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Use of Complementary and Alternative Medicine by Males With Duchenne or Becker Muscular Dystrophy

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Abstract

Use of complementary and alternative medicine by males with Duchenne or Becker muscular dystrophy was examined using interview reports from caregivers enrolled in the population-based Muscular Dystrophy Surveillance, Tracking, and Research Network. Of the 200 caregivers interviewed, 160 (80%) reported “ever” using complementary and alternative medicine for their affected children. Mind-body medicine (61.5%) was most frequently used, followed by biologically based practices (48.0%), manipulative and body-based practices (29.0%), and whole medical systems (8.5%). Caregivers reporting use of whole medical systems had higher education and income levels compared with nonusers; affected males had shorter disease duration.

Caregivers reporting use of mind-body medicine, excluding aquatherapy, had higher education level compared with nonusers. Overall, complementary and alternative medicine use was high; disease duration, education, and income levels influenced use. These findings have implications

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Author Contributions

All the authors contributed to the conception, design, interpretation of data, and critical review, revisions, and approval of the final manuscript. SN and KAC conducted the analysis. SN prepared the initial manuscript draft.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Ethical Approval

All sites participating in the Muscular Dystrophy Surveillance, Tracking, and Research Network received approval from their respective institutional review boards to conduct interviews.

for developing clinical care protocols and monitoring possible interactions between complementary and alternative medicine and conventional medical therapies.

Keywords

Becker; Duchenne; muscular dystrophy; complementary and alternative medicine

Complementary and alternative medicine is a diverse group of medical and healthcare practices that are not generally considered conventional therapy.¹ Complementary medicine is used in conjunction with conventional therapy, whereas alternative medicine is used in place of conventional medicine.¹ Use of complementary and alternative medicine to manage chronic illness is common worldwide, with estimates ranging from 6% to 65% in adults.² In particular, a 2007 report revealed that 38.3% adults in the United States used complementary and alternative medicine.³

Use of complementary and alternative medicine has also been reported in pediatric populations,^{4–9} especially among children with chronic disease or disability.^{4,10,11} Higher rates of use are reported in children with chronic conditions not amenable to surgical treatment (eg, cerebral palsy)¹² compared with those that can be surgically repaired (eg, cleft lip and/or palate).¹⁰ Two Canadian studies that examined use of complementary and alternative medicine in pediatric patients with neurologic disorders reported rates of 30% in patients with neuromuscular disease in general¹³ and 20% in patients with Duchenne muscular dystrophy.¹⁴

A variety of complementary and alternative therapies have been reported among pediatric populations, including chiropractic manipulation, herbal therapy, homeopathy, prayer, massage, special diets, megavitamins, acupuncture, and aquatherapy.^{4,7,10,12–14} Factors noted to influence use included child age^{6,7,12} and disease state,¹² parent/caregiver age,⁶ race,⁷ and use of complementary and alternative medicine,^{6–10,12} maternal education level,¹² healthcare provider recommendation,¹⁰ and geographical region of residence^{8,9}; however, these findings have not been consistently replicated. A common limitation of many studies is the use of small clinic-based samples.^{7,13,14} In addition, some studies have not focused on complementary and alternative medicine use in children with specific chronic conditions, but rather studied use among children receiving services in special needs clinics.^{10,14}

With the increase in complementary and alternative medicine use among children with chronic disease or disability, improved understanding of types and patterns of such use for specific conditions is needed. This is particularly important as clinical trials of new potential therapies are being designed. To address this gap, use of complementary and alternative medicine and factors influencing such use were examined in a population-based cohort of males with childhood-onset Duchenne or Becker muscular dystrophy identified by the Muscular Dystrophy Surveillance, Tracking, and Research Network.

