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Complementary and alternative medicine use among African-Americans with AIDS

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Complementary and alternative medicine use among African-Americans with AIDS

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S.M., Harvard University, 2005

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An abstract of
A dissertation submitted to the Faculty of the Graduate School of Emory University
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy
in Behavioral Sciences and Health Education
2009

Abstract

Complementary and alternative medicine use among African-Americans with AIDS
By Ashli A. Owen-Smith

The use of complementary and alternative medicine (CAM), a group of health care practices and products that are not considered part of conventional medicine, has increased in recent years, particularly among individuals with Human Immune Deficiency Virus (HIV). Assessing the prevalence and predictors of CAM use among HIV+ populations is important as some CAM therapies may adversely affect the efficacy of conventional HIV medications. Unfortunately, CAM use is not comprehensively or systematically assessed among HIV+ populations. Therefore, the aims of the present study were: (1) evaluate the quality of the current instruments employed in studies assessing CAM use among HIV+ populations, (2) develop and evaluate a new measure of CAM use, and (3) use this refined measure to investigate the prevalence and predictors of CAM use. First, a systematic review was conducted to evaluate the quality of studies that used CAM instruments among HIV+ study populations. Results indicate that approximately 20% of studies assessed the reliability and 3% assessed the validity of the CAM instrument employed. This information was the impetus for the next two data collection phases with a HIV+ study population. In Phase 1, focus group data were used to refine an already-existing CAM measure. In Phase 2, this refined instrument was implemented with a larger sample. The resulting data were then analyzed to evaluate the psychometric properties of the instrument and to investigate the patterns and predictors of CAM use. Results indicate that the revised CAM instrument had adequate internal consistency ($\alpha=0.67$) and test-retest reliability ($r=0.79$, $p<0.01$). The majority of

participants (94%) reported using at least 1 type of CAM therapy in the past 12 months. In regression models, being female, having a higher income, higher health literacy and higher HIV viral load were associated with a greater frequency of CAM use while stronger emotional well-being was associated with a lower frequency of CAM use, even after controlling for other variables in the model. Findings underscore the need for more precise assessment of CAM use among HIV+ populations and dissemination of these research findings to HIV healthcare providers to facilitate more effective doctor-patient dialogue about CAM use.

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Acknowledgements

This project was supported by Grant Number F31AT004553 from the National Center for Complementary & Alternative Medicine. The content is solely the responsibility of the author and does not necessarily represent the official views of the National Center for Complementary & Alternative Medicine or the National Institutes of Health.

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Introduction

Background and Significance

At the end of 2003, the Centers for Disease Control and Prevention estimated that approximately 1,039,000-1,185,000 individuals in the United States are living with HIV/AIDS[1]. Racial and ethnic minorities are disproportionately affected by the epidemic; African-Americans, though they make up approximately 12% of the US population, account for over *half* of those infected[2]. Further, the rates of AIDS cases in 2004 were 56.4 per 100,000 in the African-American population in contrast to 6.0 per 100,000 in the Caucasian population[3]. Clearly, there exists a profound racial disparity in HIV/AIDS infection in the United States.

Given the magnitude of the HIV/AIDS epidemic among this population and the absence of an effective vaccine, timely and appropriate treatment has become critical in extending the length and quality of life of those infected. For example, recent research suggests that earlier treatment with highly active antiretroviral therapy (HAART) is associated with more effective immune-system improvement, less toxicity and drug intolerance, fewer AIDS-defining illnesses and improved survival[4, 5].

Unfortunately, evidence suggests that African-American HIV-positive individuals may face more barriers accessing and receiving timely and effective treatment than their Caucasian counterparts[6]. The possible reasons for this disparity include insufficient health insurance and lack of access to care, lack of racial concordance in the patient-provider relationship, dissatisfaction with care and patient-provider communication difficulties[7]. Additionally, the Public Health Syphilis Study laid a foundation for African-Americans' pervasive distrust of the healthcare system in the United States

which, to this day, may contribute to this population's reluctance to seek care and a lessened confidence in the care they do receive[8].

These perceived barriers to conventional HIV-related care may motivate some African-Americans to seek out complementary or alternative treatment modalities. Results from a recent study suggest that lack of access to and dissatisfaction with traditional care were both predictors of complementary and alternative medicine (CAM) use[9]. Findings from other studies corroborate these results, consistently reporting a significant positive relationship between dissatisfaction with, lack of access to and distrust of conventional care and reported CAM use [10-15].

