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Journal
Complementary Therapies in Medicine, 23(3)

ISSN
0965-2299

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Publication Date
2015-06-01

DOI
10.1016/j.ctim.2015.02.004

Complementary Therapies in Medicine (2015) 23, 462—468

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevierhealth.com/journals/ctim

Differences in referral and use of complementary and alternative medicine between pediatric providers and patients

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Available online 9 March 2015

KEYWORDS
Complementary and alternative medicine;
Pediatric use;
Provider referral

Summary
Objectives: The goal of this study was to compare pediatric complementary and alternative medicine (CAM) use and pediatric health care provider CAM referral as well as identify predictors of use and referral.
Design: Surveys were administered to 283 parents/caregivers of pediatric patients and 200 pediatric health care providers (HCP).
Setting: This study took place at the Children's Hospital of Orange County (CHOC Children's) in Orange, CA.
Main outcome measures: Caregivers and HCP were provided a list of 32 CAM interventions and asked to indicate which treatments their child had *ever* used or which they would consider using for their child and which treatments they had *ever* referred or which they would consider referring, respectively. The main outcome variables were the number and type of CAM therapies endorsed by participants.
Results: Providers referred the majority of CAM therapies significantly more often than patients used each therapy and more often than caregivers would consider each therapy for their child. In addition, children from families with higher incomes, whose parents were older and had more education, who were White, and whose primary language spoken at home was English were more likely to use CAM therapies, all p's < 0.05. HCP CAM referral was not significantly predicted by number of years a health care provider practiced or health care profession, all p's < 0.05.
Conclusions: HCP referred CAM therapies more often than parents reported use for their children. Findings may imply that parents/caregivers are underutilizing CAM therapies for their children. Potential barriers to CAM use in pediatric patients needs to be explored.

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http://dx.doi.org/10.1016/j.ctim.2015.02.004
0965-2299/

Introduction

Complementary and alternative medicine (CAM) refers to non-traditional medical approaches used in conjunction with (complementary) or in place of (alternative) conventional medicine.[1] CAM often includes natural remedies such as yoga, herbology, or acupressure and is associated with minimal side effects.[2–6] Additionally, several forms of CAM therapy may be more cost-effective compared to conventional medicine.[7,8] It is therefore not surprising that CAM therapies have become increasingly popular with recent studies documenting that 40% of adults reported using at least one CAM therapy in the past 12 months[9] and 39–48% of physicians reported recommending CAM to adult patients.[10,11]

CAM is also becoming more prevalent in pediatric settings. The use of CAM among children continues to grow[12] with reports of between 11% and 21% of children using at least one CAM therapy each year.[9,13] In terms of health care providers (HCP), 66% of pediatricians believe that CAM is effective in reducing negative health symptoms in children[14] and report having referred CAM to their pediatric patients.[15] Although CAM use has been studied in many pediatric populations, less is known about how this use correlates with referrals by HCP.

Due to the growing use of CAM, it is important to understand how often pediatric patients are using CAM and how often providers are referring patients to CAM therapies. To investigate these questions, we asked parents and caregivers receiving treatment at a major children's hospital which CAM therapies their children have ever used. Similarly, HCP at the same hospital were asked which CAM therapies they have ever referred to pediatric patients. The first aim of this study was to examine the frequency of a broad range of CAM use and referral by pediatric patients and HCP, and to explore predictors of use and referral. The second objective was to compare frequency of pediatric use and HCP referral to uncover whether CAM treatments are being utilized at frequencies consistent with referrals by HCP.

There is lack of agreement about which specific therapies should be considered as CAM (e.g., folk medicine, vitamins, and prayer are not always included).[6,9] Accordingly, selection of CAM therapies to include can impact results. In the present investigation, we chose to include a broad range of strategies under the CAM definition in order to capture therapies that both parents and HCP may be using/referring that could potentially be missed when using more narrow definitions of CAM therapies. This approach allows for broader examination of the differences in CAM use and referral between patients and providers.

Methods

This study was approved by the Children's Hospital of Orange County (CHOC Children's) institutional review board. A waiver of written informed consent was obtained. Participation was voluntary and caregivers and health care providers (HCP) were not paid for their involvement.

Participants

Families

Surveys were administered to a convenience sample of 283 caregivers of inpatient (65%) and ambulatory care (35%) pediatric patients at CHOC Children's. Caregivers were comprised of 75% mothers, 16% fathers, and 9% ''other'' (e.g., grandmother, grandfather, etc.). Caregivers were eligible if their primary language was English or Spanish. Surveys were in Spanish or English to match participant primary language.

