

ORIGINAL ARTICLE

Complementary and alternative medicine use among people with asthma and health-related quality of life

Nan Huo, MD, Glen E. Ray, PhD, Sheila Mehta, PhD, and Steven G. LoBello, PhD, MSPH

*Department of Psychology, Auburn University Montgomery, Montgomery, AL, USA***Abstract**

Objective: This study investigated the relationship between complementary and alternative medicine (CAM) use and self-reported health-related quality of life among people with asthma. **Method:** Data from the 2010 Behavioral Risk Factor Surveillance System (BRFSS) survey and the 2010 Asthma Callback Survey (ACBS) were used. Survey respondents were men and women with asthma who were 18–99 years of age who responded to both surveys. **Results:** CAM use was associated with an increase in the number of days of poor mental health (OR = 1.02, 95% CI 1.02, 1.03) and poor physical health (OR = 1.02, 95% CI 1.01, 1.02). The odds ratios are adjusted for covariates such as asthma severity, age, sex, race/ethnicity, income, and educational attainment. CAM users report more days of poor mental health (7.2 versus 4.6) and poor physical health (9.6 versus 6.5) compared with those not using CAM therapies. **Conclusions:** Contrary to the hypotheses, CAM use is associated with poorer health-related quality of life. Implications for research and practice are discussed in detail.

Keywords

Airway disease, BRFSS, CAM, chronic disease, compliance, respiratory disease, self-treatment

History

Received 9 May 2014

Revised 4 September 2014

Accepted 5 September 2014

Published online 26 September 2014

Introduction

Asthma is one of the most common chronic respiratory diseases in the United States. It is a chronic inflammatory disease of the airway, and it is one of the types of obstructive lung diseases. The characteristic symptoms are variable and recurrent and include reversible airflow obstruction and bronchospasm. Asthma results in coughing, wheezing, tachypnea, dyspnea, hypoxemia, and mucus plugging. During the years 2006–2008, asthma prevalence among US adults is estimated to be 7.2% using National Health Interview Survey data [1]. Not only does asthma affect the integrity of the body but also the quality of life may be seriously diminished [2–4].

Because asthma is a chronic disease, interventions typically involved symptom management and control using a variety of medications. However, current allopathic asthma therapies may cause side effects. For example, long-term use of inhaled glucocorticoids at conventional doses carries a minor risk for cataracts [5], and short-term use of albuterol may lead to fine tremor, anxiety, headache, muscle cramps, dry mouth, and heart palpitation. However, side effects of conventional asthma control medications are not a primary motivator of complementary and alternative medicine (CAM) use according to Chen et al. [6], who reported that CAM use was unrelated to the use of controller medications.

CAM use is widespread. A systematic review examining CAM use for asthma reported that 20–30% of adults and 50–60% of children with asthma may be using CAM [7]. Currently, popular CAM therapies used for asthma management include homeopathy, chiropractic, acupuncture, hypnosis, relaxation techniques and herbal, Chinese, Japanese, and Indian medicines, among others [8].

There has been considerable research into the motivations of people who pursue CAM therapies. The results of these studies may vary depending on the particular health problem and the sample being studied [9]. Ernst [10] notes that motivations for CAM use are complex and differ across time, culture, and remedies. In general, it has been proposed that CAM use is motivated by a sense of personal control and psychological well-being. Likewise, dissatisfaction with conventional healthcare may explain some of the popularities of CAM therapies [11]. However, consistent with Ernst's [10] conclusions about motivation for CAM use, studies that both support and refute these generalities may be cited [9,12,13]. Unconventional beliefs, values, and personal philosophy may be consistent with seeking and using alternative therapies [9,12]. Individuals seek alternative treatments for asthma to enhance health, prevent, or manage disease, and to treat existing health problems [14]. Adults with more severe asthma symptoms were more likely to report using CAM [6,15].

Although CAM remedies often lack evidence of clear benefit for asthma, more people are opting for CAM use as part of their asthma care [16]. Although there are a wide variety of CAM interventions for the treatment of asthma, few provide significant improvements in respiratory function or

Correspondence: Steven G. LoBello, Ph.D., MSPH, Department of Psychology, Auburn University Montgomery, PO Box 244023, Montgomery, AL 36124, USA. Tel: +1 334 244 3309. E-mail: slobello@aum.edu

quality of life [17]. Many research studies of CAM have not provided scientific support for their use [18]. Despite a lack of demonstrated efficacy, people may report that CAM use improves physical condition and works better than conventional medication [12]. In contrast to these anecdotal claims, people with asthma who use CAM are more likely to report activity limitations and ER visits [19]. The majority of adults with asthma have mild forms of disorder, but many rate their health as worse than people without asthma [7]. People with asthma are also predisposed to developing depression [20]. An increased mortality in patients with co-morbid asthma and depression has also been reported for asthma patients treated in tertiary care [21].