Indeed, research suggests that many African-Americans report using CAM. While some research indicates that CAM use is more common among younger, better educated, more affluent Caucasian populations[16], these findings may be due to the fact that many CAM instruments do not specifically ask participants about their use of folk medicine (e.g., plant-derived medicine) and prayer, two common therapies used in the African-American community, thereby underestimating CAM utilization estimates for this population. In fact, several studies suggest that there is substantial use of CAM in the form of folk medicine in the African-American community. In a study conducted with a rural population in Mississippi, 78% of African-American adults reported using at least one plant-derived medicine during the past year [17]. In another study of CAM use among ethnic minorities, African-Americans more frequently used herbal medicines and home remedies compared to their Caucasian counterparts[18]. Further, another study reported that when CAM instruments assess participants' use of religion and prayer, the prevalence of CAM use among African-Americans increased from 37.9% to 57.4% [19].

CAM is also gaining increasing popularity among HIV-positive populations, with reported usage rates ranging from 29%[10] to 76%[20]. Consequently, research about the use of CAM among HIV-positive populations has burgeoned in recent years, resulting in an expanding knowledge base about the patterns and predictors of and reasons for CAM use. The following is a brief summary of this research to date.

Patterns of Use. Due to different characterizations of CAM across studies, assessing the most common types of CAM used among HIV-positive populations is challenging. Some research suggests that vitamins, herbs, and mineral supplements are most commonly used [20-22]; others indicate that faith healing and prayer are also often used, especially among African-American populations [23-26].

Predictors of Use. While some prior studies suggest that CAM use is associated with higher socioeconomic status (e.g., higher education [20, 23, 25, 27], higher income [23, 24]), others provide evidence that CAM use is related to economic disadvantage (e.g., absence of health insurance [27]). Other studies report no relationship between CAM use and socioeconomic indicators [13]. Research indicates that CAM use is also consistently positively associated with older age [13, 27-29], female gender [28-31] and time elapsed since diagnosis [10, 27, 32]. Additionally, perceived locus of control, coping self-efficacy and greater perceived social support have been found to predict CAM use [13, 33]. Research also suggests that HIV-positive CAM users may be less likely to adhere to their conventional treatment regimens, although this literature is conflicting[34, 35].

Reasons for Use. HIV-positive individuals report myriad reasons for CAM use, although the most salient reasons are to gain freedom from medical regimens and assert some control over and independence in their healthcare [36]. Others report using CAM to

manage symptoms, side effects and AIDS stigma, improve antiretroviral efficacy and survival and strengthen the body [22, 37-39].

Further, evidence suggests that CAM use may be common among HIV-positive African-Americans. One recent study indicated that 39% of HIV-positive African-Americans reported using CAM[23], suggesting that African-American individuals use CAM as frequently (and, in some cases *more* frequently[28]) than Caucasian HIV-positive individuals.

Recent efficacy studies indicate that several CAM therapies may be promising. For example, research indicates that acupuncture can reduce reported pain, improve the duration and quality of sleep, and alleviate many symptoms associated with AIDS [40-42]. Nutritional and plant-based supplements have also been efficacious at improving appetite and increasing body weight in HIV-positive populations [43-47]. Recent evidence also suggests that HIV-infected patients who take micronutrient supplements and vitamins have improved clinical outcomes, specifically as indexed by an improvement in CD4, CD8 cell counts and decreased viral load [27, 48, 49]. Patients also consistently report that they *believe* that CAM therapies are "extremely" or "quite a bit" helpful[20] and that these therapies are as or even more effective than conventional treatments[50].

In spite of the mounting evidence, measurement-related limitations in CAM research remain. These limitations consequently diminish the degree to which CAM study findings can be relevant for HIV treatment providers. Specifically, it is difficult to draw any conclusions from and disseminate information about CAM use across varying HIV-positive populations because there is substantive variability in (1) how CAM is operationalized, (2) the types of CAM used and (3) when CAM is used.

First, the ways in which CAM is operationalized varies significantly across studies. For example, in their 1993 seminal work on the prevalence and patterns of CAM use in the United States, David Eisenberg and colleagues defined CAM as "medical interventions not taught widely at U.S. medical schools or generally available at U.S. hospitals" [51]. While this conceptualization of CAM is a helpful guide, definitional challenges still emerge. The tendency in quantitative research has been to list these categories (and the therapies included in each) and ask study participants to report use/non-use and frequency of use without giving them the opportunity to self-identify therapies *they* perceive as CAM. This can result in the underestimation of both types and frequency of therapies used [52]. By contrast, much of the qualitative literature argues that the definition of CAM should be delineated with the beliefs of the individual consumer as the defining source [53]. This perspective can result in the CAM net being cast too wide, such that every health practice, behavior or therapy that is not perceived to be included in conventional medicine is "thrown into the basket" [52], thereby overestimating the types and frequency of CAM use. In fact, one recent study on CAM use among a HIV-positive population reported that participants used over 1,600 different types of therapies [21]. This becomes a problematic definition when decisions about CAM measurement must be addressed. As one byproduct of these definition-related challenges, few studies report the psychometric properties of the CAM instruments employed. In their review of twelve studies on CAM use among breast cancer patients, Lengacher and colleagues reported that *none* of these studies cited any reliability or validity statistics for the CAM instruments [54]. Few studies that examine CAM use among HIV-positive populations report such indices.

