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Dora L. Clayton-Jones

Lee Za Ong

Mauricio Garnier-Villarreal

Lori Vick

Rachel Sawdy

See next page for additional authors

Authors

Dora L. Clayton-Jones, Lee Za Ong, Mauricio Garnier-Villarreal, Lori Vick, Rachel Sawdy, Safiya George, and Kristin Haglund

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Dora Clayton-Jones
Marquette University College of Nursing, Milwaukee, WI
Lee Za Ong
Marquette University, Department of Counselor Education and Counseling Psychology, WI
Mauricio Garnier-Villarreal
Vrije Universiteit Amsterdam, Sociology Department, the Netherlands
Lori Vick
University of South Carolina College of Nursing, SC
Rachel Sawdy
Marquette University College of Nursing, Milwaukee, WI
Safiya George
Christine E. Lynn College of Nursing, Florida Atlantic University, FL
Kristin Haglund

Marquette University College of Nursing, Milwaukee, WI

Abstract

Purpose

The aim of this paper is to examine complementary and alternative medicine (CAM) use among racially and ethnically diverse adolescents. Greater understanding of CAM use among this group is warranted to better inform health care providers in delivering a culturally relevant health promotion approach.

Design and methods

A secondary data analysis was conducted using the 2012 Child Complementary and Alternative Medicine Supplement of the National Health Interview Survey (CAM-NHIS) data, which was collected from a national sample of adolescents aged 12–17 years. A logistic regression test was employed to investigate the predictors associated with CAM use among racially and ethnically diverse adolescents.

Results

While Black and Hispanic adolescents were the least likely to use CAM compared to their White counterparts, families with higher incomes, higher education attainment, and adolescents who experienced pain were more likely to use CAM.

Conclusions

Findings suggest the need for future research to gain a greater understanding of CAM use among racially and ethnically diverse adolescents, and insights into how health disparities impact CAM use. Greater understanding of how CAM use intersects with health beliefs and outcomes is also warranted.

Practice implications

Based on the CAM-NHIS survey, few racially and ethnically diverse adolescents have reported use of CAM. Development of culturally appropriate instruments and methods to assess CAM use among racially and ethnically diverse adolescents may yield specific data for this population. Informed health care providers can advocate for improved access to CAM for minority adolescents and alter disparate use.

The National Center for Complementary and Integrative Health (NCCIH) of the National Institutes of Health (NIH) defines complementary and alternative medicine (CAM) as health care interventions independent of conventional treatment (NCCIH, 2018). CAM consists of a variety of health approaches that are used to supplement or enhance conventional medical treatment (NHIS, 2012). Generally, CAM falls within four main categories: mind-body therapies, biologically and whole medical systems, energy therapies, and manipulative and body-based practices (NCCIH, 2018). When used with conventional medicine, CAM is referred to as complementary. When CAM is used in place of conventional medicine, it is considered alternative (NCCIH, 2018).

Approximately 45% of the pediatric population in the United States use some form of CAM (NHIS, 2012). Over 730,000 children in the United States use CAM for various types of pain (Black et al., 2018) and over ten million children used yoga, meditation, or a chiropractor as a CAM approach (2018). CAM use is increasing among children and adolescents with acute and chronic illnesses (Abu-Baker et al., 2018; Italia et al., 2014). CAM use is more likely among older children aged 12–17 living with chronic health conditions or recurrent headaches, and among children whose parents use CAM (Black et al., 2015). Parents and caregivers commonly administer CAM to their children to promote wellness and manage a range of health issues such as sleep (Cohen et al., 2018),

asthma or gastrointestinal disorders (Anheyer et al., 2017; Fifi et al., 2018; Kim et al., 2020) neurological or mental health conditions (Charkhandeh et al., 2016; Chen et al., 2016; DeFilippis, 2018) and acute and chronic pain, such as sickle cell pain (Lovas et al., 2017; Lu et al., 2014; Matthie et al., 2015; Neri et al., 2016; Williams & Tanabe, 2016).

Evidence for the safety, acceptability, and efficacy of CAM approaches is growing. CAM treatments are nonpharmacological with low risk for adverse effects. CAM treatments include practices that children and adolescents can learn to do on their own, which increases their capacity to manage and promote their own health. Examples of CAM treatments used by children and adolescents include vitamins, minerals, herbs, and probiotics, and mind and body practices such as meditation, prayer, yoga, acupuncture, chiropractic care, and massage therapy (Yeon & Nam, 2016). Non-vitamin, non-mineral dietary supplements such as Echinacea, fish oil, melatonin, prebiotics, and probiotics are commonly used CAM therapy among children (Groenewald et al., 2017).

