



Use of complementary and alternative medicine among adults with epilepsy in a university epilepsy clinic in Poland

Magdalena Bosak*, Agnieszka Słowik

Dept. of Neurology, Jagiellonian University Medical College, Krakow, Poland



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ABSTRACT

Introduction: The use of complementary and alternative medicine (CAM) is becoming increasingly prevalent both in general population and patients with chronic diseases. The aim of the study was to determine the prevalence, reasons, and factors influencing the use of CAM in Polish patients with epilepsy (PWE).

Material and methods: This prospective study involved PWE treated in a university epilepsy clinic. Data on epilepsy, antiepileptic drugs, level of education, vocational activity, and patterns of CAM were collected from a structured interview and from medical records.

Results: The sample population consisted of 473 PWE (mean age: 35.3 years); 220 (46.5%) were females, and 228 (46.5%) were in remission. Overall 26.8% (127) of the cohort used at least one type of CAM. The CAM modalities most frequently used were herbal and dietary supplements (32.3%), energy healing (31.5%), and marijuana (27.6%). The internet was the most common source of information on CAM (45.7%). In one-third of subjects, CAM usage affected negatively compliance to standard treatment. Logistic regression analysis revealed several independent risk factors for CAM use in PWE: younger age, longer duration of epilepsy, lack of remission, and lower level of education.

Conclusion: A significant proportion of PWE uses CAM, and its usage may affect negatively compliance to standard treatment. Our findings highlight poor communication between patients and physicians with regard to CAM use. Healthcare professionals should routinely check for CAM utilization in PWE to prevent potential harm related to its use.

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1. Introduction

The use of complementary and alternative medicine (CAM) is becoming increasingly prevalent both in general population and patients with chronic diseases [1,2]. Among adults with common neurological conditions, the use of CAM has been estimated to be around 45% to 50% [3,4]. National Center for Complementary and Integrative Health of the National Institutes of Health defines CAM as “a group of diverse medical and healthcare systems, practices, and products that are not generally considered part of conventional medicine”. Complementary and alternative medicine includes healing practices such as biofeedback, homeopathy, chiropractic care, hypnosis, special diets, herbal and dietary supplements, and many others [5].

Epilepsy, with the point prevalence of active disease of 6.38 per 1000 persons, is one of the most common neurological disorders [6]. Despite the development and introduction of many new antiepileptic drugs (AEDs) over the last two decades, one-third of patients with newly diagnosed epilepsy do not achieve seizure freedom [7]. Nondrug therapies

such as epilepsy surgery, implantable devices, or ketogenic diet are effective in the minority of cases. Thus, many patients may consider the use of CAM to control their seizures and to improve their quality of life.

The use of CAM in epilepsy has been studied extensively; however, the substantial proportion of studies focused on children [8–12]. Most studies exploring CAM use in adult patients with epilepsy (PWE) were published more than 10 years ago [13–16] or come from non-Western cultures [17–21]. Furthermore, socioeconomic and cultural factors, e.g., health insurance and healthcare systems, ethnicity, and local tradition may influence the pattern of CAM practices in PWE. To the best of our knowledge, to date, no studies have been published on the use of CAM in PWE from Eastern Europe.

Therefore, in this study, we aimed to determine the prevalence, reasons, and factors influencing the use of CAM in a large cohort of adult PWE in a Polish university clinic.

2. Material and methods

2.1. Patients

Participants were recruited among consecutive patients aged ≥ 18 who visited an epilepsy clinic within the Department of Neurology,

* Corresponding author at: Dept. of Neurology, Jagiellonian University Medical College, Botaniczna 3, 31-503 Krakow, Poland.

E-mail address: magdalena.bosak@uj.edu.pl (M. Bosak).

University Hospital between March 2018 and December 2018. The inclusion criterion was the diagnosis of epilepsy established according to the guidelines of International League Against Epilepsy (ILAE) [22]. Patients with coexisting psychogenic nonepileptic seizures were excluded from the study.

Protocol of the study followed the principles of Helsinki Declaration and received approval from the university bioethical committee. Each subject obtained the detailed information about the goal of the study and the methods to be used and gave his/her informed consent to participate. All eligible patients agreed to participate.

