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Complementary and Alternative Medicine Use Among People with Asthma and Additional Chronic Health Conditions

by

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COMPLEMENTARY AND ALTERNATIVE MEDICINE USE AMONG PEOPLE WITH ASTHMA AND ADDITIONAL CHRONIC HEALTH CONDITIONS

Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not include propriety or classified information.

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Abstract

The purpose of this study was to examine whether coexisting disease, chronic disease burden and asthma severity significantly increased the odds of individuals using complementary and alternative medicine (CAM). The current study utilized data from surveys completed by men and women aged 18-99 (N=15,403) who participated in the 2009 Behavioral Risk Factor Surveillance System (BRFSS) questionnaire and the 2009 Asthma Callback Survey (ACBS). Every individual who participated in the ACBS had earlier participated in the BRFSS questionnaire. The results indicated that cardiovascular disease, diabetes, and stroke were unrelated to CAM use. Chronic disease burden was likewise not related to CAM use. The results also indicated that individuals with more severe asthma symptoms were more likely to use CAM. The most common form of CAM use reported by individuals with asthma is breathing exercises (21.6%). Breathing exercises and techniques are unlikely to interact with traditional medical therapies. However, for physicians to give the best possible care, they need to understand everything their patients are doing to manage their health.

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List of Abbreviations

ACBS	Asthma Callback Survey
BRFSS	Behavioral Risk Factor Surveillance System
CAM	Complementary and Alternative Medicine

It is estimated that 300 million individuals around the world and 25 million individuals in the United States currently suffer from asthma (Zahran, Bailey, & Garbe, 2011). Asthma is a chronic disease that is characterized by airway inflammation and constriction, caused by an interplay between the immune system and the environment (Shen & Oraka, 2011). Asthma episodes can be triggered by environmental factors such as air pollution, tobacco smoke, and pets. Asthma often requires ongoing medical management and conventional medications are available to treat asthma. However, some individuals choose to use complementary and alternative medication (CAM) to treat asthma. CAM treatments may be used exclusively or in combination with prescription and over-the-counter medications. Due to the chronic nature of asthma, individuals suffering from this disease sometimes seek the use of CAM for the relief of asthma symptoms. The current literature suggests CAM use is linked to other chronic diseases as well (Arguder et al., 2009; Saydah & Eberhardt, 2006; Denneson, Corson, & Dobscha, 2011).

CAM is defined as "a group of diverse medical and healthcare systems, practices, and products that are not generally considered to be part of conventional medicine" (National Center for Complementary and Alternative Medicine, 2008). It is estimated that four out of ten adults in the United States use CAM (Barnes, Bloom, & Nahin, 2008). The annual use of CAM in the United States has increased from 33.7% to 42.1% (Wheaton, Blanck, Gizlice, & Reyes, 2005) but the exact number of individuals using CAM that suffer from asthma is unclear.

Some of the conventional medications used to treat asthma include inhaled corticosteroids, leukotriene modifiers, and long- acting beta antagonists (Mayo

Foundation for Medical Education and Research, 2012). Estimates of the percentage of individuals with asthma using CAM vary from 4% to 79% (Slader, Reddel, Jenkins, Armour, & Anticevich, 2006). Individuals seek out alternative treatments for asthma to enhance their health, prevent disease, and to treat existing health problems (Hawk, Ndetan, & Evans, 2011). CAM therapies used for asthma relief vary greatly and include massage therapy, herbal remedies, homeopathy, breathing techniques, acupuncture, and vitamins. Research has not determined the most popular CAM therapy. Two studies report that herbal remedies are among the most popular CAM (Arguder et al., 2009; Wheaton et al., 2005) while another study found that chiropractic manipulation was the most popular (Hawk et al., 2011). Differences in preferences may be due to sample differences.

Herbal remedies and some other types of CAM have the potential for adverse interactions with conventional medications. Compounding this problem is that only 34% of individuals using CAM tell their doctors about their CAM therapies (Wheaton et al., 2005). Asthma is a chronic condition but some individuals do go into remission and no longer suffer severe symptoms of the disease. Although remission can occur, individuals can also come out of remission and begin suffering the symptoms of asthma. If individuals have gotten into a routine of using CAM, either while having active symptoms of asthma or in remission, they may not consult their doctor about the CAM use. Physicians and emergency caregivers will be unable to properly treat chronic or acute asthma if they are unaware of the patients' use of CAM. Certain types of CAM are contraindicated for use with conventional medications used to control disease and this can become a very dangerous situation. Certain types of CAM may also increase the

severity of asthma symptoms. For example, some individuals reported the use of Echinacea to treat their asthma symptoms (George, Birck, Hufford, Jemmott, & Weaver, 2006). Echinacea is a member of the daisy family and worsening asthma may result from allergic reactions to products derived from the daisy family (George et al., 2006). CAM ingredients and dosages are not regulated in the same way that conventional medications are and this increases the toxicity risk (Wheaton et al., 2005) and the risk of allergic reactions (George et al., 2006).

