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Erin Sanchez

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Factors that Explain the Use of Complementary and Alternative Medicine in Undergraduates

Erin Sanchez, Chemistry

Mentor: Susan Hutchinson, Ph.D., Applied Statistics and Research Methods

Abstract: Complementary and alternative medicine (CAM) has been determined to be highly effective in treating health problems and improving the lives of college students. However, if students are not using CAM therapies, they are not receiving the benefits that CAM could provide them. In a small city, where CAM may not be widely available, CAM use may be low. The current study attempted to determine if trends in student CAM use in large cities are similar in a small city. A survey was distributed to undergraduates at a mid-sized university in the Rocky Mountain region, yielding 217 completed surveys. The survey asked students about their use of, knowledge about, attitudes toward, and barriers to using CAM, as well as their demographic characteristics including gender, ethnicity, religion, and parental income. Frequencies revealed that knowledge was a major barrier to student CAM use. A t-test determined that females tended to have more knowledge about CAM than males. Correlation and regression analyses suggested that demographic characteristics did not explain CAM use; while, positive attitudes toward CAM and more knowledge about CAM may lead to higher CAM use. These findings may be useful in developing strategies for increasing undergraduate students' use of CAM.

Keywords: *complementary and alternative medicine, undergraduates, knowledge, barriers*

The use of complementary and alternative medicine (CAM) is on the rise in the United States, particularly among college students (Ambrose & Samuels, 2004; Birkett, 2012; Chng, Neill, & Fogle, 2003; Feldman & Laura, 2004; Fogle, 2001; Holifena, 2002; Johnson & Blanchard, 2006; Lamarine, Fisher, & Sbarbaro, 2003; Newberry, Beerman, Duncan, McGuire, & Hillers, 2001; Reeves, Hunyh, & Liu, 2012; Versnik and Dorman, 2008). According to the

National Center for Complementary and Alternative Medicine (NCCAM), alternative medicine is the use of non-traditional health practices in place of conventional practices. Some examples of alternative medicine are acupuncture, aroma therapy, massage therapy, herbs, etc. The NCCAM defines complementary medicine to be the use of both non-traditional and traditional health practices (See Table 1).

Table 1. Definitions and examples of difference types of medicine

Type of Medicine	Conventional Medicine	Alternative Medicine	Complementary Medicine
Definitions	Medicine practiced by a practitioner holding a medical degree. "Western" medicine	Any medicine that is not considered conventional. "Eastern" medicine	The combination of conventional and alternative medicine.
Examples	<ul style="list-style-type: none"> • Antibiotics • Birth control • Inhalers 	<ul style="list-style-type: none"> • Massage therapy • Acupuncture • Biofeedback • Exercise 	<ul style="list-style-type: none"> • Massage therapy and muscle relaxants to treat a back injury

While the use of CAM by college undergraduates has been widely researched, these studies have several limitations. Many previous studies were located in large suburban areas or at

big universities. Trends in CAM use may be different in smaller cities or universities. Previous studies used specific groups of students, such as undergraduates studying health or living in the

dorms. A more general sample may yield different results. Further research in undergraduates' use of CAM is needed because many CAM therapies have been determined to be highly effective in preventing illness and improving the well-being of college students, for example, decreasing anxiety and increasing mental performance (Birkel & Edgren, 2000; Ganpat, Nagendra, & Selvi, 2013; Henriques, Keffer, Abrahamson, & Horst, 2011; King, 2006; Long, 1992; Ratanasiripong, Sverduk, Prince, & Hayasshino, 2012). However, CAM therapies and practitioner availability may be limited in a small city. There may also be other barriers that prevent students from using CAM, such as knowledge or financial reasons. Research is needed to study CAM trends in college students attending a university in a small city from various majors to determine if efforts are needed to increase CAM use and how it may be increased. For example, planned behavior theory claims that an individual's intentions to perform a behavior can be predicted by the attitude of the individual (Ajzen, 1991). Other studies have determined there is a relationship between students' attitudes and behavior and attitudes and knowledge about health related issues (Al-Khamees, 2006; Clark, McCann, Rowe, & Lazenbatt, 2004; Early, Armstrong, & Thompson, 2011; Hackman, Dykstra, & Collins, 2011; Sandfort & Pleasant, 2009). Yet, there is no research examining these relationships in students' CAM use. Determining relationships between attitudes and behavior and attitudes and knowledge, may be helpful in increasing students' CAM use so they may receive the benefits that CAM can provide them.

