

A Pilot Study to Assess Students' Perceptions, Familiarity, and Knowledge in the Use of Complementary and Alternative Herbal Supplements in Health Promotion

Caitlyn Zimmerman; Jay Kandiah, PhD, RD, CD

ABSTRACT

Context • According to the National Center for Complementary and Alternative Medicine (NCCAM), use of herbal supplements is increasing and will continue to rise. With parents administering medicinal herbs to children as a preventive alternative to traditional drugs, the research team thought it would be interesting to assess the use of these products during the transition into adulthood through college life.

Objective • This study examined participants' perceptions of, familiarity with, and knowledge of herbal supplements for health promotion.

Design • The research team invited participants to complete a 13-item Perception, Familiarity, and Knowledge Survey (PFKS). This online survey included questions regarding demographics, perceptions of complementary and alternative medicine, and familiarity with and knowledge of ginkgo, ginseng, St. John's wort, garlic, echinacea, and cinnamon.

Setting • The study occurred at a Midwestern university.

Participants • Two-hundred and eighty-six college students participated.

Outcome Measures • The research team used the Chi-square test of association to examine the class rank (freshmen/sophomores, juniors/seniors, and graduate students) of students (frequency) and their gender in relation to

their perceptions of, familiarity with, and knowledge of herbal supplements.

Results • Chi-square analysis showed that 80.8% of participants were familiar with complementary and alternative medicine (CAM) ($P = .000$). Of participants who were aware of the six herbs, a majority was familiar with ginkgo (82.4%), ginseng (96.1%), St. John's wort (78.4%), garlic (98.4%), echinacea (65.6%), and cinnamon (96.8%). Despite students' familiarity with the herbs, 45.1% to 74.1% of the participants were unsure of their effectiveness in preventing disease or promoting good health. Participants perceived the barriers to their CAM awareness as (1) insufficient education (26.0%), (2) a lack of scientific evidence (25.9%), and (3) a lack of trained professionals (17.5%). Many students (85.8%) desired educational courses on CAM therapies, with nutrition professors being ranked highest as the providers of this education by 88.0%. Over 60.0% of participants thought that conventional medicine could benefit from integration with CAM and that medical professionals should integrate CAM into health-care practices.

Conclusion • College students appear to be highly familiar with CAM and herbal supplements but currently have little experience with and knowledge of herbal supplements. (*Altern Ther Health Med.* 2012;18(5):28-33.)

Caitlyn Zimmerman was an undergraduate student studying dietetics at Ball State University in Muncie, Indiana.

Corresponding author: Caitlyn Zimmerman
E-mail: cazimmerman1@gmail.com

According to the 2007 National Health Interview Survey (NHIS) conducted by the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS), use of complementary and alternative medicine (CAM) is on the rise. In that year in the United States, 38.3% of adults used some form of CAM, with 17.7% using herbal supplements. Herbal supplements, also known as "nonvitamin, nonmineral, natural products," are defined as "products... taken by mouth (that) contain

dietary ingredients other than vitamins and minerals that are intended to supplement the diet. Examples include herbs, herbal medicine, [and] other botanical products.”¹

In 2007, Americans spent approximately \$15 billion on herbal supplements.¹ The five most prevalent supplements that adults used were fish oil/omega-3 (37.4%), glucosamine (19.9%), echinacea (19.8%), flaxseed oil or pills (15.9%), and ginseng (14.1%).¹ Individuals use herbal supplements most commonly for the treatment of diseases and sicknesses, such as back (17.1%), neck (5.9%), and joint (5.2%) problems and pain and arthritis (3.5%). Seventy percent of users were 40 to 69 years of age, with females being the greater users. Eisenberg et al noted that college education positively influenced consumers’ decision to use CAM therapies, with herbal supplements being the most-used CAM.²

Thus far, most research completed on the perception of, familiarity with, and knowledge of herbal supplements has focused mainly on adults, children, or college students living overseas.¹⁻¹³ Very limited research has occurred, however, on the use of herbal supplements by college students residing in the United States. A review of the literature on college-aged students in the United States uncovered a study that showed that 50.0% of a pool of 59 students, who had completed required or experimental courses on herbal supplements, had a more favorable perception and felt adequately knowledgeable on the subject.¹⁴ Harris et al assessed 63 pharmacy students’ perceptions of, familiarity with, and knowledge of herbal supplements and found that 73.0% wanted to increase their knowledge.¹⁵

According to the National Center for Complementary and Alternative Medicine (NCCAM), use of herbal supplements is increasing and will continue to rise.¹² With parents administering medicinal herbs to children as a preventive alternative to traditional drugs,^{1,10} the research team thought it would be interesting to assess the use of these products during the transition into adulthood through college life. Therefore, the purpose of this study was to research college students’ perceptions of, familiarity with, and knowledge of herbal supplements in health promotion.