Studies have shown that CAM use among subpopulations varies. A study investigating CAM use in children with asthma found that CAM use was most prevalent with poor, uneducated Black children and parents, and children who had persistent symptoms of asthma (Arcoleo, Yoos, McMullen, & Kitzman, 2007). Using the 2001 Behavioral Risk Factor Surveillance System (BRFSS) data comparing North Carolina to the national average, females, non-Hispanic whites, people ages 35-54, individuals with less than a high school education, individuals with an income level of $35,000 or more per year, and people with a very good health status were more likely to use CAM (Wheaton et al., 2005). A variety of other studies among specific subpopulations found varying results with respect to who was more likely to use CAM (George, Campbell, & Rand, 2009; Rafferty et al., 2002).

CAM use is associated with chronic conditions. For example, in a study conducted by Arguder et al. (2009), researchers found that over half of the individuals in the study suffering from chronic obstructive pulmonary disease (COPD) used CAM. Similar results have been found with individuals suffering from cancer, arthritis, cardiovascular disease, lung disease (Saydah & Eberhardt, 2006) and noncancerous pain

in the veteran population (Denneson et al., 2011). Individuals suffering from these chronic conditions were more likely than the average population to use CAM. The severity of disease also affected CAM use. Individuals reported that they were more likely to use CAM if their asthma symptoms were mild and use of traditional asthma medication increased as the symptoms became more severe (George et al., 2009). People with chronic disease are more likely to use CAM but disease burden, or how many diseases an individual suffers from, was found not to influence CAM use (Denneson et al., 2011).

The research that has been conducted on variables associated with CAM use has limitations. Some of the studies were conducted on a limited subpopulation (Arcoleo et al., 2007; Denneson et al., 2011) and may not generalize to the general public. The study conducted by Saydah and Eberhardt (2006) dealt with asthma but combined asthma with emphysema to define the lung disease group, so the picture of CAM use among people with asthma is unclear. Arguder et al. (2009) reported on a sample from Turkey which may not generalize to the United States population. Research that corrects for these sampling issues is needed.

Although the current literature suggests that chronic disease is positively correlated with CAM use, not much research has been done in the area of CAM use with asthma plus another chronic condition. The present study proposes to address this limitation of current knowledge. The BRFSS and Asthma Callback Survey (ACBS) provide information about asthma and other chronic diseases, such as heart disease, diabetes, and stroke. Respondents on the BRFSS survey provided information about their chronic diseases and whether CAM use was employed. Some respondents to the BRFSS

who reported a history of asthma were then administered the ACBS at a later date. The ACBS provides information about asthma, CAM use, and other variables.

The purpose of this study is to explore the connection between CAM use with asthma alone and asthma with other chronic conditions (disease burden) in a sample representative of the general population of the United States. A further aim is to determine if asthma severity is related to CAM use. The specific hypotheses investigated in this study are: a) The odds of CAM use are significantly increased when asthma is more severe; b) The odds of CAM use are significantly increased among individuals who have coexisting chronic disease (i.e., heart disease, stroke, or diabetes); and c) The odds of CAM use significantly increase among individuals with greater total disease burden, defined as multiple chronic diseases.

Method

Participants

The 2009 BRFSS ACBS was administered to 15,403 participants. All participants were originally selected to complete the BRFSS survey, which is a random digit dialing telephone survey performed in the United States including the 50 states, Guam, the District of Columbia, the U.S. Virgin Islands, and Puerto Rico. If participants endorsed suffering from asthma, they were asked to agree to participate in the ACBS at a later date. Participants ranged in age from 18-99 years old and the mean age was 55.11 years old. Table 1 summarizes basic demographic information about the survey respondents.

Materials and Procedure

The BRFSS is a survey conducted at the state level that gathers information regarding health risk behaviors, access to healthcare, and preventative practices (Centers for Disease Control and Prevention, 2008). A standardized questionnaire is given in a telephone interview to gather information about risky behaviors and health practices (CDC, 2008). The ACBS is a detailed asthma survey given by telephone interview to some participants who endorsed suffering from asthma on the BRFSS survey. The ACBS asks questions that regard the health and experiences of people that have been diagnosed with asthma (Centers for Disease Control and Prevention, 2012). This study is based on the 2009 BRFSS and subsequent ACBS.