As adolescents living with a chronic health conditions transition from pediatric to adult health care, having an awareness of therapies used to support their self-management is critical for individualized care and precision health (Allen et al., 2018; Lansing & Berg, 2014; Sjoeholm et al., 2016). CAM approaches can be affordable, accessible, and effective. However, disparities exist in access to, and use of, CAM among youth from racial and ethnic minority groups. For example, non-Hispanic White children were more likely to use yoga (10.5%) than non-Hispanic Black children (5.9%) and Hispanic children (4.6%) (Black et al., 2018). Non-Hispanic White children were also more likely to use a chiropractor (5.1%) than Non-Hispanic Black children (1%) and Hispanic children (1.4%).

One of the main goals of the Health Resources and Services Administration (HRSA) is to improve health equity by developing, implementing, and evaluating interventions that address disparities in health and health care (HRSA, 2019). The use of CAM offers a means for improving health equity by supplementing or enhancing conventional medical treatment approaches. To increase equitable access and use of CAM, it is important for healthcare providers to know barriers to, and patterns of, CAM use within the populations that they serve. Healthcare providers need to consistently assess CAM use among pediatric patients and have up-to-date knowledge of CAM to be able to provide accurate information and recommendations for children and their families.

There is a lack of literature specifically for CAM use among adolescent populations aged 12–17 from racially and ethnically diverse groups including Black or African American, Asian, American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, or those with multiple races (United States Census Bureau, 2017). Greater understanding of patterns CAM use among racially and ethnically diverse adolescents will help health care providers to assess barriers and increase access to CAM. The purpose of this study was to examine complementary and alternative medicine (CAM) use among racially and ethnically diverse adolescents. The research question was which sociodemographic (i.e., race, ethnicity, insurance status, poverty level, and parent education) and health-related factors (pain) are associated with, or predictive of, CAM use among youth? In this study, any use of CAM was assessed without differentiation between those using it for health promotion versus those using CAM to treat acute or chronic conditions. Implications regarding the use of complementary and alternative medicine among racially and ethnically diverse adolescents will be discussed.

Methods

Data were drawn from the 2012 National Health Interview Survey. Data from 2012 were the most recent data available that was inclusive of questions regarding CAM use. The 2017 National Health Interview Survey did not focus on complementary approaches. The Child Complementary and Alternative Medicine supplement consisted of a questionnaire used to collect specific information regarding the use of CAM to include reasons for use and

types of CAM therapies used (NHIS, 2012). The sample from the 2012 Child Complementary and Alternative Medicine supplement included 13,275 interviews with adult caregivers who responded to questions about their children's CAM use. The data set contained an over-sampling of racially and ethnically diverse children. The following types of CAM approaches were included in the analysis of data: mantra meditation, mindfulness meditation, spiritual meditation, guided imagery, progressive relaxation, yoga, tai chi, and qi gong. These approaches were selected as there is the potential to be more accessible for use.

Measures

Outcome variable

Lifetime use of CAM was measured with a single item, "Did the subject use at least 1 CAM?" Zero was assigned when the respondents answered 'No" and 1 was assigned when the respondents answered 'Yes" to the question. Respondents were not asked what CAM was used for so we could not classify CAM use by health promotion versus symptom management.

Predictors

The sociodemographic variables of interest were race (White, Black, Asian, multirace), ethnicity (non-Hispanic, Hispanic), insurance status (not insured, insured), poverty level (0–99% FPL, 100–199% FPL, 200–399% FPL, 400% FPL and above), and parent education (less than high school, HS or GED, more than HS). The health-related variable of interest was pain (no pain, one or more types of pain). Pain during the past 12 months, a health-related variable, as one of the predictors was assessed using the nine items, "has had frequent or severe headaches, including migraine?', has had abdominal pain?", "has had neck pain?", "has had low back pain?", "had had recurring headache other than migraine?", "has had other muscle or bone pain?", "has had other chronic pain?", "has had any severe sprains or strains?", and "has had dental pain?" The responses were coded as 1 if a respondent reported yes to one or more of the items and 0 if a respondent reported no to all the items.

Data analysis

Frequency tables were presented for all variables. For inferential models, we applied the Generalized Linear Models (GLM) family of analyses: a series of predictive models that calculate the score of the observed outcome for the subjects based on the selected variables. This allowed us to adjust the predictive model into a binary one to make use of logistic regression (Agresti, 2019; Darlington & Hayes, 2017). We followed this by evaluating the relevance of the overall model and each variable based on null hypothesis tests and effect size measures. Both elements were considered to determine that a variable had a relevant impact on the outcome. For the null hypothesis test of each variable, we used a significance level of 0.05 as the threshold to reject the null hypothesis of the slopes being equal to 0.

