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Prevalence and Determinants of Complementary and Alternative Medicine Use among Children living with Epilepsy in Port Harcourt, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author NGJ designed the study, performed the statistical analysis, wrote the protocol. Author KNW wrote the first draft of the manuscript, and managed the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Epilepsy is a common neurologic disorder in children with its management centered on the use of anti-seizure medications (ASM). However, many children do not achieve seizure control despite being on the appropriate ASM. Hence, caregivers may seek complementary and alternative medicines (CAMs) therapies. The aim of this study is to investigate the prevalence and types of CAM used by children with epilepsy in a tertiary hospital in Port Harcourt, Nigeria, and the factors that determines their use.
Methods: A descriptive cross-sectional study was conducted among children diagnosed with epilepsy and their caregivers. Participants were recruited using a convenient sampling method, a

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structured questionnaire was used to collect data. Descriptive statistic was performed using IBM SPSS while Pearson's chi-square test was used to identify significant associations.
Results: The prevalence of CAM use was found to be 84.3%, the use of CAM is a risk for poor adherence to ASM. Family members were the main influencers in the decision to use CAM, and the majority of parents/caregivers did not consult their children's healthcare providers before incorporating these therapies. Significant factors influencing the use of CAM includes: being a male (P=0.01), higher seizure frequency (P=0.002), multiple ASM use (P=0.01), and the presence of comorbidities (P=0.04). The most common CAMs used were prayers, kernel or crude oil and scarifications.
Conclusion: CAM use among children with epilepsy is common and is a cause of poor adherence to ASMs with its untoward effects. It is crucial for healthcare providers to proactively inquire about the use of CAM with caregivers during the management of childhood epilepsy and to educate them on the possible risks specifically regarding drug adherence, compliance and poor seizure control.

Keywords: Complementary; alternative; medicine use; children; epilepsy.

1. INTRODUCTION

Epilepsy is a common neurologic disorder in children. It is a disease of the brain defined as the occurrence of at least 2 unprovoked seizures more than 24 hours apart, or by a single unprovoked seizure with the possibility of more or diagnosis of epilepsy syndrome [1]. The management of epilepsy in children is centered on the rational use of anti-seizure medications (ASM); nevertheless, only two-thirds of them achieve seizure freedom despite being on the appropriate ASM. In addition to being linked to higher rates of morbidity and mortality, epilepsy can result in discrimination and stigmatization [2]. Children due to their dependency state, lack the ability to make an informed decision on their healthcare, hence their parents or care givers are left with this responsibility. Therefore, some parents may seek out complementary and alternative medicines (CAMs) even as the child is on their ASM, despite lack of adequate scientific evidence of their benefits [3].

CAM includes treatments, practices, therapies as well as products used outside of the conventional orthodox medicine. Complementary medicine is utilized as an adjunct to conventional medicine, not in place of it while in alternative medicine the conventional medicine is replaced for a nonmainstream approach [4,5].

The use of CAM in the management of epilepsy comprises the use of practices and products which are not recognized as standard and conventional anti-seizure medicines. Such practices which commonly involve the use of nutritional supplements, herbal remedies, homeopathy, osteopathy and spiritual practices have perceived benefits and potential risks which may pose immediate and long-term consequences on epilepsy treatment outcome [6,7] These may contribute in various ways to morbidity including untoward effects of drug-drug interactions, poor seizure control, physical and psychological trauma, poor adherence to ASM, increase in the cost of care and worsening of epilepsy treatment gaps [2,8].

Worldwide, the use of CAM has remained popular, even among parents and care givers who have not identified definite benefits from consistent use of these medications and practices. The prevalence of use of CAM in children with epilepsy is relatively high across the world, Doederin et al [9] reported a prevalence of 37% in Heidelberg, Germany, while a prevalence of 56% was reported in Ibadan, Nigeria [10]. In developing countries, such forms of CAM use like the use of herbal concoctions, prayers and spiritual healing, scarifications in addition to vitamins and nutritional supplements may account for comparably higher prevalence [10]. Other types of CAMs reported include use of cannabis products, aromatherapy, dietary therapy, massage therapy among others.[2] Such practices have also been attributed to the influence of certain socio-economic factors including ignorance, poverty, low level of education and social class [10].