METHODS

Participants

The research team invited all college students enrolled in the first summer session at a Midwestern university to participate in an online survey. The inclusion criteria were (1) ≥ 18 years of age, (2) prior knowledge of herbal supplements, and (3) familiarity with CAM. A recruitment email informed participants of the following parameters related to the study: (1) the criteria for participation, (2) the purpose of the research procedures, and (3) the time commitment related to the research. The research team informed subjects that they were giving their consent by completing and submitting the survey. The duration of recruitment for the survey was 2 weeks. Prior to the start of research, the Institutional Review Board of Ball State University approved all aspects of the project.

The Survey

Five registered dietitians accepted the 13-item Perception, Familiarity, and Knowledge Survey (PFKS) for face validity. The research team developed the survey. The team established the survey’s reliability by surveying a small sample ($n = 30$) of students other than the study’s population, who also fit the inclusion/exclusion criteria for the study. Each participant took the survey twice, with 1.5 weeks between each administration. The research team conducted two tests to assess the reliability of each participant’s answers in order to determine if answers were consistent over time. The Kappa coefficient from the test-retest ranged from a low of 0.12 to 1.00, with a median coefficient of 0.47. The PFKS included questions on demographics and on participants’ perceptions of, familiarity with, and knowledge of herbal supplements:

Demographics. The study included questions about the following characteristics of participants: (1) year in school, (2) gender, (3) major in college, and (4) ethnicity.

Familiarity With the Herbs. The study evaluated participants’ familiarity with ginkgo, ginseng, St. John’s wort, garlic, echinacea, and cinnamon. The research team selected these six herbs because supporting evidence shows that the general public currently uses the herbs for the treatment and/or prevention of various ailments.¹⁷⁻²² The study used a 3-point Likert scale to evaluate students’ familiarity. Students indicated whether they had (1) “heard about the herb,” (2) “heard about and used the herb,” or (3) “never heard of the herb.”

Perceptions About the Herbs’ Effectiveness. The study asked participants about the herbs’ effectiveness in preventing disease and promoting good health. For this assessment, students rated the herbs as (1) “effective,” (2) “not effective,” or (3) “unsure of effectiveness.”

Knowledge About the Herbs’ Uses. The study directed participants to match the listed herbs to their uses in the treatment or prevention of various diseases and sicknesses.

Barriers to CAM Awareness. The survey assessed participants’ perceptions of the barriers to CAM awareness and also questioned participants about whether universities should provide CAM education and whom they thought would be qualified to teach the course.

CAM and Conventional Medicine. The study asked students whether (1) CAM could benefit conventional medicine, (2) health-care practices should integrate CAM and conventional medicine, and (3) health-care practices should use CAM modalities not supported by scientific evidence. Students recorded their ratings on a Likert scale ranging from “strongly agree” to “strongly disagree.”

Statistical Analysis

The research team used the Chi-square test of association to examine the class rank (freshmen/sophomores, juniors/seniors, and graduate students) of students (frequency) and their gender in relation to their perceptions of, familiarity with, and knowledge of herbal supplements. The research team established significance at $P \leq .05$.

RESULTS

From a pool of 7283 active students who attended the first summer session, 286 college students (68 males, 23.8%; 218 females, 76.2%) successfully completed the online survey. Data from the university's fact book indicated that 58.0% of the student population was female. The class rank of participants included freshmen/sophomores (21.0%, $n=60$), juniors/seniors (36.0%, $n=103$), and graduate students (43.0%, $n=123$). Most participants were Caucasian ($n=245$; 85.7%), and the remaining participants were either African American (2.8%, $n=8$), Hispanic (1.4%, $n=4$), Asian (5.2%, $n=15$), or other (4.9%, $n=14$) ethnicities, such as Middle Eastern, Irish, Polynesian, or biracial. Information regarding major and ethnicity was not included in this article.

