic-clonic seizures. with intellectual, neuropsychological, emotional and social function in patients with epilepsy. Epilepsia. 1986; 27: 399-411. https://bit.ly/2P5baVx

25. Kumar VJ, Vatsala M. Cross sectional study to determine the cognitive impairment among epilepsy patients. Int J Res Med Sci. 2019; 7: 1465-1471. https://bit.ly/2MZm8sJ

26. Dodson WE, Trimble MR. Epilepsy and quality of life in epilepsy. New York; Raven Press; 1994.

27. Aldenkamp AP, Dreifuss FE, Renier WO. Epilepsy in children and adolescents. New York; CRC-Press Publishers; 1995.

28. Berg AT. Epilepsy, cognition, and behavior: The clinical picture. Epilepsia. 2011; 52: 7-12. https://bit.ly/2MTBYVW

29. Helmstaedter C. Neuropsychological aspects of epilepsy surgery. Epilepsy & Behavior. 2004; 5 Suppl 1: S45-S55. https://bit.ly/2pIIc2P

30. Aldenkamp AP. Cognitive impairment in epilepsy: State of affairs and clinical relevance. Seizure. 2006; 15: 219-220. https://bit.ly/31taBqR

31. Jokeit H, Ebner A. Effects of chronic epilepsy on intellectual functions. Prog Brain Res. 2002; 135: 455-463. https://bit.ly/2qovcjg

32. Hesdorffer DC, Ludvigsson P, Olafsson E, Gudmundsson G, Kjartansson O, Hauser WA. ADHD as a risk factor for incident unprovoked seizures and epilepsy in children. Arch Gen Psychiatry. 2004; 61: 731-736. https://bit.ly/2VXavXo

33. Kwan P, Brodie MJ. Neuropsychological effects of epilepsy and antiepileptic drugs. Lancet. 2001; 357: 216-222. https://bit.ly/2P5bXWv