Methods

The Muscular Dystrophy Surveillance, Tracking, and Research Network is a multisite project established by the Centers for Disease Control and Prevention in 2002. Initially, it was composed of 4 sites: Arizona, Colorado, Iowa, and New York. More recently, activities were expanded to Georgia in 2005 and Hawaii in 2008. The methods for surveillance activities have been described elsewhere.¹⁵ Briefly, each site conducts population-based surveillance for Duchenne or Becker muscular dystrophy statewide, with the exception of New York, which conducts surveillance in 12 western counties. An individual with Duchenne or Becker muscular dystrophy was eligible for inclusion if born on or after January 1, 1982, and was a resident in any Muscular Dystrophy Surveillance, Tracking, and Research Network site. For each potential case identified, information abstracted was used to assign 1 of 6 case definitions (definite, probable, possible, asymptomatic, affected female, or not Duchenne or Becker muscular dystrophy).¹⁶ The present analysis was restricted to males with a definite or probable clinical diagnosis of Duchenne or Becker muscular dystrophy as evidenced by an elevated creatine kinase level, and either documentation of a dystrophin mutation, a muscle biopsy that showed abnormal dystrophin by immunostaining or Western blot, or a documented family history of an X-linked muscular dystrophy.¹⁶

As an extension of the surveillance activities, baseline interviews were conducted with primary caregivers to examine socioeconomic and acculturation factors, family characteristics, geography, social support, clinical outcomes, and use of complementary and alternative medicine, medical services, and assistive technology. A telephone interview instrument was developed with closed and open-ended questions. Items related to use of complementary and alternative medicine were developed based on previous research on children with special healthcare needs.^{9,10}

Survey Sample and Baseline Telephone Interview

The population for the baseline telephone interviews was composed of the primary caregivers of 464 males (living or deceased) identified during the first 2 surveillance years (April 2004–August 2006) from Arizona, Colorado, Georgia, Iowa, and western New York. Individuals from Hawaii were not included because surveillance had not commenced by 2006. Of the 464 males, all 43 from Georgia were excluded as surveillance was not complete for the entire catchment area. Also excluded were 1 male who had moved out of the United States and 1 male who was later determined not to have Duchenne or Becker muscular dystrophy, resulting in a sample of 419 males. For these 419 males, there were 372 independent caregivers. Eligible primary caregivers (in priority order) were birth mother, birth father, and legal guardian; only 1 caregiver was selected per family.

From April 2007 through May 2008, caregivers were contacted to participate in the interview. Recruitment was initiated directly with caregivers by mail (Iowa and New York), telephone (Colorado), or indirectly by mail through the primary healthcare provider (Arizona). Following the initial contact, each caregiver was sent a study packet with an introductory letter, project brochure, information on frequently asked questions and rights of research subjects, a residence history worksheet, and \$20 compensation for time and effort required to complete the interview. A systematic follow-up protocol by telephone and mail

was used to obtain consent to conduct the interviews. The interviews were administered in English or Spanish language by trained interviewers and typically took between 45 and 60 minutes to complete, depending on the age and number of affected males in the family. In families with more than 1 affected male, a short additional module was completed to provide data on younger affected sibling(s). Regarding use of complementary and alternative medicine, caregivers were asked if an affected male had ever used any medicines read from a prespecified list. To obtain a more complete picture of use, caregivers had the option to report any other complementary and alternative therapies used. If caregivers indicated use of special diet, they were asked to indicate the type of diet. In addition, caregivers were asked if each complementary and alternative therapy used was recommended by a healthcare provider.

For every completed interview, the respective interviewer and interview supervisor each conducted a manual review of item responses recorded to identify entry errors and the need for callbacks with a caregiver. Local institutional review board approval to conduct interview data collection with primary caregivers was obtained at each site.

Data Analysis

Deidentified interview data from each participating site were pooled at the Data Coordination Center (interview data, release date April 2009) and used for analysis. Surveillance data were used to provide sociodemographic information on nonparticipants to examine possible participation bias. Interview data were used to evaluate factors that influence use of complementary and alternative medicine. Because use of complementary and alternative medicine is likely to be correlated in families with multiple affected males, the family unit was used as the unit of analysis. Caregiver characteristics examined were age at interview (25–39, 40–49, 50–64 years), race/ethnicity as reported by the caregiver (white non-Hispanic, Hispanic, other), education level (high school, some college or vocational training, college graduate), and current marital status if the caregiver was the biological parent (single, married). Affected male characteristics were person-years with disease and disease phenotype. Person-years were calculated as the difference between age at interview and age at diagnosis. If the index child was deceased at the time of the interview, the age at death was substituted for the age at interview. Disease phenotype was based on age of onset of signs and symptoms. Affected males with signs and symptoms before their sixth birthday were classified as early onset, which was used as a proxy for Duchenne muscular dystrophy. If signs and symptoms started after the sixth birthday, then age of onset was classified as late and used as a proxy for Becker muscular dystrophy. Additional variables examined were site (Arizona, Colorado, Iowa, western New York) and family household income (<\$30 000, \$30 000–\$50 000, >\$50 000).