Logistic regression is the GLM needed for binary (0,1) outcomes. It specifies a model to predict binary data by the addition of the logit link; predicting the increase/decrease in log-odds to score 1 in the binary outcome. The logit link function transforms continuous predicted values to the range of probabilities (0, 1). These log-odds are later transformed into odds ratio (OR), and probabilities for interpretation and presentation as effect sizes. The OR represents the multiplicative change in the odds of scoring 1 in the binary outcome variable. The results are presented as OR and probability increase/decrease of answering 1 for each outcome as multiple interpretations of the effect sizes (Agresti, 2019). The model will be evaluated by its overall predictive accuracy with Tjur's pseudo-R^2 (Tjur, 2009), which evaluated the discriminant quality of the probability of answering 1.

Results

Sample characteristics

The sample consisted of parents who reported the racial and ethnic background of their adolescent children. The largest group of adolescents were White (n = 3298; 71%); of these, 1264 were identified as Hispanic. Seventeen percent of participants were identified as Black (n = 789), 8% as Asian (n = 350), and 4% as were identified as multiracial (n = 206; 4%). There were 517 parents who reported use of at least one CAM by their adolescent children, while 4136 did not use CAMs. Approximately 90% are insured, and 20% are in the 0–99% FPL (n = 888). See Table 1 for detailed sociodemographic characteristics of adolescents, and their CAM use.

Table 1. Descriptive statistics of the sample characteristics (N = 4653).

Variable		n	%
CAM use			
	Yes (one or more types)	517	12
	No	4136	88
Race			
	Asian	350	8
	Black	789	17
	Multirace	206	4
	White	3298	71
Ethnicity			
	Hispanic	1264	27
	non-Hispanic	3389	73
Health insurance	Insured	4158	90
	Not Insured	466	10
Poverty level			
	0–99% FPL	888	19
	100–199% FPL	1128	24
	200–399% FPL	1384	30
	400% FPL or above	1253	27
Parent education			
	Less than high school	474	10
	HS diploma or GED	971	21
	More than HS	3203	69
Report some pain			
	Yes (one or more types of pain)	1600	35
	No	3038	65

Odds of CAM use

Table 2 presents the results from the logistic regression. For the logistic regression model, Tjur's pseudo-R^2 = 0.05, indicated that there was a 0.05 predictive probability mean difference between groups based on the model. This represents a negligible effect for the overall model.

Table 2. Logistic regression analysis of factors associated with CAM use in racially and ethnically diverse adolescents.

	Estimate	Std. Error	p-value	OR	2.5%	97.5%
(Intercept)	−2.976	0.3	< 0.001	0.051	0.028	0.09
Race						

Black	−1.089	0.187	< 0.001	0.337	0.229	0.479
Asian	−0.129	0.182	0.478	0.879	0.606	1.242
Multiracial	0.303	0.197	0.124	1.354	0.908	1.969
Hispanic	−0.527	0.135	< 0.001	0.59	0.451	0.765
Insured	0.091	0.184	0.622	1.095	0.773	1.592
Poverty level						
100–199% FPL	0.104	0.178	0.557	1.11	0.786	1.579
200–399% FPL	0.168	0.171	0.326	1.183	0.85	1.666
400% FPL or above	0.435	0.173	0.012	1.545	1.106	2.183
Parent education						
HS diploma or GED	−0.043	0.259	0.868	0.958	0.584	1.615
More than HS	0.641	0.235	0.006	1.898	1.219	3.074
Reported some pain	0.839	0.097	< 0.001	2.314	1.914	2.8