Health care providers

Surveys were administered to a convenience sample of 200 HCP (attending physicians, nurses, medical residents, etc.; see results for descriptive information on health care profession) at CHOC Children's. HCP were recruited during medical rounds and staff meetings or through email.

Measures

Demographics

Caregivers reported demographic information including parental age, race/ethnicity, and education; child age, gender, race/ethnicity, inpatient/outpatient status; family income; and primary language spoken at home. If caregivers were not the mother or father of the child (e.g., grandparent), they were asked to report demographic characteristics of the child's mother and father. HCP indicated their healthcare profession, and years post training.

CAM therapies

Caregivers were provided a list of 32 CAM interventions as identified by the National Center for Complementary and Alternative Medicine,[16] published empirical articles on CAM,[12,14,17] and recent reviews of the CAM literature[18,19] (see Appendix A) and asked to indicate which treatments their child had ever used or which they would consider using for their child. HCP were given the same list and asked to indicate which treatments they had ever referred pediatric patients to or which they would consider referring.

Statistical analyses

Means, standard deviations, and percentages were used to present demographic information for children, caregivers, and HCP. Percentages were also used to describe the numbers of children using the different CAM therapies, the amount of caregivers willing to consider CAM therapies for their children, and the amount of HCP who have referred or would consider referring the CAM therapies. Pearson product-moment correlations were used to examine relationships between caregiver/patient demographic variables and number of CAM therapies used, caregiver/patient demographic variables and number of CAM therapies considered, and HCP demographic variables and number of CAM therapies referred. Mean comparisons via independent sample *t*-tests and analysis of variance (ANOVA) examined differences in CAM use and consideration among child gender, race, and primary language as well as differences in HCP CAM referral based on health care profession. Finally, Chi-square analyses with a Bonferroni correction for family-wise error were used to examine differences between the frequency of HCP CAM referral and child use of CAM as well as between HCP CAM referral and caregiver consideration of use of CAM for their child.

Table 1 Child, parent, and household demographic information.

Child data		
Age in years, *M* (SD)	7.75 (5.74)	
Gender		
Male	54%	
Female	46%	
Race/ethnicity		
Hispanic	52%	
White	26%	
Other	22%	
Parent data	**Mothers**	**Fathers**
Age in years, *M* (SD)	35.59 (8.12)	37.90 (8.97)
Race/ethnicity		
Hispanic	52%	51%
White	31%	32%
Other	17%	17%
Primary language spoken at home		
English	54%	
Spanish	46%	

Results

Descriptive statistics

Families

Table 1 describes the demographic characteristics of children and caregivers. Because of the low numbers of races other than Hispanic and White, all other races were combined into an ''other'' category for descriptive purposes but were not included in subsequent analyses due to the heterogeneity of this category. Median household income was $21,000—$30,000. The median education for fathers and mothers was a high school education.

Health care providers

Table 2 presents type of profession and years post training for the health care providers (HCP). Because of the low percentages for professions other than physician, medical resident, and nurse, all the other professions were combined into an ''other'' category for analyses.

Table 2 Provider demographic information.

Health care providers	
Healthcare profession	
Attending physicians	26%
Nurses	20%
Medical residents	14%
Other	40%
Years post-training	
More than 20 years	30%
16—20 years	8%
11—15 years	10%
6—10 years	15%
0—5 years	27%
Still in training program or residency/internship	10%

Number of CAM therapies

Frequencies of CAM use by children and CAM referral by HCP are reported in Table 3. Most children (74%) used at least one therapy. The five most frequently used therapies were prayer (51%), exercise (47%), vitamin/mineral supplements (44%), massage (40%), and physical therapy (40%). Considering whether these high use CAM therapies drove the effects, the percentages of children using each specific therapy as their *only* CAM therapy were as follows: prayer (3%), exercise (2%), vitamin/mineral supplements (1%), massage (1%), and physical therapy (1%). Most HCP (89%) referred pediatric patients to CAM. The top five most frequently referred therapies by HCP were exercise (90%), physical therapy (89%), relaxation (77%), deep breathing exercises (76%), and vitamin/mineral supplements (73%). None of these therapies were the sole therapy referred by HCP (with the exception of one provider who only referred exercise).