There are several factors that have been determined to explain CAM use in college students, including demographic characteristics (such as gender, ethnicity, religion, and parental income), knowledge about CAM, attitudes toward CAM, and barriers to CAM use. Each of these factors is discussed in greater detail below.

Demographic Characteristics and CAM Use

Past studies have determined associations between the use of CAM and demographic

characteristics including gender and ethnicity. For example, several studies determined that females tend to use CAM more than males (Burke, 2012; Chng et al., 2003; Feldman & Laura, 2004; Fogle, 2001; Johnson & Blanchard, 2006; Lamarine et al., 2003). In a study of medical students in Turkey, females were also determined to have more positive attitudes toward CAM and were more aware of CAM therapies (Akan et al., 2012). While most research has determined that females tend to use CAM more than males, further research is needed to determine if this trend is similar in students attending school in a small city. These studies also have not examined other gender differences with regards to CAM use, such as knowledge differences. This information may be helpful for health practitioners because it may give more insight into how to properly educate patients about CAM.

Ethnicity is another demographic characteristic that has been examined in conjunction with CAM, yielding mixed results. The studies that determined a relationship between ethnicity and CAM oversampled for ethnic diversity, used pre-existing data sets with large sample sizes, or were conducted with the general population (Chng et al., 2003; Fogle, 2001; Holifena, 2002; Johnson & Blanchard, 2006; Perkin, Wilson, Schuster, Rodriguez, & Allen-Chabot, 2002). In contrast, the studies based on college students did not find that ethnicity was related to CAM use (Graham et al., 2005; Kronenberg, Cushman, Wade, Kalmuss, & Chao, 2006). These latter studies also generally had samples mostly made up of Caucasians. It is possible that ethnicity plays a lesser role in explaining CAM use among college students due to the effect of a college education on CAM use (Astin, 1998).

The relationship between CAM use and religion is rarely studied in the general population or in college students despite religion having been determined to be beneficial to health in the general population (Byrd, 1988; Gillum, 2008; Levin & Vanderpool, 1989; Kabat-Zinn, Lipworth, & Burney, 1985). However, Feldman and Laura's (2004) study determined college

students frequently used prayer. Because religion has been determined to be beneficial to health and is free and easy to use, further research is needed to determine if there is a relationship between religion and CAM use.

Income and CAM use has also not been studied in either the general population or with college students. CAM is commonly used as a preventive treatment and there has been research that examined how income affects the use of other preventative care practices in the general population (Katz, 1994; Makuc, Freid, & Kleinman, 1989). Economic barriers have been determined to prevent students from using CAM (Foote-Ardah, 2002; Feldman & Laura, 2004). College students from low-income households may lack the funds to purchase CAM services from a CAM practitioner. Davis and Weeks (2012) found the average amount of money spent on CAM therapies a year is \$1385, which may be an excessive expenditure for people from low-income households, including college students. Although there is a lack of research examining the relationship between income and CAM use, it is important to study because it can provide insights into CAM users and non-users.

Knowledge about CAM

Students tend to have a high awareness of CAM therapies (Zimmerman & Kandiah, 2012), yet they lack knowledge about CAM effectiveness (Ambrose & Samuels, 2004; Zimmerman & Kandiah, 2012). Most studies researching CAM knowledge focus only on awareness of certain CAM therapies and not on facts about CAM therapies, such as dangers or what therapies are used to treat or prevent. It is crucial for healthcare professionals to know how much students know about CAM in order to provide them with the information they need. It is also important to determine how students obtain information regarding their health because it can be helpful in increasing students' knowledge about CAM. According to existing research, most students receive information about CAM from friends or family (Ambrose & Samuels, 2004; Birkett, 2012; Perkin et al., 2002). These studies did not include

modern sources of information, such as the Internet or social media. Students today may obtain more health information from these types of sources than friends or family because digital information sources are discrete and more readily available. Similarly, understanding the relationship between knowledge and CAM use might be helpful in increasing students' CAM use. Previous studies have not examined this relationship. CAM users have indicated in previous studies that a lack of knowledge about CAM facts has acted as a barrier to their CAM use (Foote-Ardah, 2002; Zimmerman & Kandiah, 2012). The research on the relationship between knowledge and CAM use has been limited to one study with HIV patients in the general population and another study that focused on herbal supplements. Therefore, more research is needed to determine if those who are misinformed about many types of CAM also perceive their lack of knowledge as a barrier.

