© Health Research and Educational Trust
DOI: 10.1111/j.1475-6773.2012.01406.x
RESEARCH ARTICLE

Delays in Seeking Conventional Medical Care and Complementary and Alternative Medicine Utilization

Stephanie L. Ayers and Jennie J. Kronenfeld

Objective. To test the association between delays in utilization of conventional medical care and complementary and alternative medicine (CAM) utilization.

Data Source. The 2007 National Health Interview Survey, a cross-sectional nationally representative study of adults aged 18 years and older.

Study Design. Using zero-inflated regression models, delays in utilizing conventional care due to organizational inaccessibility are examined to determine whether delays are associated with both the decision to try CAM and the number of CAM types used.

Principal Findings. Individuals have significantly higher odds using provider-based CAM types if they delayed seeking conventional care due to organizational inaccessibility (OR = 1.63). Individuals use significantly more types of both provider-based (IRR = 1.35) and non-provider-based (IRR = 1.49) CAM if they delayed seeking conventional care due to organizational inaccessibility.

Conclusion. Individuals who delay seeking conventional medical care are more likely to use CAM and use more types of CAM. The current structure of the conventional health care system may have created barriers that can make conventional health care inaccessible. Individuals who face these barriers appear to be pushed not only into trying CAM but using a greater number of CAM types, a finding not in previous research.

Key Words. Access/demand/utilization of services, biostatistical methods, medical decision making

Although research has examined the connection between conventional medicine and complementary and alternative medicine (CAM) utilization, findings are mixed. On the one hand, a positive association for using both forms of medical treatments has been noted, such that higher conventional medicine use is associated with higher CAM use (Astin 1998; Eisenberg et al. 1998; Druss and Rosenheck 1999; Barrett et al. 2003; Mikhail, Wali, and Ziment 2004). On the other hand, researchers have observed a negative association

(Barrett et al. 2003; Agdal 2005; Pagan and Pauly 2005), with individuals delaying conventional care and using more CAM (Marquis, Davies, and Ware 1983; Cassileth et al. 1984; Jensen 1990; Sutherland and Verhoef 1994; Sirois and Gick 2002). Given that utilization of CAM has remained popular and delays in seeking conventional medicine are on the rise, it is important to understand the relationship between CAM utilization and conventional medicine utilization, particularly if delays in seeking conventional medicine are associated with higher CAM utilization.

The positive association between utilization of conventional medicine and CAM suggests that the heaviest conventional medicine users are also the heaviest CAM users (Eisenberg et al. 1993; Druss and Rosenheck 1999; Caban and Walker 2006), indicating that CAM users do not abandon conventional medicine, but rather use CAM in a complementary fashion (Barrett et al. 2000; Kessler et al. 2001; Fadlon 2005). This positive association supports the idea of medical pluralism: individuals adopt multiple forms of medicine or health practices even when conventional care is available (Kaptchuk and Eisenberg 2001) and do not simply make dichotomous choices in relation to health care (Kelner and Wellman 1997). While individuals “may reject specific medical treatments, such as certain medications, [they] retain a meaningful involvement with the conventional health care system” (Thorne et al. 2002, p. 675). For example, Hispanics who use prayer for healing view prayer as a supplement to receiving conventional health care and not as a replacement for such care (Mikhail, Wali, and Ziment 2004).

On the other hand, the negative association between CAM and conventional medicine utilization suggests that individuals are opting for CAM prior to or instead of using conventional medicine (Agdal 2005). This negative association has been attributed to the ineffectiveness of conventional medicine for treating some health problems (Cassileth et al. 1984; Jensen 1990), the unpleasant and negative side effects of some conventional medications (Marquis, Davies, and Ware 1983), and the dissatisfaction with conventional practitioners or with the medical encounter (McGregor and Peay 1996; Siahpush 1999; Bishop, Yardley, and Lewith 2006). Conventional medicine

Address correspondence to Stephanie L. Ayers, Ph.D., Arizona State University, Southwest Interdisciplinary Research Center, 411 N. Central Ave., Suite 720, Phoenix, Arizona 85004-0693; e-mail: Stephanie.L.Ayers@asu.edu. Jennie J. Kronenfeld, Ph.D., is with the Arizona State University, Sociology Program, School of Social and Family Dynamics, P.O. Box 873701, Tempe, AZ, 85287-3701.

can be viewed by some patients as too authoritative with a paternalistic, disparaging, condescending, or chauvinistic practitioner, while CAM can be viewed in a more positive light of facilitating health outcomes (Barrett et al. 2003). Due to the impersonal nature of conventional medicine, some patients report using CAM instead of conventional medicine because they are disgruntled with their physician (Furnham and Smith 1988; Siahpush 1999; Bishop, Yardley, and Lewith 2006).

