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Implicit Reasons for Disclosure of the Use of Complementary Health Approaches (CHA): A  
Consumer Commitment Perspective

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## Abstract

**Background:** Disclosure of the use of complementary health approaches (CHA) is an important yet understudied health behaviour with important implications for patient care. Yet research into disclosure of CHA has been atheoretical and neglected the role of health beliefs.

**Purpose:** Using a consumer commitment model of CHA use as a guiding conceptual framework, the current study tests the hypotheses that perceived positive CHA outcomes (utilitarian values) and positive CHA beliefs (symbolic values) are associated with disclosure of CHA to conventional-care providers in a nationally representative US sample.

**Methods:** From a sample of 33,594 with CHA use information from the 2012 National Health Interview Survey (NHIS), a subsample of 7,348 who used CHA within the past 12 months was analysed. The 2012 NHIS is a cross-sectional survey of the non-institutionalized US adult population, which includes the most recent nationally representative CHA use data.

**Results:** The 63.2 % who disclosed CHA use were older, less educated, and had visited a health-care provider in the past year. Weighted logistic regression analyses controlling for demographic variables revealed that those who disclosed were more likely to report experiencing positive psychological (improved coping and well-being) and physical outcomes (better sleep, improved health) from CHA, and hold positive CHA-related beliefs.

**Conclusions:** CHA users who perceive physical and psychological benefits from CHA use, and who hold positive attitudes towards CHA are more likely to disclose their CHA use. Findings support the relevance of a consumer commitment perspective for understanding CHA disclosure, and suggest CHA disclosure as an important proactive health behaviour that warrants further attention.

**Key Words:** Disclosure; complementary health approaches; health behaviours; health beliefs; patient-reported outcomes; consumer behaviour

Consisting of a broad and diverse set of healing therapies of differing modalities, practices, and health systems (1), complementary health approaches (CHA; formerly known as complementary and alternative medicine or “CAM”) are popular health-care options, with an increasing number of health-care consumers integrating CHA into their health-care repertoire. Whether defined as provider delivered (e.g., acupuncture, homeopathy, massage therapy), or as self-care (e.g., herbal supplements, yoga, meditation), rates of CHA use have been on the rise for more than a decade (2-4). For example, in 2012 over one-third of the US population had used some form of CHA in the previous year (4).

Given the popularity of CHA, and evidence indicating CHA are primarily used to supplement rather than replace conventional health care (5-7), disclosure of CHA use to health-care providers is crucial for ensuring coordination of care (8), for minimizing any potential adverse reactions between CHA and conventional treatments (9, 10), and for improving adherence to treatment (e.g., 11). Disclosing CHA use can also facilitate better integration of CHA into both conventional care treatments and self-care. This may potentially improve the practice of important health behaviours, as there is evidence that CHA are associated with and may promote such behaviours (12-15). Despite the importance of CHA disclosure for safe and effective coordination of care, rates of disclosure to conventional care providers are not uniformly high, and can vary greatly across and within different populations. For example, rates of disclosure range from 21 to 71 % in general medical populations (16, 17), from 12 to 53 % in oncology patients (18, 19), and are as low as 36 % in HIV patients (20), and 30 % in hypertension patients (11).

Disclosure of CHA use is an important yet understudied health behaviour that can have several important implications for patient behaviors and care, as noted above. Understanding the factors that can facilitate disclosure of CHA use can help to guide educational strategies for both CHA users and conventional health-care providers, as well as inform clinical

guideline practices. Yet to date, the research on CHA disclosure has been largely atheoretical and focused on barriers to disclosure, such as poor patient-provider communication (17, 20-22), rather than on factors that might promote or facilitate disclosure of CHA use, such as beliefs and outcomes from CHA use. The aim of this study was to address this gap by applying recent theoretical developments on CHA-related behaviours to understand the implicit reasons for disclosure of CHA use using a large, nationally representative sample.

### **Understanding CHA Disclosure: Issues and Prospects**

There are several issues in the research to date on why people disclose their CHA use. First, research has been largely atheoretical and focused primarily on medical and socioeconomic factors as determinants, rather than on the underlying motivational factors for disclosure. For example, one national study (23) found people were more likely to disclose their CHA use if they were insured, treating a specific medical issue, or were referred to CHA by a health professional. Although these factors may contribute to the necessary conditions for disclosure, they do not necessarily reflect the reasons *why* people disclose their CHA use. Indeed, qualitative research indicates that the decision to disclose CHA use is often complex and involves not only objective medical and sociodemographic factors, but also subjective patient perspectives and beliefs about the costs and benefits of disclosure (24, 25).