Attitudes toward CAM

Students tend to have positive attitudes toward CAM therapies and practitioners (Chng et al., 2003; Feldman & Laura, 2004; Fogle, 2001). These studies also reported higher CAM use than the national average, which may be related to more positive attitudes toward CAM. One study by Versnik and Dorman (2008) revealed students had slightly negative attitudes toward CAM, but reported high CAM use. The authors argued that a lack of knowledge may have been the cause of the negative attitudes. Positive attitudes were determined to be associated with longer exposure to CAM (Ho, 2012). It is important to measure students' attitudes toward CAM because their attitudes may be indicative of their CAM use and possibly their knowledge about CAM. In addition, gaining a better understanding of the factors that explain students' attitudes toward CAM could be potentially beneficial to CAM providers.

Literature Review Conclusion

By reviewing the current literature on students' CAM use, it becomes clear that further research is warranted. Limitations in previous research include: studies done only in large cities,

(including, Newark, New Jersey and San Francisco, California) or major universities, studies tend to research only specific CAM modalities (such as, non-vitamin non-mineral dietary supplements and herbs), and student participants tend to be from specific courses or majors (for example, nursing students). Additional research should be done because CAM therapies (such as, yoga, biofeedback, and guided imagery), have been determined to be highly effective in treating and preventing common ailments, like stress and anxiety, in undergraduates. All students should have the opportunity to benefit from all that CAM has to offer.

Therefore, the purpose of this study is to determine CAM use trends at a mid-sized university located in a small city, including several types of CAM with students from a wide variety of disciplines. This research was guided by the following research questions:

- 1) To what extent do gender, religion, parental income, and ethnicity explain the frequency of use of CAM amongst undergraduate students?
- 2) Do male and female undergraduate students differ in their knowledge of CAM?
- 3) To what extent does knowledge of CAM explain the frequency of CAM use?
- 4) What perceived barriers prevent undergraduate students from using CAM frequently?
- 5) To what extent do attitudes of CAM explain the frequency of CAM use?

I predicted that females would use CAM more than males, and those who have parents with high income would use CAM more than those who have parents with low income. I also predicted that females would have more knowledge about CAM than males, accessibility to CAM would be a major barrier, and that those with more positive attitudes toward CAM, and more knowledge about CAM, would be more likely to use CAM.

METHOD

Setting

The setting for the current study was a mid-sized Doctoral Research University (DRU) with

an overall enrollment of just over 12,000 students. The university is located in the Rocky Mountain region of the U.S and is housed in a small city with a population of 96,539 (according to the US Census Bureau) within a largely agricultural county. This location is ideal for a CAM study with college students because of its major differences with other study locales. The varieties of CAM therapies available in the local community are very limited with only massage therapy and acupuncture widely available. Some other CAM therapies are available in the local community, but may be hard to find if a student is not a permanent resident. College students may not know where to find these harder-to-come-by modalities. Therefore, CAM use may be low due to these hidden CAM therapies.

Participants

The participants in this study were undergraduate students over the age of 18. The target sample size was between 100 and 150 students to attain sufficient statistical power for the tests used in the study. Based on an a priori power analysis for an eight predictor multiple regression model and a medium estimated effect size value based on $R^2 = .13$ with $\alpha = .05$ and $\text{power} = .80$, a sample size of 108 was estimated to provide enough statistical power to detect the relationship between the explanatory and outcome variables (Green, 1991). To achieve this sample size, 300 surveys were distributed with an anticipated response rate of approximately 33% based on previous survey studies of college students' CAM use that obtained response rates similar to or greater than this (Chng et al., 2003; Fogle, 2001; Holifena, 2002; Newberry et al., 2001). The actual sample size was 217 with a response rate of 65%. Students were recruited from several intact classes that represented introductory undergraduate courses, such as general chemistry and college algebra. I chose introductory courses in order to obtain a representative sample of the student population at the university. The majority of the participants were female, freshmen, and from a suburban area (see Table 2).

