**Marquette University**

**e-Publications@Marquette**

***Nursing Faculty Research and Publications/College of Nursing***

***This paper is NOT THE PUBLISHED VERSION*.**

Access the published version via the link in the citation below.

*Journal of Pediatric Nursing*, Vol. 61 (November/December 2021): 254-259. [DOI](https://doi.org/10.1016/j.pedn.2021.07.009). This article is © Elsevier (WB Saunders) and permission has been granted for this version to appear in [e-Publications@Marquette](http://epublications.marquette.edu/). Elsevier (WB Saunders) does not grant permission for this article to be further copied/distributed or hosted elsewhere without the express permission from Elsevier (WB Saunders).

Complementary and Alternative Medicine Mind-Body Approaches Used Among Racially and Ethnically Diverse Adolescents

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).

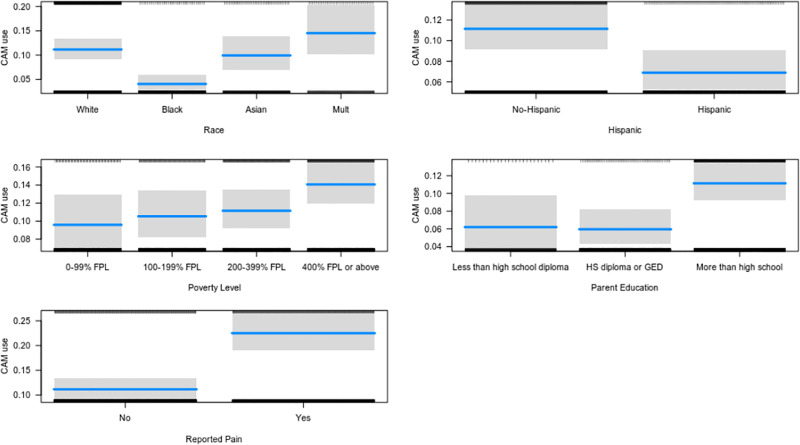


Fig. 1. Conditional effects of predictors.

## 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.

# Funding

This research project was supported by New Connections: Increasing Diversity of Robert Wood Johnson Foundation Programming. In addition, research assistance for data analysis and article development was supported by research funds from the Marquette University College of Nursing.

# Declaration of Competing Interest

The corresponding author, Dr. Dora Clayton-Jones received grant funding from New Connections: Increasing Diversity of Robert Wood Johnson Foundation Programming.

# References

Abu-Baker et al., 2018. N.N. Abu-Baker, C. Savage, B.H. Amarneh. **Strategies of managing minor childhood illnesses using complementary and alternative medicine in Jorden.** Global Journal of Health Sciences, 10 (2) (2018), pp. 145-154. https://doi.org/10.5539/gjhs.v10n2p145

Agresti, 2019. A. Agresti. **An introduction to categorical data analysis (3rd ed).** John Wiley & Sons (2019)

Allen et al., 2018. T.M. Allen, A.A. Wren, L.M. Anderson, A. Sabholk, C.F. Mauro. **A group CBT-yoga protocol targeting pain-related and internalizing symptoms in youth.** Clinical Practice in Pediatric Psychology, 6 (1) (2018), pp. 7-18. https://doi.org/10.1037/cpp0000206

Anheyer et al., 2017. D. Anheyer, J. Frawley, A.K. Koch, R. Lauche, J. Langhorst, G. Dobos, H. Cramer. **Herbal medicines for gastrointestinal disorders in children and adolescents: A systematic review.** Pediatrics, 139 (6) (2017). https://doi.org/10.1542/peds.2017-0062

Ben-Arye et al., 2012. E. Ben-Arye, E. Schiff, H. Vintal, O. Agour, L. Preis, M. Steiner. **Integrating complementary medicine and supportive care: Patients’ perspectives toward complementary medicine and spirituality.** Journal of Alternative and Complementary Medicine, 18 (9) (2012), pp. 824-831. https://doi.org/10.1089/acm.2011.0327

Black et al., 2015. L.I. Black, T.C. Clarke, P.M. Barnes, B.J. Stussman, R.L. Nahin. **Use of complementary health approaches among children aged 4–17 years in the United States: National Health Interview Survey, 2007–2012.** National Health Statistics Reports, 10 (78) (2015), pp. 1-19. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4562218/

Black et al., 2018. L.I. Black, T.C. Clarke, P.M. Barnes, B.J. Stussman, R.L. Nahin. **Use of yoga, meditation, and among U.S. children aged 4–17 years: National Health Interview Survey, 2007–2012. National Health Statistics Reports; no 324.** National Center for Health Statistics, Hyattsville, MD (2018)