Second, research has tended to ignore the implicit reasons for disclosure, that is, how CHA disclosure may reflect unspoken patient values and beliefs. Such values and beliefs may be part of a broader system of beliefs relating to identity, and that are not necessarily explicitly linked to CHA disclosure. The notion that identity related factors may play a role in CHA disclosure is consistent with research on disclosure behavior in general within medical contexts. For example, research has demonstrated that the more important a particular identity is to an individual, the more likely they are to disclose identity-related information to general practitioners (26). Accordingly, disclosing CHA use to a health-care provider may be

viewed as a symbolic act that reinforces one's identity with respect to being someone who uses CHA. Health beliefs and values are well-known to play a key role in health behaviors in general (27), and in other CHA-related behaviors such as the frequency and breadth of CHA use (5, 28). However, a scan of the published literature indicates that the link between CHA-related beliefs and CHA disclosure has received little attention. In one of the two retrieved studies testing this link, attitude towards the benefits of CHA use was a predictor of disclosure of use of natural health products in a sample of 257 outpatients (29). In the other study, perceived control over health, experiencing positive health behavior outcomes from CHA, and patient-centered care, were associated with disclosure of provider-based CHA in a sample of 226 undergraduate students, but not in a sample of 126 adults from the community (25). The use of small non-representative convenience samples, and the focus on specific types of CHA, call into question the generalizability of these findings.

### **The Consumer Commitment Model and Disclosure of CHA Use**

One model that holds some promise for addressing these issues and providing insights into how CHA values and beliefs are implicated in CHA disclosure behaviour, is the CAM consumer commitment model (30)(see Figure 1). Derived from extant research on the reasons why people continue to use CHA (5, 31, 32), consumer psychology (33) and health behavior theory (27, 34), the CAM consumer commitment model posits that commitment to CHA reflects a psychological state with behavioral indicators (30). According to this model, disclosing CHA use to conventional health-care providers is one of several key CHA-related behaviours that reflect a commitment to continued use of CHA as a health-care option (25, 30). These include using CHA frequently (5, 32, 35), recommending CHA to others, and adhering to CHA recommendations.

The CAM consumer commitment model (30) is founded on principles of brand commitment from consumer psychology (33), and posits that CAM use as a health-care

choice, has similarities to brand choice among consumers. Brand commitment or the degree to which a “consumer is emotionally attached to the relationship with a particular brand in a product class” (33), arises from value congruency and affective commitment, two related psychological constructs. Extending this model to CHA use, the CAM consumer commitment model posits that two sets of consumer values contribute to the development of commitment to CHA as a “brand” of health care. Utilitarian values reflect the functional benefits of CHA, which are that people will be motivated to commit to CHA use if they obtain positive outcomes from CHA, are satisfied with their CHA care, and trust CHA as a treatment option (30). These positive physical, emotional, and behavioral outcomes from CHA treatment are posited to play a role in commitment by reinforcing peoples’ decision to use CHA. In this respect, the positive CHA outcome strengthen utilitarian values in a manner similar to reciprocal determinism from Bandura’s (34) Social Cognitive Theory. To the extent that disclosure of CHA use is an indicator of CHA commitment, individuals will be more likely to disclose their use of CHA to conventional health-care providers if they experience positive outcomes from CHA use.

In contrast, symbolic values reflect a meaningful “fit” or congruency between the individual’s beliefs about healing and CHA as a health-care option. Consistent with a systematic review of the health beliefs associated with CHA use (28), those who believe that CHA is a natural treatment option, promotes taking an active role in treatment and exercising control over one’s health, and emphasizes whole person treatment, are more likely to continue to use CHA because using CHA reinforces their health beliefs (30). In this respect, the CAM commitment model shares some of the underlying principles of other widely used and well-validated models of motivated health behavior, such as the Theory of Planned Behavior (TPB; 27). In the TPB positive beliefs about the behavior (pro-CHA beliefs) are the antecedents of intentions to engage in the behavior (CHA disclosure) and the actual behavior.

The notion that symbolic values are linked to CHA disclosure is also consistent with research demonstrating that coordination of care among different health-care providers is viewed as a meaningful act by health-care consumers (8), and with Lupton's (36) assertion that health-care decisions include considerations of not only the "use" or practical value of health care, but also its abstract or symbolic value. Accordingly, we argue that these utilitarian and symbolic values can be viewed as the implicit reasons for CHA disclosure.

Preliminary evidence supports the relevance of the CAM consumer commitment model (30) for understanding CHA disclosure. In a sample of undergraduate students and a sample of community adults, select symbolic (taking an active role in treatment decisions) and utilitarian (positive CHA outcomes) values were associated with a greater likelihood of disclosing the use of provider-delivered CHA to conventional health-care providers (25). However, the samples were small and non-representative, CHA use was provider-based only, and a limited set of values from the CAM consumer commitment model were examined. It is unknown whether the same results would be obtained with a larger, nationally representative sample, with a greater range of utilitarian and symbolic values, or in relation to both provider-based and self-care CHA.

### **The Present Study**

The aim of this study was to address these issues by examining the role of utilitarian and symbolic values in CHA disclosure in the most recent representative US national data from the 2012 National Health Interview Survey (NHIS). Unique to the 2012 panel of the NHIS is the inclusion of a detailed set of subjective, patient-reported outcomes and beliefs about CHA use that is consistent with previous research, and that map onto the utilitarian and symbolic values from the CAM consumer commitment model adapted for explaining CHA disclosure (see Figure 2). The utilitarian values examined included positive psychological and physical outcomes experienced from CHA use, whereas the symbolic values included



positive beliefs about CHA that previous research indicates reflect a “fit” between CHA and the consumer (6, 28, 37).