Diverse factors have been noted to be predictive of the use of CAM among children with epilepsy, notable among these include the previous occurrence of adverse drug event (ADE),[7] others include the duration of illness, use of CAM by the parents themselves and the desire of the parents to receive a holistic and natural treatment for their child.[5] Other contributory factors which may influence the use of CAMs

especially in developing countries include scarcity of ASMs due to lack of local production and over reliance on foreign pharmaceutical companies and high cost when they are available [11]. There is paucity of study on the use of CAM among children with epilepsy in this region, this Study was done to determine the prevalence and types of CAM use among children with Epilepsy receiving care in a tertiary hospital in Port Harcourt, Nigeria and to determine the factors that enhances the use of CAM in the region.

2. MATERIALS AND METHODS

2.1 Study Design and Population

Cross sectional descriptive study was carried out in the paediatric neurology clinic at the University of Port Harcourt Teaching Hospital. The study participants included children who were less than 18 years with a diagnosis of epilepsy made by a paediatrician or a child neurologist and is on follow up, and their parents/guardians that presented to the paediatric neurology clinic of the University of Teaching Hospital from June 2022-December 2023. The children most have been on ASM for at least 4 months, assented to the study and their parents or care givers given their consent before they were recruited into the study.

2.2 Sample Size Calculation

OpenEpi, an open-source statistical software program Version 3 [12], was used to calculate the sample size. Using a population of 150 as found in the clinic epilepsy cohort, with a 95% confidence interval, and the prevalence of 56.6% observed in another study previously done in Nigeria, [10] a minimum of 108 patients were required for this study.

2.3 Sampling Method

A convenience sampling method was used to recruit the participants, 108 children diagnosed with epilepsy who assented or gave consent and their parents who gave consent to the study participated in the study. The participants were consecutively recruited until sample size was met.

2.4 Statistical Analysis

Statistical analysis was carried out with a significance level set at 0.05 using IBM SPSS Statistics software (version 25.0). Student T-test was used to calculate the mean age. The relationship between CAM use and categorical variables (socio-demographic and some clinical variables) were examined by using the Pearson's chi square test ($\chi 2$). Results were presented as frequency tables in simple proportions and graphs.

3. RESULTS

Table 1 shows the socio-demographic characteristics of the parents/ caregivers of the patients. Eighty three (76.8%) were the parents of the patients while 25 (23.2%) were caregivers that were either relatives or not related to them.

Their ages ranged from 20 years to 62 years with a mean age of 45.0 ± 15.8 years. Sixty three percent of them were married, 94 (87%) of them has above primary level of education. Fifty nine (54.6%) of the caregivers earn above 100,000 naira monthly.

The clinical characteristics of the patients is shown in Table 2. Forty two (38.9%) of them are males with a male to female ratio of 1: 1.6. The patient's age ranged from 6 months to 17 years of age with a mean age of 8.96 ±6.24 years. There was no significant difference in the mean age for sex (t -1.33, p 0.22). Thirty six (33.3%) of the patients have a family history of epilepsy, in 85/108 (78.7%) patients, the duration of epilepsy is more than 1 year while 56(51.8%) of them had other co-morbidities.

Concerning the use of ASM, 74 (68.5 %) were on mono-therapy while 34 (31.5%) were on poly therapy, only 22 (20.4%) of the patients had used ASM for less than a year. Forty two (38.9%) has more than 5 seizures per month, 48 (44.4%) reported that the ASM was effective while 18 (16.7%) reported that they were not sure of the effectiveness of ASM.

Table 3 shows the characteristic and prevalence of CAM use. Of the 108 study participants 91(84.3%) reported that they had used CAM in the course of their treatment. In 54 (59.3%) of the participants, the CAM was suggested to them by their family member, 86(94.5%) did not discuss the CAM use with their doctor before using them.