2.2. Methods

The study had a cross-sectional design. An interview was structured and used the questionnaire that included information on age, sex, age at onset of epilepsy, duration of epilepsy, type and frequency of seizures, ongoing treatment with AED(s), level of education, and vocational activity. We defined the three types of vocational activity as employed, unemployed, and disabled (unable to work because of serious mental/physical disability). The types of epilepsy (focal, generalized, combined, or unknown) were defined in line with the recent ILAE classification [23], according to the history, neurological examination, electroencephalography, and neuroimaging. The following information on the use of CAM in the last 5 years was collected: types of CAM, reasons for CAM use, the source of information on CAM, and willingness of CAM use in future. In person, interviews were conducted with patients who visited the clinic for their regularly scheduled appointments. Questionnaires were completed, and all data were collected by the senior author (MB).

2.3. Statistical analysis

Categorical data are reported as numbers and percentages, and numerical data are represented as means with standard deviations and minimum/maximum as appropriate. The significance of the differences between the groups was tested with the chi-square test for categorical variables or with Mann–Whitney *U* test for numerical data. Predictors of CAM use were modeled with logistic regression. Initial models were built with all the variables and were optimized using the stepwise method (backward selection with determining criterion likelihood ratio for the selection of the variables). A *p*-value of less than 0.05 was considered significant for the differences between groups or for variables which entered the final models of logistic regression. All the analyses were performed using IBM SPSS Statistics 23 software.

3. Results

3.1. Sample characteristics

A total of 473 patients participated in this study. Table 1 presents the clinical characteristics of the studied group regarding age, sex, age at the onset of epilepsy, type of epilepsy, frequency of seizures, number of currently used AEDs, vocational activity, and level of education. Mean age of patients was 36.2 ± 12.51 years [range = 18–77 years]. Of the 473 patients, 220 (46.5%) were females; 319 (67.4%) patients had focal epilepsy; and 228 (46.5%) were in remission. A total of 260 (55.0%) patients were on monotherapy, and the most commonly prescribed AEDs (in mono- or polytherapy) were levetiracetam, valproate, and lamotrigine. All patients were Caucasians.

3.2. Profile of CAM utilization

Overall, 26.8% (127) of the patients used at least one type of CAM. The most frequently used CAM modalities were herbal and dietary supplements (32.3%) and energy healing (31.5%) followed by marijuana (27.6%). The most frequently used herbal and dietary supplements were vitamins/multivitamins, minerals, herbs or other botanicals,

Table 1
General characteristics of the patients.

| Variable | |
|--|--------------------------|
| Female sex, n (%) | 289 (61.1%) |
| Age (years), \pm SD [range] | 36.2 ± 12.51 [18–77] |
| Age at onset of epilepsy (years), \pm SD [range] | 18.56 ± 13.81 [1–72] |
| Duration of epilepsy (years), \pm SD [range] | 17.51 ± 11.56 [1–58] |
| Type of epilepsy, n (%) | |
| Generalized | 117 (24.7) |
| Focal | 319 (67.4) |
| Combined (generalized and focal) | 15 (3.2) |
| Unknown | 22 (4.7) |
| Frequency of seizures, n (%) | |
| Persistent seizures | 253 (53.5) |
| Remission | 220 (46.5) |
| Number of currently used AEDs, n (%) | |
| 1 | 258 (54.5) |
| 2 | 153 (32.3) |
| 3 | 55 (11.6) |
| ≥ 4 | 7 (1.5) |
| The most commonly used AEDs (in mono- or polytherapy), n (%) | |
| Levetiracetam | 211 (44.6) |
| Valproate | 200 (42.3) |
| Lamotrigine | 127 (26.8) |
| Carbamazepine | 64 (13.5) |
| Topiramate | 48 (10.1) |
| Education, n (%) | |
| None | 33 (7.0) |
| Primary school | 80 (16.9) |
| Secondary/vocational | 281 (59.4) |
| Bachelor's/master's degree | 79 (16.7) |
| Vocational activity, n (%) | |
| Employed | 217 (45.9) |
| Unemployed | 165 (34.9) |
| Disabled | 91 (19.2) |

Abbreviations: SD, standard deviation; AEDs, antiepileptic drugs.

carnitine, and fatty acids. Nearly half of the CAM users (60, 47.2%) tried more than one type of CAM in the last 5 years. Table 2 and Fig. 1 summarize the detailed information on CAM use.

