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Factors associated with complementary medicine use in pediatric musculoskeletal conditions: Results from a national survey

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ABSTRACT

Objectives: Complementary and alternative medicine (CAM) use is common in children, but its use has only been investigated in children with musculoskeletal conditions (MSK) to a limited extent. We aimed to characterize factors associated with CAM use in children with MSK conditions.
Methods: Within the 2012 National Health Interview Survey dataset (including its child CAM supplement), we examined factors associated with CAM use in children with MSK conditions and performed an analysis examining the perceived usefulness of CAM therapies for MSK conditions.
Results: Overall, there were 10,218 children in the dataset. 28.0% of children with MSK conditions used CAM, compared to 8.8% of children without MSK conditions. Gender ($p = 0.003$), region ($p = 0.001$), race ($p = 0.001$), parental CAM use ($p < 0.001$), education (<0.001), and having anxiety, stress or depression ($p = 0.030$) were correlated with CAM use. Among 90 children who reported on CAM use, 89.7% said that CAM helped some or a great deal for their MSK condition.
Conclusions: Several factors, particularly parental education and parental CAM use, were associated with CAM use, and self-reported improvement rates were high. Interventional trials are needed to determine the efficacy of specific CAM therapies for treating different MSK conditions in children.

1. Introduction

Musculoskeletal (MSK) conditions in children are common, and comprise a large group of conditions including injuries, trauma, congenital skeletal anomalies, infections, inflammatory conditions, cancers and conditions of amplified pain. While it is difficult to provide estimates of overall prevalence, selected conditions have been studied. A large review by King et al. examined a number of different causes of musculoskeletal pain.[1] Median prevalence of back pain in children and adolescents was estimated at 21%, based upon pooled results from two large studies.[2,3] Estimates of limb pain ranged between 9 and 40%, but many were found to be sports-related.[1] A large review of worldwide epidemiologic studies of juvenile idiopathic arthritis reported a prevalence ranging from 0.07 to 4.01 per 1000 children, and incidence rates ranging from 0.08 to 2.26 per 10,000 children-years.[4] Though juvenile arthritis is far less common than MSK injuries, it accounts for approximately 827,000 ambulatory health care visits yearly.[5]

Current treatments for chronic pain in children suffer from modest effect sizes and a significant lack of evidence.[6] For MSK conditions caused by injury, the mantra 'rest, ice, compression and elevation' is often recommended, although existing evidence is equivocal.[7] Non-steroidal anti-inflammatory drugs (NSAIDs) and physical therapy also play an important role in recovery.[8] For chronic inflammatory conditions, steroids and disease-modifying antirheumatic drugs (DMARDs) have become the standard of care, but many children are left with pain despite outward evidence that inflammation has been suppressed.[9] Persistence of pain in children with these and other MSK conditions may have a significant impact on the functioning of family and child.[10] Many families turn to com-

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plementary and alternative medicine (CAM) therapies to treat pain in children.

CAM describes a set of practices and treatments which people choose in addition or as alternatives to Western medical practices.[11] Current figures from the National Center for Complementary and Integrative Health, whose data is derived from the National Health Interview Survey (NHIS), estimate that about 30% of adults and 12% of children utilize CAM therapies.[12] A recent briefing from the Department of Health and Human Services reported 41.6% CAM use in adults with musculoskeletal conditions.[13] Despite the high prevalence of CAM use in children overall, few studies have examined the prevalence of CAM use in children with MSK conditions. A study by Black et al. utilizing the National Health Interview Survey (NHIS) data from 2007 to 2012 estimated frequencies and age-adjusted percentages of CAM use in children with neck and back pain and other MSK conditions, but they did not stratify further by CAM therapy or type of MSK condition.[14] Hagen et al. performed a survey study in 114 patients of types of CAM use in a population of children seen in rheumatology clinic, however, this study was primarily descriptive and did not identify predictors of CAM use.[15] In addition, given that it was restricted to patients seen in rheumatology clinic, it is not likely generalizable to more common causes of MSK pain in children, such as injuries. A study by Feldman et al. of 118 children with juvenile idiopathic arthritis (JIA) found that parental CAM use and identifying as "Canadian" (rather than belonging to a specific ethnic group) was associated with CAM use. Though informative about the JIA population, it was not a large enough to examine specific ethnic groups or to include other relevant demographic variables in its regression analysis.