Second, prior research suggests that, while some modalities are considered CAM by all users (e.g., acupuncture), many other modalities are used primarily by only one race/ethnic group (e.g., the use of green tea and soy products by Asian-Americans, the use of Curandero by Latinos, and the use of prayer by African-Americans, to name but a few) [55-58]. Therefore, in order to accurately assess CAM utilization the questions asked must be tailored to the particular racial/ethnic study population. Unfortunately, most studies have administered a "one size fits all" CAM measure which may result in CAM use estimate inaccuracy.

Third, little research, especially within the field of HIV/AIDS, has specifically examined when (at what stage during illness) individuals use CAM; the research which has attempted to distinguish between CAM use among HIV-positive and AIDS patients is contradictory. While some reports suggest that CAM use was not related to stage of illness [12, 13, 59] others have demonstrated that a relationship exists between CAM use and numbers of clinic visits [60], lower helper T cell counts [20] and higher viral load [30]. Research on this relationship for other health problems (e.g., multiple sclerosis, cancer and cerebral palsy), however, is not as ambiguous and suggests that CAM utilization is positively associated with disease severity, progression and self-reported poor health [24, 61-64]. Additional research is needed that examines CAM use among HIV-positive and AIDS patients *independently* so that a more sophisticated understanding of patterns of CAM utilization can be reached.

Although CAM use among African-American HIV-positive populations is common and can be an effective treatment modality, research suggests that its use is underreported to healthcare providers. For example, a recent study suggests that more

than half of those HIV-positive individuals who reported using CAM had not told their providers[30]. This underreporting by HIV-positive patients could have two problematic consequences. First, recent evidence suggests that St John's Wort, garlic and Vitamin C may reduce HIV drug concentrations in the blood, thus potentially lowering their effectiveness in controlling HIV viral load[65-68]. Second, preliminary evidence suggests that CAM users may be less likely to adhere to their conventional HIV medications, HAART, although these findings are conflicting. In a recent study involving a cohort of HIV-positive gay men, participants using alternative medicine reported better adherence to HAART as compared to those not using alternative medicine [35]. By contrast, results from a study with HIV-positive Latino gay and bisexual men suggest that those using CAM were less likely to follow physician recommendations, keep doctors' appointments and adhere to HAART[34]. Given these incongruities in the literature, the high prevalence of CAM use among HIV-positive populations and the critical importance of HAART adherence for the health and well-being of HIV-positive patients[69], additional research is needed that explores this relationship.

One possible reason why HIV patients may underreport CAM use to providers is that providers often fail to ask their patients about whether they have used or are currently using CAM. Matthew Wynia and colleagues report that only 7% of HIV-treatment providers reported discussing CAM therapies with every new patient while only 5% reported discussing CAM at "most" or "every" follow-up visit[70]. Other recent findings similarly report that, in more than 90% of cases where the provider was unaware of CAM use, HIV-positive patients reported that the provider had not inquired about possible use[30].

Healthcare providers may not ask patients about their CAM in part because they often report not feeling comfortable talking with patients about CAM, a sentiment likely due to the lack of knowledge about the frequency and efficacy of CAM use[71-73]. For example, 61% of physicians in one study reported that they do not feel sufficiently knowledgeable about CAM safety or efficacy[71]; more than 70% of providers in another study claimed that they had little or no knowledge about herbal remedies[72]. In spite of this lack of knowledge, most providers surveyed reported wanting to "receive more education about CAM modalities"[71] and would "recommend it to a patient if they knew it was safe and effective" [73].

HIV healthcare providers may not always inquire about their patients' CAM use in part because they report not feeling knowledgeable about CAM [71-73]. This failure to engage in dialogues about CAM use with patients may result in significant underreporting of use by patients, a potentially problematic trend given recent evidence for the potential drug interactions between HAART and several CAM modalities often used by HIV-positive individuals. Fortunately, many surveyed providers report that they do want to engage in discourse about CAM with their patients and would do so with more education about CAM use and efficacy [73].

The present research attempts to address this need by developing, validating and implementing a culturally- and stage-of-disease-appropriate measure of CAM use among a population of African-American individuals with AIDS. The findings from this research will then be disseminated to the healthcare professionals treating this population so as to (1) further educate providers about their patient population's CAM use thereby (2) facilitating effective patient-provider interactions and (3) improving the quality of the

healthcare provided.

Contributions to the Field

The present research addresses two primary goals outlined in the Department of Health and Human Services 2004-2009 Strategic Plan: (1) reducing communication barriers between healthcare providers and patients (Objective 3.4) and (2) improving the communication of health research results by establishing partnerships with health professionals to disseminate research findings (Objective 4.4)[74]. Further, the research concentrates on one of the Healthy People 2010 primary focus areas, HIV/AIDS[75].