Table 2. Characteristics of the sample.

Variable		N = 217
Age	Range	18-45
	Mean	19
	Standard Deviation	3.21
Gender	Female	59.90%
	Male	40.10%
Origin	Rural	18.80%
	Suburban	57.30%
	Urban	23.90%
Annual Income	\$0-29999	18.40%
	\$30000-49999	12.20%
	\$50000-69999	24.00%
	\$70000-89999	19.40%
	>\$90000	26.00%
Class	Freshman	57.10%
	Sophomore	17.50%
	Junior	16.60%
	Senior	8.80%
Religion	Catholic	27.60%
	Protestant	11.60%
	Buddhist	5.00%
	Jewish	1.50%
	Agnostic/Atheist	20.10%
	Other	34.20%

Table 3. Definitions of CAM provided to participants in the survey.

Type of Medicine	Definition
Conventional	Any medication or health practice that is prescribed or recommended by a physician holding an M.D. (medical doctor) or D.O. (doctor of osteopathy) degree. It can be anything from antibiotics, birth control pills, or anti-anxiety medication.
Alternative	Any medical and health care systems, practices, and products that are not generally considered part of conventional medicine. It can be acupuncture, aromatherapy, or homeopathy.
Complementary	A combination of conventional and alternative medicine. For example, the use of anti-anxiety medicine and massage therapy to treat stress.

Materials

I developed a survey by combining measures from previous studies and writing some sections for the purpose of the current study. At the

beginning of the survey, several definitions were included for participants (see Table 3). The survey had five sections comprised of a total of 80 items as described below.

CAM use. The first section of the survey asked participants about their CAM use in the past year. This section contained eight items that came from Holifena's (2002) thesis about the prevalence of students' CAM use at a large university. Four of the eight items required a yes or no response. For example, item 1 asked, "Have you used an alternative medicine and/or complementary medicine in the past 12 months?" These items were used to determine the general CAM use in the sample. Item 5 had a list of 14 CAM therapies, such as massage therapy, exercise, and aromatherapy. Participants were asked to indicate if they use any of the therapies listed. The results from this item were used to create a total mean CAM use score. Item 7 contained a list of sources from which participants receive information about CAM, for example, family/friends or a medical doctor. Item 6 asked participants about the amount of money spent on CAM in the past 12 months. Participants chose from a range of monetary values to indicate their response. Scores on the CAM use scale had a reliability coefficient of Cronbach's $\alpha = .73$.

Awareness of CAM. This section contained 16 items that I developed for the purpose of the current study using the NCCAM website, which lists several of the most commonly used CAM therapies in the United States. I created a different list of these therapies, on which participants would indicate if they were aware or not aware of each therapy. Responses were summed and had a range from 0-16. Scores on the awareness scale had a Cronbach's alpha reliability of $\alpha = .86$ based on the current sample.

Knowledge of CAM. Using the same list of 16 therapies from the awareness item, I located common facts about these therapies and created two statements that were either true or false for each therapy. For example, item 2 said, "Aloe vera can be taken orally as a laxative without risk." The participants were asked to identify if this statement was true, false, or if they did not know. The number of correct responses to this set of items was summed which had a range from 0-32. The knowledge scores based on the current sample had a Cronbach's $\alpha = .77$.

Barriers to CAM use. The third section, which was also developed for the purpose of the current study, asked participants about perceived barriers to CAM they believe they had experienced. I chose the barriers based on Foote-Ardah's (2002) study, which examined barriers to CAM in the general population. Foote-Ardah examined several barriers to these types of medicines and determined accessibility and affordability to be highly prevalent. This section included 11 items, each using a Likert 5-point scale ranging from strongly agree to strongly disagree. An example statement from this section stated, "I believe that I do NOT have the means to contact an alternative medicine practitioner to seek their services." An overall mean barriers score was calculated and had a range from 1-5. Scores on the barriers scale in the current sample had a Cronbach's $\alpha = .65$.