The relationship of CAM use to quality of life or sense of physical and mental well-being among people with asthma is not well understood. Research findings suggest that people who use CAM remedies attest to their efficacy, yet people with asthma who use CAM are far less well on objective indices of functioning such as ER visits and physical limitations. CAM use is also associated with asthma symptom severity, which could both motivate people to use CAM and explain poorer physical outcomes. Thus, it is important to control for asthma symptom severity when investigating the association between CAM use and health-related quality of life, which is the purpose of this study. Health-related quality of life is defined as a self-reported number of days during the previous month when mental health and physical health were poor. Because one motivation for CAM use is to seek an improved sense of well-being, it was hypothesized that people with asthma who use CAM therapies would report better health-related quality of life compared with those who do not use CAM.

Methods

This study was exempt from review by the Institutional Review Board at Auburn University at Montgomery. Data from the 2010 Behavioral Risk Factor Surveillance System were used to test the hypotheses [22]. The BRFSS is a collaborative project of the Centers for Disease Control and Prevention (CDC) and the public health departments of US states and territories. It is an ongoing survey program designed to measure health behaviors and risk factors for health problems in the adult population (18 years of age or older) living in US households. In 2010, more than 450 000 people responded to the BRFSS survey.

Data were collected using a random digit dialing telephone survey of adults, including some with asthma. Some of the variables in these analyses were obtained from the BRFSS survey, most notably the two outcome variables, the number of days of poor mental and physical health. However, the information about CAM use comes from the Asthma Call-back Survey [23]. The ACBS is an in-depth follow-up survey of BRFSS survey respondents who report an asthma diagnosis on the BRFSS. The ACBS was conducted approximately 2 weeks after the Behavioral Risk Factor Surveillance Survey data were collected [24].

Participants

The analysis was limited to 17 923 adults between the ages 18 and 99 years with asthma who participated in the ACBS.

Table 1. Demographic data for sample used in analysis of outcome variable number of days with poor mental health ($N = 17\,199$).

Model variables	<i>N</i>	Weighted percent
CAM use		
Yes	5402	31.4
No	11 797	68.6
Sex		
Female	12 057	59.7
Male	5142	40.3
Education		
No formal education	16	0.1
Elementary school (grades 1–8)	454	2.7
Some high school (grades 9–11)	1129	6.8
HS graduate or GED	4387	25.2
College (1–3 years)/tech school	4962	28.5
College 4 years or more	6237	36.7
Unknown	14	0.1
Income		
\$50 k or more	6095	41.3
\$35–\$49.9 k	2281	12.1
\$25–\$34.9 k	1755	9.9
\$15–\$24.9 k	2862	14.1
Less than 15 k	2521	12.3
Unknown	1685	10.3
Race/ethnicity		
White	13 637	72.8
African American	1257	9.4
Other, non-Hispanic	551	3.3
Multiracial, non-Hispanic	1021	10.3
Hispanic	603	3.5
Unknown	131	0.75

However, missing values on response and explanatory variables yielded effective samples for the mental health and physical health outcome variables of 17 199 (96%) and 17 183 (96%), respectively. The two samples are similar, so information only about the sample used in the analysis for the mental health outcome variable is provided. Because data loss was relatively minor, no measures were taken to replace missing values. In the sample, there were 12 057 women and 5142 men. The average age of the participants is 56 years ($s = 15.4$ years). All variables used in the study are given in Table 1.

Measurement

The outcome variable is a self-reported CAM use versus no reported use. The data for this variable came from the ACBS, where adults with asthma identified during the earlier BRFSS survey answered a set of questions about 11 different CAM treatment methods (specific CAM remedies were herbs, vitamins, acupuncture, acupressure, aromatherapy, homeopathy, reflexology, yoga, breathing techniques, naturopathy, etc.). The sample was divided into two groups: those who reported using at least one CAM treatment and those who reported no CAM use. The outcome variable that was created was binary and amenable to analysis by logistic regression.