Use of complementary and alternative medicine was the outcome variable, and it was examined based on domains defined by the National Center for Complementary and Alternative Medicine.¹ These domains were biologically based practices (eg, dietary supplements, herbal products, special diets, or vitamins), manipulative and body-based practices (eg, firecupping, gwa sha, chiropractic or osteopathic manipulation, massage, myofascial release, electro- and laser therapy), mind-body medicine (eg, aquatherapy,

companion animals, hippotherapy, hypnosis, meditation, music therapy, prayer, or yoga), and whole medical systems (eg, acupuncture, homeopathy, or Qi gong).

Bivariable analyses were conducted to examine associations between the affected male's person-years of disease, caregiver characteristics (age, race/ethnicity, marital status, and education level), site, family income, and use of specific complementary and alternative medicine domains. For each domain examined, the comparison group included caregivers who reported no use of complementary and alternative medicine. Since special diets (eg, low-fat diets) and aquatherapy are commonly recommended practices in the management of Duchenne or Becker muscular dystrophy,¹⁷ analyses for the biologically based complementary and alternative medicine domain included all families who reported use of special diet and excluded families who reported use of special diet only ($n = 11$). Similarly, analyses for mind-body medicine included all families who reported use of aqua-therapy and excluded families who reported use of aquatherapy only ($n = 17$). t tests and chi-squares were used to test for significant differences in means and proportions ($P < .05$). Observations with unknown or missing responses were excluded from analyses.

Results

Of the 372 eligible caregivers, 200 (53.8%) completed interviews, 2 (0.5%) consented but were unable to complete interviews by the close of data collection, 84 (22.6%) refused, and 86 (23.1%) were not located. Participation rates for each individual site were 42.6% in Arizona, 50.0% in Colorado, 71.4% in Iowa, and 62.2% in western New York. Overall, caregivers were more likely to participate if both parents were identified as caregivers; mothers were most often the primary respondent 175 (87.5%). Based on surveillance data, mothers who participated were more likely than nonparticipants to be older, white non-Hispanic, and to have at least a high school education (Table 1). For other participants (eg, fathers), corresponding data on nonparticipants were not available for comparison.

Among caregiver participants, the median age at interview was 44 years, and one-half reported a family income greater than \$50 000. Among the 200 affected males, 162 (81.0%) had early onset of signs and symptoms, 37 (18.5%) had late onset, and 1 affected male had undetermined age at onset. The median ages at interview and at diagnosis of Duchenne or Becker muscular dystrophy for the oldest affected males were 16 and 4.5 years, respectively, and mean person-years of disease was 11 years 2 months \pm 5 years 1 month (data not shown).

Of the 200 caregiver participants, 160 (80%) reported "ever" using complementary and alternative medicine for their affected children. There was no significant difference in reported use between caregivers of males with early onset of signs and symptoms and those of males with late onset (82.1% vs 70.3%; P value = .11); therefore, further analyses combined both groups. The number of complementary and alternative therapies reported ranged from 1 to 9 per family. Of the caregivers who reported use of complementary and alternative medicine, 55 (34%) reported use of 1, 42 (26%) reported 2, 26 (16%) reported 3, 15 (9%) reported 4, and 22 (14%) reported 5 or more (data not shown). Aquatherapy, prayer, and special diets (commonly low fat or low calorie) were most often reported (Table 2).

Reports of “other” complementary and alternative medicine included such therapies as creatine, coenzyme Q10, fire cupping, qwa sha, electro- and laser therapy, and Qi gong (data not shown). Aquatherapy and special diets were most often reported to have been recommended by healthcare providers. Excluding families that reported use of aquatherapy only, diet only, or both (Figure 1), there was only a slight decline in the overall use of complementary and alternative medicine.

Based on the complementary and alternative medicine domains, use of mind-body medicine was most commonly reported ($n = 123$; 61.5%), followed by biologically based practices ($n = 96$; 48.0%). Use of manipulative and body-based practices was reported by 58 (29.0%) caregivers, and 17 (8.5%) reported use of whole medical systems (data not shown). Caregivers frequently reported use of complementary and alternative medicine across multiple domains as shown in Table 3.