Based on the CAM consumer commitment model (30) and previous research applying this model to CHA disclosure (25), we hypothesized that utilitarian and symbolic values would predict disclosure of CHA use after accounting for relevant socio-demographic variables. Specifically, we controlled for a set of factors known to influence disclosure of CHA use, namely age, sex, ethnicity, income, marital status and education (21, 23, 38, 39) in the multivariate analysis of each consumer value. We also examined overall CHA use and the demographic characteristics associated with CHA use to contextualize the main analysis.

## **Methods**

### *Study Design and Survey*

The data are from the 2012 NHIS which includes the most recent data on CHA in the US. The NHIS is an ongoing multipurpose health survey of civilian, non-institutionalized population of the US (40). It is a multistage probability design and is a cross-sectional household interview survey. The survey includes a core component and, every five years, a supplement on Adult Alternative Medicine. A sample of adults from the core (Sample Adult Core) 18 or over from each household was randomly selected to respond to more detailed health questions and to participate in the Adult Alternative Medicine Supplement. In the 2012 NHIS survey,  $n = 34,525$  individuals were in the Sample Adult Core and the response rate was 79.7% (41). Adults were asked about their use of 20 specific CHA modalities. For those modalities used in the past 12 months, more detailed questions were asked included disclosure to a conventional health-care provider, reasons for use, and perceived health outcomes from using specific CHA modalities.

Of the total sample ( $n = 34,525$ ), 11,516 respondents indicated that they had used at least one CHA in the past 12 months. Further, 7,493 of these individuals reported having a

personal health-care provider and named at least one CHA as a top three CHA used for their health. Excluded individuals had an invalid or missing response for the question about a personal health-care provider ( $n = 1,582$ ), did not have a personal health-care provider nor mentioned a top three CHA ( $n = 223$ ), had a personal health-care provider but did not mention a top 3 CHA ( $n = 890$ ), or indicated a top three CHA but did not have a personal health-care provider ( $n = 1,328$ ). In addition, the answer to the question about disclosure was missing, “refused”, “don’t know”, or “not ascertained” for 145 respondents, resulting in a final sample of 7,348 individuals.

Our analytic sample first considers all those individuals with valid CHA use information ( $n = 33,594$ ), but the focus is on recent CHA users who have a personal health-care provider, and with valid information on disclosure, reasons for use, and health outcomes ( $n = 7,348$ ). Table 1 presents the demographic characteristics of both the overall sample and the CHA user subsample.

Table 1

### *Measures*

*CHA use in past 12 months.* The NHIS includes questions regarding use of 20 different CHA, making this array of CHA among the most comprehensive available in national US datasets. Individuals who reported use of at least one type of CHA (e.g., acupuncture, meditation, yoga, chiropractic, among others) in the past 12 months were coded as “recent users” (see Table 2 for a full list of the CHA types used).

*Disclosure to conventional provider.* For up to three of the CHA modalities used in the past 12 months, individuals who used CHA within the past 12 months and had a regular health-care provider were asked if they “let your personal health-care provider know about your use of [CHA modality]”? A response of “yes” for any CHA modality was counted as indicating disclosure of CHA. In the NHIS, personal health-care provider is defined as “a

health professional who knows you well and is familiar with your health history. This can be a general doctor, a specialist doctor, a nurse practitioner, a physician's assistant, or another type of provider.”

*Utilitarian and symbolic values for CHA use.* Unique to the 2012 Adult Alternative Medicine supplement is the inclusion of an array of questions regarding reasons for CHA use and perceived health benefits of use. We incorporated some of these measures to operationalize our two key constructs. Utilitarian values were based on users' reports that CHA did the following: 1) reduced stress, 2) improved sleep, 3) made them feel better emotionally, 4) made it easier to cope with health problems, and 5) improved overall health and made them feel better overall. Any mention of each health benefit was coded as a “yes.” Symbolic values included: 1) CHA gave user a sense of control over own health, 2) CHA can be done on own, 3) CHA is natural, and 4) CHA focuses on the whole person, mind, body, and spirit. Any mention of each reason for CHA use was coded as a “yes.” Each of these dichotomous variables is treated as a predictor to investigate the association of perceived health benefits (utilitarian values) and attitudes about CHA (symbolic values), with disclosure.

*Covariates.* Gender was coded as a dichotomous variable. Age was coded as an ordinal variable (18-29, 30-39, 40-49, 50-59, 60-69, 70+). Race and ethnicity was based on self-report with priority given to any mention of Hispanic, with the White, Black, Asian, and Other race categories referring to non-Hispanic. Education was coded ordinally (less than high school, high school or GED graduate, some college but no degree, associate degree, college graduate, and more than college graduate). Annual household income was coded into the following categories ( $\leq$  \$34,999, \$35,000-\$49,999, \$50,000-\$74,999, \$75,000-\$99,999, and  $\geq$  \$100,000). Marital status was coded as a categorical variable (never married, married, cohabiting, and divorced/widowed). Nativity status was coded as a categorical variable (US

born and foreign born). Lastly, whether a health-care provider had been visited in the past 12 months was coded dichotomously (yes versus no).