Table 2
Patterns of CAM use in patients with epilepsy.

| | n | % |
|--|----|------|
| <i>Types of CAM used by patients (n = 127)</i> | | |
| Herbal and dietary supplements | 41 | 32.3 |
| Energy healing | 40 | 31.5 |
| Marijuana | 35 | 27.6 |
| Homeopathy | 30 | 23.6 |
| EEG biofeedback | 28 | 22.0 |
| Diet | 13 | 10.2 |
| Others | 31 | 24.4 |
| <i>Number of CAM used per patient</i> | | |
| 1 | 67 | 52.8 |
| 2 | 33 | 26.0 |
| 3 | 23 | 18.1 |
| 4 | 4 | 3.1 |
| <i>Reasons for using CAM</i> | | |
| To improve general health | 40 | 31.5 |
| To control seizures | 32 | 25.2 |
| To counteract the side effects of AEDs | 28 | 22.1 |
| Because it is natural and safe | 27 | 21.2 |
| <i>Information sources for users of CAM</i> | | |
| Internet | 58 | 45.7 |
| Family/friends | 25 | 19.7 |
| Television/newspapers | 22 | 17.3 |
| Patients (or their relatives) with epilepsy | 12 | 9.4 |
| I do not remember | 10 | 7.9 |

Abbreviations: CAM, complementary and alternative medicine; EEG, electroencephalographic; AEDs, antiepileptic drugs.

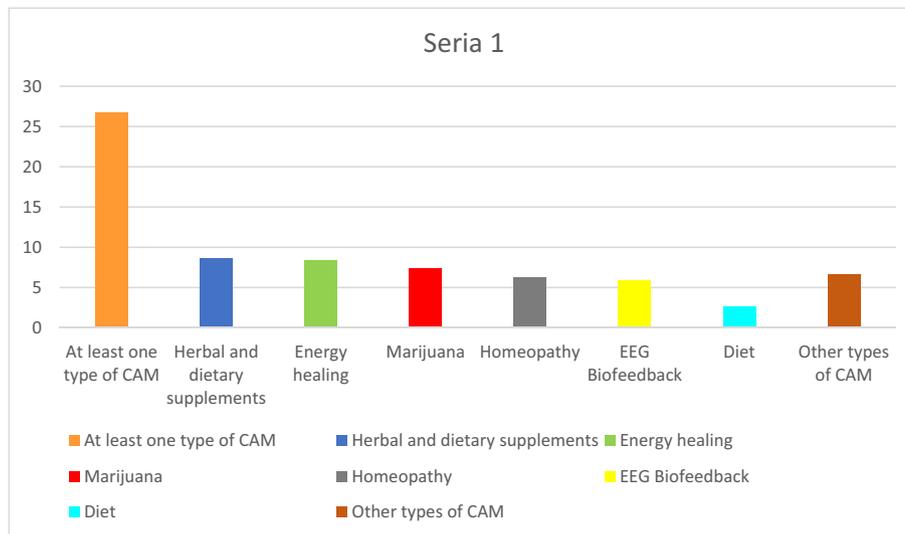


Fig. 1. The most frequently used CAM modalities.

The internet was the most common source of information on CAM (45.7%), followed by family/friend's recommendation (19.7%). The majority of patients (101, 79.5%) did not consult a healthcare professional before using CAM. In addition, 31 (24.4%) patients reported that the use of CAM negatively affected their adherence to AEDs regimen; in further 10 patients (7.8%), CAM practitioners advised to lower doses/withdraw AEDs or undermined the diagnosis of epilepsy. The majority of patients (66, 51.9%) used CAM for epilepsy-related reasons, 70% of patients listed ≥ 2 reasons for CAM usage. One-third of CAM users (44, 33.6%) and 15.6% (64) of nonusers expressed a willingness to use CAM in the near future.

We compared CAM users and nonusers with regard to sex, age, age at onset of epilepsy, duration of epilepsy, epilepsy type, seizure frequency (remission vs persistent seizures), epilepsy therapy (monotherapy vs polytherapy), level of education, and vocational activity. Table 3

Table 3
Characteristics of users and nonusers of CAM.