Although associations have been noted between CAM and conventional medicine, researchers have not typically moved beyond the individual beliefs and behaviors to understand how the structure of the conventional health care system can also push individuals toward CAM utilization. Goldstein (2002) argues that access issues, such as the structure and nature of the conventional health care system, should also be examined. As Strasen (1999) points out:

Consumers have fewer choices about whom and where they can go for services and they have to get complicated authorizations, validations, and verifications before they can be seen by a health care practitioner. They need to fill out more forms, listen to more recorded messages, and wait longer to get an appointment. When they finally get an appointment, they wait longer periods of time, they see practitioners for shorter periods of time or not all, they spend more time with untrained support staff, and they get little or no personal attention. (p. 247)

This organizational inaccessibility may also play a role in CAM use and is virtually absent in CAM research.

The purpose of this study was to examine how delays in seeking conventional medical care because of access issues is associated with use of CAM. To refine this understanding, zero-inflated models are used to expand dichotomous measures of CAM utilization, a necessary, yet neglected, analysis in CAM research. Because previous studies have typically examined utilization of CAM with dichotomous measure (e.g., use/non-use) (i.e., Astin 1998 and Eisenberg et al. 1998), variance is hidden, and there becomes no way to distinguish the characteristics between an individual who used one CAM therapy and an individual who used five CAM therapies. This is the first study that we are aware of, to move beyond individuals' health behaviors and beliefs and focus on the factors inherent within the structure of the health care system using zero-inflated models. It is hypothesized that individuals who delay in seeking medical care due to organizational inaccessibility will be more likely to use CAM and will use more types of CAM.

METHODS

Data

The data for this study are drawn from the 2007 National Health Interview Survey (NHIS), conducted by the National Center for Health Statistics (NCHS). The NHIS is a cross-sectional probability survey consisting of non-institutionalized, civilian U.S. population. The NHIS is considered the most wide-ranging and inclusive U.S. population data on health (Kennedy 2005). A multistage, stratified, random sampling selected households, and interviews were conducted with household members. Racial/ethnic minorities were oversampled to improve estimations on minority health, health care access, and health care utilization. In 2007, the supplemental section of the NHIS, co-sponsored with The National Center for Complementary and Alternative Medicine and the Office of Dietary Supplements, interviewed sample adults regarding their use of CAM, including types of CAM used and reasons for CAM use. With IRB approval granted from Arizona State University, the starting sample size for this study is 22,781 adults aged 18 and older.

Types of CAM Used

The 2007 NHIS includes questions, each focusing on different types of CAM, which asks participants if they have used any of the following types of CAM within the last 12 months: acupuncture, ayurveda, biofeedback, chelation, chiropractic, deep breathing, energy healing therapies, folk medicine, guided imagery, types of herbs, homeopathy, hypnosis, massage, meditation, naturopathy, relaxation, and types of vitamins (see Su & Li, 2001 for definitions of CAM types). Participants answered yes (1) or no (0) to each type of CAM. The constructed dependent variable, *provider-based CAM types*, includes acupuncture, ayurveda, biofeedback, chelation, chiropractic, energy healing therapies, folk medicine, homeopathy, hypnosis, massage, and naturopathy and range from 0 to 8 different types of provider-based CAM types used within the past 12 months. *Non-provider-based CAM types* includes deep breathing, guided imagery, meditation, relaxation, types of herbs, and types of vitamins and range from 0 to 6 different types of non-provider-based CAM types used in the past 12 months.

Delay Due to Organizational Inaccessibility

Delay due to organizational inaccessibility measures whether the respondent delayed medical care due to inaccessibility with the conventional health care organization. Four questions are included in creating this variable: Have you ever delayed getting care because of the following: (1) you couldn't get through on the telephone; (2) you couldn't get an appointment soon enough; (3) once you got there, you had to wait too long to see the doctor; and (4) the clinic/doctor's office was not open when you could get there. If respondents answer "yes" to any of the four questions, they are coded as (1) delaying medical care due to organizational inaccessibility. If the respondents answer "no" to all four questions, they are coded as (0) not delaying medical care due to organizational inaccessibility.