Chao et al., 2008. M.T. Chao, C. Wade, F. Kronenberg. **Disclosure of complementary and alternative medicine to conventional medical providers: Variation by race/ethnicity and type of CAM.** Journal of the National Medical Association, 100 (11) (2008), pp. 1341-1349. https://doi.org/10.1016/s0027-9684(15)31514-5

Charkhandeh et al., 2016. M. Charkhandeh, M.A. Talib, C.J. Hunt. **The clinical effectiveness of cognitive behavior therapy and an alternative medicine approach in reducing symptoms of depression in adolescents.** Psychiatry Research, 239 (2016), pp. 325-330

Chen et al., 2016. C. Chen, Y.J. Chong, S.L. Hie, R. Sultana, S. Lee, W. Chan, ..., H.H. Cheong. **Complementary and alternative medicines use among pediatric patients with epilepsy in a multiethnic community.** Epilepsy & Behavior: E&B, 60 (2016), pp. 68-74. https://doi.org/10.1016/j.yebeh.2016.04.008

Clayton-Jones & Haglund, 2016. D Clayton-Jones, K Haglund. **The role of spirituality and religiosity in persons living with sickle cell disease: A review of the literature.** Journal of Holistic Nursing, 34 (4) (2016), pp. 351-360, 10.1177/0898010115619055

Cohen et al., 2018. E.M. Cohen, M.L. Dossett, D.H. Mehta, R.B. Davis, Y.C. Lee. **Factors associated with insomnia and complementary medicine use in children: Results of a national survey.** Sleep Medicine, 44 (2018), pp. 82-88. https://doi.org/10.1016/j.sleep.2018.01.007

Darlington and Hayes, 2017. R.B. Darlington, A.F. Hayes. **Regression analysis and linear models*.* Concepts, applications, and implementation.** The Guilford Press (2017)

DeFilippis, 2018. M. DeFilippis. **The use of complementary alternative medicine in children and adolescents with autism Spectrum disorder.** Psychopharmacology Bulletin, 48 (1) (2018), pp. 40-63

Dew, Kollins, & Koenig, 2020. R.E. Dew, S.H. Kollins, H.G. Koenig. **ADHD, religiosity, and psychiatric comorbidity in adolescence and adulthood.** Journal of Attention Disorders. Advance online publication. (2020), 10.1177/1087054720972803

Fifi et al., 2018. A.C. Fifi, C.H. Axelrod, P. Chakraborty, M. Saps. **Herbs and spices in the treatment of functional gastrointestinal disorders: A review of clinical trials.** Nutrients, 10 (11) (2018), p. 1715. https://doi.org/10.3390/nu10111715

Gardiner et al., 2013. P. Gardiner, S. Mitchell, A.C. Filippelli. **Health literacy and complementary and alternative medicine use among underserved inpatients in a safety net hospital.** Journal of Health Community, 18 (2013), pp. 290-297. https://doi.org/10.1080/10810730.2013.830663

Groenewald et al., 2017. C.B. Groenewald, S.E. Beals-Erickson, J. Ralston-Wilson, J.A. Rabbits, T.M. Palermo. **Complementary and alternative medicine use by children with pain in the United States.** Complementary and Alternative Medicine, 17 (7) (2017), pp. 785-793. https://doi.org/10.1016/j.acap.2017.02.008

Health Services and Resources Administration, 2019. Health Services, Resources Administration. **Health services and resources administration strategic plan.** Retrieved from http://www.hrsa.gov/about/strategic-plan/index.html (2019 October)

Italia et al., 2014. S. Italia, S.B. Wolfenstetter, C.M. Teuner. **Patterns of complementary and alternative medicine (CAM) use in children: A systematic review.** European Journal of Pediatrics, 173 (11) (2014), pp. 1413-1428 https://doi.org/10.1007/s00431-014-2300-z

Kawachi, 2020. I. Kawachi. **Invited commentary: Religion as a social determinant of health.** American Journal of Epidemiology, 189 (12) (2020), pp. 1461-1463 https://doi.org/10.1093/aje/kwz204

Kim et al., 2020. E.J. Kim, J. Simonson, S. Jacome, J. Conigliaro, A.D. Hanchate, N. Hajizadeh. **Disparities in complementary alternative medicine use and asthma exacerbation in the United States.** The Journal of Asthma: Official Journal of the Association for the Care of Asthma, 57 (8) (2020), pp. 866-874. https://doi.org/10.1080/02770903.2019.161461

Lansing and Berg, 2014. A.H. Lansing, C.A. Berg. **Topical review: Adolescent self-regulation as a foundation for chronic illness self-management.** Journal of Pediatric Psychology, 39 (10) (2014), pp. 1091-1096. https://doi.org/10.1093/jpepsy/jsu067

Lovas et al., 2017. D.A. Lovas, K. Pajer, J.M. Chorney, D.X. Vo, M. Howlett, A. Doyle, A. Huber. **Mindfulness for adolescent chronic pain: A pilot feasibility study.** Journal of Child and Adolescent Mental Health, 29 (2) (2017), pp. 129-136. https://doi.org/10.2989/17280583.2017.1355807

