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The Utilization of Complementary and Alternative Medicine in Pediatric Patients with Neurological Disorders

Sinir Sistemi Hastalığı Olan Çocuklarda Tamamlayıcı ve Alternatif Tedavilerin Kullanımı

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Abstract

Aims: Interest in complementary and alternative medicine (CAM) has been increasing worldwide and in Turkey. We aimed to evaluate the prevalence, types, determinants and perceived effects of CAM use among children with neurological disorders, and to compare our findings with the literature.

Material and Method: This cross-sectional study included 753 children aged 0–18 years who attended a pediatric neurology outpatient clinic between January 2011 and February 2013. Data were collected using a structured face-to-face questionnaire covering sociodemographic characteristics, neurological diagnoses, CAM methods (type and frequency), reasons for use, perceived benefits and adverse effects. Descriptive statistics and chi-square tests were used ($p<0.05$).

Results: CAM use was reported by 58% of participants. The most frequently used methods were mind–body practices (55.8%), biologically based therapies (42.3%) and manipulative/body-based methods (19.0%). Higher paternal educational level, multiple neurological diagnoses and frequent outpatient visits were associated with CAM use ($p<0.05$). CAM use was most common among children with cerebral palsy (81.3%), specific learning disorder (70.8%) and developmental delay (69.2%). Nearly half of families (47.6%) perceived benefit, and adverse effects were reported in 1.8% of users (all mild).

Conclusion: CAM use is common among children with neurological disorders and is often used alongside conventional treatment. Although families frequently perceive benefit, evidence for many modalities remains limited, and some biologically based treatments may pose drug–interaction risks. Clinicians should ask routinely about CAM use, provide evidence-based guidance and consider potential interactions. Further controlled studies are needed in pediatric neurology.

Keywords: Complementary and alternative medicine, pediatric neurology, epilepsy, cerebral palsy, herbal medicine, mind–body therapies

Öz

Amaç: Son yıllarda tüm dünyada ve ülkemizde tamamlayıcı ve alternatif tedavi (TAT) yöntemlerine olan ilgi giderek artmaktadır. Nörolojik bozuklukları olan çocuklarda TAT kullanımının yaygınlığını, türlerini, belirleyicilerini ve etkilerini değerlendirmek ve bulguları mevcut literatürle karşılaştırmak.

Gereç ve Yöntem: Bu kesitsel çalışmaya, Ocak 2011 ile Şubat 2013 tarihleri arasında çocuk nöroloji polikliniğine başvuran 0-18 yaş arası 753 çocuk dahil edildi. Veriler, sosyodemografik özellikler, nörolojik tanılar, TAT kullanım türleri ve sıklığı, kullanım nedenleri, faydalar ve yan etkilerini inceleyen yüz yüze uygulanmış bir anket kullanılarak toplandı. Tanımlayıcı istatistikler ve ki-kare testleri yapıldı ve $p<0,05$ anlamlılık düzeyi kabul edildi.

Bulgular: Katılımcıların %58'inde TAT kullanımı bildirildi. En sık kullanılan yöntemler zihin-beden uygulamaları (%55,8), biyolojik temelli terapiler (%42,3) ve manipülatif/beden temelli yöntemler (%19) idi. Daha yüksek baba eğitim düzeyi, çoklu nörolojik tanılar ve sık poliklinik ziyaretleri, TAT kullanımıyla anlamlı derecede ilişkiliydi ($p<0,05$). TAT kullanımı en çok serebral palsili (%81,3), öğrenme güçlüğü olan (%70,8) ve gelişimsel gecikmesi olan (%69,2) çocuklarda yaygındı. Ailelerin neredeyse yarısı (%47,6) fayda sağlandığını bildirirken, kullanıcıların %1,8'inde bazı yan etkiler bildirildi ve bunların tümü hafifti.