Two questions on the BRFSS survey were asked to the respondents to estimate the number of days during the previous 30 d of suboptimal mental and physical health. The first question is “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 d was your mental

health not good?" [22]. The question pertaining to physical health is "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 d was your physical health not good?" [22]. Valid responses to these questions range from 0 to 30 d.

Two binary logistic regression models were designed to test the hypotheses. One model tested the relationship between CAM use (yes–no) and self-rated mental health. The second model was identical except that self-rated physical health was the predictor variable of interest.

The models include covariates, such as sex, educational level (six categories), income (five categories), racial/ethnic background (five categories), age, and asthma severity. Some covariates were included in the model because previous research has shown that CAM use is associated with these variables. CAM users are more likely to be women [25–27] and the use of CAM is associated with higher levels of income [25,26]. One study indicated that CAM use was more frequent among Asian and Pacific Islanders [25] and Hsiao et al. [28] provided evidence that people in different racial/ethnic groups use different CAM remedies, ordinarily gravitating toward those remedies that derive from their own culture.

Asthma severity was measured by a question on the Asthma Call-Back Survey that asked "During the past 30 d, on how many days did you have any symptoms of asthma?" [23]. Valid responses to this question ranged from 0 to 30 d. Asthma severity was included in the model because of its previous association with CAM use [15] and it is logical to infer that asthma severity would be positively related to the number of poor mental and physical health days reported.

The SAS surveylogistic module was used for data analysis. The regression models were weighted to correct for non-response (telephone not answered) and non-coverage (no telephone) bias so that the parameter estimates would more closely approximate the population values. In addition, models accounted for complex survey design effects by specifying adjustments for sample stratification and cluster sampling methodology.

Results

Table 2 summarizes the Type 3 analysis of effects for the separate models for the number of reported poor mental health days and the number of reported poor physical health days. In both models, all variables are significantly related to the CAM use variable, except for the race/ethnicity variable in the physical health days' model. For both models, the full model provided significantly better fit than the intercept-only or null model. The likelihood ratio test for the poor mental health days' model was significant ($\chi^2=781,794$, $p<0.0001$), as it was for the poor physical health days' model ($\chi^2=747,779$, $p<0.0001$).

Table 3 presents the adjusted odds ratios and 95% confidence intervals for the relationship of CAM use reported the number of poor mental health days and all covariates. The results indicate that increases in days of poor mental health during the previous 30 d were associated with an increase in the odds of using CAM therapy. The odds ratio of 1.02 indicates that the odds of CAM use increase by 2% for every

Table 2. Type 3 analysis of effects for model 1: the number of poor mental health days reported and model 2: the number of poor physical health days reported.

Variable	df	Wald χ^2	p
Model 1: poor mental health days			
Poor mental health days	1	44.5	<0.0001
Age	1	6	0.014
Education	6	31	<0.0001
Race/ethnicity	5	12.7	0.03
Income	5	21.4	0.0007
Sex	1	68.4	<0.0001
Asthma symptom severity	1	182.4	<0.0001
Model 2: poor physical health days			
Poor physical health days	1	24.7	<0.0001
Age	1	13	0.0003
Education	6	29.1	<0.0001
Race/ethnicity	5	10.8	0.055
Income	5	24.4	0.0002
Sex	1	71.2	<0.0001
Asthma symptom severity	1	176.9	<0.0001

Table 3. Adjusted odds ratios and 95% confidence intervals for outcome variable number of days of poor mental health and covariates.

Variable	Adjusted odds ratio	95% Confidence interval
Mental health	1.02	1.02–1.03
Asthma severity	1.04	1.04–1.05
Age	0.995	0.991–0.999
Sex		
Women	–	–
Men	0.5	0.5–0.6
Education		
College graduate	–	–
College (1–3 years)/tech school	0.9	0.8–1.1
HS graduate or GED	0.7	0.6–0.9
Some high school (grades 9–11)	0.7	0.5–0.9
Elementary school (grades 1–8)	0.4	0.3–0.6
No formal education	2.1	0.4–9.6
Unknown	1.6	0.2–13.2
Annual income		
\$50 000 or above	–	–
\$35 000–49 999	1.2	1–1.5
\$25 000–34 999	1.1	0.9–1.4
\$15 000–24 999	1.6	1.3–2
Less than \$15 000	1.4	1.1–1.8
Unknown	1.2	0.9–1.5
Race/ethnic group		
White	–	–
African-American	1.1	0.9–1.4
Other, non-Hispanic	1.6	1.1–2.5
Multiracial, non-Hispanic	1.5	1–2.0
Hispanic	1.2	0.9–1.6
Unknown	0.6	0.3–1.3

Confidence intervals that do not contain the value of 1 are statistically significant, $p<0.05$.