Demographic Characteristics

All models include patient characteristics as control variables. *Race/ethnicity* includes Hispanics and non-Hispanic African Americans and Asians, with non-Hispanic whites as the reference group. It should be noted that because of the low number of individuals from another race (e.g., multiple races) who used CAM types, these individuals were not included in the analyses. *Gender* measures the respondent's gender with male as the reference group. *Age* is measured continuously ranging from 18 to 85 years or older. *Education*, a categorical measure, includes high school degree or less, some college or college degree, and advanced/graduate degree with high school degree or less as the reference group. *Income* is a continuous measure ranging from less than \$35,000 annually to \$100,000 or greater annually. *Health insurance* measures whether the respondent has health insurance and is coded as (0) insured and (1) uninsured. *Poor self-rated health* measures how the respondent self-rates his/her own health and is a categorical variable coded as (0) good, very good, and excellent health and (1) poor and fair health.

Statistical Analysis

The two dependent variables, provider-based CAM types used and non-provider-based CAM types used, contain a high number of zeros (e.g., 84% did not use any type of provider-based CAM in the past 12 months). OLS regression, which assumes normality, would not constitute an efficient estimation technique because these data are non-negative and skewed. Rather,

zero-inflated regression is a more appropriate statistical technique because it allows for the asymptotic distribution of the data, including overdispersion and a preponderance of zeros (Atkins and Gallop 2007). Overdispersion of the data (e.g., when the variance is larger than the mean) was assessed with *STATA* 11 (StataCorp 2010) using the likelihood ratio test (Cameron and Trivedi 1998). To account for the preponderance of zeros, Vounou's statistic was used to test whether zero-inflated models are more appropriate. Both the likelihood ratio test (*Provider-Based CAM*: LR = 797.13; *Non-Provider-Based CAM*: LR = 112.50) and the Vounou's statistic test (*Provider-Based CAM*: $V = 6.24$; *Non-Provider-Based CAM*: $V = 4.74$) indicate that the zero-inflated negative binomial regression (ZINB) model is the preferred model for the dependent variables.

There are two types of results in zero-inflated models. The first part, a logistics regression, is the odds of using CAM versus no CAM use (i.e., is the individual a CAM user or non-CAM user). In the second part of the model, the negative binomial regression, the dependent variable, number of types of CAM used, is logged and expressed in the ratio of the rates of CAM types used (i.e., for those that used at least one type of CAM in the past 12 months, their rate of use). In both the descriptive statistics and zero-inflated negative binomial regression models, analytic weights were used to adjust for the complex sample design using *STATA* 11, which allows for the characteristics of complex designs, such as weight, cluster, and strata variables, so that estimates and standard errors are unbiased (StataCorp 2010).

RESULTS

Population Characteristics

Of the 22,781 adults in the total sample, 2,183 (10%) had delayed due to organizational inaccessibility. Significantly more individuals who delayed due to organizational inaccessibility had used a provider-based CAM in the past 12 months (25%) compared with individuals who did not delay (16%) ($\chi^2 = 113.8, p < .001$); however, the average number of provider-based CAM types among users was not significantly different for those who delayed and those who did not delay. In addition, a significantly higher percent of individuals who delayed conventional medical care used non-provider-based CAM types (delay due to organizational inaccessibility: 75%; no delay: 60%; $\chi^2 = 124.5, p < .001$), and among users of non-provider-based CAM types, individuals who delayed conventional care used significantly more types of