Ginkgo

An association existed between class rank and participants' familiarity with ginkgo ($\chi^2 = 26.77$, $df = 4$, $P \leq .001$). Most graduate students (77.9%) were familiar with the herb compared to 46.0% of freshmen/sophomores and 65.1% of juniors/seniors (Table 1). Unfortunately, no association existed between participants' perceptions and knowledge of ginkgo in relation to class rank or gender.

Ginseng

The Chi-square test revealed an association between class rank and participants' familiarity with ginseng ($\chi^2 = 9.89$, $df = 4$, $P = .042$). Interestingly, more juniors/seniors (37.0%) claimed to use ginseng than graduate students (29.0%) and freshmen/sophomores (26.5%). Unexpectedly, 57.5% of juniors/seniors had heard about the herb, compared to 70.2% of graduate students. Similarly, the Chi-square test demonstrated an association between participants' gender and familiarity with ginseng ($\chi^2 = 12.89$, $df = 2$, $P = .002$). See Table 2. More males (49.3%) consumed ginseng than females (26.6%), while 69.1% of females and 47.9% of males had only heard about the herb. Analysis of the relationships between class rank and gender and participants' perceptions and knowledge of ginseng provided no significant data.

St. John's wort

The test found a significant association between participants' familiarity with St. John's wort and class rank ($\chi^2 = 19.48$, $df = 4$, $P = .001$). A greater number of participants (50.0% freshmen/sophomores, 57.9% juniors/seniors, and 74.4% graduates) indicated their familiarity with St. John's wort than those who indicated unfamiliarity with the herb. Assessment of the relationships between class rank and gender and participants' perceptions and knowledge of St. John's wort were statistically insignificant.

Garlic

Table 1. Students' Familiarity With Six Herbs by Class Rank

Herbs:	Class rank								
	Freshmen/Sophomores ($n=60$) ^d			Juniors/Seniors ($n=103$)			Graduates ($n=123$)		
	Never heard about it	Heard about it	Heard and used it	Never heard about it	Heard about it	Heard and used it	Never heard about it	Heard about it	Heard and used it
Ginkgo	37.9% ^a ($n=22$)	46.6% ^a ($n=27$)	15.5% ^a ($n=9$)	20.4% ^a ($n=21$)	65.0% ^a ($n=67$)	14.6% ^a ($n=15$)	6.5% ^a ($n=8$)	78.0% ^a ($n=96$)	15.4% ^a ($n=19$)
Ginseng	8.3% ^b ($n=5$)	65.0% ^b ($n=39$)	26.7% ^b ($n=16$)	5.8% ^b ($n=6$)	57.3% ^b ($n=59$)	36.9% ^b ($n=38$)	0.8% ^b ($n=1$)	69.9% ^b ($n=86$)	29.3% ^b ($n=36$)
St. John's wort	36.2% ^c ($n=21$)	50.0% ^c ($n=29$)	13.6% ^c ($n=8$)	27.2% ^c ($n=28$)	58.2% ^c ($n=60$)	14.6% ^c ($n=15$)	9.7% ^c ($n=12$)	74.8% ^c ($n=92$)	15.5% ^c ($n=19$)
Garlic	0.0% ^b ($n=0$)	50.0% ^b ($n=29$)	50.0% ^b ($n=30$)	3.9% ^b ($n=4$)	43.7% ^b ($n=45$)	52.4% ^b ($n=54$)	0.0% ^b ($n=0$)	57.7% ^b ($n=71$)	42.3% ^b ($n=52$)
Echinacea	55.9% ^a ($n=33$)	35.6% ^a ($n=21$)	8.5% ^a ($n=5$)	38.9% ^a ($n=40$)	41.7% ^a ($n=43$)	19.4% ^a ($n=20$)	21.1% ^a ($n=26$)	47.2% ^a ($n=58$)	31.7% ^a ($n=39$)
Cinnamon	1.7% ($n=1$)	42.4% ($n=25$)	55.9% ($n=33$)	5.8% ($n=6$)	42.7% ($n=44$)	51.5% ($n=53$)	1.6% ($n=2$)	52.0% ($n=64$)	46.3% ($n=57$)

^a $P < .001$

^b $P < .05$

^c $P < .01$

^dNot all participants responded to each question.