Of the 91 patients that had ever used CAM, 32(35.2%) were still using CAM, while 59(64.8%) had stopped taking their ASMs while on CAM.

When asked if they will want their children to continue the use of CAM in future 23(25.3)

answered yes, 54(59.3%) said no, while 14(15.4%) were not sure.

Reasons for not continuing with CAM incudes the cost among 35/54 (63.0%), not effective 16/54 (29.6%), worsening seizures 4/54 (7.4%)

Table 4 shows the different types of CAM used-prayers, applying palm kernel oil and crude oil were the most common each accounting for 15.2%.

Fig. 1, shows the reasons given by the parents for using CAM on their children.

Table 5, shows the relationship between the use of CAM and other variables. Being a male child, having higher seizure frequency, using multiple anti-seizure medications, duration of epilepsy of less than one year, and the presence of a co-morbid state were significant factors that determined the use of CAM among children with epilepsy.

Table 1. Socio-demographic characteristics of parents/caregivers

Variables	Frequency N=108	Percentages
Parent /care givers		
Mothers	59	54.6
Fathers	24	22.2
Relatives	15	13.9
Non relatives	10	9.3
Ages of parents/caregivers		
20-29	17	15.7
30-39	32	29.6
40-49	30	27.8
50-59	17	15.7
≥60	12	11.1
Marital status		
Married	68	63.0
Separated/Divorced/widowed	25	23.1
Single	15	13.9
Level of education		
Primary/none	14	13.0
Secondary	43	39.8
Tertiary	51	47.2
Total income per month		
≤ 100,000	49	45.4
> 100,000	59	54.6

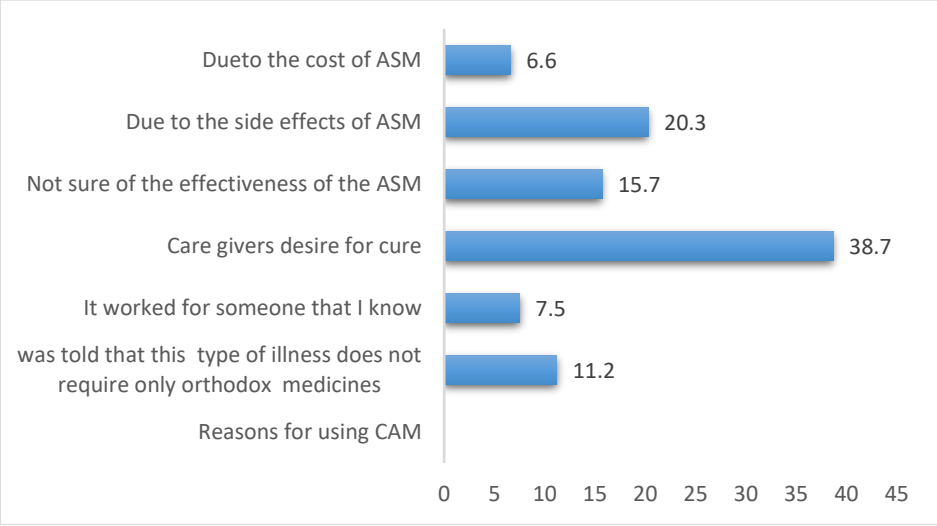

Fig. 1. Reasons for the use of CAM

Table 2. Clinical characteristics of patients

Variable's	Frequency N=108	Percentages
Sex		
Males	42	38.9
Females	66	61.1
Ages of patient		
≤ 1	22	20.4
1-5	37	34.2
>5 years	49	45.4
Family history of epilepsy		
Yes	36	33.3
No	72	66.7
Duration of epilepsy		
Less than 1 year	23	21.3
1-5	37	34.3
More than 5 years	48	44.4
On ASM		
Yes	103	95.4
No	5	4.6
ASM		
Monotherapy	74	68.5
Polytherapy	34	31.5
Number of seizure / month		
None	44	40.7
1-5	22	20.4
More than 5	42	38.9
Effectiveness of ASM		
Very effective	48	44.4
Effective	13	12.0
Slightly effective	19	17.6
Not effective at all	10	9.3
Not sure	18	16.7
Duration of ASM use (years)		
< 1	22	20.4
1-2	56	51.9
3-4	12	11.1
> 5	18	16.7
Presence of comorbid state		
Yes	56	51.8
No	52	48.2
Total	108	100.0