## Table 2

### **Analyses**

All analyses were weighted and used the sample adult sampling weights and estimates are representative of the non-institutionalized US population 18 and over (41). Bivariate analyses used the design-based  $F$  test, a corrected weighted Pearson chi-square statistic converted to a  $F$  statistic. Weighted logistic regression was used to first examine the demographic correlates of disclosure among CHA users in 9 separate regressions, one for each of the utilitarian (5) and symbolic (4) values being tested. Then, among CHA users, we investigated the association between each of the utilitarian and symbolic values and disclosure. Adjusted odds ratios (AOR) and 95% confidence intervals (CI) of the AOR are presented. All analyses were performed using Stata 12.0 (42).

### **Results**

Table 1 shows the prevalence of CHA use in the past 12 months according to demographic characteristics. Overall, over 35.5% of American adults used CHA and there were significant differences in use for all demographic characteristics. A higher percentage of women used CHA compared to men and while there were significant age differences in CHA use, the actual prevalence was not all that different according to age, although the oldest age group had the lowest use. Whites, Asians, and Other racial groups all had higher (and similar) prevalence of use compared to Blacks and Hispanics. Prevalence of CHA use was significantly higher among those with higher education and higher incomes. CHA use also differed significantly according to nativity status, with higher CHA use among those who were US born. While there were significant differences according to marital status, the actual percentages were fairly similar. Last, among adults who used CHA in the past 12 months and

also reported they had a health-care provider, nearly two-thirds disclosed their use of CHA to their provider (63.2%).

The remaining analyses only considers CHA users who provided information on their disclosure ( $n = 7,348$ ). First, to better understand how CHA disclosure varied across different types of CHA, the CHA were categorised according to whether they were provider-delivered (e.g., acupuncture, energy healing etc.), products (e.g., herbs, natural supplements, etc.), or practices (e.g., yoga, meditation, etc.) according to the definitions from Upchurch and Wexler-Rainsich (13). Because respondents could mention up to three CHA used in the past year, categories were not mutually exclusive. For the 4,212 category mentions of using CHA providers, 54.87 % were disclosed. For the 4,295 category mentions of using CHA products, 72.92 % were disclosed. Finally, for the 3,771 category mentions of using CHA practices, 45.45 % were disclosed.

Table 3 presents the multivariate results with respect to demographic characteristics associated with disclosure. There were no gender differences. Compared to the youngest age group, all older ages were significantly more likely to disclose and the adjusted odds ratios were greater as age increased. For example, for 30-39 year olds the AOR was 1.39 but for those 70 and older it was 3.37. Except for those with an Associate Degree, those with more education were less likely to disclose compared to those with the lowest level of education. Those who had visited their health-care provider in the previous 12 months were also more likely to disclose their CHA use. There were no significant differences in disclosure for income, race/ethnicity, nativity status, or marital status.

### Table 3

Table 4 presents the results for a series of regression analyses examining the association between disclosure and individual utilitarian (practical) and symbolic values. The first column shows the weighted percentages of CHA users who reported “yes” to each of the

nine items for at least one of the top 3 CHA. Close to or more than half of recent CHA users reported positive health outcomes (utilitarian values) and expressed holistic and empowering attitudes about CHA (symbolic values). For example, over three-quarters of users said CHA improved their overall health and made them feel better, and almost two-thirds used CHA because they thought it was natural.

#### Table 4

In the multivariate models, all utilitarian value (except for reduced stress), and all symbolic values, were significantly associated with disclosure of CHA use. With respect to utilitarian values, those who reported better sleep, feeling better emotionally, increased ability to cope with health problems, and improved overall health and feeling better, were more likely to disclose CHA use to their health-care provider. With respect to symbolic values, those who reported that they used CHA because it gave them more control over their health, because it afforded them a more active role in their health, and because CHA is natural and focuses on the whole person, were more likely to disclose their CHA use.

#### Table 3

### **Discussion**

Using the CAM consumer commitment model (30) as a guiding conceptual framework, we found support for our hypotheses regarding the role of health-related beliefs and positive CHA outcomes in the disclosure of CHA use to conventional health-care providers. Those who experienced positive psychological and physical outcomes from CHA (utilitarian values), and who held positive beliefs about CHA (symbolic values) were more likely to disclose CHA use to health-care providers. Importantly, four out of the five utilitarian values, and all four of the symbolic values, tested were significantly associated with CHA disclosure after accounting for relevant socio-demographic variables. Overall, these findings extend previous research with small non-representative samples (25) by

demonstrating for the first time that the CAM consumer model of commitment is relevant for understanding CHA disclosure in a large nationally representative sample of CHA users.

Our results with respect to demographic factors were generally consistent with previous research. The likelihood of disclosing CHA use associated with older ages has been noted in other studies of both general medical and clinical samples (20, 23, 38). Additionally, previous research has found that lower levels of education were associated with greater likelihood of CHA disclosure (21, 39). However, unlike our findings, in an analysis of 2002 NHIS, CHA disclosure rates were higher among non-Latino whites relative to other racial/ethnic groups (21), while we found no racial/ethnic differences in disclosure. This may be due to differences in model specifications or time trend differences in racial/ethnic disclosure rates, as the data we used were collected in 2012.

