

ORIGINAL RESEARCH



Patterns of Complementary and Alternative Medicine Use in Children With Common Neurological Conditions

补充与替代医学治疗模式在罹患常见神经性病症儿童身上的应用

Patrones de uso de la medicina complementaria y alternativa en niños con enfermedades neurológicas comunes

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ABSTRACT

Background: Recent literature suggests that one in nine children in the United States uses some type of complementary and alternative medicine (CAM). Children with challenging neurological conditions such as headache, migraine, and seizures may seek CAM in their attempts at self-care. Our objective was to describe CAM use in children with these conditions.

Methods: We compared use of CAM among children aged 3 to 17 years with and without common neurological conditions (headaches, migraines, seizures) where CAM might plausibly play a role in their self-management using the 2007 National Health Interview Survey (NHIS) data.

Results: Children with common neurological conditions reported significantly more CAM use compared to the children without these conditions (24.0% vs 12.6%, $P < .0001$). Compared to other pediatric CAM users, children with neurological conditions report similarly high use of biological therapies and significantly higher use of mind-body techniques (38.6% vs 20.5%, $P < .007$). Of the mind-body techniques, deep breathing (32.5%), meditation (15.1%), and progressive relaxation (10.1%) were used most frequently. **Conclusions:** About one in four children with common neurological conditions use CAM. The nature of CAM use in this population, as well as its risks and benefits in neurological disease, deserve further investigation.

摘要

背景: 最近的文献资料显示, 九分之一的美国儿童在接受某种类型的补充与替代医学 (CAM) 治疗。罹患头痛、偏头痛和癫痫等顽固性神经性病症的儿童在尝试自我护理时往往寻求 CAM。我们的目的在于阐明 CAM 在此类病症患儿身上的应用。

方法: 根据 2007 年美国国民健康访问调查 (NHIS) 的数据, 我们对 3 到 17 岁患有与未患有常见神经性病症 (头痛、偏头痛、癫痫) 的少年儿童使用 CAM 的情况, 发现 CAM 在他们的自我护理中似乎发挥了一定的作用。

结果: 据报道, 在患有常见神经性病症的儿童中, CAM 的应用要明显多于未患有此类病症的儿童 (24.0% 与 12.6%, $P < .0001$)。与其他儿科 CAM 使用者相比, 使用生物疗法的神经性病症患儿数量同样众多, 而他们使用身心疗法的比例则明显更高些 (38.6% 与 20.5%, $P < .007$)。在身心疗法中, 最常用的方法有深呼吸 (32.5%)、冥想 (15.1%) 和渐进放松法 (10.1%)。

结论: 患有常见神经性病症的儿童中, 约四分之一的人采用 CAM 疗法。在这一人群中, 所用 CAM 的性质及其对神经性病症的风险与裨益, 尚有待做进一步的研究。

SINOPSIS

Antecedentes: Publicaciones recientes sugieren que uno de cada nueve niños en los Estados Unidos hace uso de algún tipo de medicina complementaria y alternativa (MCA). Los niños que presentan enfermedades neurológicas problemáticas, tales como dolores de cabeza, migraña y convulsiones,

pueden recurrir a la MCA en un intento de tratamiento personal. Nuestro objetivo consistió en describir el uso de la MCA en los niños que presentan dichas enfermedades.

Métodos: Hemos comparado el uso de la MCA en niños de edades comprendidas entre los 3 y los 17 años, con y sin enfermedades neurológicas comunes (dolores de cabeza, migrañas, convulsiones) en las que la MCA podría desempeñar de forma verosímil un papel en su tratamiento personal, haciendo uso de los datos de la Encuesta Nacional de Salud de 2007 (National Health Interview Survey, NHIS) estadounidense.

Resultados: En los niños con enfermedades neurológicas comunes se notificó un uso significativamente mayor de MCA en comparación con los niños sin estas enfermedades (24,0 % frente a 12,6 %, $P < 0,0001$). En comparación con otros usuarios pediátricos de MCA, los niños con enfermedades neurológicas comunicaron un uso igualmente elevado de tratamientos biológicos y un uso significativamente mayor de técnicas psicósomáticas (38,6 % frente a 20,5 %, $P < 0,007$). Las técnicas psicósomáticas que se utilizaron con mayor frecuencia fueron la respiración profunda (32,5 %), la meditación (15,1 %) y la relajación progresiva (10,1 %).