Predictors of child CAM use

Table 4 presents correlations between demographic variables and child CAM use and parent consideration of CAM use for their children. Children from families with higher incomes and who have parents with more education are more likely to use CAM therapies.

Number of CAM therapies used and considered varied significantly by child race and primary language spoken at home (Table 5). Children who were White and whose primary language spoken at home was English used significantly more CAM therapies than did children who were Hispanic or whose primary language spoken at home was Spanish. Child CAM use and caregiver consideration did not vary by child gender.

Predictors of HCP CAM referral

CAM referral was not associated with number of years a health care provider practiced $r(185) = 0.10$, $p = 0.18$ or health care profession (i.e., attending physician, medical resident, nurse, and other), $F(3, 181) = 0.53$, $p = 0.66$.

Differences in use and referral of CAM between children and HCP

Table 6 presents percentages of caregivers who reported ever using or considering each CAM for their child and the percentage of providers who reported ever referring each CAM therapy. Chi-square analyses were used to examine differences between the percentage of patients who have used each CAM therapy and the percentage of providers who have recommended each CAM therapy. Due to the 32 different analyses conducted, a Bonferroni corrected p-value of 0.0016 was used to determine statistical significance. Because CAM referral did not differ by health care profession (i.e., attending physician, medical resident, nurse, and other), all providers were grouped together in this analysis.

In 26 of the 32 options, providers referred each CAM therapy significantly more often than patients used each CAM therapy (see Table 6). In 19 of the 32 options, providers referred each CAM therapy significantly more often than caregivers would consider each therapy for their child. Ayurveda, naturopathy, and Qi Gong were the only therapies in which caregivers considered the therapy for their child more often than providers were referring the therapy.

Table 3 Percentage of CAM therapies used and considered by families and referred and considered by providers.

Total number of CAM therapies	Families		Health care providers	
	% CAM used	% Would consider using	% CAM referred	% Would consider referring
0	23	27	11	28
1—3	29	14	6	15
4—6	21	10	9	13
7—10	15	10	22	15
11 or more	12	39	52	29

Table 4 Correlations between demographic variables and complementary and alternative medicine use and consideration for children.

	Number of CAM therapies used (*r*)	*p*-Value	Number of CAM therapies interested (*r*)	*p*-Value
Age of mother	0.14	0.03	0.12	0.09
Age of father	0.14	0.04	0.14	0.04
Age of child	0.12	0.05	−0.07	0.27
Income	0.21	0.001	0.32	<0.001
Education of mother	0.22	<0.001	0.42	<0.001
Education of father	0.28	<0.001	0.38	<0.001

Table 5 Differences in complementary and alternative medicine use and consideration for children by child race, gender, and primary language.

	Number of CAM used Mean (SD)	*p*-Value	Number of CAM considered Mean (SD)	*p*-Value
Child race				
Hispanic	3.81 (3.71)	0.004	7.28 (7.95)	<0.001
White	5.72 (4.39)		13.05 (9.99)	
Child gender				
Male	4.40 (4.49)	0.94	8.65 (9.13)	0.26
Female	4.46 (4.13)		9.92 (9.55)	
Primary language				
English	5.73 (4.56)	<0.001	12.45 (9.85)	<0.001
Spanish	2.89 (3.44)		5.47 (7.20)	

Discussion

Under the conditions of this study, we found that CAM use is frequent among pediatric patients at a major children's hospital in Southern California. Specifically, 77% of children were reported to have used at least one type of CAM therapy and 45% used four or more over the child's lifetime. Non-Hispanic White children whose family's primary language was English were more likely to use CAM compared to Hispanic/Latino children whose family's primary language was Spanish.

Similarly, CAM referral was common among pediatric HCP. The majority of HCP (89%) have referred at least one type of CAM therapy and 83% of providers reported referring four or more over the course of their practice. Neither medical profession (nurse, attending physician, or medical resident) nor years post-training were associated with CAM referral.