Our findings have important implications for public health concerns and conventional care issues with respect to the non-disclosed use of CHA in relation to conventional medicine. We found that 35.5 % of American adults had used some form of CHA in the previous 12 months, and that 63.2 % of these CHA users who had a health-care provider, had disclosed their use of CHA. These results highlight both the continued prevalence of CHA use and that disclosure remains an important issue to understand and address. The findings provide supportive evidence for the proposition that positive experiences and beliefs about CHA are linked to disclosure of CHA use because disclosure reflects an ongoing commitment to using CHA as part of one's health-care repertoire (30). Although a similar linkage between the positive benefits of CHA (in the form of natural products use) and disclosure has been noted in previous research (29), the reasons for this association were not discussed. Our study addresses this issue by situating CHA disclosure within the theoretical context of commitment to CHA.

The results with respect to the associations of symbolic values with CHA disclosure also

provide new insights into disclosure as a health behaviour. Those who believed CHA promotes taking an active role and gives a sense of control over health were more likely to disclose their CHA. This provides suggestive evidence that disclosure of CHA may also be viewed as a proactive means of taking control of health by patients. Though speculative, this assertion is consistent with evidence indicating that disclosure of CHA use is associated with engaging in disease self-management behaviours (20). It is also consistent with previous research indicating that individuals who use CHA are proactive health-care consumers who value control and autonomy over their health (28, 37). Accordingly, they are more likely to engage in positive health behaviours such as physical activity and healthy eating (12, 43), use preventive health services (44, 45), and are less likely to engage in health risky behaviours such as smoking (12), in comparison to those who do not use CHA. In this respect, disclosure of CHA may be considered an important health behaviour akin to other health-promoting and self-care behaviours, and which deserves greater attention in both research and clinical settings.

The current findings also draw attention to the perceived benefits of CHA use in the US population in relation to CHA disclosure. Over three-quarters of CHA users reported that CHA improved their overall health, and over 40 % reported specific psychological and physical benefits from CHA including improved sleep, better coping, improved emotional well-being, and stress management. The endorsement of utilitarian values appears to reflect the use of CHA for health self-management and wellness purposes rather than strictly therapeutic purposes, a growing trend noted in previous research (13). When such use is perceived to be effective, our findings indicate that users are more likely to disclose their CHA use to health-care providers.

Additional implications of these results centre on a corollary of these findings. Those who did *not* experience beneficial physical and psychological outcomes from CHA, and who



were *less* invested in beliefs and values reflecting an acceptance of, and commitment to, CHA, were less likely to disclose their CHA use. The former proposition, in particular, suggests that some users may not feel it necessary, or may feel embarrassed, to tell their health-care providers about CHA use if CHA was not effective for improving their health and well-being.

For such individuals, it is also possible that CHA may not be appropriate for dealing with specific health concerns and thus did not yield beneficial results. Additionally, CHA may have even contributed to adverse effects resulting from the CHA treatment itself, or from the context in which the treatment was delivered (46). Under these circumstances, CHA use may have been dismissed as not worth mentioning to the health-care provider simply because it didn't work, or because they had discontinued CHA use and thus did not feel it necessary to disclose. From a CAM consumer commitment perspective, individuals who are less committed to CHA use (perhaps because they do not experience psychological and physical benefits from CHA), and who use CHA less frequently or on a trial rather than ongoing basis, may be less likely to disclose this use to their conventional care providers. These individuals may be at greater risk for experiencing adverse interactions between CHA and conventional care because of lost opportunities to optimize continuity in the delivery of their care.

The finding that CHA consumers who have more positive outcomes are more likely to disclose CHA use has potential important implications for general practitioners (GPs) and their patients. Qualitative evidence suggests that GPs gain some of their knowledge about CHA directly from their patients' experiences, and that such experiential knowledge plays a key role in advising patients about CHA use (47). Thus, it is important that GPs are aware that the information they get about CHA from patients who do disclose their use will be biased towards positive results from CHA. The current study suggests that those with

less positive results will be less likely to share their use or this information with GPs.

The findings from the current study should be considered in light of several limitations and strengths. The cross-sectional design of the NHIS precludes drawing any firm conclusions about the causal relations or temporal order of the utilitarian and symbolic values in relation to CHA disclosure. The analysis excluded participants who did not specify whether they had personal health-care provider and those who had not used CHA within the past 12 months. There is some evidence that “infrequent” CHA consumers hold different beliefs about CHA than more frequent consumers (5), suggesting that the current findings may not generalise to this group of CHA consumers. In addition, participants were simply asked about whether or not they disclosed CHA, and not about the details and contexts in which disclosure occurred. Therefore, in this study it is unknown whether disclosure was patient initiated or provider initiated, or how positive CHA experiences and beliefs about CHA may be related to each type of disclosure. Indeed, there is evidence that CHA use is not likely to be disclosed if the provider doesn’t initiate the discussion (22). Accordingly, future work on CHA disclosure behaviour should take a more fine-grained approach to assessing the circumstances surrounding CHA disclosure, and employ a longitudinal approach to test the temporal precedence of CHA values in relation to disclosure suggested by the CAM consumer commitment model (30).