This research also addresses three goals highlighted in the National Center for Complementary and Alternative Medicine (NCCAM) Strategic Plan. By developing and validating a new measure of CAM that is specifically tailored to the population of interest, African-American individuals living with AIDS, the research addresses a need stipulated by the NCCAM: improved CAM survey instruments. By using a mixed methods approach to accomplish this task, this research addresses a second goal by the NCCAM: the use of a variety of innovative qualitative and quantitative methods as a vehicle for data collection. Finally, the NCCAM emphasizes the importance of helping "healthcare professionals make informed healthcare decisions about CAM" specifically by "communicating state-of-the-science CAM information"[76]. In response to this mandate, this research prioritizes the dissemination of study findings to healthcare providers.

The Manuscripts

CAM use is rarely assessed among HIV+ populations in a comprehensive manner. However, there has not yet been any formal investigation of CAM assessment

with this population. Therefore, the first manuscript, a systematic review, evaluates the quality of the current instruments employed in studies assessing CAM use among HIV-positive study populations. The resulting data served as the impetus for the next two research phases with a study population of African-Americans with AIDS. In phase 1, qualitative methods were used to refine an already-existing CAM measure. The resulting second manuscript reports the development and evaluation of this new CAM instrument and discusses the implications for future assessment of CAM use. In phase 2, this new instrument was then implemented with a larger sample using quantitative methods in order to assess CAM use among this population. The resulting third manuscript reports the prevalence and predictors of CAM use and discusses the importance of disseminating such information to HIV healthcare providers.

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The Assessment of Complementary and Alternative Medicine Use among Individuals with HIV: A Systematic Review and Recommendations for Future Research

Introduction

Recent estimates from the Centers for Disease Control and Prevention suggest that approximately 1.1 million adolescents and adults in the United States were living with Human Immunodeficiency Virus (HIV) at the end of 2006[1]. Given the magnitude of this epidemic and the absence of an effective vaccine, timely and appropriate treatment, highly active antiretroviral therapy (HAART), is critical in extending the length and quality of life of those infected. Many HIV-positive individuals, however, still seek out alternative treatment modalities, with approximately 60% using complementary and alternative medicine (CAM)[2], typically defined as "a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine"[3].

Several studies indicate that several CAM therapies show promising results. For example, evidence suggests that acupuncture can reduce reported pain, improve the duration and quality of sleep, and alleviate many HIV-associated symptoms[4-6]. Nutritional and plant-based supplements have been efficacious at improving appetite and increasing body weight in HIV-positive populations[7-11]. Evidence also indicates that HIV-infected patients who consume micronutrient supplements and vitamins may also have improved clinical outcomes, specifically as indexed by an improvement in CD4, CD8 cell counts and decreased viral load[12-14]. Further, patients also consistently report that they *believe* that CAM therapies are "extremely" or "quite a bit" helpful[15] and that these therapies are as or even more effective than conventional treatments[16].

Although CAM use among HIV-positive populations is common and can be an effective treatment modality, research suggests that, in some cases, its use may be problematic. For example, recent evidence suggests that St John's Wort, garlic and Vitamin C may reduce the concentrations of HAART in the blood, thus potentially lowering its effectiveness in controlling HIV viral load[17-19]. Further, some studies have reported that HIV-positive CAM users may be less likely to adhere to their conventional treatment regimens, although this literature is conflicting [2, 20, 21]. Given the possibility of CAM-drug interactions and the critical importance of HAART adherence for the health and well-being of HIV-positive patients[22] it is imperative that CAM use be consistently and rigorously assessed among this population.

Unfortunately, there has been a lack of consensus regarding the best way to operationalize and measure CAM use, in general, and among HIV-positive populations, in particular. The tendency in quantitative research has been to list CAM modalities and ask study participants to report use/non-use and frequency of use without giving them the opportunity to self-identify therapies *they* perceive as CAM. The resulting omissions cause the underestimation of both types and frequency of therapies used[23]. By contrast, much of the qualitative literature argues that the definition of CAM should be developed with the beliefs of the individual consumer as the defining source[24]. This perspective can result in the CAM net being cast too wide, such that every health practice, behavior or therapy that is not considered conventional medicine is "thrown into the [CAM] basket"[23], thereby overestimating the types and frequency of CAM use. In fact, one recent study on CAM use among individuals in the AIDS Research Center's Alternative Medicine Care Outcomes in AIDS (AMCOA) cohort reported that participants used over

1,600 different types of therapies[25]. This subjective, individual-centered approach becomes problematic when decisions about CAM measurement must be addressed. One byproduct of these definitional challenges is that few studies report the reliability and/or validity of CAM measures. In their review of twelve studies on CAM use among breast cancer patients, Lengacher and colleagues reported that none of these studies cited any psychometric indices assessing the reliability or validity for CAM instruments[26]. These measurement-related limitations consequently diminish the degree to which research findings on CAM use can be compared across studies[27] and subsequently disseminated to HIV healthcare providers.