Table 2. Students' Familiarity With Six Herbs by Gender

Herbs:	Gender					
	Male (n = 68)			Female (n = 218) ^c		
	Never heard of it	Heard about it	Heard about it and used it	Never heard of it	Heard about it	Heard about it and used it
Ginkgo	16.2% (n = 11)	64.7% (n = 44)	19.1% (n = 13)	17.9% (n = 39)	68.4% (n = 149)	13.7% (n = 30)
Ginseng	2.9% ^a (n = 2)	47.1% ^a (n = 32)	50.0% ^a (n = 34)	4.2% ^a (n = 9)	69.2% ^a (n = 151)	26.6% ^a (n = 58)
St. John's wort	25.0% (n = 17)	55.9% (n = 38)	19.1% (n = 13)	20.6% (n = 45)	66.0% (n = 144)	13.4% (n = 29)
Garlic	2.9% ^b (n = 2)	38.3% ^b (n = 26)	58.8% ^b (n = 40)	1.4% ^b (n = 3)	55.0% ^b (n = 120)	43.6% ^b (n = 95)
Echinacea	42.7% (n = 29)	39.7% (n = 27)	17.6% (n = 12)	32.1% (n = 70)	44.0% (n = 96)	23.9% (n = 52)
Cinnamon	5.9% (n = 4)	38.2% (n = 26)	55.9% (n = 38)	2.8% (n = 6)	50.0% (n = 108)	47.2% (n = 102)

^a*P* <.01

^b*P* <.05

^cNot all participants responded to each question.

The Chi-Square test revealed an association between class rank and gender and responses related to participants' familiarity with garlic. Fifty percent of freshmen/sophomores, 52.0% of juniors/seniors, and 42.0% of graduates had used the herb ($\chi^2 = 11.03$, *df* = 4, *P* = .026). When comparing gender, 59.2% of males and 43.6% of females had used garlic ($\chi^2 = 6.69$, *df* = 2, *P* = .035). Additionally, an association existed between gender and responses related to perception of garlic as preventive medicine ($\chi^2 = 6.88$, *df* = 2, *P* = .032). Notably, 38.6% of males and 27.4% of females perceived garlic as effective; however, 47.1% of males and 64.3% of females were unsure of garlic's effectiveness as a preventive medicine. Data regarding the relationships between class rank and gender and perceptions and knowledge of garlic were statistically insignificant.

Echinacea

The research team observed an association between class rank and participants' familiarity with echinacea ($\chi^2 = 24.90$, *df* = 4, *P* ≤ .001). As expected, 56.0% of freshmen/sophomores were unfamiliar with the herb. Juniors/seniors were second with 38.9%, followed by graduate students at 21.5%. When compared to juniors/seniors (19.0%) and freshmen/sophomores (8.0%), more than one-third (31.5%) of graduate students had taken the herb. The Chi-square test revealed associations between class rank and participants' knowledge of echinacea. Results indicated that 70.0% of graduate students, 50.0% of juniors/seniors, and 20.0% of freshmen/sophomores identified its use in disease prevention and health promotion ($\chi^2 = 20.74$, *df* = 10, *P* = .023). No other data con-

cerning perceptions of echinacea was significant with respect to class rank and gender.

Cinnamon

Chi-square test of associations revealed no significant data between gender and class rank with cinnamon.

CAM

As Table 3 notes, an association existed between class rank and perception of barriers to CAM awareness. These barriers included (1) lack of media exposure ($\chi^2 = 9.84$, *df* = 2, *P* = .007), (2) insufficient education ($\chi^2 = 8.60$, *df* = 2, *P* = .014), and (3) limited availability of herbs in stores ($\chi^2 = 6.40$, *df* = 2, *P* = .041). Less than 25.0% (23.3%) of graduate students stated that they did not perceive lack of media exposure as a significant barrier; however, freshmen/sophomores and juniors/seniors perceived this lack as slightly more of a barrier, 45.7% and 37.0% respectively. Surprisingly, results indicated that 72.4% of juniors/seniors perceived inadequate education as a barrier to CAM. Interestingly, freshmen/sophomores and graduate students were fairly close in their perceptions of education as a barrier to CAM awareness, 54.3% and 56.6% respectively. Limited availability of herbs in stores was significantly lower as a potential barrier to CAM awareness. All class ranks shared this view. All other barriers to CAM awareness were statistically insignificant with respect to class rank and gender. Table 4 shows the descriptive data of participants' desire for CAM education, perception of conventional medicine benefiting from CAM, perception of CAM and conventional medicine being inte-

grated into healthcare practices, and belief that CAM unsupported by scientific evidence should be discouraged in conventional medicine use.