Sonuç: TAT kullanımı, nörolojik bozuklukları olan çocuklar arasında oldukça yaygındır ve genellikle geleneksel tıbbi tedavinin yanında tamamlayıcı bir yaklaşım olarak kullanılır. Aileler sıklıkla fayda görse de, çoğu TAT yöntemini destekleyen bilimsel kanıtlar sınırlıdır ve bazı biyolojik temelli tedaviler ilaç etkileşimi riskleri oluşturabilir. Klinisyenler rutin olarak TAT kullanımı hakkında bilgi edinmeli, aileleri kanıta dayalı bilgilerle yönlendirmeli ve yönetim sırasında potansiyel etkileşimleri göz önünde bulundurmalıdır. Pediatrik nörolojide TAT yöntemlerinin güvenliği ve etkinliğini değerlendirmek için daha fazla kontrollü çalışmaya ihtiyaç vardır.

Anahtar Kelimeler: Tamamlayıcı ve alternatif tıp, pediatrik nöroloji, epilepsi, serebral palsi, bitkisel tıp, zihin-beden terapileri

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INTRODUCTION

The term "complementary and alternative medicine" (CAM) covers therapeutic approaches that are not part of conventional biomedicine but are increasingly used in clinical practice. The World Health Organization (WHO) describes CAM as including herbal products, mind–body techniques, traditional medical systems, energy-based practices and manipulative techniques (**Table 1**). CAM use has increased in pediatric populations, particularly among children with long-term conditions.[1] Biopsychosocial factors, cultural beliefs, a poor response to traditional treatments, and families' pursuit of alternative methods are all linked to this rise.[2-5]

Table 1. CAM methods according to the WHO classification.

Main Category (WHO)	Alternative Methods / Applications
Alternative Medicine System	Traditional Chinese Medicine, Acupuncture and Related Techniques, Ayurveda, Unani, Siddha, Traditional Arabic-Islamic Medicine, African Traditional Medicine
Herbal Medicine	Herbal mixtures, extracts, aromatherapy, phytotherapy
Manual/ Manipulative Therapies	Massage, chiropractic, osteopathy, reflexology
Mind-Body Therapies	Meditation, yoga, breathing exercises, biofeedback, religious healing, hypnotherapy, meditation, art therapy
Energy Therapies	Reiki, magnetic therapy, bioenergy
Dietary and Nutritional Approaches	Ketogenic diet, gluten-free diet, probiotics, vitamin-mineral supplements

Childhood neurological disorders can substantially affect quality of life and often require long-term, multidisciplinary care. Functional limitations, motor and cognitive impairment and variable responses to treatment may prompt families to seek complementary approaches for conditions such as epilepsy, cerebral palsy, developmental delay, neurodevelopmental disorders and chronic headache. Studies suggest that 30%–80% of children with neurological disorders use CAM, often more frequently than the general pediatric population.[3,6]

Drivers of CAM use include a desire to enhance treatment effectiveness, hope for recovery, avoiding adverse effects from medicines, cultural or religious beliefs and social influence. However, many CAM practices lack robust evidence, and some carry risks, including herb–drug interactions (particularly with antiepileptic medicines) and delays to effective medical care.[7-9]

This study evaluated the prevalence, preferred methods, reasons for use, perceived effects and sociodemographic and clinical determinants of CAM use among children with neurological disorders, and compared the findings with the literature.

MATERIAL AND METHOD

Ethical Considerations

Ethical approval was obtained from the Selçuk University Meram Medical Faculty Ethics Committee (Date: 24.02.2011, Decision no: 2011/079) and conducted in accordance with the Declaration of Helsinki. Written and verbal informed consent was obtained from all participating parents or legal guardians.

Study Design and Setting

This cross-sectional descriptive study assessed CAM use among children attending a pediatric neurology outpatient clinic. Data were collected between January 2011 and February 2013.

Participants and Sample Size

The study population comprised children aged 0–18 years who attended the pediatric neurology outpatient clinic at Selçuk University Meram Medical Faculty during the study period, together with their parents or legal guardians. A total of 753 children were included.

Sample size was estimated using the CAM prevalence reported by Aburahma et al. (2010) (56%). With a 95% confidence level, expected prevalence p=0.56 and absolute margin of error d=0.05, the minimum required sample size was 379 participants (standard cross-sectional formula). The achieved sample (n=753) enabled a more precise estimate and allowed exploration of associated factors.