In spite of recent evidence that suggests that quality assessment of observational studies in systematic review is essential, it is conducted infrequently[28]. Therefore, the purpose of this systematic review was to evaluate the quality of the instruments employed in observational studies assessing CAM use among HIV-positive populations by examining the degree to which these studies (1) evaluated the psychometric properties of their CAM instruments and (2) assessed the multi-dimensional nature of CAM use.

Methods

Search Strategy

A multi-step search process based on recommended strategies[29] was utilized to identify relevant studies. First, a comprehensive search of the literature was conducted under the guidance of an experienced research librarian using combinations of the keywords *complementary medicine/medication/therapy* or *alternative medicine/medication/therapy* or *integrative medicine/medication/therapy* or *self-treatment* with *Human Immunodeficiency Virus/HIV* or *Acquired Immune Deficiency*

Syndrome/AIDS. This initial search produced 345 results from Medline, 148 from EMBASE, 137 from the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database, 79 from Alternative Health Watch, 10 from Global Health, 15 from EBM Reviews, 47 from PsychInfo, 34 from Sociological Abstracts, and 0 from Health and Psychosocial Instruments, yielding a total of 815 abstracts.

Second, these 815 abstracts were evaluated for inclusion. Specifically, articles had to meet all of the following criteria for inclusion in the review: (1) publication year between 1997 and 2007, (2) published in English and (3) in a peer-reviewed journal, (4) empirical, (5) quantitative, (6) observational, (7) study population human and (8) HIV-positive and (9) complementary and/or alternative medicine assessed. Six hundred and fifty-nine articles were excluded after the initial abstract review, as their ineligibility was unambiguous from the abstract. The remaining 156 articles were retrieved for further review because study inclusion could not be determined from the abstract (Figure 1).

One hundred fifty-one articles were reviewed for study inclusion by the first author (5 articles could not be retrieved because the journals were not available through any University-affiliated library). Though prior systematic reviews have not evaluated inter-coder reliability at the study inclusion stage (only at the article coding stage)[30, 31], there has been a recent call for researchers to assess inter-coder reliability at both stages[32, 33]. Therefore, the second author reviewed a randomly selected subsample of the 151abstracts (approximately 20%; N=30) to evaluate inter-coder reliability for study inclusion. Inter-coder reliability between the two reviewers, adjusting for chance agreement, was satisfactory (kappa=0.864). From the 151 reviewed articles, 119 were

excluded, resulting in 32 remaining included articles (Figure 1). Each of the included articles employed only 1 CAM instrument.

Article Coding

Reliability and Validity

The quality of the 32 included articles was first assessed by examining the degree to which each assessed and/or reported any psychometric properties of the CAM use instrument(s) employed. Using an approach similar to that developed by Noar and colleagues[31] each article was assigned higher numeric values if it were strong on a characteristic and lower values if it were weak on a characteristic. For example, if an article reported information about the reliability and validity of the CAM instrument, it was assigned a 2, if an article reported information about the reliability or validity of the instrument, it was assigned a 1. If this information was not reported or the assessment/reporting was unclear, it was assigned a 0 (maximum score=2).

Dimensions of CAM Use

The quality of the 32 included articles was also assessed by examining the extent to which each article assessed the following dimensions of CAM use: (1) the types of therapies used, (2) the number of therapies used, (3) when therapies were used, (4) the frequency of use, (5) the dose used, (6) the duration of use, (7) how the therapies were used (as a complement or as an alternative to conventional medical approaches), (8) the reasons for use, (9) whether use was disclosed to healthcare providers, (10) satisfaction with use, (11) perceived benefits/efficacy of use, (12) sources of information about use and (13) use-related expenditures. For each dimension the values were assigned the following way. For the first dimension, the types of therapies used, articles were

assigned a 2 if they assessed the types of CAM used with closed-ended and open-ended questions, a 1 if they used closed-ended or open-ended questions and a 0 if they did not assess types of CAM used or if this assessment was unclear. Articles were given the higher score for using both closed-ended *and* open-ended questions because this approach provides study participants the opportunity to both respond to a priori CAM categories provided by the researcher and self-identify any CAM therapies not already specified. This mixed-method approach increases the likelihood that the research will most accurately capture the full range of CAM therapies being used by the study population while also allowing for common categories to be captured uniformly. For the second dimension, the number of therapies used, articles were assigned a 2 if they assessed $\geq$ 5 modalities or $\geq$ 10 therapies, a 1 if they assessed <5 modalities or <10 therapies and a 0 if this information was not assessed or was unclear. Articles were assigned an additional 2 points if they also reported > 5 modalities or > 10 therapies, a 1 if they reported <5 modalities or <10 therapies and a 0 if this information was not reported or was unclear (maximum score=4). At least five CAM modalities (broad categories of CAM, such as mind-body interventions) and/or 10 CAM therapies (individual therapies such as meditation) were selected as the requirement for the highest quality score as these are the primary modalities/therapies used in the United States as outlined by the National Center for Complementary and Alternative Medicine (NCCAM)[3]. No *specific* modalities or individual therapies were required for an article to receive the highest quality score for this dimension, only that the minimum number of modalities/therapies be met, as this suggests that the research more fully captured the extent of participants' CAM-related experiences. For the third dimension, when