For all variables, we rejected the null hypothesis ($p < 0.05$) of them being equal to 0 for five regression slopes. Black participants were less likely to use CAM than White participants, with White participants being 2.96 times more likely to use CAM, OR = 0.34, 95% CI [0.23, 0.48]. Hispanic participants were less likely to use CAM than non-Hispanic participants, with the non-Hispanic participants being 1.69 times more likely to use CAM, OR = 0.59, 95% CI [0.45, 0.77]. Participants who were at 400% FPL or above were 1.5 times more likely to use CAM than participants in the 0–99% FPL, OR = 1.55, 95% CI [1.11, 2.18]. Adolescents whose parents had an education higher than high school are more likely to use CAM than those whose parents had education less than high school, OR = 1.9, 95% CI [0.219, 3.074]. Adolescents who reported some type of pain were more 2.3 times more likely to use CAM than those participants who reported no pain, OR = 2.31, 95% CI [1.91, 2.8]. The conditional effects plots are presented for these predictors in Fig. 1. (insert Table 2 and Fig. 1 here).
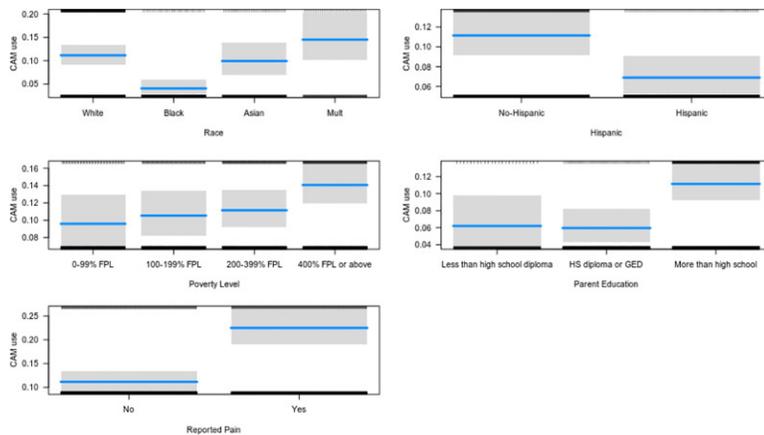

Fig. 1. Conditional effects of predictors.

Prevalence of CAM use by race/ethnicity and pain

To compare if the use of CAM varied depending on the racial and ethnic groups who reported some type of pain, we ran two interactions models. First, to evaluate if race and pain interacted to predict the use of CAM, and second to evaluate if ethnicity and pain interacted, we reject the null hypothesis for both ($p = 0.09$, and $p = 0.50$ respectively), and these models presented no improvement in the overall model predictive accuracy (Tjur's pseudo-$R^2 = 0.05$). (Insert Table 3 here).

Table 3. Racial and ethnic minority groups and their reports of pain.

	No pain	Reported some pain

Race		
White	2123	1166
Black	540	246
Asian	248	101
Multiracial	118	86
Ethnicity		
Non-Hispanic	2165	1210
Hispanic	873	390

Discussion

Our results revealed that racial and ethnic background, family socioeconomic status, level of parent education, and presence of pain were associated with differences in CAM use. While CAM use was evident among racially and ethnically diverse adolescents, they had lower rates of CAM use in comparison to non-Hispanic Whites. Reasons for these differences may be related to variations in definitions and descriptions of CAM. For example, prayer was classified under meditative practices. In the NHIS question, the phrase meditative practices was used and not the word prayer (NHIS, 2012). Predictors for those who engage in meditation are more likely to be non-Hispanic White and have a higher education level. What is not clear, are the reasons other racial and ethnic minority populations are less likely to use meditation. In addition, while prayer could fall under the category of meditation, the construct for studies reviewed often use the word prayer and not meditation (Clayton-Jones & Haglund, 2016; Dew, Kollins, & Koenig, 2020; Kawachi, 2020; Ly et al., 2020). In addition, the results may reflect the fact that the respondents perceived CAM as being provider delivered instead of their self-management with CAM.

Given the history and salience of spirituality to include prayer in Black and Hispanic populations, it is surprising that both populations reported using this category of CAM approaches less often than other parents. In the NHIS survey, prayer was referred to as meditation. Some parents may not have perceived that prayer fit in the category of meditation, therefore, they may not have disclosed participation in prayer as CAM use. Lack of disclosure to CAM use has an impact on the measured prevalence. It is important for healthcare providers to be aware of words and labels used by populations they care for. Patients who expressed having spiritual beliefs and preferences expected their provider to be more involved in developing the CAM treatment plan compared to patients with average spirituality (Ben-Arye et al., 2012). There is also a need to have consistent language for concepts used in research. Whether spiritual practices and beliefs should be classified as CAM, warrants further discussion. Inclusion of spiritual practices and beliefs may give the perception that racial/ethnic minority populations have equal access to and use diverse types of CAM. Further research to understand CAM use, encompassing or not encompassing spiritual beliefs and practices is needed.