Conclusiones: Aproximadamente el 25 % de los niños con enfermedades neurológicas comunes hacen uso de la MCA. La naturaleza del uso de la MCA en esta población, así como sus riesgos y beneficios sobre la enfermedad neurológica, merecen ser estudiados con mayor detalle.

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Citation

Global Adv Health Med. 2014;3(1):18-24. DOI: 10.7453/gahmj.2013.001

Key Words

Complementary and alternative medicine, pediatric neurology, mind-body medicine, migraine, headache, seizure

Disclosures

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and had no potential conflicts to disclose.

Complementary and alternative medicine (CAM) refers to a broad category of practices, healing systems, and products that intend to promote health but are generally considered to be outside the scope of conventional medicine.¹ Recent evidence suggests that approximately one in nine children in the United States uses CAM² and that use of these therapies may be higher in children with chronic health conditions.³

Neurological conditions that commonly affect children often are chronic in nature and can be challenging to manage. Epilepsy is estimated to have an incidence of 41 per 100 000 children and is associated with cognitive and social impairments that influence development.⁴ Similarly, headaches, of both the migraine and non-migraine variety, are very common in childhood and negatively impact school performance and activity level.^{5,6} While pharmacological treatment provides some relief for patients suffering from seizures and headaches, the risk of side effects accompanies use of many antiepileptic medications and many prophylactic and abortive headache treatments.^{7,8}

Non-pharmacological therapies that include those classified as CAM have been recognized as potentially useful in the treatment of epilepsy and headache.⁹ CAM practices that use the power of distraction and relaxation can be effective in reducing the frequency, intensity, and duration of headaches.¹⁰ Similarly, biofeedback has shown promise in decreasing seizure burden.¹¹ On the other hand, CAM therapies such as herbal supplementation might pose dangerous interaction risks in children who take medications for their neurological condition. While previous studies have clarified CAM use in the general pediatric and adult neurology populations, little is known about the use of CAM in children with neurological conditions.^{12,13}

The objective of the current study was to characterize the use of CAM in children with challenging neurological symptoms such as seizures, headaches, and migraine. We explored the patterns of CAM use as well as potential distinguishing characteristics of children with neurological conditions who reported using CAM as compared to children who used CAM for non-neurological conditions and those who do not use CAM. Additionally, we examined the types of CAM modalities used by children with neurological conditions.

METHODS

Subjects and Study Design

We obtained and analyzed publicly available data from the 2007 National Health Interview Survey (NHIS).¹⁴ NHIS is an annual telephone survey administered by the National Center for Health Statistics (NCHS). The study design of NHIS relies on a cross-sectional household survey designed to monitor the health of the US population. The sampling is representative of the US noninstitutionalized population. In 2007, NHIS data were collected from 29 266 house-

holds, yielding data from 75 764 people from 29 915 families, representing 296 905 107 individuals nationwide. The response rate was 87.1%.² The current study used data from the Adult, Child, and Family Core surveys, as well as the CAM supplements.

Questions on the 2007 NHIS CAM supplement queried use of 36 types of CAM therapies described elsewhere.² These modalities included 10 types of provider-based CAM therapies, such as massage, acupuncture, or chiropractic, as well as 26 other treatment types that are not reliant on a trained provider (eg, natural products, special diets, movement therapies). These treatment modalities were grouped into five broad categories for analytical purposes: alternative medical systems, biologically-based therapies, manipulative and body-based therapies, mind-body therapies, and energy healing therapies. In order to more clearly characterize the use of mind-body therapies, we segregated the relaxation and biofeedback therapies from the movement-based practices (eg, yoga, tai chi, qigong), subcategorizing them as movement therapies. A composite variable was created which designated the use of any type of CAM therapy within the previous 12 months.

As a survey of the overall health status of households, NHIS questions pertain to conditions with a relatively high prevalence in the general population. We defined children with a "common neurological condition" as those between the ages of 3 and 17 years whose parent or guardian reported affirmative answers to any of the following items on the 2007 NHIS pediatric supplement: (1) child had frequent headaches/migraines within the prior 12 months, (2) child had non-migraine headaches within the prior 12 months, and (3) child had seizures within the prior 12 months. Given that the capacity for self-care and insight increases with age, three distinct age categories were used to best capture overall trends.