Attitudes toward CAM. The next section of the survey asked participants about their attitudes toward CAM. Each item used a 5-point Likert scale ranging from strongly agree to strongly disagree. The 21 items came from Fogle's (2011) thesis about college students' use of and attitudes toward CAM. An example statement from this section stated, "I am NOT satisfied with the quality of care I receive from conventional medicine." A mean attitude score was calculated from these data. In Fogle's study using this measure, the alpha reliability coefficient was Cronbach's $\alpha = .92$ based on scores from college students. For the attitude scores in the current sample, Cronbach's $\alpha = .81$.

The final section included eight items asking about participants' demographic characteristics (i.e., gender, age, major of study).

Data Collection Procedures

Data collection occurred during the spring 2014 semester. Permission from the Institutional Review Board (IRB) was granted prior to beginning data collection. With permission from professors, I recruited students from general chemistry, organic chemistry, general biology, and college algebra courses. Students completed the survey during class time with the exception of one class. This professor indicated he would

rather the students fill out the survey on their own time and return the completed survey in a sealed envelope in his office. Students were given a small incentive during class to increase the survey response rates.

Data Analysis

After collecting the data via a paper/pencil survey, I first entered the data into Excel, which was later exported to SPSS 20 for statistical analysis. Prior to conducting statistical analyses to answer my research questions, descriptive statistics, such as univariate frequency analyses, were run. Descriptive analysis provided information about demographic characteristics of the participants, distributional characteristics of the data, and suitability of the data for subsequent statistical analysis. Preliminary analyses also included reliability analysis based on Cronbach's alpha in order to determine how reliable the scores were for the various multi-item measures of variables in the survey. A frequency distribution was used to answer research question 4 about the barriers students feel they experience. Multiple regression analysis was used to answer research questions 1, 3, and 5, regarding the relationships between the different explanatory variables (i.e., demographic characteristics, attitudes, and knowledge) and students' use of CAM. Preliminary diagnostics indicated that the residuals were normally distributed, with the exception of one outlier. Residual scatterplots, used to determine if the variables had a linear relationship and exhibited homoscedasticity in the model suggested the regression assumptions were satisfied. Nominal variables such as gender, ethnicity, and religion, were dummy coded prior to entry in the multiple regression model.

In addition, an independent samples *t*-test was used to answer research question 2 about gender differences in knowledge about CAM. A *t*-test can only be successfully completed if certain assumptions are met. These assumptions are: the dependent variable is continuous and has a normal distribution, the observations are independent, and the population variances are equal. These assumptions were met. The independent variable,

gender, was tested and the dependent variable, knowledge, was measured using the designed instrument. Preliminary descriptive analysis based on examination of skewness and kurtosis indicated knowledge had a normal distribution. An $\alpha = .01$ was used to conduct the statistical analyses.

RESULTS

Overall, CAM use was low in this population with only 34% of participants indicating they had used CAM therapies in the past 12 months. The most common CAM therapies used by participants were exercise (77%), yoga (33.6%), and herbal medicine (27.2%). The overall knowledge score was 11.5 out of 32 and the overall awareness score was 9.76 out of 16.

The multiple regression model indicated that 16.3% of CAM use can be explained by the full set of explanatory variables included in the model ($R^2 = .163$, $F(14, 181) = 3.71$, $p < .01$). With respect to research question 1, 9.3% of the variance in CAM use was explained collectively by students' gender, parental income, religion, and ethnicity ($R^2 = .093$, $F(12, 181) = 1.81$, $p > .01$), which indicates these variables did not contribute significantly to the explanation of CAM use (see Table 5).

Some of the students who indicated they had not used CAM in general in the past 12 months indicated later in the survey they did use particular therapies, suggesting a low awareness of CAM in the sample. The mean awareness score was 9.76 out of 16 ($SD = 3.76$), which supports a moderate CAM awareness. The mean knowledge score was 11.5 out of 32 ($SD = 4.67$), which indicates low CAM knowledge. Results from the *t*-test indicate that females had a higher mean knowledge score than males did (see Table 4).

Participants tended to get information about CAM from friends/family (53.9%) or a physician (20.7%). Knowledge about CAM explained 3.3% of the variance in CAM use, ($R^2 = .033$, $F(1, 181) = 7.73$, $p < .01$), conveying a statistically significant relationship (see Table 5).