Using the 2012 NHIS, we aimed to describe the prevalence of CAM use in children with MSK conditions and the types of CAM therapies used for different MSK conditions. We also examined demographic variables associated with CAM use and explored self-reported response rates to CAM therapies in children with MSK conditions. Given that CAM use in children with MSK problems is common, the clinical significance of our endeavor was to better understand what factors were associated with CAM use, so as to inform investigation of specific therapies in the future.

2. Methods

2.1. Study population

We conducted an analysis of the 2012 National Health Interview Survey using data from the Household, Family, Person, Adult, and Child Core surveys, as well as the CAM supplements. NHIS is a multi-purpose survey conducted by the National Center for Health Statistics (NCHS) and the Centers for Disease Control (CDC).[16] This cross-sectional, in-person survey oversamples underrepresented minorities and uses a complex sampling design to provide estimates for the U.S. civilian, non-institutionalized population. The NHIS 2012 survey interviewed 42,366 households, yielding 108,131 persons from 43,345 families. Overall, there were 10,218 children age 4–17 with responses to the CAM supplement. The total household response rate was 77.6%.

2.2. Definition of CAM use

The 2012 NHIS CAM supplement collected information about all children between the age of 4 and 17 on the use of CAM within the 12 months prior to being surveyed. We categorized the CAM practices included in the survey into six groups: (1) mind-body therapies (hypnosis, biofeedback, meditation, guided imagery, progressive relaxation, yoga, tai chi, and qi gong), (2) manipulation therapies (chiropractic, massage, craniosacral therapy), (3) movement therapies (Feldenkrais, Alexander, Pilates, Trager), (4) dietary therapies, (5) non-vitamin and non-mineral supplements, and (6) other CAM therapies (acupuncture, energy healing, naturopathy, ayurveda, chelation, homeopathy, traditional healer). For all questions about use of CAM for specific medical conditions, NHIS asked only about the use of the interviewee's top three CAM modalities.

We defined use of any CAM therapy in the past year as use of any of the aforementioned modalities in that time span. We defined having a MSK condition as a composite variable, including children who reported in the last 12 months: (1) joint pain/stiffness, arthritis, sprain, muscle or bone pain, neck or back pain or (2) use of CAM therapies for any of these conditions. We restricted all analyses to children greater than or equal to 4 years of age (up to 18), because the CAM supplement was only offered in this age range. We defined response to CAM therapy as reporting 'helped a great deal' or 'helped some' for a specific MSK condition.

2.3. Statistical analyses

NHIS survey weighting procedures were used to provide statistically accurate estimates for the U.S. civilian, non-institutionalized population.[17] Wald Chi-squared tests were used in unadjusted analyses to examine the frequency of covariates within different subgroups (MSK and non-MSK groups, different MSK conditions). We included the following covariates in our logistic regression analysis of CAM use in children with MSK conditions: age, sex, race, Hispanic ethnicity, region, presence of anxiety, depression or stress, highest education of one parent, school days missed, parental use of CAM therapy in the last year, ratio of poverty threshold based upon household income, insurance category, and self-reported health status. Presence of anxiety, depression or stress was defined as the report of any of these symptoms in the past 12 months or the use of CAM therapies for these conditions.

Within the subset of children with a MSK condition, we constructed a multivariable logistic regression model with any CAM use in the past year as the outcome variable and with the independent variables above as covariates. Collinearity was assessed by evaluating percent change in standard errors with the presence or absence of a given variable. Missing data were included in the model as separate categories. Associations between these variables and CAM use were described as odds ratios (OR) with 95% confidence intervals. The level of significance was set as a two-tailed $p < 0.05$. All statistical analyses were performed using Stata version 14.0. This study was deemed exempt by the Partners Institutional Review Board.

3. Results

3.1. Patient characteristics

Children with MSK conditions in the last year comprised 15.5% of all children (Table 1). Of the children with MSK conditions in the last year, 42.2% reported neck or back pain, 29.5% reported sprain, and 61.3% reported muscle, joint or bone pain. Children who reported arthritis constituted 0.8% of children with MSK conditions. Compared with children without MSK conditions, children with MSK conditions were predominantly white (77.9% vs. 74.1%; $p = 0.0002$), non-Hispanic (81.7% vs. 78.2%, $p = 0.0002$), with private insurance (60.3% vs. 56.3%, $p = 0.04$), and had a mean age of 13.2 (vs. 10.4, $p < 0.0001$) years. 70.6% of their parents had more than a high school education, compared to 65.1% in the non-MSK group ($p = 0.0002$). There was an approximately equal distribution of gender and regions from the United States.