4. DISCUSSION

The percentage of parents reporting the use of complementary and alternative medicine (CAM) for the treatment of their children with epilepsy in this study (84.3%) is high. This finding is in keeping with recent reports on the use of CAM in children and adolescents [13]. Our finding is comparably higher than the previous report of 56.6% by Lagunju [10] emanating from this region over a decade ago, although the reason for this disparity is not clear, it is possible that the socio-economic status of the patients in the two study was different. This present study however, did not addressed the issue of socioeconomic status.

This study showed that the commencement of CAMs among respondents was done in majority of the cases (95%) without the knowledge of the health care service provider, this is similar to reports by Doering et al[9] who stated that majority of the patients starts CAMs without the knowledge of their managing physicians, this highlights the need for the doctors to explore the history of CAM use in all their patients. The

importance of a good index of suspicion of the use of CAMs cannot be overemphasized, especially as study has shown that the potential for pharmacological interaction between the active substances in CAMs has the potential to limit the effectiveness of ASMs prescribed by the unsuspecting clinician [2]. Furthermore, the risk of toxicity and end-organ damages especially from herbal remedies in addition to the potential side effects of ASM may synergistically increase the morbidity among children with epilepsy, hence the physician's awareness of the drug history at each follow up visit is imperative [14].

Table 3. History of CAM use

Variables	Frequency N = 91	Percentages
Ever used CAM		
Yes	91	84.3
No	17	15.7
Who suggested the CAM?		
Member of the family	54	59.3
Priest	11	12.1
Friends	14	15.4
Doctor/Pharmacists	4	4.4
No one	6	6.6
Others	2	2.2
Did you ever discuss with the doctor before using CAM?		
Yes	5	5.5
No	86	94.5
Were there any Side effects?		
Yes	36	39.6
No	55	60.4
Was your child still taking ASM while on CAM?		
Yes	32	35.2
No	59	64.8
Will you continue CAM?		
Yes	23	25.3
No	54	59.3
Not sure	14	15.4

Table 4. Type of CAM used among patients

Variables	Frequency N=597	Percentages
Prayers	91	15.2
Scarifications	62	10.4
Applying crude oil	91	15.2
Applying palm kernel oil	91	15.2
Application of onion juice	56	9.4
Use of supplements/vitamins	84	14.0
Water based herbal remedies	78	13.0
Exorcism	26	4.3
Alcohol base herbal remedies	1	0.2
Cannabis oil	3	0.5
Locking the child for the seizures to pass	6	1.0
Animal sacrifice	8	1.3