Chronic disease burden, coexisting chronic disease, and asthma severity are the predictor variables in this study and CAM use is the outcome variable. Chronic disease burden refers to how many chronic diseases an individual has and was measured by the number of chronic diseases the participant reported on the BRFSS survey. Participants reported if they suffered from chronic diseases such as cardiovascular disease, asthma, stroke, and diabetes. Asthma severity refers to the severity of asthma symptoms experienced and was measured by using two ACBS questions to form the asthma severity scale. The first question was, "During the past two weeks, on how many days were you completely symptom-free, that is no coughing, wheezing, or other symptoms of asthma?" The response range was 1-14 days(s) or none. The second question was, "During the past 30 days, on how many days did you have any symptoms of asthma?". The response range was 1-30 day(s), no days, or every day. The severity score was the sum of the values reported for these two variables. The coefficient alpha for this scale is .81.

Design

This is a binary logistic regression model. The two category outcome variable is use or nonuse of complementary and alternative medication. The variables of interest are self-reported chronic conditions (stroke, heart attack, diabetes, and asthma alone). Variables to be included as covariates are sex, age (in years), race, income, and education. BRFSS data are weighted for the number of telephones in a household, the probability that a telephone number will be selected, and how many adults are in the household. A final weighting adjustment was made for non-response (telephone was not answered in household) and non-coverage (no telephone in household) (Centers for Disease Control and Prevention, 2008). Data were analyzed using SAS proc surveylogistic software and any SAS component needed for supplementary data analysis. An alpha level of 0.05 was used when comparing CAM use with other variables to determine significance.

Results

Table 2 summarizes the number and percent of asthma sufferes who report using various CAM remedies. Breathing techniques were the most commonly used CAM among people with asthma, with vitamins and "other" as second and third most reported CAM remedy. 28.5% of individuals reported using some form of CAM, 17.25% reported using one type of CAM, and 11.2% reported using two or more types of CAM.

For the model constructed to test the first two hypotheses, the model fit is significantly better than the null model. The likelihood ratio test was significant ($\chi^2_{[21]} = 727{,}855.7, p < .0001$). Table 3 summarzies Type 3 effects for the relationships of all

variables included in the model with the outcome variable of CAM use. Asthma severity, cardiovasuclar disease, diabetes, sex, age, income, and education are significantly related to CAM use. History of stroke was not associated with CAM use.

Table 4 presents the adjusted odds ratios for the severity variable and all covariates. The hypothesis that individuals with more severe types of asthma would be more likely to use CAM was supported. The odds ratio is 1.04 for asthma severity. For every one unit increase in severity, the odds of CAM use increases about 4%. Significant covariates include age, sex, income, and education. Younger individuals, women, individuals in the lower income group, who completed grades 9-12 or received a GED were more likely than those with the highest level of educational attainment to use CAM.

The second hypothesis was that the odds of CAM use would be increased among individuals who reported a history of cardiovascular disease, stroke, or diabetes. As mentioned above, history of stroke was not associated with CAM use. Type 3 effects were significant for CAM use among individuals reporting cardiovasular disease and diabetes. However, inspection of the odds ratios (Table 4) reveals that the only significant effects for both cardiovascular disease and diabetes were the "don't know" response groups compared to the groups who reported no history of either disease.

A second logistic regression model was run to test the third hypothesis that total disease burden was related to CAM use. In this analysis, a variable was created that combined the history of cardiovascular disease, stroke, and diabetes, which formed the measure of disease burden. Table 5 presents the Type 3 effects for this second model. Total disease burden was not significantly related to CAM use but, as in the first model, asthma severity, sex, age, income, and education were all significantly related to CAM

use. From the table of Type 3 effects, it was clear that having more chronic diseases was not related to CAM use (Wald $\chi^2 = 2.5, p =$ n.s.). Because the primary hypothesis was not supported, no further analyses are reported.

Discussion

The goal of this study was to determine if individuals who have asthma with a coexisting disease were more likely to use CAM, if individuals with asthma and multiple chronic conditions were more likely to use CAM, and if individuals with more severe asthma symptoms were more likely to use CAM. The results indicate that cardiovascular disease, diabetes, and stroke were not significantly related to CAM use. Disease burden was also found to not be significantly related to CAM use. The more severe asthma symptoms that an individual experiences, the more likely they will be to use CAM.

The major limitation of this study is the restriction of data available from the BRFSS. The BRFSS does not provide a complete medical history and all data are self-report. Were other chronic conditions not broadly assessed on the BRFSS (e.g., cancer) included in the survey, then relationships between CAM use and chronic disease may be detected. Disease burden may be significantly related to CAM use but the restricted range of chronic diseases assessed on the BRFSS does not allow an extended analysis of this relationship. Additional research is needed to verify if other chronic diseases are significantly related to CAM use.