In bivariable analyses (Table 4), significant associations were found between use of whole medical systems (acupuncture, homeopathy, and Qi gong) and person-years of disease, caregiver education level, and family income. Compared with nonusers, males who used complementary and alternative medicine in the whole medical system domain had significantly shorter duration of disease (t -test P value = 0.02), and their caregivers had a college education or higher and family income $>$ \$50 000 (exact P value $<$.05 as appropriate). No significant associations were observed for biologically based practices (with or without special diet) and manipulative and body-based practices. For mind-body medicine, when users of aquatherapy only were excluded, a significant association was observed with caregiver education level. Compared with nonusers, caregivers of males who used mind-body practices had a college education or higher (chi-square P value $<$.05).

Discussion

The proportion of reported complementary and alternative medicine use observed in this study was higher than has been reported for the general pediatric population,^{5,7,9} and in children with neuromuscular disorders in general,¹³ and muscular dystrophy in particular.^{13,14} Similarly, the proportion of use in this population was higher than what has been reported for adults with neurologic disorders¹⁸ or functional disabilities.¹⁹ These findings persisted after exclusion of complementary and alternative therapies considered part of conventional care for Duchenne or Becker muscular dystrophy (aquatherapy and special diet). Several factors, such as duration of use (lifetime use^{7,12,13} vs a more restricted time period of 6 or 12 months^{7,9,10,14}), differences in study populations sampled,^{13,14} society-wide changes in knowledge, popularity and availability of complementary and alternative medicine,²⁰ and differences in classification of complementary and alternative therapies, might explain the discrepant findings. Similar to previously published reports,^{12,13} families enrolled in the Muscular Dystrophy Surveillance, Tracking, and Research Network tended to use more than 1 complementary and alternative therapy.

As has been reported in other studies of children with special healthcare needs, aquatherapy, special diet, and prayer were commonly reported.^{10,12,21,22} Aquatherapy, a specialized form of physical therapy performed in water, is recommended as a complement to traditional

physical therapy; therefore, it might well be considered a conventional form of treatment and not a complementary and alternative therapy. Indeed, use of aqua-therapy has been recommended as part of the clinical care considerations for Duchenne or Becker muscular dystrophy.¹⁷ Likewise, nutritional guidance (diet, vitamins, and nutrients) is a key component of the clinical care considerations.¹⁷ This is supported by the fact that aquatherapy and special diet were most likely to be recommended by healthcare providers.

Use of prayer as a coping mechanism has been reported by families with children who are chronically ill.^{22–25} Anecdotal information suggests that prayer is used by individuals with Duchenne or Becker muscular dystrophy to cope with their illness,²⁶ which may explain the high proportion of prayer use in this population. That said, this study was unable to distinguish between families who reported use of prayer as a healing mechanism as opposed to regular prayer.

Several factors have been reported to influence use of complementary and alternative medicine in pediatric populations. Similar to previous reports,^{12,27,28} this study did find that caregiver education was associated with use of certain complementary and alternative therapies, and that use was higher in families where the caregiver had a college education.

These findings need to be considered with respect to several limitations. Because the interview participation rate of 53.8% was modest, there is potential for participation bias in this population as a significantly higher proportion of participants were older, non-Hispanic whites and had relatively higher education levels compared with nonparticipants. Another limitation was that data collected were self-reports and because complementary and alternative medicine use was not limited to a specific time period, it was potentially difficult for caregivers to recall all possible therapies used. Also, caregivers were only asked about physician recommendation if they reported using a specific complementary and alternative therapy. As a result, such recommendations could only be evaluated if the caregiver endorsed use and not if the therapy was recommended but not used. Lastly, missing values for some variables reduced the effective sample size for analysis, which may have resulted in the inability to detect any associations in factors that have been previously reported. Despite these limitations, this study is one of the few studies using a population based sample of males with Duchenne or Becker muscular dystrophy and their families; thus, these findings may be indicative of the prevalence of complementary and alternative medicine use in this population.

Conclusion

Findings from this study suggest a high proportion of complementary and alternative medicine use by males with Duchenne or Becker muscular dystrophy. Healthcare providers and policy makers need to be aware of the extent of such use in this population, as there may be implications for development of disease-specific clinical care protocols and monitoring of possible interactions between complementary and alternative medicine and conventional treatments. Further research is needed to elucidate the advantages and disadvantages of specific complementary and alternative therapies in alleviating symptoms, as well as any potential side effects of these medicines.