Despite these limitations, the use of a large nationally representative sample of CHA consumers is a clear strength of the study that provides greater confidence in the findings and their generalizability and strong evidence supporting the use of the CAM consumer model for understanding CHA disclosure. Our findings also provide good preliminary evidence that reframing CHA disclosure as a proactive health behaviour rather than simply as a patient-provider communication issue can provide useful insights into the factors that facilitate disclosure. Understanding how CHA disclosure may relate to other important preventive and

health-promoting behaviours, such as screening behaviours, diet, and physical activity, could also be a fruitful area for future research.

### **Conclusions**

By taking a theory-driven approach to understanding CHA disclosure, our study is the first to find support for the role of health-related consumer values and patient outcomes for disclosure in a large nationally representative sample of US adults. CHA users who experience physical and psychological benefits from CHA use, and who hold positive attitudes towards CHA, are more likely to disclose their CHA use to conventional care providers. We argue that these findings can be understood from the perspective of consumer commitment to CAM (30), and that disclosure of CHA use can be conceptualised as a behavioural indicator of being psychologically committed to using CHA as a health-care option, that reflects taking an active role in coordinating CHA care with conventional providers. Further research is needed to build on these findings and longitudinally examine the role of positive CHA outcomes and beliefs in CHA disclosure behaviour.

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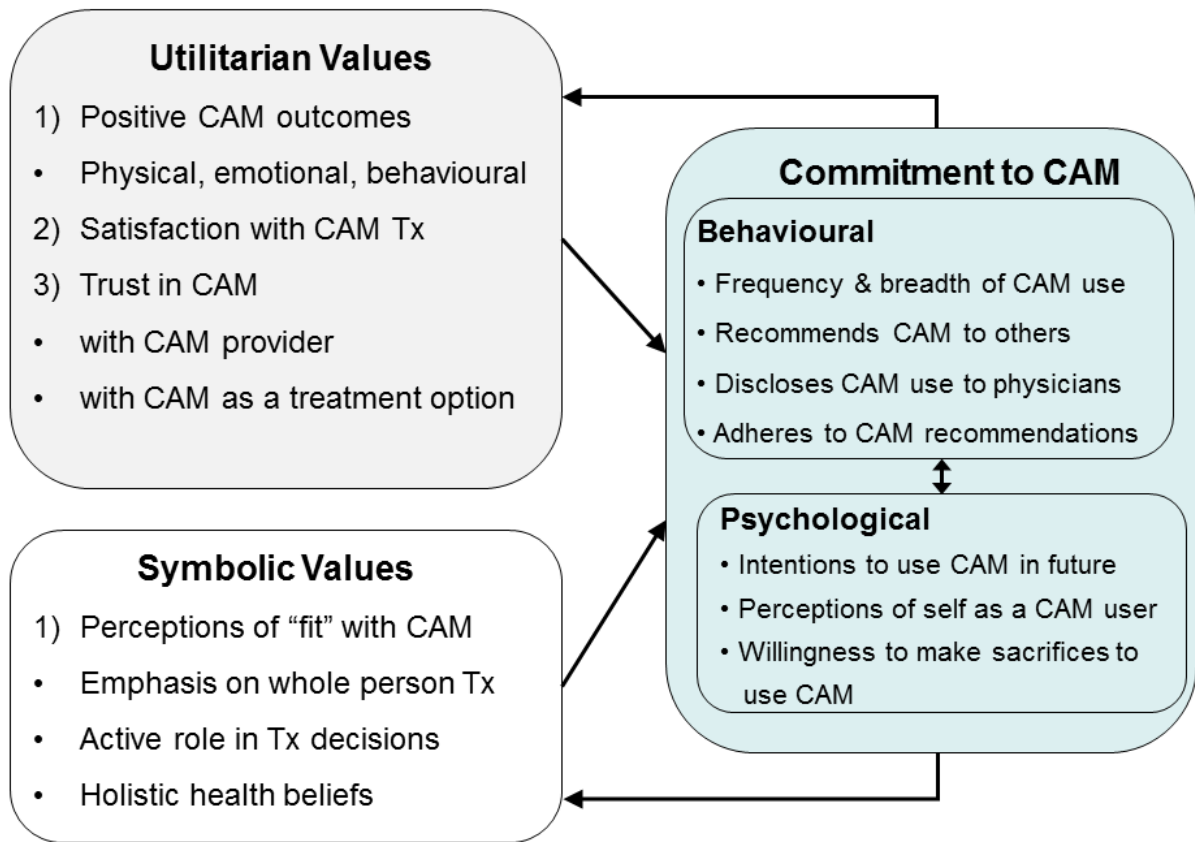


Figure 1: Complementary and Alternative Medicine (CAM) Consumer Commitment Model (Sirois, Salamonsen, & Kristoffersen, 2016).