This study was deemed exempt from review by the Mayo Foundation Institutional Review Board.

Statistical Analysis

The primary outcome for this study was use of CAM by the sample child within the last 12 months. The following sociodemographic characteristics were included as covariates: age (categorized as 3-5, 6-11, 12-17 y); sex; race (Hispanic, non-Hispanic white, black, other); region of the United States (Northeast, South, Midwest, West); household income as compared to federal poverty level (FPL) (<0.50-1.99, 2.00-3.99, 4.00 and above); highest educational attainment of at least one parent (less than high school diploma, high school diploma or General Educational Development degree, more than high school); single parent status (widowed, divorced/separated, or never married vs living with partner or married); and insurance status (privately insured, publicly insured, uninsured). Additionally, the following health indicators were included as covariates: self-reported health status (good, very good, or

excellent vs poor or fair), measures of disability (need to take prescription medication for at least 3 months; number of school days missed in the last 12 months; need for special equipment due to health problem; limited ability to walk, crawl, or play; and expectation for this problem to last 12 months or longer), and access to care (have a usual source of care, have delayed or failed to seek care in the past 12 months). Finally, we included parental CAM use, which was dichotomized as “ever vs never use,” as the final covariate. A sensitivity analysis was also conducted to determine if CAM use was more or less likely depending on one or more specific neurological conditions.

Using Wald chi-square tests of independence, we compared the sociodemographic characteristics, health behaviors, and reported health status of children with neurological conditions vs children without neurological conditions and subsequently compared the rates of reported CAM use for these two groups. Wald *P* values are reported, and all reported differences were determined to be significant at $P < .05$ (two-tailed). Multivariate analysis was conducted using logistic regression. Variables were considered for multivariable analysis only if they were significant at univariate stage or deemed necessary to adjust for important characteristics, such as gender and ethnicity. All analyses were conducted using the standard NHIS survey weights to represent the US civilian, noninstitutionalized population and were conducted in SAS 9.2 (SAS Institute, Inc, Cary, North Carolina).

RESULTS

Demographics

The demographic features of children with and without neurological conditions are presented in Table 1. Headaches, migraines, and seizures were found to affect 8.2% of children in our study population, representing an estimated 2286735 children nationwide. Within the “children with neurological conditions” study population, 9.1% reported seizures, 68.4% reported frequent headaches/migraines, and 56.0% reported non-migraine headaches; 32.5% of these respondents reported that they experienced more than one of these conditions. Compared to children without neurological conditions, those affected by seizures, migraine, and non-migraine headache were more likely to be teenagers aged 12 to 17 years ($P < .001$), have a lower socioeconomic status ($P < .001$), and live in a single parent household ($P < .001$). Children with neurological conditions reported a significant increase in measures of disability compared to those without neurological conditions, with over 30% taking prescription medication and missing over twice as many days of school per year (18.5 vs 7.4, $P = .0126$).

Patterns of Complementary and Alternative Medicine Use

Of the children with neurological conditions, 24.0% reported use of some type of CAM modality in

the past 12 months, as compared to 12.6% of children without neurological conditions ($P < .0001$; Table 1). Parental CAM use was more prevalent among children with neurological conditions than among those without (53.3% vs 39.1%, $P < .0001$).

Multivariate results are presented in Table 2. For each year of age, the odds of using CAM increased by 6.3% (OR: 1.063, CI 1.041-1.086). White ethnicity was associated with a higher likelihood of CAM use (OR: 1.321, CI 1.076-1.622), while males were less likely to report using CAM (OR: 0.792, CI: 0.682-0.921). Those living in either the Northeast, Midwest, or South were less likely to report CAM use compared to those living in the West (OR: 0.775, CI 0.610-0.984; OR: 0.740, CI: 0.589-0.929; OR 0.510, CI 0.412-0.623, respectively). CAM users with neurological conditions also were less likely to live in households with family income less than four times the federal poverty level and less likely to have low parental education (OR: 0.601, CI: 0.461-0.784; OR: 0.576, CI: 0.399-0.831, respectively).

While the odds of CAM use did not differ significantly between children reported to have fair/poor health vs those with good/very good/excellent health (OR: 1.609, CI: 0.916-2.828), children who were taking at least one prescribed medication were less likely to use CAM (OR: 0.576, CI: 0.457-0.725). Those who reported that they had waited or failed to seek medical care were more likely to use CAM (OR: 1.650, CI: 1.120-2.429). Parental CAM use was associated with a much higher likelihood of CAM use among children (OR: 2.600, CI: 2.174-3.108).