Eligibility Criteria

Inclusion criteria: (i) children aged 0–18 years; (ii) diagnosis of a neurological condition (e.g., epilepsy, cerebral palsy, developmental delay, neurodevelopmental disorder, headache); and (iii) a parent/guardian willing to participate.

Exclusion criteria: (i) severe acute illness requiring hospitalisation; (ii) parent/guardian with communication difficulties preventing completion of the questionnaire; and (iii) inability to provide reliable information about CAM use.

Data Collection

The questionnaire was developed based on previously published studies and included both closed-ended and multiple-choice questions addressing CAM use. Participants were consecutively recruited during routine outpatient visits within the study period to minimize selection bias. The questionnaire took approximately 15 minutes to complete and covered sociodemographic characteristics, neurological diagnoses, CAM methods used (type and frequency), reasons for use, perceived benefits and adverse effects.

Statistical Analysis

Analyses were performed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY, USA). Continuous variables are presented as mean±standard deviation and categorical variables as frequencies and percentages. Associations between categorical variables

were assessed using the chi-square (χ^2) test. Normality was evaluated using the Kolmogorov–Smirnov test; non-normally distributed continuous variables were compared using the Mann–Whitney U test. A p-value<0.05 was considered statistically significant. Although multivariable analysis was planned, only descriptive and univariate analyses were performed because of dataset structure.

RESULTS

The children's ages ranged from 1 to 216 months (mean 94.1±58.1 months). There was no significant association between age and CAM use (p>0.05).

Of the 753 children, 350 (46.5%) were female and 403 (53.5%) were male. CAM use was reported in 232 males (57.6%) and 205 females (58.6%), with no significant difference by sex (p>0.05). Overall, 437 participants (58.0%) had used at least one CAM method, while 316 (42.0%) had not used any non-medical alternative therapy.

The mean maternal age was 34.2 years (range 17–54) and the mean paternal age was 37.3 years (range 21–65). Parental age was not associated with CAM use (p>0.05). Maternal educational level was not associated with CAM use, whereas CAM use increased significantly with higher paternal educational level (p=0.01). Family income was not significantly associated with CAM use (p>0.05).

The most commonly used CAM category was mind–body practices (n=244; 55.8%), predominantly religious practices: prayer (n=152; 62%), use of amulets (n=87; 35%) and visiting shrines (n=12; 5%). Biologically based therapies were reported by 185 children (42.3%), manipulative/body-based therapies by 83 (19.0%), energy therapies by 20 (4.6%) and alternative medical systems by 2 (0.5%). Some children used more than one method (**Table 2**).

Table 2. CAM methods used by participants (within-category percentages; multiple responses possible).

CAM method	n	%
Alternative medical systems		
Acupuncture	2	0.5
Mind–body therapies		
Prayer	152	62.0
Amulet	87	35.0
Visiting shrines	12	5.0
Herbal, dietary and nutritional approaches		
Herbal mixtures	63	34.0
Special diet	27	14.5
Vitamin–mineral supplements	121	65.4
Bee pollen	16	8.6
Manual/manipulative therapies		
Massage	81	96.5
Hydrotherapy	3	3.5
Energy therapies		
Reflexology	16	80.0
Therapeutic touch	2	10.0
Bioenergy	2	10.0

The most common neurological diagnosis was epilepsy (n=359; 47.7%), followed by developmental delay, specific learning disorder, cerebral palsy, seizures, headache and neuromuscular diseases. Febrile seizures were the least common diagnosis (n=25; 3.3%). A single neurological diagnosis was present in 490 children (65.1%), while 263 (34.9%) had multiple diagnoses.

CAM use was most prevalent among children with cerebral palsy (81.3%), followed by specific learning disorder (70.8%) and developmental delay (69.2%). The lowest CAM use rate was observed among children presenting with seizures (37.5%). CAM use was significantly higher among children with multiple neurological diagnoses than among those with a single diagnosis (p=0.02) (**Table 3**).

Table 3. CAM use by diagnosis.