non-provider-based CAM (delay due to organizational inaccessibility: $M = 2$; no delay: $M = 1.6$; $t = 11.1$, $p < .001$). The only notable racial difference of participants was that more Hispanics delayed due to organizational inaccessibility (16%) than not (13%). More females delayed conventional care (59%) than not (51%); however, the opposite is true for males (delay due to organizational inaccessibility = 41%; no delay = 49%). The average age of those delaying conventional care was not significantly different for those who did not delay care (delay due to organizational inaccessibility: $M = 45$; no delay: $M = 46$). While the same proportion of participants with advanced or graduate degrees had delays compared with no delays in conventional care due to organizational inaccessibility (11%), those with a college degree had higher delays in conventional medicine (delay due to organizational inaccessibility = 50%; no delay = 46%). However, participants with a high school degree or less had a higher proportion of those who did not delay (43%) than those who did delay due to organizational inaccessibility (39%). Slight significant differences existed in income between the two groups (delay due to organizational inaccessibility: $M = 2.6$; no delay: $M = 2.7$; $t = -.1$, $p < .05$). No significant differences were noted in health insurance status, with approximately 15% of uninsured participants in both categories. Finally, those who did not delay were significantly healthier, with 87% reporting an excellent, very good, or good health status, compared to 79% of those who delayed due to organizational inaccessibility ($\chi^2 = 99.9$, $p < .001$) (Table 1).

CAM Utilization

Results of the ZINB model for *provider-based CAM types* (Table 2) and *non-provider-based CAM types* (Table 3) used in the past 12 months present both the odds of using CAM and the expected count of number of CAM types used. It should be noted that for ease of interpretation, the odds of using CAM have been transformed to the odds of being a CAM user rather than being a non-user.

Odds of Using Provider-Based CAM Types. Having delays in seeking conventional medical care due to inaccessibility is significant in predicting the odds of using a provider-based CAM in the past 12 months (Table 3). Participants delaying conventional medical care due to organizational inaccessibility have higher odds of using a provider-based type of CAM (OR = 1.63, $p < .001$). African Americans (OR = 0.18, $p < .001$), Hispanics (OR = 0.24, $p < .001$), females (OR = 0.64, $p < .05$), and the uninsured (OR = 0.51, $p < .01$) have

Table 1: Participant Characteristics for Total Sample and for Those Who Delayed Conventional Medicine Due to Organizational Inaccessibility*

	<i>Delay Due to Organizational Inaccessibility n = 2,183</i>	<i>Do Not Delay Due to Organizational Inaccessibility n = 20,598</i>	<i>Test Statistic[‡]</i>
Provider-based CAM types used, (%)	25	16	113.8***
Among users, provider-based CAM types Used, mean (SD)	1.4 (.8)	1.3 (.7)	1.5
Non-provider-based CAM types used, (%)	75	60	124.5***
Among users, non-provider-based CAM Types used, mean (SD)	2 (1)	1.6 (1)	11.1***
Race [‡] (%)			
non-Hispanic White	70	70	15.9**
African American	11	12	
Hispanic	16	13	
Asian	3	5	
Gender (%)			
Male	41	49	50.8***
Female	59	51	
Age, mean (SD)	45 (17)	46 (18)	-1.6
Education (%)			
High school degree or less	39	43	16.5**
Some college or college degree	50	46	
Advanced/graduate degree	11	11	
Income, mean (SD)	2.6 (1)	2.7 (1)	-0.1*
Health insurance (%)			
Insured	86	85	0.7
Uninsured	14	15	
Self-rated health status (%)			
Poor/fair	21	13	99.9***
Good/very good/excellent	79	87	

*Data are drawn from the 2007 National Health Interview Survey and have been weighted.

[†]All test statistics were performed adjusting for survey design. For continuous variables, the t statistic was tested; for categorical variables, the Pearson's chi-square statistic was used.

[‡]African Americans and Asians also represent non-Hispanic individuals.

CAM, complementary and alternative medicine.

significantly lower odds of using a provider-based CAM, compared to their respective reference group. As age increases, the odds of using a provider-based CAM also decreases (OR = 0.97, $p < .10$). On the other hand, those with a college education, compared to those with a high school diploma or less, have higher odds of using a provider-based type of CAM (OR = 1.77, $p < .10$), and as income increases, the odds of using a provider-based CAM increase as well (OR = 1.39, $p < .01$).