A majority of the participants did not believe they had enough education about alternative medicine to use it (48% either agreed or strongly agreed to this statement). Other barriers, such as accessibility and affordability, were not indicated by the sample as barriers to CAM use.

The total attitude score for the sample was 3.13 ($SD = .50$), indicating overall neutral attitudes. Approximately 4.2% of the variance in

CAM use was explained by students' attitudes ($R^2 = .042$, $F(1,181) = 9.70$, $p < .01$) (see Table 5).

Pearson correlations were examined to determine how various CAM-related factors were correlated with one another. From this analysis, several relationships were determined to be statistically significant ($p < .01$) (see Table 6). Of these, the relationship between awareness of CAM and knowledge about CAM was the strongest, ($r = .48$, $p < .01$).

Table 4. Results from a t-test to determine knowledge differences between genders.

Gender	N	Mean	SD	t	df	p-value (2-tailed)
Female	130	12.11	4.35			
Male	87	10.61	4.99			
Equal Variances Assumed				2.34	215	.02

Note: $SD = standard deviation$ & $df = degrees of freedom$.

Table 5. Results from the multiple regression.

Parameter	R^2	p-value	df	β	F
Demographics	.093	.05	12		1.81
Ethnicity	.047	.059	5		2.18
Caucasian				.033	
Asian				.178	
African-American				.002	
Hispanic				-.199	
Native American				.110	
Religion	.006	.932	5		.26
Catholic				-.013	
Protestant				.057	
Agnostic				-.012	
Buddhist				.010	
Atheist				.034	
Gender	.020	.034	1	.145	4.58
Income	.001		1	.038	.285
Knowledge	.033	.006*	1	.205	7.73
Attitudes	.042	.002*	1	.312	9.70
N	.163		14		

Note: * $p < .01$.

Table 6. Pearson correlation results.

	Use of CAM	Knowledge about CAM	Awareness of CAM	Attitude toward CAM	Barriers to CAM
Use of CAM	1.00				
Knowledge about CAM	.27*	1.00			
Awareness of CAM	.25*	.48*	1.00		
Attitude toward CAM	.33*	.25*	.12	1.00	
Barriers to CAM	-.24*	-.21*	-.13	-.23*	1.00

Note: * $p < .01$

DISCUSSION

CAM use in this sample was determined to be lower than use reported in previous studies (Ambrose & Samuels, 2004; Birkett, 2012; Chng et al., 2003; Fogle, 2001; Holifena, 2002; Johnson & Blanchard, 2006; Newberry et al., 2001; Feldman & Laura, 2004; Lamarine et al., 2003; Reeves et al., 2012; Versnik & Dorman, 2008).

There may be several reasons for the disparity in results between the current study and prior research, which are discussed below. The most common CAM therapies used in this sample were exercise, yoga, and herbal medicine. Exercise and yoga courses are offered at the university studied, so this may be why they were the most commonly used.

Results indicated the demographic characteristics as a whole did not explain level of CAM use. I was surprised that gender did not yield a significant relationship with CAM use given that many other studies have found this result (Burke, 2012; Chng et al., 2003; Fogle, 2001; Johnson & Blanchard, 2006; Feldman & Laura, 2004; Lamarine et al., 2003). These studies used statistical tests, such as a chi-square, that looked at gender apart from other variables. Therefore, gender not might play as much a role in explaining CAM use when other factors related to gender are taken into account. Religion and ethnicity may have not yielded significant relationships with CAM use due to a majority of the sample being Caucasian and Christian. Given that previous studies did not find a correlation between ethnicity and CAM, which included undergraduate students as participants, I was not

surprised by this result (Chng et al., 2003; Fogle, 2001; Holifena, 2002; Johnson & Blanchard, 2006; Perkin et al., 2002).