therapies were used, articles were assigned a 1 if they assessed whether CAM was ever used, a 1 if they assessed whether CAM was used since HIV diagnosis and a 1 if they assessed whether CAM used was used currently[a] (maximum score=3). Articles were assigned a 1 if this information was assessed but the information was not reported (ANR) or was reported but information about the assessment was not described (RAND). Articles were assigned a 0 if the information was not assessed or reported or was unclear. For each of the remaining 10 dimensions, articles were assigned a 2 if the dimension was assessed, a 1 if the dimension was either ANR or RAND or a 0 if the information was not assessed/reported or was unclear. The values for each of the above characteristics, including the reliability and validity scores, were summed in order to give a total quality score for which the maximum value was 31.

All 32 included articles were independently evaluated by two coders (the first and second author) and then the results were compared to one another. There was evidence of strong reliability between the two coders, even after adjusting for chance agreement (kappa=0.853). The coders met to discuss and reconcile all discrepancies.

Results

The 32 included studies had a cumulative *N* of 16, 925 participants. Most studies utilized convenience sampling (90.6%), were conducted in the United States (59.4%) and predominantly enrolled male and female participants (75%) from HIV treatment centers (50.0%). Study samples were diverse in racial/ethnic background (Table 1).

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[a] Within the past 12 months

Table 2 contains detailed information about each of the studies including whether psychometric information was reported, whether each of the other 13 dimensions was addressed and the calculated quality score for CAM use assessment. A summary by dimension across articles is provided in Table 3. With respect to the assessment of the psychometric properties of the CAM instruments, approximately 20% of the studies assessed the reliability (5 examined internal consistency, 1 examined test-retest) and 3% assessed the validity (face and content validity) of the CAM instrument employed.

With respect to the assessment of the 13 CAM dimensions, most studies (78.2%) assessed the *types* of CAM modalities being used by study participants; closed-ended question formats were the most common (37.5%). The majority of studies asked participants about whether they used at least 5 different types of CAM modalities and/or at least 10 types of CAM therapies (68.8%). Approximately 75% of studies assessed when participants were using CAM, though the most common time frame of assessment was whether participants were "currently" using CAM (50%). The other CAM dimensions were assessed less often. For example, only 12.5% studies assessed how often participants use CAM (frequency), 3.1% assessed how much CAM participants use (dose), and 3.1% assessed how long participants have used CAM (duration). Further, only 25% of studies made a distinction between 'complementary' and 'alternative' medicine when asking study participants about CAM use, 9.4% assessed whether participants were disclosing CAM use to healthcare providers and 15.6% assessed where participants were acquiring information about their CAM therapies. No studies assessed the degree to which study participants were satisfied with CAM.

The CAM assessment quality scores ranged from a low of 3 to a high of 13, with a mean of 8.09 (SD=2.52). Articles were classified as "low quality" if their final score was between 0-10, of "moderate quality" if their final score was between 11-20 and of "high quality" if their final score was between 21-31, based on a tertile split. Using these cut points, 26 articles were categorized as low quality, 6 were of moderate quality and none were categorized as high quality.

Discussion

In the most recent strategic plan, the NCCAM states that helping healthcare professionals make informed decisions with their patients about CAM is an important priority[34]. For healthcare providers to be equipped to engage in these dialogues, however, they need access to rigorously conducted, thorough CAM research. Unfortunately, most CAM research, particularly within the field of HIV/AIDS, is lacking on both accounts. Rigorous research should, in addition to many other criteria, employ instruments that have evidence of satisfactory reliability and validity. This evidence not only increases the likelihood that the phenomenon of interest (CAM) was assessed appropriately but also makes comparing findings across studies and synthesizing research findings possible, a critical process for healthcare providers and patients as they make decisions about using CAM. The fact that only 6 articles reported any reliability data and only 1 study reported any validity data highlights a glaring gap in the empirical database and the need for more psychometric evaluation and reporting in the field of CAM assessment.