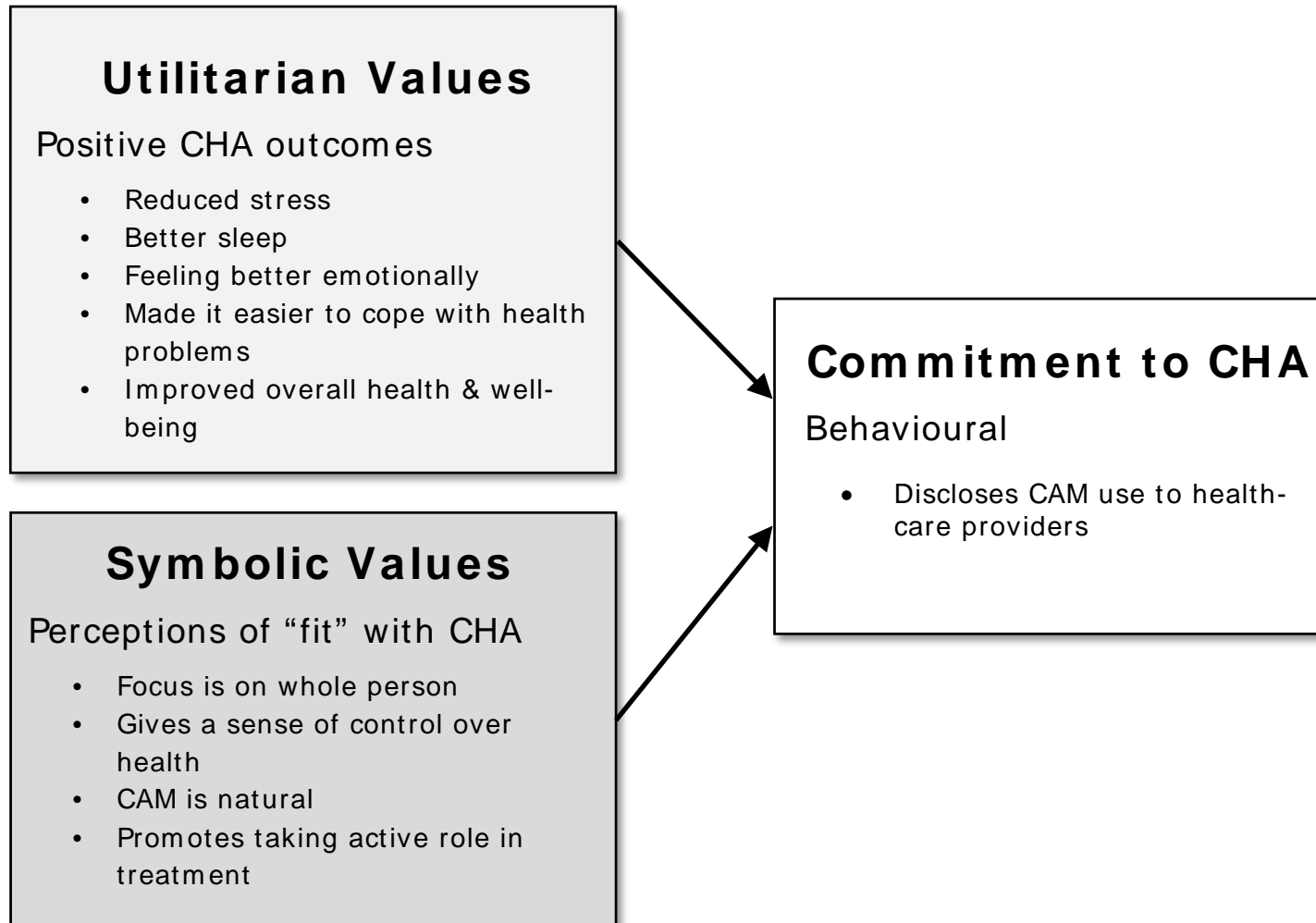


Figure 2: Consumer Commitment model of Complementary Health Approaches (CHA) disclosure. Adapted from Sirois, Salamonsen, & Kristoffersen (2016). Reasons for continuing use of Complementary and Alternative Medicine (CAM) in students: a consumer commitment model. *BMC Complementary and Alternative Medicine*, 16(1), 1-9.

Table 1. *Demographic Characteristics and Prevalence of Complementary Health Approaches (CHA) Use in Past Year, US Adults, NHIS 2012 (N =33,594)<sup>a</sup>*

	Total (%)	CAM users (%)	Design-based <i>F</i> -test	<i>p</i> -value
Total	100.0	35.5		
Gender				
Men	45.3	30.9	182.8	0.000
Women	54.7	39.3		
Age***				
18-29	19.2	33.5	32.6	0.000
30-39	16.5	38.1		
40-49	16.4	37.3		
50-59	17.6	38.7		
60-69	15.1	38.0		
≥70	15.2	27.0		
Race/Ethnicity				
White	69.4	39.7	152.1	0.000
Black	12.5	22.3		
Hispanic	12.8	24.2		
Asian	4.5	39.3		
Other	0.8	39.3		
Education				
< High School	13.6	16.4	278.4	0.000
High School Graduate	25.9	26.4		
Some college, No degree	20.4	38.0		
Associate Degree	10.9	40.7		
College Graduate	18.8	46.3		
>College	10.4	53.1		
Household Income			117.1	0.000
≤\$34,999	43.1	28.2		
\$35,000-\$49,999	13.4	34.0		
\$50,000-\$74,999	17.2	39.5		
\$75,000-\$99,999	9.8	42.1		
≥\$100,000	16.5	46.8		
Marital Status				
Never Married	24.2	34.9	5.5	0.001
Married	43.8	36.8		
Cohabiting	6.0	36.3		
Divorced/Widowed	26.0	33.7		
Nativity Status				