Table 2: Results from Zero-Inflated Negative Binomial Model Showing the Odds of Using Provider-Based CAM and the Expected Count of Number of Provider-Based CAM Types Used in the Past 12 Months*

	Provider-Based CAM Types N = 20,048					
	Odds of Using CAM			Expected Count of Number of CAM Types Used		
	OR	95% CI	p	IRR	95% CI	p
Delay due to inaccessibility	1.63	0.98–2.72	<.10	1.35	1.15–1.60	<.001
Race/ethnicity [†]						
White [‡]	–	–	–	–	–	–
African American	0.18	0.09–0.38	<.001	0.73	0.48–1.13	.154
Hispanic	0.24	0.14–0.42	<.001	0.89	0.66–1.19	.431
Asian	0.85	0.25–2.86	.79	0.67	0.49–0.92	<.01
Gender						
Male [‡]	–	–	–	–	–	–
Female	0.64	0.42–0.96	<.05	1.72	1.51–1.95	<.001
Age	0.97	0.94–1.00	<.10	1.01	0.99–1.02	.372
Education						
High school degree or less [‡]	–	–	–	–	–	–
Some college or college degree	1.77	0.97–3.24	<.10	1.46	1.16–1.85	<.001
Advanced/graduate degree	2.02	0.46–8.92	.351	1.74	1.23–2.46	<.01
Income	1.39	1.12–1.73	<.01	1.02	0.97–1.06	.484
Health status						
Good/very good/excellent [‡]	–	–	–	–	–	–
Poor/fair health	1.48	0.87–2.50	.145	0.96	0.77–1.19	.692
Health insurance						
Insured [‡]	–	–	–	–	–	–
Uninsured	0.51	0.32–0.82	<.01	1.43	1.15–1.77	<.001

*Data are drawn from the 2007 National Health Interview Survey and have been weighted.

[†]Because of the low number of individuals from another/multiple races who used provider-based CAM types, another/multiple race was not included in the analysis.

[‡]Reference category.

CAM, complementary and alternative medicine; CI, 95% confidence interval; IRR, incidence rate ratio; OR, odds ratio.

Expected Count of Number of Provider-Based CAM Types Used. Among potential CAM users, the number of provider-based CAM types used by individuals who delayed seeking conventional care due to organizational inaccessibility is 1.35 times the number used by non-delaying individuals (IRR = 1.35, $p < .001$) (Table 3). Among CAM users, compared to non-Hispanic whites, only Asians utilize fewer types of provider-based CAM (IRR = 0.67, $p < .01$). Females (IRR = 1.72, $p < .001$), those with a higher education (college:

Table 3: Results from Zero-Inflated Negative Binomial Model Showing the Odds of Using Non-Provider-Based CAM and the Expected Count of Number of Non-Provider-Based CAM Types Used in the Past 12 Months*

	Non-Provider-Based CAM Types N = 19,999					
	Odds of Using CAM			Expected Count of Number of CAM Types Used		
	OR	95% CI	p	IRR	95% CI	p
Delay due to inaccessibility	0.91	0.33–2.50	.849	1.49	1.42–1.57	<.001
Race/ethnicity [†]						
White [‡]	–	–	–	–	–	–
African American	0.53	0.26–1.11	<.10	0.77	0.72–0.83	<.001
Hispanic	0.66	0.33–1.32	.24	0.72	0.66–0.77	<.001
Asian	1.39	0.21–9.23	.73	0.82	0.75–0.90	<.001
Gender						
Male [‡]	–	–	–	–	–	–
Female	3.23	1.75–5.95	<.001	1.25	1.20–1.30	<.001
Age	1.10	1.06–1.15	<.001	1.01	1.01–1.01	<.005
Education						
High school degree or less [‡]	–	–	–	–	–	–
Some college or college degree	4.87	2.14–11.11	<.001	1.43	1.37–1.49	<.001
Advanced/graduate degree	1.16	0.34–3.99	.817	1.76	1.64–1.88	<.001
Income	1.05	0.82–1.36	.68	1.03	1.01–1.04	<.001
Health status						
Good/very good/excellent [‡]	–	–	–	–	–	–
Poor/fair health	0.37	0.15–0.91	<.05	1.01	0.94–1.06	.911
Health insurance						
Insured [‡]	–	–	–	–	–	–
Uninsured	0.33	0.16–0.66	<.01	1.04	0.96–1.13	.328

*Data are drawn from the 2007 National Health Interview Survey and have been weighted.
[†]Because of the low number of individuals from another/multiple races who used non-provider-based CAM types, another/multiple race was not included in the analysis.
[‡]Reference category.
CAM, complementary and alternative medicine; CI, 95% confidence interval; IRR, incidence rate ratio.