Though most of the included articles did assess the *types* of CAM modalities used (and did so using an adequate number of modalities/therapies), many did not further

investigate CAM use beyond this one dimension. Few studies asked study participants about their frequency, dose and/or duration of CAM use, information which could have important clinical implications. For example, the patient who has been taking 300 milligrams (dose) of St John's wort once per week (frequency) for 2 months (duration) could be at significantly less risk for HAART drug interactions compared to the patient who has been taking 900 milligrams per day for 2 years. While it is important to assess *what* patients are using it is also critically important to assess the dose, frequency and duration of CAM therapies, particularly for those that are biologically-based.

Also notable was the scarcity of studies that examined *how* CAM was being used (whether the modalities were being used as a complement or an alternative to conventional healthcare). Research suggests that individuals who are using Echinacea, garlic, Kava, or St John's wort *in addition to* their HAART may be at risk for significant drug interactions, including an increase in HIV viral load, a risk of sub-therapeutic HAART levels and hepatotoxicity[35]. By contrast, patients who are using CAM therapies *instead of* conventional medicine may be more likely to develop drug resistance due to inconsistent use of HAART, thereby compromising their treatment efficacy[36]. Clearly this is an important distinction that should be consistently assessed in CAM research with HIV-positive populations.

Similarly, few studies asked study participants whether they had discussed their CAM use with their HIV healthcare providers. Given the possibility of drug interactions and/or HAART resistance as a result of CAM use it is of upmost importance that patients and providers have candid conversations about whether patients are using CAM and, if so, which therapies they are using. By assessing and reporting the (in)frequency of

patient disclosure of CAM use to providers, those individuals involved in HIV healthcare can be more knowledgeable about the importance of initiating these dialogues during patient-provider interactions.

Only 18.8% of studies reported study participants' reasons for using various CAM therapies. In one recent focus group facilitated by the first author, a HIV-positive patient spoke at length about and with great confidence in his use of Milk thistle as part of a detoxification regimen because he felt that his HAART medications were noxious to his liver. However, there is limited research on the efficacy of Milk thistle for this purpose and, in fact, some findings suggest that intake of this herb could increase a patient's risk of HAART-related side effects[35]. Therefore, assessing patients' reasons for CAM use may not only elucidate patients' motivations for using CAM, an interesting phenomenon in of itself, but also potentially highlight the need for more patient education about the advantages, disadvantages and contraindications of various CAM therapies.

Recommendations for Future Research

The field of CAM research among HIV-positive populations is still in its nascent stages. However, given the increasing popularity of CAM use among this population, it is imperative that the assessment of CAM be rigorous and thorough so that HIV healthcare providers can be adequately informed about their patients' CAM-related behaviors, knowledge and beliefs. More educated providers will ultimately provide better quality of care for the patients.

The first step in this process requires CAM researchers to be more thoughtful in our development and implementation of CAM instruments. Most studies administer a "one size fits all" CAM measure typically consisting of simplistic questions (e.g., "Have

you ever used any of the following types of CAM?") followed by a laundry list of all possible CAM modalities, in spite of the fact that prior literature suggests that the CAM therapies used by study participants often vary by race/ethnicity and stage of disease. For example, while some modalities are considered CAM by most users (e.g., acupuncture), many other modalities are used primarily by only one ethnic group (e.g., the use of green tea and soy products by Asian-Americans, the use of a Curandero by Latinos, and the use of prayer or garlic by African-Americans, to name but a few)[37-40]. Other evidence indicates that individuals who report more clinic visits, have lower Helper T-Cell levels and higher HIV viral load may be more likely to use different types of CAM or use CAM more frequently compared to their healthier counterparts[15, 41, 42]. Yet, most studies with HIV-positive populations fail to administer CAM instruments that reflect an understanding of this diversity in CAM use by race/ethnicity or stage of disease. To accurately assess CAM utilization the questions asked must be tailored to the specific study population.

The second step towards more rigorous CAM measurement involves more thorough assessment of this complex phenomenon in three ways. One, because of the inherently subjective nature of CAM[24], questions must assess participants' *intentions* with respect to their CAM use. For example, green tea may be listed on an instrument as a possible CAM therapy. Two participants may indicate that they drink green tea regularly; however, one does so because she believes it is anticarcinogenic while the other simply likes the taste. The former participant is using CAM, the latter is not. Failure to include an assessment of intention in CAM-related questions may result in measurement inaccuracy. Two, CAM measures should assess multiple dimensions of

use. Though investigating the types of CAM used is undoubtedly essential information, so are many other dimensions, including the frequency, dose, and duration of, reasons for, and satisfaction with CAM use as well as the frequency of discussion about CAM use with healthcare providers. Three, CAM researchers should move beyond providing only dichotomous response options and/or categorizing participants broadly as "users" or "non-users." Though this approach makes for more straight-forward instruments and data analysis it does not provide the level of precision of information needed to generate nuanced research. Instead, CAM instruments should assess degree (intensity) of use[43].