It is important to note that we incorporated therapies less commonly identified as CAM (e.g., prayers, folk medicine, and vitamins) in an effort to capture a broad range of therapies participants and HCP may be using/referring to treat health issues. Although it is possible that inclusion of these therapies could inflate the percentage of individuals who use or refer CAM, our results do not support this assertion. Specifically, we found that even when participants used or referred these specific CAM therapies they were typically using or referring other CAM therapies as well. This suggests that utilizing these CAM therapies in the analyses did not drive the findings. However, it is important to note that previously published data have found differences with 10% of children in Canada with chronic illnesses using vitamin/minerals as their only form of CAM therapy.[6] This is in contrast to our finding that 1% of children used vitamins/minerals as their only form of CAM. It is possible that this disparity stems from differences in participant populations (our sample was mostly healthy and from the US). However, more research is needed to confirm true population differences. Nevertheless, selecting a broad range of

Table 6 Percent of caregivers reporting that their child has ever used or they would consider using for their child complementary alternative therapies and the percentage of health care providers who reported that they have ever referred complementary and alternative therapies.

Therapy	% Providers who have referred	% Children who have used	*p*-Value	% Caregivers who would consider using for their children in the future	*p*-Value
Acupressure	52	6	<0.001*	32	<0.001*
Acupuncture	64	8	<0.001*	32	<0.001*
Aromatherapy	31	10	<0.001*	31	0.94
Art therapy	66	18	<0.001*	40	<0.001*
Ayurveda	6	0	<0.001*	20	<0.001*
Biofeedback	57	7	<0.001*	23	<0.001*
Chelation	13	0.4	<0.001*	13	0.99
Chiropractic care	37	16	<0.001*	30	0.13
Deep breathing exercises	76	23	<0.001*	37	<0.001*
Diet based therapies	61	10	<0.001*	28	<0.001*
Energy healing therapy/Reiki	11	6	0.12	20	0.02
Exercise	90	47	<0.001*	42	<0.001*
Folk medicine	13	8	0.09	11	0.49
Guided imagery	54	7	<0.001*	21	<0.001*
Herbology/non-vitamin, non-mineral, natural products	45	18	<0.001*	33	0.015
Homeopathy	23	9	<0.001*	28	0.24
Hypnotherapy	25	4	<0.001*	16	0.02
Massage	72	40	<0.001*	37	<0.001*
Meditation	65	11	<0.001*	35	<0.001*
Megavitamin/mineral therapy	17	6	<0.001*	26	0.05
Music therapy	68	23	<0.001*	39	<0.001*
Naturopathy	15	7	0.02	28	0.004
Other	27	8	0.01	3	<0.001*
Pet-therapy/animal-assisted therapy	72	23	<0.001*	41	<0.001*
Physical therapy	89	40	<0.001*	39	<0.001*
Prayer	62	51	0.03	35	<0.001*
Qi Gong	12	3	0.001*	24	0.004
Reflexology	29	17	0.01	41	0.02
Relaxation	77	16	<0.001*	35	<0.001*
Tai Chi	28	4	<0.001*	30	0.59
Vitamin/mineral supplement use	73	44	<0.001*	34	<0.001*
Yoga	58	10	<0.001*	36	<0.001*

* Significant at the Bonferroni corrected alpha level of 0.0016.

therapies when researching CAM may allow researchers to capture what patients or providers use to manage health. Indeed, leaving out specific therapies might underestimate the use of CAM in these populations.

Comparing frequencies of CAM use by patients and referral by providers, large discrepancies were apparent. HCP referred CAM therapies at frequencies significantly greater than use by children in the overwhelming majority of therapies. The only therapies that caregivers would consider using more frequently than HCP referred tended to be the most infrequently used therapies. Similarly, for most therapies, caregivers were not considering CAM use for their children at frequencies consistent with provider referral. The findings imply that caregivers may not be utilizing CAM therapies for their children to their full extent.

Future research is needed to understand the discrepancies found between CAM use and referral. One explanation is that families are unable to access CAM due to availability or lack of coverage by insurance. For example, it is possible that fewer clinics offer CAM treatment or sell CAM products compared to the prevalence of conventional medical treatments and product availability. Additionally, many insurance companies do not cover CAM to the extent that conventional medicine is covered.[20] This may create a lack of financial ability to access CAM treatments.

There may also be communication barriers between families and HCP that contribute to the differences in referral versus use. It is possible that the benefits of CAM or how to access the therapies are not adequately explained to patients. Therefore, patients may not understand how effective CAM therapy can be or what they can do to access such treatment. Further, extant literature documents that HCP do not always ask about patient CAM use[14] and patients do not always report CAM use to providers.[13] Thus it may be that CAM is simply not addressed in patient encounters. Language barriers may be an additional source

of this inconsistency, particularly given that children of Spanish-speaking Hispanic/Latino families were less likely to report CAM use compared to children of Non-Hispanic White English-speaking families. Previous research has demonstrated that language barriers are a significant predictor of low adherence to treatments.[21] Thus, insufficient communication due to a lack of detailed explanation or language barriers may be contributing to the underutilization of CAM by children compared to the frequency of CAM referral by pediatric HCP.