Diagnosis	CAM use		Total (%)
	Yes, n (%)	No, n (%)	
Cerebral palsy	74 (81.3)	17 (18.7)	91 (100)
Specific learning disorder	114 (70.8)	47 (29.2)	161 (100)
Developmental delay	117 (69.2)	52 (30.8)	169 (100)
Epilepsy	222 (61.8)	137 (38.2)	359 (100)
Neuromuscular disease	15 (50.0)	15 (50.0)	30 (100)
Headache	24 (44.4)	30 (55.6)	54 (100)
Febrile seizure	11 (44.0)	14 (56.0)	25 (100)
Seizures	21 (37.5)	35 (62.5)	56 (100)
Other diagnoses	81 (59.1)	56 (40.9)	137 (100)
Total	437	316	753

Of the participants, 165 were first-time visitors to the clinic, while 588 had attended on multiple occasions. CAM use was significantly higher among children with repeated visits (62%) than among first-time visitors (38%) (p<0.01).

Among CAM users, 326 (74.3%) were still using CAM at the time of the survey and 111 (25.7%) had discontinued use. Seven families (1.6%) reported discontinuing conventional medical treatment while using CAM, whereas 430 (98.4%) used CAM alongside conventional treatment.

Of the 437 CAM users, 350 (80.1%) used a single method and 87 (19.9%) used multiple methods. The most common reason for CAM use was "to obtain partial benefit for the disease" (37.7%), while the least common was "to remove toxins after medical treatment" (0.2%).

Family members were the most influential source for choosing CAM (37.3%), followed by physicians (21.6%), television (13.6%) and the internet (4.6%). Nearly half of families (47.6%) perceived benefit, 19.7% perceived no benefit and 32.7% were unsure.

Adverse effects were reported in eight children (1.8%), including diarrhoea, constipation and vomiting. Most CAM applications were administered by family members (79.6%). The majority of families (64.7%) considered CAM less expensive than hospital-based medical treatment.

Physicians were aware of CAM use in 32.4% of cases. Among these, 72.5% supported CAM use, while 25.4% provided no comment.

DISCUSSION

This large cross-sectional study assessed the prevalence, methods, motivations and determinants of CAM use among children with neurological disorders. The findings highlight the clinical relevance of CAM in pediatric neurology and broadly align with national and international reports.

CAM use in our sample was 58%, similar to findings from pediatric neurology settings. Aburahma et al. reported a prevalence of 56% in a Jordanian pediatric neurology clinic, while Soo et al. reported 44% in a Canadian clinic. In Korea, Yeon and Nam reported a range of 24%–78% depending on diagnosis. Kenney et al. found CAM use in 41.6% of pediatric neurology outpatients and suggested under-reporting because many families did not identify their practices as CAM.[1,6,10,11]

The most commonly used CAM categories were mind–body practices (55.8%), biologically based therapies (42.3%) and manipulative/body-based therapies (19.0%). The prominence of mind–body practices—particularly religious healing—likely reflects cultural and religious traditions in Turkey. In contrast, studies from some other countries report higher use of modalities such as acupuncture, massage and herbal remedies, which may reflect differences in access, beliefs and healthcare systems.[1,6]

Children with developmental delays (69.2%), specific learning disorders (70.8%), and cerebral palsy (81.3%) had the highest rates of CAM use. These patient groups have more severe cognitive and motor impairments, which prompts families to look for alternative forms of treatment. Patients with epilepsy used CAM at a rate of 61.8%, which was in line with published ranges of 40–65% worldwide. This pattern is in line with earlier research showing that children with chronic developmental disabilities and more severe or complex functional impairments are more likely to use complementary and alternative medicine. According to Zisman et al., children with developmental disabilities were more likely than their typically developing peers to use CAM, particularly when they had other chronic medical conditions. In a similar vein, Galicia-Connolly et al. noted that parents frequently resorted to CAM when traditional therapies were deemed inadequate, and they reported higher CAM use in pediatric neurology patients with chronic and treatment-resistant conditions.[12,13] Our results lend credence to the idea that the complexity of neurological disorders and the burden of disability are important factors influencing the adoption of complementary and alternative medicine.