IRR = 1.46, $p < .001$; advanced/graduate degree: IRR = 1.74, $p < .001$), and the uninsured (IRR = 1.43, $p < .001$) use significantly more types of provider-based CAM.

Odds of Using Non-Provider-Based CAM Types. The odds of using a non-provider-based CAM type are not significant for individuals who delayed seeking

conventional care due to inaccessibility (Table 3). Females (OR = 3.23, $p < .001$), older ages (OR = 1.10, $p < .001$), and the college educated (OR = 4.87, $p < .001$) have significantly higher odds of using a non-provider-based CAM, while African Americans (OR = 0.53, $p < .10$), those in poor or fair health (OR = 0.37, $p < .05$), and the uninsured (OR = 0.33, $p < .01$) have significantly higher lower odds of using a non-provider-based CAM compared to their respective reference group.

Expected Count of Number of Non-Provider-Based CAM Types Used. Among potential CAM users, the number of non-provider-based CAM types used by individuals who delayed seeking conventional care due to inaccessibility is higher than those that did not delay (IRR = 1.49, $p < .001$) (Table 3). African Americans (IRR = 0.77, $p < .001$), Hispanics (IRR = 0.72, $p < .001$), Asians (IRR = 0.82, $p < .001$), and females (IRR = 1.25, $p < .001$) use a higher number of non-provider-based CAM types than respective reference groups. Finally, as age (IRR = 1.01, $p < .001$), education (college: IRR = 1.43, $p < .001$; advanced/graduate degree: IRR = 1.76, $p < .001$), and income (IRR = 1.03, $p < .001$) increase, the number of non-provider-based CAM types used also increases.

DISCUSSION

Using zero-inflated regression models, this study moved beyond how individual health behaviors and beliefs impact CAM utilization to encompass how the structure of the health care system is also associated with CAM utilization. Specifically, this study explored how delaying utilization of conventional medicine because of organizational inaccessibility is associated with using both provider-based and non-provider-based CAM; these are factors that have rarely been examined in CAM research (Pagan and Pauly 2005; Su and Lifeng 2011). Our hypothesis, that individuals who delay in seeking conventional medical care due to organizational inaccessibility are more likely to use CAM and will use more types of CAM, was generally supported.

Our findings support and further Goldstein's (2002) argument that access issues related to the health care system within the United States should be included when examining factors that can push individuals toward utilization of CAM. Results indicate that when conventional medical care is inacces-

sible due to the organizational nature and structure of the health care system, both provider-based and non-provider-based CAM therapies are more likely to be used in greater number. With some CAM therapies self-directed and others operating outside of normal business hours and on weekends, individuals can utilize CAM therapies as their schedule permits. These findings highlight how delays in seeking conventional medical care may not only push individuals toward using CAM but push them in such a way that they have higher rates of using CAM types, a finding that has not been discovered in previous CAM research.

Although research using a dichotomous measure of CAM utilization has found a link between conventional medicine and CAM utilization, this relationship has not been consistent—some articles report individuals use more CAM instead of conventional medicine (Agdal 2005) versus others that report individuals who use CAM also use conventional medicine more (Eisenberg et al. 1993; Druss and Rosenheck 1999; Caban and Walker 2006). By expanding this line of research to zero-inflated models, this study provides a distinction between those individuals who used a CAM therapy once and someone who used five CAM therapies. This distinction is important in better understanding broader patterns of CAM use rather than simply if a dissatisfied individual used CAM (yes/no). Because prior research has typically used dichotomous measures of CAM utilization, ignoring that at least 50% of CAM utilization is continuous (Kessler et al. 2001), the pattern of CAM utilization becomes obscured and concealed, especially for the number of CAM types used. This can be seen in the results particularly for non-provider-based CAM. While delays in seeking conventional medical care were not significantly associated with whether an individual used a non-provider-based therapy, among CAM users, having delays were significantly associated with the number of non-provider-based CAM therapies used. This research was able to examine what factors push an individual into initially trying CAM versus factors that impact a higher level of CAM use. This not only broadens the overall knowledge of CAM utilization, but it can begin to inform those interested in health disparities in Western medicine utilization to incorporate findings from integrative health care.