When the overall neurological conditions composite covariate was entered into the model, having one or any combination of the three conditions was associated with a higher likelihood of CAM use (OR: 1.639, CI: 1.284-2.094). The sensitivity analysis revealed that the odds of CAM use did not differ between children with and without either seizures or frequent headaches/migraines compared to those without those conditions (OR: 0.744, CI: 0.220-2.513; OR: 1.224, CI: 0.856-1.751, respectively). The odds of CAM use among children with non-migraine headaches was higher than in children without non-migraine headaches (OR: 1.715, CI: 1.169-2.516).

Comparisons of CAM modalities used by children with and without neurological conditions are presented in Table 3. Use of biologically-based therapies was most prevalent among both groups, and the rate was only slightly higher in children with neurological conditions (43.9% vs 37.8%). The use of mind-body therapies by children with neurological conditions was significantly increased as compared to children without neurological conditions (38.6% vs 20.5%, $P < .007$; Figure). Therapies used more frequently by children with neurological conditions compared to those without included deep breathing (32.5% vs 17.3%), meditation (15.1% vs 9.1%), and progressive relaxation (10.1% vs 3.1%).

Table 1 Comparison of Demographic and Disability Characteristics of Children With and Without Common Neurological Conditions

	% (SE)			
	General Pediatric Population (Weighted N=27996154; N=7669)	Children Without Neurological Conditions (Weighted N=25709419; N=7083)	Children With Neurological Conditions (Weighted N=2286735; N=586)	Wald P value
Mean Age (SE)	10.3 (0.06)	10.1 (0.06)	12.6 (0.17)	<.0001
Age Groups, y^a				<.0001
3-5	20.5 (0.56)	21.9 (0.61)	4.5 (0.88)	
6-11	35.7 (0.62)	36.3 (0.67)	29.9 (2.13)	
12-17	43.8 (0.63)	41.8 (0.67)	65.7 (2.15)	
Gender				.5197
Male	51.0 (0.71)	51.2 (0.75)	49.6 (2.25)	
Female	49.0 (0.71)	48.8 (0.75)	50.4 (2.25)	
Region				.0432
Northeast	17.6 (0.66)	17.8 (0.68)	15.0 (1.60)	
Midwest	22.9 (0.81)	22.7 (0.85)	25.4 (1.85)	
South	37.8 (0.90)	37.5 (0.93)	41.1 (2.19)	
West	21.7 (0.82)	22.0 (0.86)	18.5 (1.72)	
Race/Ethnicity				.1794
Hispanic	18.3 (0.59)	18.4 (0.61)	17.7 (1.57)	
Non-Hispanic				
White	60.0 (0.80)	59.7 (0.83)	63.4 (2.00)	
Black	14.2 (0.53)	14.3 (0.54)	13.4 (1.32)	
Other	7.4 (0.39)	7.6 (0.41)	5.6 (0.98)	
Measure of Disability				
Taken prescription medication for at least 3 mo	14.0 (0.49)	12.5 (0.49)	31.0 (2.13)	<.0001
Mean (SE) no. days of school missed due to illness/injury	8.4 (1.03)	7.4 (0.97)	18.5 (4.47)	.0126
Need special equipment due to health problem	0.9 (0.12)	0.8 (0.12)	2.1 (0.59)	.0523
Limited ability to walk/crawl/run/play	1.8 (0.19)	1.4 (0.16)	7.2 (1.22)	<.0001
Ratio of Family Income to Poverty Threshold				<.0001
< 0.50-1.99	36.0 (0.80)	35.3 (0.81)	43.8 (2.25)	
2.00-3.99	32.1 (0.66)	32.1 (0.66)	31.8 (2.19)	
4.00 and above	32.0 (0.79)	32.7 (0.81)	24.5 (2.03)	
Highest Education of Parent				.3889
Less than high school diploma	10.7 (0.41)	10.6 (0.41)	11.3 (1.41)	
High school diploma or GED	23.0 (0.56)	22.7 (0.59)	25.6 (2.26)	
More than high school	66.3 (0.69)	66.6 (0.71)	63.2 (2.41)	
Single Parent Household	26.9 (0.65)	25.9 (0.68)	37.7 (2.20)	<.0001
Health Status				<.0001
Fair/Poor	1.6 (0.14)	1.2 (0.14)	5.7 (0.95)	
Access to Care				.0003
Public insurance	25.9 (0.61)	25.2 (0.61)	33.7 (2.34)	
Private insurance	64.6 (0.70)	65.4 (0.70)	55.8 (2.34)	
No coverage	9.4 (0.38)	9.3 (0.40)	10.5 (1.43)	
Parental CAM Use	40.3 (0.76)	39.1 (0.78)	53.3 (2.17)	<.0001
Child CAM Use	13.5 (0.47)	12.6 (0.47)	24.0 (1.93)	<.0001