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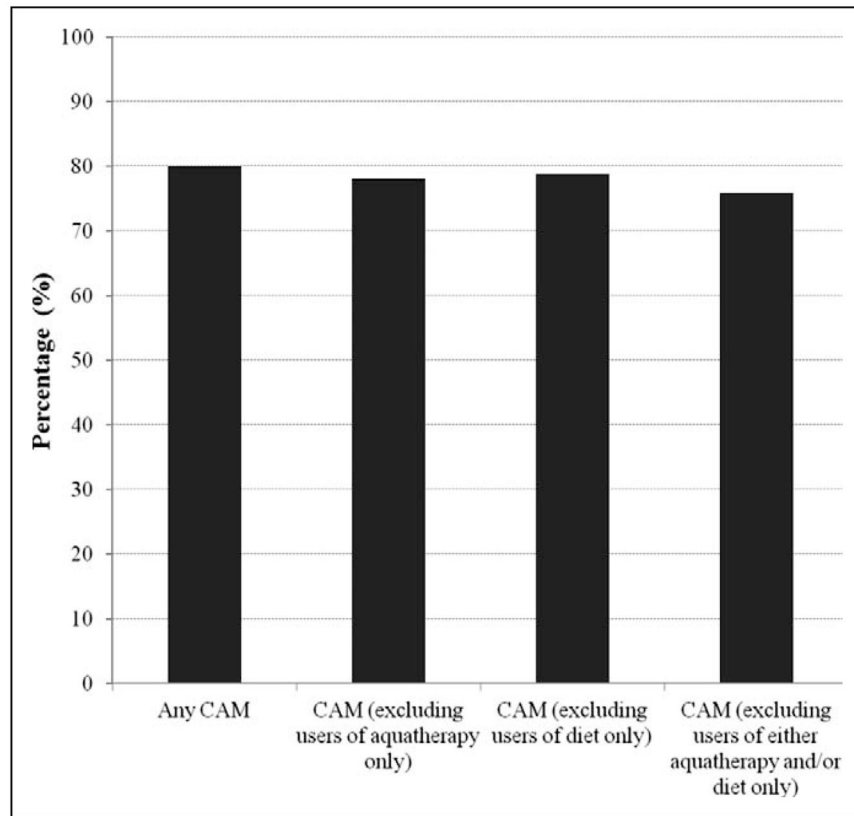


Figure 1.
Reported use of CAM by males with Duchenne or Becker muscular dystrophy.
CAM, complementary and alternative medicine.

Table 1Distribution of Selected Population Sociodemographic Characteristics by Participation Status^a

Affected Male and Caregiver Characteristic	Participants (N = 200) N (%)	Nonparticipants (N = 172) N (%)	P value
MD STARnet site			<.05
Arizona	52 (26.0)	70 (40.7)	
Colorado	47 (23.5)	51 (29.7)	
Iowa	50 (25.0)	20 (11.6)	
New York	51 (25.5)	31 (18.0)	
Multiple affected males			.52
Yes	30 (15.0)	30 (17.4)	
No	170 (85.0)	142 (82.6)	
Caregiver relationship			.65
Mother	175 (87.5)	149 (86.6)	
Father	12 (6.0)	14 (8.1)	
Other	13 (6.5)	9 (5.2)	
Language used at home			.05
English	187 (93.5)	151 (87.8)	
Spanish	8 (4.0)	18 (10.5)	
Other	5 (2.5)	3 (1.7)	
Maternal year of birth ^b			.03
1960	48 (31.2)	31 (23.3)	
1961–1965	47 (30.5)	32 (24.1)	
1966–1970	37 (24.0)	33 (24.8)	
1971	22 (14.3)	37 (27.8)	
Maternal race/ethnicity			<.05
White non-Hispanic	128 (64.0)	73 (42.4)	
Black non-Hispanic	5 (2.5)	4 (2.3)	
Hispanic	30 (15.0)	43 (25.0)	
Other	4 (2.0)	8 (4.7)	
Unknown	33 (16.5)	44 (25.6)	
Maternal education level ^b			<.05
Less than high school	17 (10.8)	28 (25.2)	
High school	56 (35.7)	49 (44.1)	
Some college	38 (24.2)	23 (20.7)	
College	40 (25.5)	7 (6.3)	
Unknown	6 (3.8)	4 (3.6)	
Maternal vital status			.08
Living	192 (96.0)	171 (99.4)	
Deceased	5 (2.5)	0 (0.0)	
Unknown	3 (1.5)	1 (0.6)	
Oldest affected male year of birth			.61