LIMITATIONS

Because of the limitations in the cross-sectional secondary data, there is no way to be certain of the order in which the individual utilized conventional

medicine and CAM. While we have tried to minimize this as much as possible by using CAM use within the last 12 months, we cannot speak to the causal nature of this relationship. Future research should examine longitudinal data to account for time ordering of utilization. Second, this study was unable to examine the frequency of CAM utilization during a given period of time. Because the NHIS did not ask any questions about the frequency of CAM use, these results are limited to the number of types of CAM used, rather than how frequently an individual used types of CAM. If frequency of CAM treatments could be obtained, results might highlight more specifically how individuals use CAM. In addition, while this study examined differentiation between provider-based and non-provider-based CAM, future research should refine the understanding of how delays in conventional medical use impact certain types of CAM. This information may be important in integrating CAM and conventional care services for patients to best optimize their health. Lastly, future research should examine whether delays in seeking conventional care differentially impact racial and ethnic groups and lead to different patterns in CAM utilization.

CONCLUSION

Delay in seeking conventional care due to organizational inaccessibility acts as a push factor in CAM utilization. Individuals who delay are typically more likely to use CAM and use more types of CAM. The current structure of the conventional health care system appears to have created barriers that can make conventional health care inaccessible. Individuals who face these barriers are pushed not only into trying CAM but into trying a greater number of types of CAM, particularly provider-based types of CAM. Understanding these linkages between CAM and conventional medicine may help further our understandings of health management, enhance practitioners' competence, and reduce health disparities in minority groups. These understandings may begin to inform how health care can be integrated into a broader and more complex etiological framework that helps patients to feel like individuals and not cogs in an established medical system. For social scientists and policy makers, having a better understanding of why people make choices among types of CAM and between CAM and conventional care may enrich our understanding of how people think about health, illness, and care seeking.

REFERENCES

- Agdal, R. 2005. "Diverse and Changing Perceptions of the Body: Communicating Illness, Health, and Risk in an Age of Medical Pluralism." *The Journal of Alternative and Complementary Medicine* 11 (Suppl. 1): S-67-75.
- Astin, J. A. 1998. "Why Patients Use Alternative Medicine." *Journal of the American Medical Association* 279 (19): 1548-53.
- Atkins, D. C., and R. J. Gallop. 2007. "Rethinking How Family Researchers Model Infrequent Outcomes: A Tutorial on Count Regression and Zero-Inflated Models." *Journal of Family Psychology* 21 (4): 726-35.
- Barrett, B., L. Marchand, J. Scheder, D. Appelbaum, M. Chapman, C. Jacobs, R. Westergaard, and N. St. Clair. 2000. "Bridging the Gap between Conventional and Alternative Medicine: Results of a Qualitative Study of Patients and Providers." *The Journal of Family Practice* 49 (3): 234-9.
- Barrett, B., L. Marchand, J. Scheder, M. B. Plane, R. Maberry, D. Appelbaum, D. Rake, and D. Rabago. 2003. "Themes of Holism, Empowerment, Access, and Legitimacy Define Complementary, Alternative, and Integrative Medicine in Relation to Conventional Biomedicine." *The Journal of Alternative and Complementary Medicine* 9 (6): 937-47.
- Bishop, F. L., L. Yardley, and G. T. Lewith. 2006. "Why Do People Use Different Forms of Complementary Medicine? Multivariate Associations between Treatment and Illness Beliefs and Complementary Medicine Use." *Psychology and Health* 21 (5): 683-98.
- Caban, A., and E. A. Walker. 2006. "A Systematic Review of Research on Culturally Relevant Issues for Hispanics with Diabetes." *The Diabetes Educator* 32 (4): 584-95.
- Cameron, A. C., and P. K. Trivedi. 1998. *Regression Analysis of Count Data*. Cambridge, England: Cambridge University Press.
- Cassileth, B. R., E. J. Lusk, T. B. Strouse, and B. J. Bodenheimer. 1984. "Contemporary Unorthodox Treatments in Cancer Medicine." *Annals of Internal Medicine* 101: 105-12.
- Druss, B. G., and R. A. Rosenheck. 1999. "Association between Use of Unconventional Therapies and Conventional Medical Services." *Journal of the American Medical Association* 282 (7): 651-6.
- Eisenberg, D. M., R. C. Kessler, C. Foster, F. E. Norlock, D. R. Calkins, and T. L. Delbanco. 1993. "Unconventional Medicine in the United States: Prevalence, Costs, and Patterns of Use." *The New England Journal of Medicine* 328 (4): 246-52.
- Eisenberg, D. M., R. B. Davis, S. L. Ettner, S. Appel, S. Wilkey, M. Van Rompay, and R. C. Kessler. 1998. "Trends in Alternative Medicine Use in the United States, 1990-1997." *Journal of the American Medical Association* 280 (18): 1569-75.
- Fadlon, J. 2005. *Negotiating the Holistic Turn: The Domestication of Alternative Medicine*. Albany: State University of New York Press.
- Furnham, A., and C. Smith. 1988. "Choosing Alternative Medicine: A Comparison of the Beliefs of Patients Visiting a General Practitioner and a Homeopath." *Social Science & Medicine* 26 (7): 685-9.