Increased use of complementary and alternative medicine was independently linked to various neurological diagnoses, higher paternal education levels, and frequent outpatient visits. Studies have found varying correlations between parental education and the usage of CAM, which may be due to sociocultural and economic disparities among communities.[1,6] It is not surprising that chronic illness, numerous diagnoses, and higher usage of CAM are associated because long-term treatment regimens frequently push families toward complementary therapies.

While very few families in our study reported negative effects, primarily mild gastrointestinal symptoms, nearly half of the families reported perceived benefits from CAM. This pattern is comparable to that found in earlier studies on pediatric neurology, where a large number of families reported few or no negative effects from complementary and alternative medicine.[1] However, the perception of benefit frequently outweighs the quantity and caliber of objective evidence available for the majority of CAM modalities, especially herbal and energy-based therapies, as systematic reviews have shown.[14] Furthermore, there are still few randomized controlled trials in pediatric neurology, and the results' generalizability is limited by the variety of outcome measures. Therefore, although families' reports of improved coping and subjective improvement should not be discounted, clinicians must interpret these perceptions carefully and within the framework of evidence-based medicine.

Particular attention should be paid to safety issues, particularly when using biologically based treatments. Only a small percentage of families in our cohort reported negative effects, but this could understate the actual risk because of recall bias or a failure to identify subtle side effects. Pharmacological reviews highlight the possibility of pharmacokinetic and pharmacodynamic interactions between antiepileptic medications and herbal products acting on the central nervous system, which could change serum drug concentrations and lower seizure threshold. Patients with epilepsy who use unregulated herbal remedies or supplements have been reported to experience proconvulsant effects or significant herb-drug interactions. Careful investigation of herbal and dietary products is necessary to prevent avoidable adverse outcomes, as nearly half of our sample had epilepsy and many CAM modalities were used in conjunction with antiepileptic medications.[15] Another important finding of our study is that physicians were aware of CAM use in only about one third of cases, although most of those who were informed either supported CAM use or did not object. This low disclosure rate mirrors previous observations that many caregivers do not spontaneously inform clinicians about CAM unless asked directly.[1] The American Academy of Pediatrics and subsequent expert statements have stressed the need for pediatricians to routinely ask about CAM, provide balanced information, and integrate discussions of CAM into shared decision-making with families.[16] Our findings reinforce these recommendations, indicating that proactive, nonjudgmental communication about CAM should be part of standard pediatric neurology care, particularly in regions with strong traditional and religious healing practices.

This study has a number of advantages. A thorough evaluation of CAM prevalence, kinds, reasons for use, perceived benefit, side effects, and related sociodemographic and clinical characteristics was made possible by the large sample size, inclusion of a broad variety of neurological diseases, and use of a structured face-to-face questionnaire. Furthermore, we present a thorough picture of CAM use in pediatric neurology by placing our findings within the framework of national and international literature.

This study has several limitations. Its cross-sectional design precludes causal inferences regarding CAM use and clinical outcomes. Data were based on parental self-report, which may be subject to recall and reporting bias. In addition, the study did not assess the dosage, duration, or quality of specific CAM modalities, nor did it evaluate objective clinical outcomes associated with CAM use. These limitations should be considered when interpreting the findings.

CONCLUSION

CAM use is common among children with neurological disorders and is frequently used alongside conventional medical care. Mind–body practices, biologically based therapies and manipulative/body-based methods were the most frequently reported approaches. CAM use was associated with multiple neurological diagnoses, higher paternal educational level and frequent outpatient attendance. Although many families perceived benefit, scientific evidence remains limited for many modalities, and herbal products in particular may present clinically relevant drug–interaction risks.

These findings underscore the importance of routinely asking about CAM in pediatric neurology and providing families with evidence-based information regarding safety, effectiveness and potential adverse effects. Further prospective, controlled and standardised studies are needed to clarify the long-term safety and efficacy of CAM in children with neurological disorders.

ETHICAL DECLARATIONS

Ethics Committee Approval: Ethical approval was obtained from the Selçuk University Meram Medical Faculty Ethics Committee (Date: 24.02.2011, Decision no: 2011/079).
Informed Consent: Written informed consent was obtained from all participants prior to enrollment in the study.
Referee Evaluation Process: Externally peer-reviewed.
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