In this study, use of CAM was more prevalent among adolescents experiencing pain. In other studies, mind-body interventions such as breathing exercises, prayer, and yoga have been shown to be effective for pain management among adolescents who have chronic health conditions (Moody et al., 2017; Neri et al., 2016). Other studies reported that CAM use is more likely among older children aged 12–17 living with chronic health conditions or recurrent headaches (Black et al., 2015). In other studies, CAM treatments that include manipulative/body-based methods such as massage and exercise have been used to reduce pain and improve chronic health management among children and adolescents with racial and ethnic minority backgrounds (Moody et al., 2017). Prayer and spiritual healing have been identified as popular CAM approaches for symptom management among adolescents with sickle cell disease (McClafferty et al., 2017). Among adolescents, experiences of musculoskeletal pain or chronic disease were strong predictors of future CAM use (Steinsbekk, 2011). The relationship between CAM use and chronic conditions might be due to necessity to help alleviate

symptoms or due to interest in using a complementary approach rather than relying solely on medications. Parents also play an important role in adolescents' knowledge of and use of CAM.

Based on the results of this analysis, CAM was used more often by adolescents whose parents attained a higher level of income and education (Groenewald et al., 2017; Italia et al., 2014).). Similarly, other researchers identified that CAM use is more likely among adolescents whose parents use CAM (Black et al., 2015). Knowledge of and access to CAM have shown to be limited for low-income populations. Results from previous research also support that inadequate health literacy affects patients and is more prevalent among minority groups in terms of their interests in implementing CAM use (Montross-Thomas et al., 2017). When examining CAM use among inpatients, those with a higher health literacy utilized CAM services more often than those with a lower health literacy (Gardiner et al., 2013). To empower individuals in CAM use, instructions should be conveyed at an appropriate education level to ensure successful implementation of services.

Promoting awareness of CAM Use

Disparities exist in CAM use between minority adolescents and non-minority adolescents. It is vital that health care providers have an awareness of the disparities that exist among diverse groups and identify methods to address barriers to CAM use. Assessment of CAM use should be incorporated into a patient's health history, with an understanding between the recipient and provider of the role that CAM has in ongoing health maintenance. Consideration of the language and terms used with racially and ethnically diverse adolescent groups to describe CAM therapies is essential. Having honest and nonjudgmental dialogues are helpful in obtaining accurate assessments by health care providers who care for adolescents.

The potential for parents and adolescents to withhold information regarding CAM use should be a consideration in completing the health assessment (Chao et al., 2008). Researchers indicated that disclosure of CAM use motivated their participants to request more information regarding their health, increased healthcare providers' awareness, and promoted support from family and friends in terms of their use of CAM.

Racially and ethnically diverse adolescents may not only be limited in their access to CAM use but may also be limited in having an awareness of the various types of CAM therapies that are available. Health care providers may be less likely to discuss CAM use if it is assumed that adolescents who receive public insurance may be limited in their insurance coverage and/or out-of-pocket funds to access specific CAM therapies when compared to those with private insurance. Some health care providers may never have the discussion with their patients due to assumptions or a lack of knowledge on their part. In addition, health care providers may not establish the rapport needed with adolescents and their families to facilitate ongoing discussion regarding CAM use. Self-disclosure of CAM use may not always occur when assessed by health care providers. Promoting discussion with minority adolescents can assist health care providers in not only understanding barriers to CAM use but support understanding of facilitators, as well.

Limitations

Although the data set used for this study was large and robust, this secondary analysis is still limited to the variables included in the dataset and the survey questions used. Limitations included recall bias for those who completed the survey. Parents reported their children's CAM use, it is unknown if the children would have reported the same level of use. The cultural validity and reliability of the survey, and outcomes of CAM were not known. Different cultures and minority populations might interpret or perceive CAM differently and might not consider some CAM practices as CAM since they view them as part of their everyday life or culture (i.e. herbal teas, prayer). Therefore, some respondents might not have reported some CAM use practices, which could have contributed to underreporting on some items. Incorporating survey items that have been determined as appropriate socially and culturally will add to the validity and reliability of instruments used. Additional ethnic-

specific research will lend a greater understanding of CAM use among minority adolescents and provide insight into how CAM use intersects health and illness beliefs, and outcomes, and promotes quality of life. This information can be used to inform health care providers regarding assessment and health care delivery options.

Conclusion

CAM is a viable option to support health promotion and health maintenance for racially and ethnically diverse adolescents. Greater discussion regarding CAM use should occur between families and health care providers to achieve more comprehensive assessments. Additional research to explore CAM use among specific minority groups is warranted. Long-term CAM use and the impact on health outcomes is not well established among minority adolescents. Future inquiry inclusive of short- and long-term CAM use is warranted to better understand factors associated with CAM-related health outcomes.

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Declaration of Competing Interest

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