| Variable | Users (n = 127) | Nonusers (n = 346) | p-Value ^a |
|---|--------------------|-----------------------|----------------------|
| Age (years), mean \pm SD | 33.6 \pm 9.7 | 37.1 \pm 13.3 | 0.002 |
| Age at onset of epilepsy (years), mean \pm SD | 11.3 \pm 8.9 | 21.2 \pm 13.5 | <0.001 |
| Duration of epilepsy (years), mean \pm SD | 22.3 \pm 10.9 | 15.7 \pm 11.3 | <0.001 |
| Sex, n (%) | | | 0.61 |
| Women | 80 (27.7%) | 209 (72.3%) | |
| Men | 47 (25.5%) | 134 (74.5%) | |
| Type of epilepsy, n (%) | | | <0.001 |
| Generalized | 18 (15.4%) | 99 (84.6%) | |
| Focal | 91 (28.5%) | 228 (71.5%) | |
| Combined (focal and generalized) | 14 (93.3%) | 1 (6.7%) | |
| Unknown | 4 (18.2%) | 18 (81.8%) | |
| Seizure frequency, n (%) | | | <0.001 |
| Remission | 26 (11.8%) | 194 (88.2%) | |
| Persistent seizures | 101 (39.9%) | 152 (60.1%) | |
| Epilepsy therapy, n (%) | | | <0.001 |
| Monotherapy | 41 (15.8%) | 219 (84.2%) | |
| Polytherapy | 85 (40.1%) | 127 (59.9%) | |
| Vocational activity, n (%) | | | <0.001 |
| Employed | 39 (18.0%) | 178 (82.0%) | |
| Unemployed | 46 (27.9%) | 119 (72.1%) | |
| Disabled | 42 (46.2%) | 49 (53.8%) | |
| Education, n (%) | | | <0.001 |
| None | 28 (84.8%) | 5 (15.2%) | |
| Primary school | 24 (30.0%) | 56 (70.0%) | |
| Secondary/vocational | 61 (21.7%) | 220 (78.3%) | |
| Bachelor's/master's degree | 14 (17.7%) | 65 (82.3%) | |

Abbreviations: SD, standard deviation; CAM, complementary and alternative medicine.
^a χ^2 test or Student's *t*-test.

presents the results of univariate analysis. Patients with epilepsy using CAM were younger and had a younger age at the onset of epilepsy, had a longer duration of epilepsy, and were more likely to suffer from combined (focal and generalized) epilepsy. Patients with persistent seizures or on polytherapy with AEDs used CAM more frequently. Other factors influencing CAM use were level of education (no education) and vocational activity (inability to work).

Multivariate analysis revealed several independent variables associated with CAM use; younger age (odds ratio [OR] = 1.09; 95% confidence interval [CI] = 1.06–1.28; $p < 0.001$), longer duration of epilepsy (OR = 0.92; 95% CI = 0.90–0.95; $p < 0.001$), persistent seizures (OR = 0.19; 95% CI = 0.11–0.33; $p < 0.001$), and lower level of education (OR = 1.99; 95% CI = 1.44–2.76; $p < 0.001$).

4. Discussion

Despite the lack of enough scientific evidence for its efficacy, the use of CAM is highly prevalent both in developing and in developed countries [1,2,24,25]. According to a recent survey, 13% of the general population in Poland had used CAM during the last 12 months [24]. The prevalence of CAM use in PWE varies between 7.5% and 73.3% [26].

In this study, one-fourth of the patients used at least one type of CAM in the last 5 years. In developed countries, similar percentage was found by Peebles et al. (24%) [14]; however, higher rates were noted by Easterford et al. (34%) [15], Liow et al. (39%) [13], and McConnell et al. (70%) [27]. Most of the aforementioned studies have been conducted in the USA, and a direct comparison of their results may be difficult because of the differences in the health insurance and healthcare systems between the USA and Poland. Furthermore, the prevalence of CAM usage is much higher in the general population in the USA than in Poland (33% and 13%, respectively) [1,24].

The most prevalent CAM practices differ across studies. Some CAM modalities are more specific to a country or culture, i.e., Ayurveda in India or traditional Chinese medicine in Asia [21,28]. Prayer/spirituality and stress reduction were the most prevalent methods of CAM in the USA [13,16,27]. In this study, the most frequently used types of CAM were herbal and dietary supplements, energy healing, and marijuana. While energy healing seems to be harmless for PWE, various dietary products may have proconvulsive effect or have the potential for interaction with AEDs and other prescription medication. Herbal products may increase the frequency of seizures through intrinsic proconvulsive effect, contamination by heavy metals, undisclosed AEDs' content, or pharmacokinetic interactions with AEDs or other prescription medication [29–31]. Although cannabidiol (CBD) was found to reduce seizure

frequency in patients with Lennox–Gastaut syndrome and Dravet syndrome, self-treatment with cannabis-based products raises concerns about its efficacy and safety [32,33]. Marijuana and other cannabis products with moderate to high content of tetrahydrocannabinol (THC) may lead to seizure aggravation and many side effects [34]. The only legally available cannabis-based products in Poland contain mostly THC and small amounts of CBD [35,36]. Although prayer/spirituality as a type of CAM was highly prevalent in many studies [13,27], we did not include it in our survey since it is neither listed in the CAM classification system developed for the Cochrane collaboration nor included in the National Center for Complementary and Alternative Medicine [5,37].