** Multiple responses obtained*

Table 5. Relationship between the use of CAM and other variables

Variables	Ever used CAM		Total	χ^2	P
	Yes N=91	No N=17			
Sex of patient					
Males	40 (95.2)	2 (4.8)	42 (100.0)	6.19	0.01**
Females	51(77.3)	15 (22.7)	66 (100.0)		
Family history of epilepsy					
Yes	33(91.7)	3(8.3)	36(100.0)	2.21	0.13
No	58(84.3)	14(15.7)	58(100.0)		
Seizure frequency					
None / month	31(70.4)	13(2.6)	44 (100.0)	12.05	0.002**
1-5/ month	19(86.4)	3(13.6)	22 (100.0)		
>5 /month	41(97.6)	1(2.4)	42 (100.0)		
ASM					
Monotherapy	58(78.4)	16 (21.6)	74 (100.0)	6.07	0.01**
Polytherapy	33(97.1)	1 (2.9)	34 (100.0)		
Duration of epilepsy					
Less than 1 year	44 (91.7)	4 (8.3)	48 (100.0)	8.42	0.02**
1-5	32 (86.5)	5 (13.5)	37 (100.0)		
More than 5 years	15(65.2)	8 (34.8)	23 (100.0)		
Duration of ASM use (years)					
< 1	19 (86.4)	3 (13.6)	22 (100.0)	1.14	0.79*
1-2	47(83.9)	9(16.1)	56 (100.0)		
3-4	9(75.0)	3(25.0)	12 (100.0)		
> 5	16(88.9)	2(11.1)	18(100.0)		
Caregivers level of education					
Primary/none	9 (64.3)	5 (35.7)	14 (100.0)	5.56	0.06
Secondary	39 (90.7)	4 (9.3)	43 (100.0)		
Tertiary	43(84.3)	8 (15.7)	51 (100.0)		
Total income per month					
≤ 100,000	38 (77.6)	11 (22.4)	49 (100.0)	3.02	0.08
> 100,000	53 (89.8)	6 (10.2)	59 (100.0)		
Presence of co-morbid state					
Yes	51(91.1)	5(8.9)	56(100.0)	4.03	0.04**
No	40(76.9)	12(23.1)	52(100.0)		
Total	91(84.3)	17 (15.7)	108 (100.0)		

** Fishers exact test, ** significant levels*

Our study showed that the influence on the parents and caregivers to commence CAMs in their children and wards was majorly from relatives and friends, perhaps these third parties also share in the decision making and cost of care as seen in many cases of chronic illnesses in developing countries where the effectiveness of health insurance schemes is yet to be established [15].Contrary to the finding of this study were relatives and friends were the source of information on CAM, Bosak et al [16] sited the internet as the most popular place to find information on CAM.

The use of CAMs has been associated with poor drug adherence;[17] this was corroborated in this study where over two thirds of those using CAMs stopped their ASMs while CAM. The reasons for non-adherence while on CAMs was not explored in this study but the plausible reason could be due to the fear of the CAM not being effective when used with orthodox drugs, poor access to ASMs and the high cost thereof which may indirectly promote the subscription to CAMs.[11,17,18]

The types of CAMs used by the respondents in this study was heterogenous. The commonest were the use of Crude oil, Kernel oil and prayers. These are consistent with findings by Okoji et al[19] and Wonodi et al.[20]. The application of crude oil or kernel oil are age-long, harmful traditional practices with perceived effectiveness as seizure first aids [20]. These are popular even

in contemporary times and have been reported to be the most consistently used remedies in the home management of convulsions in this region.[19,20] The use of crude oil as CAMs has been reported to be associated with poor clinical outcomes and severe central nervous system sequelae in children with seizures;[19] this common practice must be continually discouraged, particularly in this environment where the accessibility to crude oil may not be challenging [20].

Prayer was among the leading CAMs in this study, this finding is similar to reports from religious communities in the United States (USA) as well as some Mediterranean and Middle Eastern countries [21,22]. As a component of mind–body intervention, prayer has been included as a type of CAM by some authorities [23]. Prayer has been widely reported as a common non- pharmacological alternative to ASMs; care-givers in an epilepsy monitoring unit admitted to praying for their children with epilepsy on a daily basis [21].Some authors have argued that the inclusion of prayer as CAM spuriously increases the prevalence of CAM among people living with chronic illnesses; this may be the situation in this present study which recorded a high prevalence of use of CAMs. Furthermore, in the context of childhood, the psychological benefits of prayer among children with epilepsy, including the mental capacity to understand the nature of their illness and positively transform their experiences with personal prayers remain questionable due to the limitations in their age-dependent cognitive abilities [23,24].

Exorcism, scarifications and animal sacrifice accounted for other *non-prayer* but spiritual types of CAMs used in this study, these practices have been reported in other parts of Nigeria [25]. Across African communities, it is thought that epilepsy is caused by evil spirits and this can be cured through a variety of spiritual means including prayers, exorcism and animal rituals.[25]. The practice of exorcism and scarifications in children is a clear risk for physical abuse, stigma, psychological abuse, breach in the rights of the child and all these can culminate in other mental health complications among children with epilepsy [26].This calls for increase in awareness and the involvement of all stake holders including the religious leaders in enlightenment campaigns that pertain to management of childhood epilepsies.