^a Estimates are age-adjusted using the projected 2000 US population as the standard population using three age groups: 0-4 y, 5-11 y, and 12-17 y.

Abbreviations: CAM, complementary and alternative medicine; ED, General Educational Development; SE, standard error.

Data source: Centers for Disease Control and Prevention/National Center for Health Statistics, National Health Interview Survey, 2007.

Table 2 Predictors of Complementary and Alternative Medicine (CAM) Use, Adjusted for Demographic, Disability, and Socioeconomic Factors

	Odds Ratio (95% CI)	P value
Age^a	1.063 (1.041-1.086)	<.0001
Male	0.792 (0.682-0.921)	.0025
White	1.321 (1.076-1.622)	.0078
Region		
Northeast (vs West)	0.775 (0.610-0.984)	.0361
Midwest (vs West)	0.740 (0.589-0.929)	.0095
South (vs West)	0.510 (0.412-0.632)	<.0001
Ratio of Income to FPL		
< 0.50 - 1.99 (vs > 4.00)	0.601 (0.461-0.784)	.0002
2.00 - 3.99 (vs > 4.00)	0.813 (0.660-1.003)	.0533
Highest Education of Parent		
< HS diploma (vs > HS)	0.576 (0.399-0.831)	.0032
HS diploma (vs > HS)	0.715 (0.565-0.907)	.0056
Single Parent Household	1.059 (0.829-1.352)	.6467
Self-described Health Status		
Fair/poor (vs good/excellent)	1.609 (0.916-2.828)	.0979
Measures of Disability		
Takes prescription medication	0.576 (0.457-0.725)	<.0001
Needs special equipment	0.879 (0.419-18.45)	.7341
Limited mobility	0.993 (0.526-1.877)	.9837
Access to Care		
Delays care	1.650 (1.120-2.429)	.0112
Acknowledges non-emergent source of care	0.847 (0.588-1.221)	.3731
Parent Uses CAM	2.600 (2.174-3.108)	<.0001
Neurological Condition		
Seizures	0.744 (0.220-2.513)	.6343
Migraine headache	1.224 (0.856-1.751)	.2677
Non-migraine headache	1.715 (1.169-2.516)	.0058

^a Age modeled as a continuous variable.

Abbreviations: CI, confidence interval; FPL, federal poverty level; HS, high school.

DISCUSSION

CAM use is twice as common in children with common neurological conditions as compared to those without. Of the five broad categories of CAM modalities, use of mind-body therapies was reported significantly more often in children with neurological conditions as compared to those without. Adolescent age, white ethnicity, female sex, and parental CAM use are some of the strongest predictors of use of CAM in children aged 3 to 17 years who have neurological conditions. These data have important clinical implications and raise many clinical questions.

The incidence of headache, migraine, and seizures reported here is consistent with previously reported figures.^{4,5} Rates of CAM use among children with neurological conditions in the current study were similar to rates in children with other chronic diseases when

compared to their healthy peers.³ In a similar analysis of the 2007 adult NHIS data, higher overall rates of CAM use were found in adults with common neurological conditions.¹³ Notably, the increased proportion of CAM users in the adolescent subset of our study population corresponds with both the known increase in migraine frequency in the teenage years,¹⁵ as well as the capacity for an understanding of self-responsibility in health and an increased attention span, which is necessary for the use of many CAM modalities.

As compared to children with neurological conditions who do not use CAM, the children in our target population reported delaying care and decreased use of prescription medications, which might represent a substitution effect of CAM therapies. In patients for whom this is not the case, CAM use might be serving to reduce disability, resulting in decreased perceived need for medications and decreased use of conventional resources. Given the lack of clinical trial support for many headache treatment strategies in pediatrics and their attendant safety profiles, such substitution for chronic symptom management may have some benefit.