- Goldstein, M. S. 2002. "The Emerging Socioeconomic and Political Support for Alternative Medicine in the United States." *The Annals of the American Academy* 583: 44–63.
- Jensen, P. 1990. "Alternative Therapy for Atopic Dermatitis and Psoriasis: Patient-Reported Motivation, Information Source and Effect." *Acta Dermato Venereologica* 70: 425–8.
- Kaptschuk, T. J., and D. M. Eisenberg. 2001. "Varieties of Healing 1: Medical Pluralism in the United States." *Annals of Internal Medicine* 135 (3): 189–95.
- Kelner, M., and B. Wellman. 1997. "Who Seeks Alternative Health Care? A Profile of the Users of Five Modes of Treatment." *The Journal of Alternative and Complementary Medicine* 3: 127–40.
- Kennedy, J.. 2005. "Herb and Supplement Use in the US Adult Population." *Clinical Therapeutics* 27 (11): 1847–58.
- Kessler, R. C., R. B. Davis, D. F. Foster, M. I. Van Rompay, E. E. Walters, S. A. Wilkey, T. J. Kaptschuk, and D. M. Eisenberg. 2001. "Long-Term Trends in the Use of Complementary and Alternative Medical Therapies in the United States." *Annals of Internal Medicine* 135 (4): 262–8.
- Marquis, M. S., A. R. Davies, and J. E. J. Ware. 1983. "Patient Satisfaction and Change in Medical Care Provider: A Longitudinal Study." *Medical Care* 21 (8): 821–9.
- McGregor, K. J., and E. R. Peay. 1996. "The Choice of Alternative Therapy for Health Care: Testing Some Propositions." *Social Science & Medicine* 43 (9): 1317–27.
- Mikhail, N., S. Wali, and I. Ziment. 2004. "Use of Alternative Medicine among Hispanics." *The Journal of Alternative and Complementary Medicine* 10 (5): 851–9.
- Pagan, J. A., and M. V. Pauly. 2005. "Access to Conventional Medical Care and the Use of Complementary and Alternative Medicine." *Health Affairs* 24 (1): 255–62.
- Siahpush, M. 1999. "Why Do People Favour Alternative Medicine?" *Australian and New Zealand Journal of Public Health* 23 (3): 266–71.
- Sirois, F. M., and M. L. Gick. 2002. "An Investigation of the Health Beliefs and Motivations of Complementary Medicine Clients." *Social Science & Medicine* 55: 1025–37.
- StataCorp. 2010. *Stata Statistical Software: Release 11*. College Station, TX: StataCorp LP.
- Strasen, L. 1999. "The Silent Health Care Revolution: The Rising Demand for Complementary Medicine." *Nursing Economics* 17 (5): 246–56.
- Su, D., and L. Lifeng. 2011. "Trends in the Use of Complementary and Alternative Medicine in the United States: 2002–2007." *Journal of Health Care for the Poor and Underserved* 22: 296–310.
- Sutherland, L. R., and M. J. Verhoef. 1994. "Why Do Patients Seek a Second Opinion or Alternative Medicine?" *Journal of Clinical Gastroenterology* 19 (3): 194–7.
- Thorne, S., B. Paterson, C. Russell, and A. Schultz. 2002. "Complementary/Alternative Medicine in Chronic Illness as Informed Self-Care Decision Making." *International Journal of Nursing Studies* 39: 671–83.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.