1 d increase in the number of poor mental health days. This effect is adjusted for the effects of covariates, all of which were significantly related to the outcome variable. Significant covariates include age, race/ethnicity, sex, income, education, and asthma severity. Younger people, women, people in the lower income group, more severe asthma, and those people with college education were more likely to use CAM than other group of people.

Table 4. Adjusted odds ratios and 95% confidence intervals for outcome variable number of days of poor physical health and covariates.

Variable	Adjusted odds ratio	95% Confidence interval
Physical health	1.02	1.01–1.02
Asthma Severity	1.04	1.04–1.05
Age	0.992	0.988–0.996
Sex		
Women	–	–
Men	0.5	0.5–0.6
Education		
College graduate	–	–
College (1–3 years)/tech school	0.9	0.8–1.1
HS graduate or GED	0.7	0.6–0.9
Some high school (grades 9–11)	0.7	0.6–1
Elementary school (grades 1–8)	0.4	0.3–0.6
No formal education	2.2	0.5–11
Unknown	1.4	0.2–10.2
Annual income		
\$50 000 or above	–	–
\$35 000–49 999	1.2	1–1.5
\$25 000–34 999	1.1	0.9–1.4
\$15 000–24 999	1.7	1.3–2.1
Less than \$15 000	1.4	1.1–1.8
Unknown	1.2	0.9–1.5
Race/ethnic group		
White	–	–
African-American	1	0.8–1.3
Other, non-Hispanic	1.6	1.1–2.4
Multiracial, non-Hispanic	1.4	1–2
Hispanic	1.2	0.9–1.6
Unknown	0.7	0.3–1.6

Confidence intervals that do not contain the value of 1 are statistically significant, $p < 0.05$.

The second hypothesis was that the number of poor physical health days reported by people with asthma would be lower among CAM users. Table 4 presents the adjusted odds ratios and 95% confidence intervals for the physical health variable and the covariates. As with mental health, the hypothesis of CAM use associated with better reported physical health was not supported. Rather, the same statistically significant relationship was found to hold for poor physical health and CAM use. For every day of reported poor physical health, the odds of CAM use increased about 2% while controlling for asthma severity and the same covariate set used in the analysis of the poor mental health variable. In this model, the race/ethnicity covariate was not significantly related to CAM use. Younger people, women, people in the lower income group, more asthma severity, and those people who received college education were more likely to use CAM than other group of people.

Following the multivariate analyses, the means for the number of poor mental and physical health days were calculated. The mean values, consistent with the results of the multivariate models, show that people who use CAM report more days of poor mental health (7.2 versus 4.6) and poor physical health (9.6 versus 6.5) compared with individuals who do not report using CAM therapies.

Discussion

The goal of this study was to determine if individuals with asthma who use CAM will report improved mental health and

physical health while controlling for the effects of asthma severity and a set of relevant covariates. Contrary to expectations, results indicate that CAM use among people with asthma is associated with more self-reported days of poor mental and physical health compared with those who do not use CAM. The effect is observed even while controlling for asthma severity and other covariates in the model.

The results do not indicate that CAM therapies cause people to experience lower quality of life or do they preclude the possibility that people using CAM therapies are better off than they would be otherwise. Rather, the results are best understood as indicating that people who use CAM are more likely to be experiencing lower quality of life than people who do not use these treatment modalities. Thus, CAM use may serve as a marker for the many possible factors that may affect the quality of life. Such factors could include poor adherence or response to conventional treatment or other unaddressed medical and psychological problems. Recent research has shown that CAM use among people with asthma was associated with poor control of physical symptoms of asthma, which is a plausible contributing factor in the quality of life [27]. Among breast cancer patients, it was found that CAM users were more likely to report both greater risk of cancer recurrence and death from breast cancer than non-users [29]. Research has also shown that multiple sclerosis patients who visit CAM practitioners do so for emotional support, rather than because of dissatisfaction with conventional therapies [13]. A review of CAM use studies among cancer patients found a variety of motives for using CAM therapies including personal control, therapeutic benefit, and a personal philosophy or belief system that favors CAM [30].