The use of multivitamins and nutritional supplements among children with epilepsy was common in this study. This is not surprising and may be potentially beneficial especially as micronutrient deficiency have been reported to be prevalent in developing countries [27-29]. Similarly, poor intake of some vitamins, for instance vitamin B1 has been linked to higher incidence of afebrile seizures [30]. Furthermore, some ASMs have been associated with nutritional deficiencies such as vitamin D, folate, vitamin B12, biotin, thiamine, carnitine, etc., hence their supplementation is imperative to limit undesired nutritional complications, however to do this the prescription should come from the managing physician after proper clinical examinations and laboratory investigations that show deficiencies [29,31]. Conversely, the use of multivitamin and nutritional supplements may result in drug-drug interaction between these and ASM, thus interfering with the efficacy of ASDs and seizure control [31,32]. Hence, the prescription of multivitamins and nutritional supplements in children with epilepsy should be done by the child neurologist after a review and exclusion of the possibilities of pharmacological interactions between these and ASMs.

The ingestion of water based herbal concoctions was also a common CAM in our study, this is in keeping with reports by Ademilokun et al. [25] The use of herbal remedies as home management of seizures depicts poor health seeking behavior, a reflection of the epilepsy treatment gaps as well as socio-cultural beliefs and age long perceived benefits of these modalities of treatment. Our study showed that water based herbal concoctions were more commonly used than alcohol-based remedies, the latter has the tendency to higher morbidity due to their pro-convulsant effects and the effects of alcohol on the end organs [33].

The main reasons for the use of CAMs among the respondents in our study was the caregiver's intention for permanent cure of epilepsy. This may be related to dissatisfaction from the long-term use of antiepileptic drugs as reported by other workers.[2] Studies have shown that about 30% of children on ASM may have poor seizure control despite good drug adherence and polytherapy,[34] therefor, the need to educate and counsel the parents and care givers on possible outcomes of the child's condition while on ASM and other treatment options available for the child in cases of drug resistant epilepsy is important.

The cost of ASMs as a reason for CAM use was 6.6% from this present study. This was rather

surprising and in contrast to finding by Farrukh et al [35] who reported that lower costs, greater accessibility of CAMs, and patients' insufficient seizure control with ASMs were the main drivers of the use of CAM.

The finding of this study showed that CAM use was significantly higher among children with higher seizure frequency, newly diagnosed epilepsy, who are on multiple ASMs and those with co-morbidities. This finding is similar to previous studies [16] and it is possible that all these factors are a reflection of the severity and the course of disease as well as the stigmatization linked epilepsy in the society, as care giver or parents are desperate to find a cure.

The sex difference on CAM use was significant with a higher prevalence among males compared to the females. This may be a reflection of the social inequalities faced by the girl child. It has been reported that the health and wellbeing of children can be impacted by gender norms particularly in Africa were there are barriers (including the ability to access health care services) that disproportionately affect females [36].

Although there is no significant relationship between the parents or caregivers level of education and the use of CAM among children with epilepsy in this study. However, this study found a higher prevalence of CAM use among children with epilepsy whose parents or caregiver had secondary and tertiary level of education. This findings is similar to previous studies [37,38] but is differing from report by Bosak et al [16] who found that CAM use was considerably more common among patients with lower educational backgrounds.

5. CONCLUSION AND RECOMMENDATION

The prevalence of CAM use among children living with epilepsy is high and is a risk for poor adherence to ASM. Majority of the parents did not seek counsel from the doctors before commencing CAM on their children. There is need for physicians to enquire about the use of CAM on any child living with epilepsy who presents to them and to counsel care givers on the dangers of CAM especially with regards to adherence and compliance to ASMs.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

CONSENT

Consent and assent were obtained from the guardian /or parents and participants where necessary.

ETHICAL APPROVAL

Ethical permission was obtained from the Ethics and Research Committee of the University of Port Harcourt Teaching Hospital.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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