Affected Male and Caregiver Characteristic	Participants (<i>N</i> = 200) <i>N</i> (%)	Nonparticipants (<i>N</i> = 172) <i>N</i> (%)	<i>P</i> value
1982–1985	39 (19.5)	24 (14.0)	
1986–1990	58 (29.0)	58 (33.7)	
1991–1995	58 (29.0)	51 (29.7)	
1996–2000	38 (19.0)	31 (18.0)	
2001–2005	7 (3.5)	8 (4.7)	
Oldest affected male vital status			.12
Living	173 (86.5)	135 (78.5)	
Deceased	26 (13.0)	36 (20.9)	
Unknown	1 (0.5)	1 (0.6)	

Abbreviation: MD STARnet, Muscular Dystrophy Surveillance, Tracking, and Research Network

Note: Because of rounding, percentages may not total 100.

^a Findings are based on surveillance data.

^b The *n* does not add up to the overall *N* for participants and nonparticipants because of missing values.

Table 2

Types of CAM Used by MD STARnet Families

CAM Type	Yes ^a n (%)	Provider Recommended ^b n (%)
Biologically based		
Herbs, mouth	37 (23.1)	11 (29.7)
Herbs, skin	11 (6.9)	1 (9.1)
Special diet	54 (33.8)	37 (68.5)
Megavitamins	11 (6.9)	5 (45.5)
Glycoproteins	6 (3.8)	1 (16.7)
Manipulative and body-based		
Massage	43 (26.9)	17 (39.5)
Chiropractic manipulation	29 (18.1)	4 (13.8)
Osteopathic manipulation	4 (2.5)	1 (25.0)
Mind-body medicine		
Aquatherapy	82 (51.3)	56 (68.3)
Hippotherapy	24 (15.0)	9 (37.5)
Self-hypnosis	2 (1.3)	0 (0.0)
Prayer/blessings	61 (38.1)	1 (1.6)
Companion animals	11 (6.9)	1 (9.1)
Whole medical systems		
Acupuncture	6 (3.8)	1 (16.7)
Homeopathy	13 (8.1)	4 (30.8)
Other	18 (11.3)	0 (0.0)

Abbreviations: CAM, complementary and alternative medicine; MD STARnet, Muscular Dystrophy Surveillance, Tracking, and Research Network.

^aDenominator used to calculate the percentages is the number of families reporting any use of CAM ($N=160$).

^bDenominator used to calculate the percentages is the number of users for each specific CAM therapy.

Table 3

Use of CAM Therapies From Specific Domains

CAM Domains	Yes ^a (N = 160) n (%)
One domain	
Biologically based only	23 (14.4)
Manipulative body-based only	9 (5.6)
Mind-body only	38 (23.8)
Two domains	
Biologically based and manipulative body-based	3 (1.9)
Biologically based and mind-body	37 (23.1)
Biologically based and whole medical system	1 (0.6)
Manipulative body-based and mind-body	17 (10.6)
Three domains	
Biologically based, manipulative body-based, and mind-body	16 (10.0)
Biologically based, mind-body, and whole medical systems	3 (1.9)
Biologically based, manipulative body-based, and whole medical systems	1 (0.6)
All four domains	
Biologically based, manipulative body-based, mind-body, and whole medical systems	12 (7.5)

Abbreviation: CAM, complementary and alternative medicine.

^aDenominator used to calculate the percentages is the number of families reporting any use of CAM (N= 160).