Females in the current study tended to know more about CAM than males did, as Akan et al. (2012) determined previously. The findings suggest that females may consult research about the therapies they use. In this study, awareness of CAM and knowledge about CAM were determined to be minimal, as previous studies have observed (Amrbose & Samuels, 2004; Perkin et al., 2002; Zimmerman & Kandiah, 2012). The limited CAM use seen in the current study may be due to relatively little knowledge students had about CAM. Participants also indicated that knowledge was a major barrier for them with respect to CAM use, consistent with previous research (Foote-Ardah, 2002; Zimmerman & Kandiah, 2012). Moreover, knowledge about CAM and use of CAM were positively correlated in the current study, which suggests that those who are more knowledgeable about CAM use CAM more than those who have minimal CAM knowledge. This may explain why CAM use was not frequently reported in the current study. Based on these findings, it may be possible that increasing knowledge about CAM may lead to an increase in CAM use. Future research should attempt to examine if such a causal relationship exists. For example, studies may implement an experimental design in which students receive manipulated levels or types of information related to CAM.

Regarding the means by which students tend to acquire information about CAM, the students in the current study primarily obtained information

from friends/family or from physicians, which is consistent with previous studies (Birkett, 2012; Perkin et al., 2002).

I was surprised that not very many students reported using the Internet to obtain CAM information. Future research should explore why students choose to use or not use certain sources of information.

Other barriers studied were accessibility, affordability, and parental income, none of which were determined to be associated with CAM use. As noted earlier, the availability of CAM in the area where the study took place is limited, which might explain why accessibility was not a factor in the current study, in contrast with Foote-Ardah's (2002) study. CAM generally is not covered by health insurance and can be expensive, so this result was surprising since a previous study determined this barrier to be prominent (Foote-Ardah, 2002). The current study may have found these results due to a lack of interest in using CAM, since attitudes were discovered to be generally neutral. If someone is not interested in using CAM, it would not matter if CAM was either unavailable in the area or if it was affordable. Not surprisingly, the number of barriers in the current study was negatively correlated with CAM use, suggesting as perceived barriers to CAM increase, CAM use decreases. Future research should focus on determining specific methods that may alleviate certain barriers students perceive they have to CAM use.

Attitudes toward CAM among participants in the current study were neutral overall, unlike previous studies that determined college students tend to have positive attitudes toward CAM (Chng et al., 2003; Fogle, 2001; Feldman & Laura, 2004). However, these studies also reported high CAM use. Although attitudes were generally neutral among students in the current study, they were positively correlated with both CAM use and knowledge about CAM.

I had predicted attitudes toward CAM would be neutral in this study due to the lack of CAM availability in the area, so these results were not surprising. As previously discussed, there has

been research that established a relationship between attitudes and knowledge and attitudes and behavior in college students (Al-Khamees, 2006; Clark, McCann, Rowe, & Lazenbatt, 2004; Early, Armstrong, & Thompson, 2011; Hackman, Dykstra, & Collins, 2011; Sandfort & Pleasant, 2009). In the current study, these relationships were also established with regards to CAM. Understanding these relationships may be helpful to increase students' use of CAM in the future.

Conclusion

CAM use was determined to be lower than in previous studies involving college students. Therefore, students may not be receiving the same benefits that CAM can provide them as students from more urban areas. In order to increase students' CAM use, principles from the Theory of Planned Behavior can be used (Ajzen, 1991). To increase students' CAM use, their attitude toward CAM needs to be more positive. Attitudes can possibly be made more positive by increasing their knowledge about the benefits of CAM.

There are several limitations to the current study including the homogeneity of the sample in terms of ethnicity and religious affiliation, given that participants were primarily Caucasian and Christian. This may have caused relations between the demographic characteristics and CAM use to not be evident. This lack of diversity in the sample may have attenuated relations between the demographic characteristics and CAM use and may limit generalizability of the results to other college student populations. A second limitation to this study is the reliance on self-reported data. Some participants may not have been truthful or may have been unable to recall exact CAM use or other health-related behaviors, during the 12 months prior to the survey.

Lastly, there were factors excluded from the current study that may explain CAM use in this population, such as health conditions and family history of CAM use.

There were also barriers that were not considered in the current study, including students' ability to accommodate to how CAM

services accept clients (i.e., hours of operation, appointment availability) and social acceptability. These different factors and barriers could give researchers a clearer picture of students' CAM use. Future studies should include these different factors and barriers in other university settings both similar to and different from the one in the current study. Qualitative research may also offer new insights about students' CAM use.

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