Lu et al., 2014. K. Lu, M.J. Cheng, X. Ge, A. Berger, D. Xu, G.J. Kato, C.P. Minniti. **A retrospective review of acupuncture use for the treatment of pain in sickle cell disease patients.** Clinical Journal of Pain, 30 (9) (2014), pp. 825-830

Ly et al., 2020. A.L. Ly, A.R. Saide, R.A. Richert. **Perceptions of the efficacy of prayer and conventional medicine for health concerns.** Journal of Religion and Health, 59 (1) (2020), pp. 1-18. https://doi.org/10.1007/s10943-018-0704-1

Matthie et al., 2015. N. Matthie, C.A. Brewer, V.A. Moura, C.M. Jenerette. **Breathing exercises for in patients with sickle cell disease.** Medsurg Nursing, 24 (1) (2015), pp. 35-38

McClafferty et al., 2017. H. McClafferty, S. Vohra, M. Bailey, M. Brown, A. Esparham, D. Gerstbacher, ..., SECTION ON INTEGRATIVE MEDICINE. **Pediatric Integrative Medicine.** Pediatrics, 140 (3) (2017), Article e20171961 https://doi.org/10.1542/peds.2017-1961

Montross-Thomas et al., 2017. L.P. Montross-Thomas, E.A. Meier, K. Reynolds-Norolahi, E.E. Raskin, D. Slater, P.J. Mills, ..., G. Kallenberg. **Inpatients’ preferences, beliefs, and stated willingness to pay for complementary and alternative medicine treatments.** Journal of Alternative & Complementary Medicine, 23 (4) (2017), pp. 259-263

Moody et al., 2017. K. Moody, B. Abrahams, R. Baker, R. Santizo, D. Manwani, V. Carullo, D. Eugenio, A. Carroll. **Randomized trial of yoga for children hospitalized with sickle cell vaso-occlusive crisis.** Journal of Pain and Symptom Management, 53 (6) (2017), pp. 1026-1034

National Center for Complementary and Integrative Health, 2018. National Center for Complementary and Integrative Health. **Complementary, alternative, or integrative health: What's in a name?** Retrieved from https://nccih.nih.gov/health/integrative-health (2018, July)

National Health Interview Survey, 2012. National Health Interview Survey. **Maternal and Child Health Bureau in collaboration with the National Center for Health Statistics.** [IBM Corp. Released 38 IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp]. 2012 NHIS Child CAM Data Set prepared by the Data Resource Center for Child and Adolescent Health, Child and Adolescent Health Measurement Initiative http://childhealthdata.org (2012)

Neri et al., 2016. C.M. Neri, T. Beeson, H. Mead, D.S. Darbari, E.R. Meier. **Provider perspective on integrative medicine for pediatric sickle cell disease-related pain.** Global Advances in Health and Medicine, 5 (1) (2016), pp. 44-50 https://doi.org/10.7453/gahmj.2015.101

Sjoeholm et al., 2016. A. Sjoeholm, A. Gray, J. Rayns, P.A. Tomlinson, B.J. Wheeler. **Prior knowledge of blood glucose meter download improves the accuracy of verbal self-reported blood glucose in teenagers with type I diabetes at ski camp.** Acta Diabetologica, 53 (4) (2016), pp. 637-642, 10.1007/s00592-016-0855-z

Steinsbekk, 2011. Aslak Steinsbekk, Rise, M. B., Bishop, F., & Lewith, G. **Predictors for adolescent visits to practitioners of complementary and alternative medicine in a total population (the Young-HUNT Studies).** PloS one, 6 (10) (2011), 10.1371/journal.pone.0025719

Tjur, 2009. T. Tjur. **Coefficients of determination in logistic regression models - a new proposal: The coefficient of discrimination.** The American Statistician, 63 (4) (2009), pp. 366-372

United States Census Bureau, 2017. United States Census Bureau. **Race and ethnicity. United States Department of Commerce Economics and Statistics Administration.** Retrieved from https://www.census.gov/mso/www/training/pdf/race-ethnicity-onepager.pdf (2017)

Williams and Tanabe, 2016. H. Williams, P. Tanabe. **Sickle cell disease: A review of non-pharmacological approaches for pain.** Journal of Pain and Symptom Management, 51 (2) (2016), pp. 163-177 https://doi.org/10.1016/j.jpainsymman.2015.10.017

Yeon and Nam, 2016. G.-M. Yeon, S.O. Nam. **The use of complementary and alternative medicine in children with common neurologic diseases.** Korean Journal of Pediatrics, 59 (8) (2016), pp. 313-318 https://doi.org/10.3345/kjp.2016.59.8.313