Unlike some surveys that ask CAM users about their satisfaction with alternative treatments [31], the BRFSS survey is a random sample, population-based survey, which means individuals were not selected for participation on the basis of illness or use of CAM therapies. It should not be surprising to find high levels of satisfaction with CAM therapies when users are asked directly about this. The present study avoids this problem because questions about health-related quality of life were asked during the BRFSS survey, conducted about 2 weeks before the Asthma Callback Survey, during which questions about CAM use were asked. These survey participants were unlikely to have been thinking of CAM use when answering questions about the number of poor mental and physical health days.

A limitation of this study is that we combined all forms of CAM into a single CAM use variable. It could be that self-reported mental and physical health could vary among different types of CAM, and that perhaps some forms of CAM are associated with improvements in these quality of life indicators. For example, in a study of younger children with asthma who received massage therapy, decreases in behavioral anxiety and cortisol levels were reported along with improvement in attitude toward asthma, peak air flow, and other pulmonary functions [32]. Investigating differences in the quality of life among users of different types of CAM therapy is the next step in this research program.

Another limitation is that the variables, particularly the physical and mental health quality of life and the asthma severity variables, are the responses to single survey

questions. The BRFSS contains additional questions that measure quality of life, but these are asked of a very small number of survey respondents and including them in this study would have severely restricted the sample. While single questions would not be considered a comprehensive assessment of any construct, such questions have utility as screening devices. Time constraints in clinical settings would often preclude the use of a thorough, multi-item scale for measuring quality of life. However, the physician may easily ask a question or two about the number of poor mental and physical health days out of the previous 30 d. This research alerts the physician to the possibility that as the quality of mental and physical health declines, the likelihood increases so that the person will pursue non-traditional remedies.

With respect to asthma severity, the BRFSS Asthma Callback Survey does include several items that probe the extent to which asthma affects the life of an individual. Some of these questions concern a limited behavioral domain (e.g., sleep) and some ask about symptoms and asthma effects over variable periods of time (e.g., 30 d, 2 weeks, 12 months, and 3 months). Because our outcome variables are concerned with the previous 30 d, we thought it best to use the asthma severity question that asked about symptoms more generally and which corresponded to the 30-d time frame.

In general, there is no evidence that alternative forms of medicine are more effective than placebo in controlling asthma [33]. Despite this, there are still many people with asthma who use CAM for this purpose. Clinicians should be aware that CAM use among patients with asthma is associated with both poorer quality of life and asthma control [5]. Awareness of CAM use should prompt clinicians to review current treatment for efficacy as well as possible interactions between CAM and conventional therapies. Recognition and understanding of CAM use through research and practice will ultimately improve the quality of care.

Declaration of interest

The authors of this study have no conflicts of interest to declare.