US born	84.5	36.9	123.9	0.000
Foreign born	15.5	27.7		
Disclosure ( <i>N</i> =7,493) <sup>b</sup>	--	63.2		

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<sup>a</sup> All percentages weighted to US population estimates. <sup>b</sup> Among those reporting CHA use in past year and reported having a healthcare provider.

**Table 2**

Complementary and alternative health approaches (CHA) included the use of one or more of the following during the past 12 months. CHA are categorized according to Upchurch and Wexler-Rainsich (13).

<b>Providers</b>	<b>Products</b>	<b>Practices</b>
1. acupuncture 2. Ayurveda 3. biofeedback 4. chelation therapy 5. chiropractic/osteopathic 6. energy healing therapy 7. hypnosis 8. massage 9. naturopathy 10. homeopathic treatment 11. folk medicine or traditional healers	12. nonvitamin, nonmineral (NVNM) dietary supplements	13. Yoga 14. tai chi 15. qi gong 16. meditation 17. guided imagery 18. progressive relaxation 19. deep breathing 20. special diets (including vegetarian and vegan, macrobiotic, Atkins, Pritikin, and Ornish)

Table 3. *Weighted Logistic Regression of Complementary Health Approaches (CHA) Disclosure on Demographic variables, Among US Adult CHA Users, NHIS 2012 (N=7,348)<sup>a</sup>*

	Adjusted Odds Ratio	95% CI
<b>Gender</b>		
Men	1.00	--
Women	0.98	(0.87, 1.10)
<b>Age</b>		
18-29	1.00	--
30-39	1.39**	(1.12, 1.72)
40-49	1.79***	(1.41, 2.29)
50-59	2.17***	(1.72, 2.74)
60-69	2.89***	(2.25, 3.73)
≥70	3.37***	(2.59, 4.39)
<b>Race/Ethnicity</b>		
White	1.00	--
Black	1.04	(0.85, 1.27)
Hispanic	0.83	(0.66, 1.05)
Asian	0.76	(0.57, 1.02)
Other	1.14	(0.62, 2.09)
<b>Education</b>		
< High School	1.00	--
High School Graduate	0.69**	(0.54, 0.91)
Some college, No degree	0.67**	(0.52, 0.86)
Associate Degree	0.84	(0.65, 1.09)
College Graduate	0.66**	(0.51, 0.85)
>College	0.66**	(0.50, 0.87)
<b>Household Income</b>		
≤\$34,999	1.00	--
\$35,000-\$49,999	1.04	(0.85, 1.26)
\$50,000-\$74,999	0.99	(0.84, 1.19)
\$75,000-\$99,999	1.06	(0.85, 1.33)
≥\$100,000	0.91	(0.76, 1.10)
<b>Marital Status</b>		
Never Married	1.00	--
Married	1.13	(0.95, 1.34)
Cohabiting	0.82	(0.63, 1.08)
Divorced/Widowed	1.04	(0.86, 1.25)
<b>Nativity</b>		
US born	1.00	--
Foreign born	0.98	(0.79, 1.22)
Provider visit in last 12 mo		



no	1.00	--
yes	3.67***	(2.77, 4.85)

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<sup>a</sup> Among those reporting use of CHA in past year and reported having a healthcare provider.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Table 4. *Weighted Logistic Regression of Disclosure on Utilitarian and Symbolic Values, Among US Adult Complementary Health Approach (CHA) Users, NHIS 2012 (N=7,348)<sup>a</sup>*

	Percentage Responding Yes (%)	Adjusted Odds Ratio	95% Confidence Interval
<b>Utilitarian Values</b>			
Reduced stress	57.8	0.95	(0.83, 1.08)
Better sleep	46.7	1.27***	(1.12, 1.44)
Feeling better emotionally	48.1	1.16*	(1.03, 1.30)
Easier to cope with health problems	42.8	1.81***	(1.61, 2.03)
Improved overall health	75.7	1.68***	(1.48, 1.90)
<b>Symbolic Values</b>			
Gave sense of control over health	49.1	1.70***	(1.51, 1.91)
Can use CAM on my own	53.4	1.58***	(1.41, 1.78)
CAM is natural	62.4	1.62***	(1.44, 1.83)
CAM focuses on whole person	46.6	1.16*	(1.04, 1.30)

<sup>a</sup> Those reporting CHA use in past year and reported having a health-care provider. Results are for 9 separate regressions. Covariates included gender, age, race/ethnicity, education, income, and marital status. Confidence intervals that are less than 1 are non-significant.

\*  $p < 0.05$

\*\*\*  $p < 0.001$