Due to the potential benefits of CAM as a cost-effective and safe alternative to conventional medicine, it is important to understand predictors of CAM use and consideration among children and their caregivers as well as how often pediatric providers are referring patients to CAM. Child use of CAM is continuing to grow but children are still not utilizing CAM therapies at frequencies consistent with referrals by HCP. Uncovering these discrepancies is important as CAM can be an effective low cost way to increase positive health outcomes.[7] These discrepancies should continue to be explored in an effort to utilize CAM to its full extent in pediatrics.

Conflict of interest

None declared.

Acknowledgements

This report was made possible with the generous support of the Children's Miracle Network. The study sponsor had no involvement in the study design; in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

Appendix A. CAM therapies

Therapy	
Acupressure[a]	Technique of pressing on certain points on the body by a hand, elbow or different objects
Acupuncture[a,b]	Technique of putting thin needles through the skin at specific points on the body to control pain and other symptoms
Aromatherapy[a]	Massage of the body and face with fragrant oils taken from herbs, flowers, and fruits
Art therapy[b]	Expressive therapy using art materials, such as paints, chalk and markers
Ayurveda[a,b]	Medical system developed in India that focuses on mind, body, and spirit to restore the natural harmony of an individual
Biofeedback[a]	Use of simple electronic instruments to regulate breathing, heart rate, temperature, and blood pressure to improve health
Chelation[a]	Use of drugs given to the blood that attach to toxic metals and waste in the bloodstream and are gotten rid of from the patient's body
Therapy	
Chiropractic care[a,b]	Adjustment of the spine and joints
Deep breathing exercises[a,b]	The practice of breathing deeply
Diet based therapies[a,b]	Such as gluten-free/casein-free, ketogenic diet, vegetarian, vegan
Energy healing therapy/Reiki[a]	Creating healing energy through the hands of a practitioner into the client's body
Exercise[b]	Using exercise to reduce the risk of disease or to treat symptoms of disease
Folk medicine[b]	System of healing by folk healers who use prayer, healing touch, laying on of hands, charms, herbal teas, magic rituals, etc.
Guided imagery[a,b]	Picturing detailed images in the mind
Herbology/non-vitamin, non-mineral, natural products[a,b]	Herbal medicines like: soy, flax, echinacea, ginkgo biloba, ginseng, garlic, kava kava, saw palmetto
Homeopathy[a,b]	Medical system based on the idea that any natural substance that can cause symptoms of disease in a healthy person, can cure those symptoms in a sick person
Hypnotherapy[b]	Treatment of different health conditions by putting an individual into a state of sleep
Massage[a,b]	The action of rubbing, kneading someone's body, to help the person relax
Meditation[a,b]	A self-directed practice for relaxing the body and calming the mind
Megavitamin/mineral therapy[a,b]	Use of large doses of vitamins and/or minerals to prevent or treat diseases
Music therapy[b]	Utilizing music within a therapeutic relationship to address physical, emotional, cognitive, and social needs of an individual
Naturopathy[a,b]	Medical system that uses natural remedies and the body's natural ability to heal itself to cure disease
Other	
Pet-therapy/animal-assisted therapy[b]	Use of animals in a directed way with patients to improve physical, social, emotional, and/or cognitive functioning, as well as motivation
Physical therapy[b]	
Prayer[a]	Using prayer for healing
Qi Gong[a,b]	Chinese regimen that uses gentle body movements, mental focus, and deep breathing

Relaxation[a,b]	Tensing and relaxing of muscle groups
Reflexology[a]	Massage of the feet or hands based on the belief that pressure applied to these points helps other parts of the body
Tai Chi[a,b]	Chinese self-defense and exercise program made up of different body positions
Vitamin/mineral supplement use[b]	Standard pediatric multivitamins, calcium
Yoga[a,b]	Combination of breathing exercises, body positions, and meditation

[a] These therapies were found in published empirical articles on CAM therapy in pediatric populations[12,14,17] and recent reviews of the CAM literature [18,19].
[b] These therapies can be found on the National Center for Complementary and Integrative Health website [16].

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