References

- Moorman JE, Zahran H, Truman BI, Molla MT. Current asthma prevalence – United States, 2006–2008. *MMWR* 2011;60: 84–86.
- Chiang LC. Exploring the health-related quality of life among children with moderate asthma. *J Nurs Res* 2005;13:31–40.
- Fiese BH, Everhart RS. Medical adherence and childhood chronic illness: family daily management skills and emotional climate as emerging contributors. *Curr Opin Pediatr* 2006;18: 551–557.
- Graham DM, Blaiss MS, Bayliss MS, Espindle DM, Ware JE. Impact of changes in asthma severity on health-related quality of life in pediatric and adult asthma patients: results from the asthma outcomes monitoring system. *Allergy Asthma Proc* 2000;21: 151–158.
- Dahl R. Systemic side effects of inhaled corticosteroids in patients with asthma. *Respir Med* 2006;100:1307–1317.
- Chen W, FitzGerald JM, Rousseau R, Lynd LD, Tan WC, Sadatsafavi M. Complementary and alternative asthma treatments and their association with asthma control: a population-based study. *BMJ Open* 2013;3:e003360.
- Sibbritt D, Adams J, Lui CW. A longitudinal analysis of complementary and alternative medicine use by a representative cohort of young Australian women with asthma, 1996–2006. *J Asthma* 2011; 48:380–386.
- World Health Organization. General guidelines for methodologies on research and evaluation of traditional medicine. Geneva, Switzerland: World Health Organization; 2000.
- Bishop FL, Yardley L, Lewith GT. A systematic review of beliefs involved in the use of complementary and alternative medicine. *J Health Psychol* 2007;12:851–867.
- Ernst E. The role of complementary and alternative medicine. *BMJ* 2000;321:1133–1135.
- Adams M, Jewell AP. The use of complementary and alternative medicine by cancer patients. *Int Semin Surg Oncol* 2007;4:10.
- Astin JA. Why patients use alternative medicine: results of a national study. *JAMA* 1998;279:1548–1553.
- Shinto L, Yadav V, Morris C, Lapidus JA, Senders A, Bourdette D. The perceived benefit and satisfaction from conventional and complementary and alternative medicine (CAM) in people with multiple sclerosis. *Complement Ther Med* 2005;13: 264–272.
- Hawk C, Ndetan H, Evans MW. Potential role of complementary and alternative health care providers in chronic disease prevention and health promotion: an analysis of national health interview survey data. *Prev Med* 2011;54:18–22.
- Morgan W, Center H, Arms-Chavez C, LoBello SG. Complementary and alternative medicine use and asthma: relation to asthma severity and comorbid chronic disease. *J Asthma* 2014; 51:333–338.
- Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. *Natl Health Stat Rep* 2008;10:1–23.
- Markham AW, Wilkinson JM. Complementary and alternative medicines (CAM) in the management of asthma: an examination of the evidence. *J Asthma* 2004;41:131–139.
- Kent H. Ignore growing patient interest in alternative medicine at your peril – MDs warned. *CMAJ* 1997;157:1427–1428.
- Marino LA, Shen J. Characteristics of complementary and alternative medicine use among adults with current asthma, 2006. *J Asthma* 2010;47:521–525.
- Walters P, Schofield P, Howard L, Ashworth M, Tylee A. The relationship between asthma and depression in primary care patients: a historical cohort and nested case control study. *PLoS One* 2011;6:1–5.
- Mancuso CA, Peterson MG, Charlson ME. Effects of depressive symptoms on health-related quality of life in asthma patients. *J Gen Intern Med* 2000;15:301–310.
- Centers for Disease Control and Prevention. Behavioral risk factor surveillance system [Data file and codebook]. 2010. Available from: http://www.cdc.gov/brfss/annual_data/annual_2010.htm Accessed May 1, 2014.
- Centers for Disease Control and Prevention. Asthma callback survey [Data file and codebook]. 2010. Available from: http://www.cdc.gov/brfss/acbs/2010/2010_documentation.htm Accessed May 1, 2014.
- Centers for Disease Control and Prevention. Behavioral risk factor surveillance system asthma call-back survey history and analysis guidance. Available from: <http://www.cdc.gov/brfss/acbs/index.htm> Accessed May 1, 2014.
- Nahin RL, Dalhamer JM, Taylor BL, Barnes PM, Stussman BJ, Simile CM, Blackman MR, et al. Health behaviors and risk factors in those who use complementary and alternative medicine. *BMC Public Health* 2007;7:217.
- Thomson P, Jones J, Evans JM, Leslie SJ. Factors influencing the use of complementary and alternative medicine and whether patients inform their primary care physician. *Complement Ther Med* 2012;20:45–53.
- Chen W, Fitzgerald JM, Rousseau R, Lynd LD, Tan WC, Sadatsafavi M. Complementary and alternative asthma treatments and their association with asthma control: a population-based study. *BMJ Open* 2013;3:e003360.
- Hsiao A-F, Wong MD, Goldstein MS, Yu HJ, Andersen RM, Brown ER, Becerra LM, Wenger NS. Variation in complementary and alternative medicine (CAM) use across racial/ethnic groups and the

- development of ethnic-specific measures of CAM use. *J Altern Complement Med* 2006;12:281–290.
29. Verhoef MJ, Balneaves LG, Boon HS, Vroegindewey A. Reasons for and characteristics associated with complementary and alternative medicine use among adult cancer patients: a systematic review. *Integr Cancer Ther* 2005;4:274–286.
30. Rakovitch E, Pignol J-P, Chartier C, Ezer M, Verma S, Dranitsaris G, Clemons M. Complementary and alternative medicine use is associated with an increased perception of breast cancer risk and death. *Breast Cancer Res Treat* 2005;90: 139–148.
31. Barbadoro P, Chiatti C, D’Errico MM, Minelli A, Pennacchietti L, Ponzio E, Prospero E. Complementary and alternative medicine (CAM) among adults in Italy: use and related satisfaction. *Eur J Integr Med* 2011;3:e325–e332.
32. Field T, Hentleff T, Reif, MH, Martinez E, Mavunda K, Kubn C, Schanberg S. Children with asthma have improved pulmonary functions after message therapy. *J Pediatr* 1998;132: 854–858.
33. Steurer-Stey C, Russi EW, Steurer J. Complementary and alternative medicine in asthma – do they work? *Swiss Med Wkly* 2002; 132:338–344.