Table 4
Association Between Selected Affected Male and Caregiver Characteristics and Use of Specific CAM Domains

Affected Male/Caregiver Characteristics	Nonusers ^a (N = 40) n (%)	Ever use CAM (N = 160) n (%)	Biologically based (N = 96) n (%)	Biologically based (excluding diet only) (N = 85) n (%)	Manipulative and Body-Based (N = 58) n (%)	Mind-Body (N = 123) n (%)	Mind-Body (excluding aquatherapy only) (N = 106) n (%)	Whole Medicine (N = 17) n (%)
DBMD male person-years of disease, <i>M</i> (SD)	12.2 (4.5)	10.9 (5.2)	10.9 (5.3)	10.8 (5.2)	10.8 (5.3)	10.8 (5.0)	10.8 (5.0)	8.9 (4.9) ^b
Caregiver age at interview (y)								
25–39	6 (17.1)	41 (27.9)	24 (26.1)	21 (25.6)	20 (37.0)	30 (26.1)	27 (27.0)	3 (18.8)
40–49	25 (71.4)	80 (54.4)	47 (51.1)	44 (53.7)	26 (48.2)	69 (60.0)	58 (58.0)	8 (50.0)
50–64	4 (11.4)	26 (17.7)	21 (22.8)	17 (20.7)	8 (14.8)	16 (13.9)	15 (15.0)	5 (31.3)
Caregiver race/ethnicity								
White non-Hispanic	29 (82.9)	119 (81.0)	75 (81.5)	70 (85.4)	42 (77.8)	98 (85.2)	84 (84.0)	14 (87.5)
Hispanic	3 (8.6)	21 (14.3)	12 (13.0)	9 (11.0)	9 (16.7)	12 (10.4)	11 (11.0)	0 (0.0)
Other ^c	3 (8.6)	7 (4.8)	5 (5.4)	3 (3.7)	3 (5.6)	5 (4.4)	5 (5.0)	2 (12.5)
Caregiver marital status ^d								
Single	9 (27.3)	24 (18.3)	15 (18.5)	13 (18.1)	6 (12.2)	17 (16.7)	13 (14.8)	1 (6.7)
Married	24 (72.7)	107 (81.7)	66 (81.5)	59 (81.9)	43 (87.8)	85 (83.3)	75 (85.2)	14 (93.3)
Caregiver education level								
High school or lower	13 (37.1)	42 (28.6)	24 (26.1)	18 (22.0)	15 (27.8)	25 (21.7)	20 (20.0) ^e	0 (0.0) ^f
Some college	13 (37.1)	60 (40.8)	39 (42.4)	36 (43.9)	20 (37.0)	52 (45.2)	48 (48.0)	6 (37.5)
College	9 (25.7)	45 (30.6)	29 (31.5)	28 (34.2)	19 (35.2)	38 (33.0)	32 (32.0)	10 (62.5)
MD STARnet site								
Arizona	7 (17.5)	45 (28.1)	30 (31.3)	24 (28.2)	18 (31.0)	30 (24.4)	25 (23.6)	6 (35.3)
Colorado	10 (25.0)	37 (23.1)	19 (19.8)	18 (21.2)	12 (20.7)	28 (22.8)	25 (23.6)	5 (29.4)
Iowa	13 (32.5)	37 (23.1)	17 (17.7)	14 (16.5)	17 (29.3)	26 (21.1)	24 (22.6)	2 (11.8)
New York	10 (25.0)	41 (25.3)	30 (31.3)	29 (34.1)	11 (19.0)	39 (31.7)	32 (30.2)	4 (23.5)
Family income								
<\$30 000	13 (32.4)	44 (30.8)	22 (26.5)	17 (23.0)	13 (24.5)	32 (28.3)	26 (26.3)	0 (0.0) ^f
\$30 000–\$50 000	7 (18.4)	24 (16.8)	12 (14.5)	11 (14.9)	9 (17.0)	20 (17.7)	18 (18.2)	1 (6.7)
>\$50 000	18 (47.4)	75 (52.5)	49 (59.0)	46 (62.3)	31 (58.5)	61 (54.0)	55 (55.6)	14 (93.3)

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Abbreviations: CAM, complementary and alternative medicine; DBMD, Duchenne or Becker muscular dystrophy; M, mean; SD, standard deviation; y, years; MD STARnet, Muscular Dystrophy Surveillance, Tracking, and Research. Note: Because of missing values, the total n for some categories may not add up to the overall N. Because of rounding, percentages may not total 100.

^aNonusers include families with no reported use of any CAM therapy.

^b*t* test *P* value = .02.

^cOther race/ethnicity includes black non-Hispanic, Asian/Pacific islanders, and Native Americans.

^dAsked only if caregiver was the biological parent.

^eChi-square *P* value <.05 for education level.

^fExact *P* value <.05 for education level and family income.