DISCUSSION

Several studies have investigated either perceptions of, familiarity with, or knowledge of CAM or herbal supplements among various groups of people. To date, researchers have conducted little research on all these factors as they relate to college students residing in the United States.

Results from this study in relation to perceptions of CAM are noted in Table 4. In 2005, Yeo et al surveyed medical students and found that 92.0% (n = 276) believed that conventional medicine would be more beneficial than CAM.³ In the present study, 82.8% agree with this statement, indicating caution in the acceptance of all CAM therapies. In 2006, Harris et al found that 53.0% (n = 33) of participating students discouraged use of CAM therapies if scientific evidence did not support them.¹⁵ The present research showed that only 33.9% of participants agreed that CAM use should be discouraged if its use lacked scientific support. Based on the findings of this current study conducted 5 years later, it is evident that the proportion of participants who demanded scientific evidence decreased by 19.1%. A possible explanation

for this finding could be greater media exposure for CAM, parental influences on the use of CAM, more CAM education, or counseling advice outside of conventional medicine.¹⁵

In the current study, participants' interests in understanding and increasing their knowledge about CAM therapies were similar to those of participants in former research.^{3,16} When compared to previous investigations, the number of participants who believed that academia should incorporate education on CAM increased 5.8% (85.8% vs 80.0%).¹⁵

Results regarding participants' knowledge of herbal supplements in the current study also were similar to those of other research. In 2008, Xu and Levine found that respondents expressed great interest in herbal supplements but lacked knowledge of their uses.⁴ As in earlier studies, participants in Xu and Levine's expressed a high interest in learning about herbal supplements and having additional resources. In the present study, however, participants simply commented on their desire for educational courses in CAM. Participants in a variety of majors stated that they wanted CAM courses. Yeo et al's research supports the concept that most participants have limited experience with herbal supplements, with more than 50.0% (n = 277) of responses in that research being "unsure of effectiveness."³ Harris et al,

Table 3. Class Rank and Students' Perception of Barriers to CAM Awareness

Barriers:	Class Rank		
	Freshmen/ Sophomores (n = 60)	Juniors/Seniors (n = 103)	Graduates (n = 123)
Insufficient scientific evidence	48.3% (n = 29)	60.2% (n = 62)	69.1% (n = 85)
Lack of trained professionals	43.3% (n = 26)	43.7% (n = 45)	40.7% (n = 50)
Lack of media/advertisements	45.0% ^a (n = 27)	36.9% ^a (n = 38)	23.6% ^a (n = 29)
Insufficient education	53.3% ^b (n = 32)	72.8% ^b (n = 75)	56.9% ^b (n = 70)
Lack of availability of herbs in stores	13.3% ^b (n = 8)	17.5% ^b (n = 18)	7.3% ^b (n = 9)
Expense of herbs	28.3% (n = 17)	20.3% (n = 21)	18.7% (n = 23)
Other	8.3% ^b (n = 5)	3.9% ^b (n = 4)	13.0% ^b (n = 16)

^aP < .01

^bP < .05

Table 4. Overall Descriptive Statistics of Perception of CAM Among College Students

Perception	Yes		No		
More education on CAM?	85.8%		14.2%		
Perception	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Conventional medicine benefit from CAM?	2.0%	2.0%	13.5%	52.0%	30.5%
Conventional medicine and CAM integrated into health-care practices?	2.0%	4.0%	20.3%	42.5%	31.2%
CAM not scientifically proven should be discouraged from medical use?	8.3%	20.2%	35.4%	23.5%	12.6%

however, recorded that a majority of students (65.0%; n=41) viewed herbal supplements as moderately effective, revealing a greater knowledge base and experience with them.¹⁵

Strengths of the current study included ease of accessibility to the survey by participants and assessment of three parameters. These parameters included college students' perceptions of, familiarity with, and knowledge of six commonly used herbs. Limitations included a low response rate from participants and a lack of ethnic and gender diversity.

CONCLUSION

In conclusion, participants appeared to be highly familiar with CAM and herbal supplements but currently had little experience with and knowledge of them. Additionally, they would like to see the use of CAM and conventional medicine in a health-care setting.

Future recommendations for research related to herbal supplements include (1) investigating the success of incorporating a CAM course into a university's curriculum as either a requirement or an elective, (2) conducting clinical research on the efficacy of specific herbal supplements in a college population, and/or (3) understanding the effects of media on perceptions of CAM use in college students.

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