Many motivations for the use of CAM in children with neurological conditions are plausible. Children with headaches, migraines, and seizures suffer from chronic conditions with episodic manifestations which affect their ability to attend school and be active. One hypothesis is that the relative unpredictability of their neurological symptoms compels these patients to seek out strategies for self-healing and self-empowerment via mind-body practices. These and other CAM modalities may reduce the feelings of vulnerability due to these disruptive and disabling conditions. Stress has been commonly identified as a trigger for exacerbations in these conditions; cultivating one's capacity for relaxation via mind-body therapies could prove useful in combating stressful situations, potentially preventing or reducing the recurrence of troublesome episodes. The chronicity of these conditions coupled with the refractory nature of symptoms might compel individuals to seek CAM, especially in light of burdensome side effects that accompany many pharmacological treatment options.

A child's ability to attend school and participate in extracurricular activities is central to his or her intellectual and social development. Neurological conditions such as headache, migraine, and seizure threaten these daily interactions and can reduce the capacity for learning. Furthermore, children who are conditioned into a "sick role" earlier in their lives might have less resiliency and a reduced understanding of their personal empowerment that could mitigate their disability, perhaps resulting in depression related to the chronic disease.¹⁶ Thus, mind-body practices in particular may offer an appealing adjunct to the treatment of these children, nurturing an attitude of well-being and self-healing, which is worthy of further investigation.

In addition to the recall bias inherent in using self-reporting measures such as those in the design of NHIS,

Table 3 Percentages of the Most Commonly Used Complementary and Alternative Medicine (CAM) Modalities by Children Aged 3-17 Years With and Without Neurologic Symptoms Who Reported CAM Use

	% (SE)		Wald P value
	Pediatric Patients Without Neurologic Symptoms Who Use CAM N=779 Weighted N=3182193	Pediatric Patients With Neurologic Symptoms Who Use CAM N=131 Weighted N=539547	
Mind-body	23.1 (1.84)	38.5 (4.85)	.0026
Biofeedback	1.4 (0.52)	2.3 (1.15)	
Relaxation technique			
Meditation	9.1 (1.13)	15.1 (3.58)	
Guided imagery	3.1 (0.65)	6.5 (3.01)	
Progressive relaxation	3.1 (0.67)	10.1 (3.40)	
Deep breathing	17.3 (1.63)	32.5 (4.67)	
Support groups	2.6 (0.56)	9.6 (3.02)	
Stress management class	1.2 (0.40)	6.8 (2.62)	
Hypnosis	0.6 (0.31)	0.6 (0.60)	
Biologic	37.8 (1.93)	43.9 (5.24)	.2654
Chelation therapies	0.4 (0.26)	0.6 (0.60)	
Herbal supplements	31.8 (1.89)	36.7 (4.96)	
Diet			
Vegetarian	4.2 (0.76)	7.4 (2.61)	
Macrobiotic	0.1 (0.10)	0	
Atkins	0.8 (0.36)	0.8 (0.85)	
Pritikin	0.1 (0.10)	0	
Ornish	0.4 (0.28)	0	
Zone	0.2 (0.11)	0	
South Beach	1.6 (0.56)	1.81 (1.05)	
Manipulative Therapies	26.8 (1.89)	26.7 (4.43)	.9699
Chiropractic or osteopathic	22.3 (1.78)	21.1 (4.08)	
Massage	7.5 (1.02)	12.7 (3.11)	
Energy Therapies			
Energy healing	1.4 (0.43)	4.4 (1.80)	.1176
Whole System Approaches	11.1 (1.29)	15.5 (3.49)	.2122
Acupuncture	2.0 (0.59)	2.0 (1.15)	
Ayurveda	0.6 (0.31)	0.9 (0.67)	
Homeopathy	8.4 (1.19)	10.3 (2.98)	
Naturopathy	1.9 (0.59)	5.7 (2.30)	
Exercise Therapies	26.1 (2.00)	22.0 (4.20)	.3921
Yoga	20.9 (1.83)	17.1 (3.82)	
Tai Chi	1.5 (0.45)	2.7 (2.02)	
Qi Gong	0.6 (0.32)	0	
Movement techniques			
Feldenkreis	0.3 (0.18)	0	
Alexander Technique	0.8 (0.35)	0	
Pilates	3.4 (0.79)	4.4 (2.12)	
Trager	0.3 (0.18)	0.4 (0.36)	
Traditional Healers	7.7 (1.37)	3.9 (1.52)	.0349
Curandero	0.5 (0.35)	0	
Espiritista	5.2 (1.12)	1.2 (1.01)	
Hierbero or Yierbera	0.6 (0.26)	0.3 (0.30)	
Shaman	0.4 (0.23)	0	
Botanica	0.3 (0.17)	0.4 (0.36)	
Medicine Man	1.0 (0.40)	1.1 (0.79)	
Sobador	0.4 (0.18)	0.9 (0.69)	