Our findings highlight the poor communication between patients and physicians with regard to the use of CAM. The majority of subjects did not consult either general practitioners or neurologists before using CAM. The most common source of information on CAM was the internet. These findings are in agreement with recently published studies [8,9,12].

Nonadherence is a frequent cause of pseudoresistance or breakthrough seizures in PWE [38,39]. The use of CAM was found to be a reason for nonadherence to AEDs among PWE [26]. A major concern noted in this study is that a significant proportion of patients (41, 32.3%) reported that the use of CAM negatively affected their adherence to AED regimen, e.g., because CAM practitioners advised them to lower doses/withdraw AEDs or undermined the diagnosis of epilepsy. Other CAM modalities which could have interfered with AEDs treatment were weight-reducing/'detox' diets including laxatives/emetics and herbal supplements with proconvulsive effect. This may lead to increased seizure frequency or even to status epilepticus. Data on CAM use were obtained by a retrospective questionnaire, and we were not able to assess the influence of treatment nonadherence on seizure frequency. In one patient with a breakthrough seizure during the study period, the direct cause of the seizure was a 'detox' diet including laxatives. The regulatory status of CAM differs between countries; in Poland, physicians are not allowed to use CAM without scientifically proven evidence of efficacy [40]. The lack of legal regulations of the practice of CAM by nonmedically qualified practitioner may have possible detrimental effects on patients' health.

Complementary and alternative medicine may be a potential coping strategy for people with epilepsy [12,41,42]. Healthcare professionalists should be educated on different CAM modalities to provide reliable information to PWE on potential harms and benefits related to its use.

Multivariate analysis revealed several independent variables associated with CAM use; younger age, longer duration of epilepsy, lack of remission, and lower level of education. We believe that all these factors reflect the more severe course of epilepsy. Contradictory to other studies [9,15,24], in this study, patients with lower levels of education were significantly more likely to use CAM. However, none or primary school education were found in patients with more pharmacoresistant epilepsy and mental disability. In such patients, parents/caregivers were responsible for the choice to use or not to use CAM, and their education played a role in the decision-making process. Furthermore, the majority of patients used CAM to control their seizures or to counteract AEDs' side effects. These findings suggest that Polish PWE use CAM for epilepsy-related reasons rather than for general health.

The major strength of this study is a large cohort of PWE studied and the reliable method of data collection. However, it has limitations. Firstly, the studied cohort involved adult patients followed-up in the university epilepsy clinic and may be not representative to general population. Fifty-three point five percent had persistent seizures, and 45.5% were on polytherapy, which reflects more pharmacoresistant course of epilepsy than in the general population of PWE. The studied patients differ from those seen by office neurologists in terms of the epilepsy therapy and etiology. Seizures of the majority of patients were treated with new AEDs, while valproate and carbamazepine are the most commonly prescribed AEDs in Poland [43]. The substantial proportion of the studied patients suffered from rare genetical disorders, malformation of

cortical development, and subsequently from highly pharmacoresistant epilepsy [44]. It should be noted, however, that our outpatient clinic serves to all patients regardless of the severity of epilepsy and we have included consecutive PWE without exclusions related to any of the characteristics of the disease. Secondly, we did not included information on patients' income in the questionnaire. It might influence whether patients could afford CAM or not. Thirdly, we did not use a case–control design so it is impossible to state clearly if the rate of CAM use in PWE differs from a general population or subjects with other chronic conditions.

5. Conclusion

A significant proportion of PWE used CAM in addition to AEDs. The most prevalent CAM modalities were herbal and dietary supplements, energy healing, and marijuana, and the majority of patients used CAM for epilepsy-related reasons. Our findings highlight the poor communication between patients and physicians with regard to CAM use. Healthcare professionals should routinely check for CAM use in PWE to prevent potential harm related to its use.

Declaration of Competing Interest

MB received honoraria for publications and participation in advisory meetings from Sanofi, and honoraria for lectures, travel expenses, and conference fees from Sanofi, Adamed, Teva Pharmaceutical, Neuraxpharm, Glenmark, and UCB Pharma.

AS received honoraria for lectures from Bayer, Boehringer Ingelheim, Novartis, Polpharma, Bristol-Myers Squibb, Biogen, Teva Pharmaceutical, and Medtronic, and for participation in advisory meetings from Bayer, Boehringer Ingelheim, and Novartis.

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