In summary, this study contributes to the understanding of populations that are significantly more likely to use CAM. Physicians should be aware that the use of CAM is significantly associated with asthma severity. Individuals with more severe types of asthma may be receiving aggressive treatments and their increased likelihood of using

CAM could pose serious threats to their treatment and health. Not all CAM therapies are harmful and, in fact, the most popular CAM therapy reported by asthma sufferers is breathing techniques. Breathing exercises and techniques are unlikely to interact with traditional medical therapies. But, a sizable proportion of people with asthma also report using more than one CAM therapy. For physicians to give the best possible care, they need to understand everything their patients are doing to manage their health. Also, finding out why individuals with severe asthma symptoms use CAM is important because they could be undertreated with traditional medications or the traditional asthma medications may not be adequately treating asthma symptoms. The reality of CAM use and self-treatment needs to be acknowledged and better understood through research in order to ultimately improve quality of care.

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Table 1

Demographic Characteristics of Sample

Sex	N	Weighted Percent
Women	10750	59.79
Men	4653	40.21
Race		
White	12284	70.52
Black	888	9.16
Other Non-Hispanic	525	5.19
Multi-racial Non-Hispanic	491	2.33
Hispanic	1090	12.22
Don't Know	121	0.59
Education		
Never attended school or only kindergarten	23	.15
Grades 1 through 8 (elementary)	446	2.48
Grades 9 through 11 (some high school)	920	6.56
Grade 12 or GED (high school graduate)	3964	24.41
College 1 year to 3 years (some college or technical school)	4475	29.02
College 4 years or more	5559	37.33
Don't know	16	.05
Income		
Less than $15,000	2206	12.03
$15,000-$25,000	2532	14.48
$25,000-$35,000	1531	8.04
$35,000-$50,000	1982	12.71
$50,000 or more	5582	41.6
Don't know	1570	11.15
Ever Diagnosed with Heart Attack		
Yes	1204	5.57
No	14084	93.77
Don't know	115	0.66
Ever Diagnosed with a Stroke		
Yes	886	3.7
No	14463	96.06
Don't know	54	0.24

Table 1 cont.

Demographic Characteristics of Sample

Ever Told by Doctor that You have Diabetes		
Yes	2482	12.25
Yes but Female Told Only During Pregnancy	128	1.05
No	12430	84.56
No but Prediabetes	348	2.01
Don't Know	12	0.10
Refused	3	0.03

Table 2

Type of CAM Use Among Individuals with Chronic Disease

CAM	N	Percent
Herb	587	3.8
Vitamins	974	6.3
Acupuncture	170	1.1
Acupressure	153	0.99
Aromatherapy	474	3.1
Homeopathy	239	1.6
Reflexology	185	1.2
Yoga	425	2.8
Breathing Techniques	3319	21.6
Naturopathy	165	1.1
Other	1002	6.5

Table 3

Type 3 Analysis of Effects of Individuals with Chronic Disease and CAM Use

Variable	Wald Chi-Square	*p*
Cardiovascular Disease	11.6113	0.0030
Stroke	0.2227	0.8946
Diabetes	10.6782	0.0136
Sex	41.2775	<.0001
Age	5.0529	0.0246
Asthma Severity	232.3256	<.0001
Income	22.6481	0.0004
Education	13.7321	0.0328

Table 4

Adjusted Odds Ratio Estimates of Individuals with Chronic Disease and CAM Use

Effect	Adjusted Odds Ratios	95% Confidence Interval
Heart Attack		
No	-	-
Yes	1.1	.8 – 1.4
Don't Know	4.6	1.9 - 11.2
Stroke		
No	-	-
Yes	0.9	.7-1.2
Don't Know	1.02	.2-4.4
Diabetes		
No	-	-
Yes	0.9	.7 - 1.1
Borderline	0.8	.5 – 1.2
Don't Know	6.1	1.7 -21.7
Age	.994	.989- .999
Sex		
Women	-	-
Men	.6	.5 - .7
Asthma Severity	1.03	1.03-1.04

Table 4 cont.

Adjusted Odds Ratio Estimates of Individuals with Chronic Disease and CAM Use

Income		
$50,000 or more	-	-
Don't Know	1.8	.9-1.5
Less than $15,000	1.7	1.3-2.2
$15,000-$25,000	1.5	1.2-1.9
$25,000-$35,000	1.4	1.1-1.8
$35,000-$50,000	1.5	1.1-1.8
Education		
College 4 years or more	-	-
Never attended school or only attended kindergarten	1.2	.3-5.4
Grades 1 through 8	0.8	.5-1.3
Grades 9 through 11	.6	.4-.9
Grade 12 or GED	.7	.6-.9
College 1 year to 3 years	.8	.7-1.02
Don't know	.5	.05-5.8

Table 5

Type 3 Analysis of Effects of Individuals with Overall Chronic Disease Burden and CAM Use

Variable	Wald Chi Square	*p*
Disease Burden	2.5	.47
Sex	40.0	<.0001
Age	4.0	.0456
Asthma Severity	229.1	<.0001
Income	23.8	.0002
Education	12.6	.0490