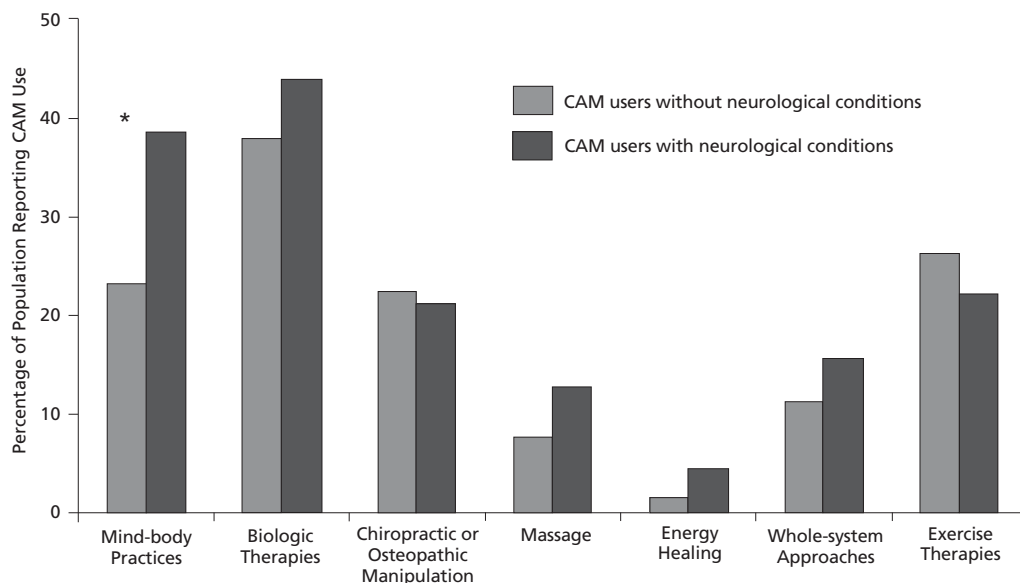


Figure Distribution of the most commonly-used complementary and alternative medicine (CAM) modalities reported by children aged 3 to 17 years with and without neurological conditions (* $P < .05$).

Acknowledgments

This publication was made possible by Mayo Clinic Department of Medicine funding to Dr Jon Tilburt and from career development funding to Dr Tilburt from Grant Number 1 KL2 RR024151 from the National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH), and the NIH Roadmap for Medical Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official view of NCRR or NIH. Information on NCRR is available at <http://www.ncrr.nih.gov/>. Information on Reengineering the Clinical Research Enterprise can be obtained from <http://nihroadmap.nih.gov>.

this study is limited in that it does not fully characterize patterns of CAM use such as frequency or perceived effect of treatment. Additionally, nonpharmacological therapies that are specific for neurological conditions (ie, the ketogenic diet for treatment of epilepsy) were not queried by NHIS. While some measures of disability are conveyed for each sample child, it is difficult to gauge the severity of each individual condition, which may impact the use of CAM. Many other neurological conditions that affect children were not considered in this analysis or in NHIS. Some of these conditions, including epilepsy, are associated with impaired cognition, which could detrimentally affect a child's ability to engage in some CAM therapies.

In summary, CAM use is common in US children with common neurological conditions and is more prevalent in children with these conditions than in those without, particularly in adolescents. This finding supports the hypothesis that children and their families seek complementary therapies in addition to conventional therapies, particularly in the setting of increased burden of disease, such as increased missed days from school or conditions that are chronic in nature. Future research is necessary to delineate the extent to which providers address the use of CAM therapy with their patients. Additionally, more work is required to determine the efficacy of many CAM modalities and their benefit for use in the field of pediatric neurology.

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