The last step towards more sophisticated CAM measurement requires investigators to assess and report the psychometric indices of their CAM instruments. Researchers and healthcare providers cannot have confidence in the integrity of study findings without evidence that the instruments employed were both reliable and valid. Further, failing to report this information is a missed opportunity to advance the field of CAM research, which relies so heavily on accurate assessment of this complex phenomenon. Developing and implementing instruments that are tailored to the specific study population and are thorough in their assessment of CAM use, the first two steps of this process outlined above, can only increase the likelihood that the instrument will have satisfactory psychometric properties. Regardless, it is our responsibility to the field to engage in the iterative process that is instrument development by consistently evaluating our CAM measures and reporting findings to colleagues.

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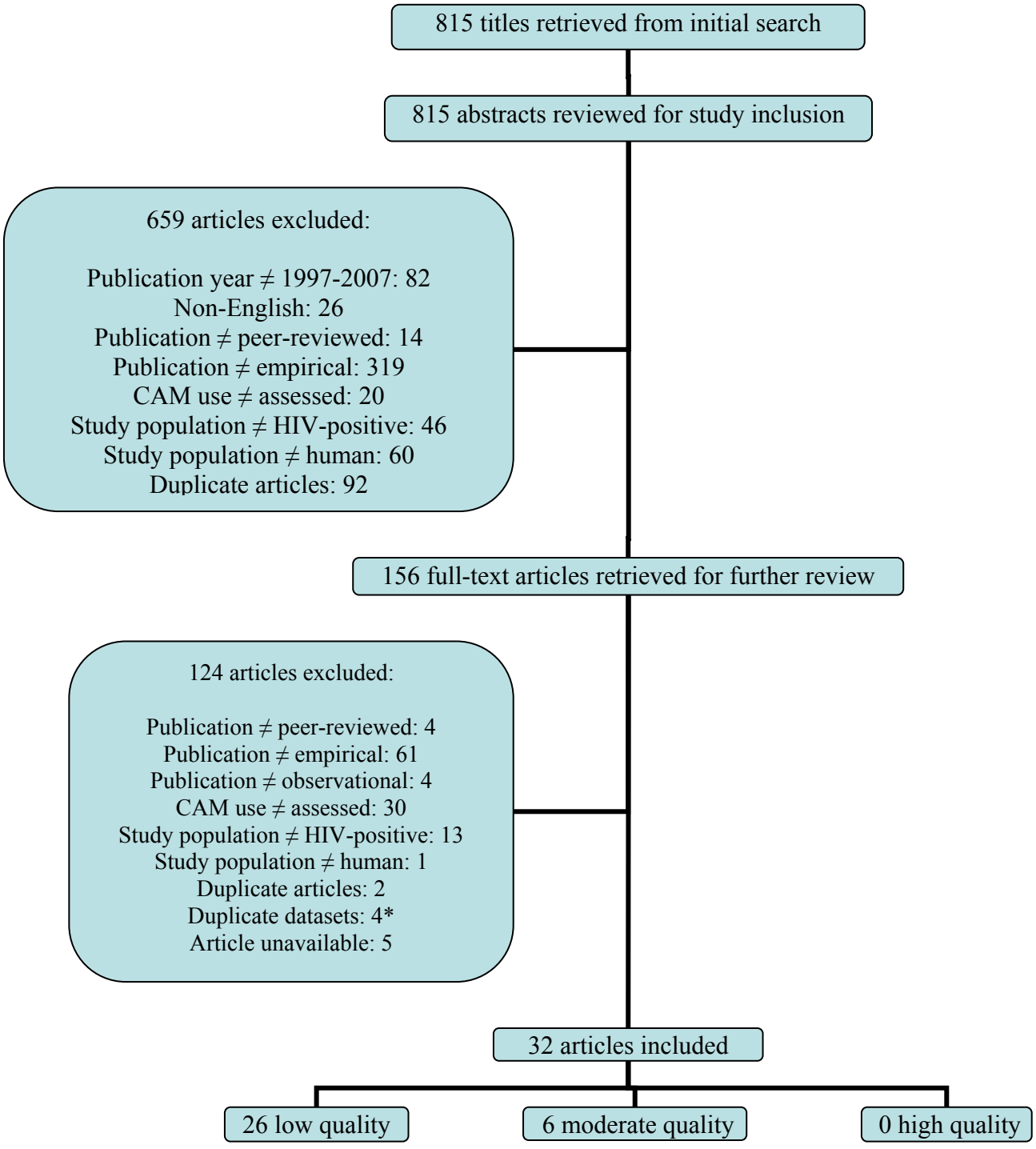
Figure 1. Search Strategy.



* In four cases there were 2 articles published from the same dataset (identified by having the same study sponsor, location and time period of data collection, methodology, and number of study participants). In these cases the first article published chronologically was selected for inclusion.

Table 1. Characteristics of the 32 studies.

Study Characteristic	*k*	%
Type of sampling		
Convenience	29	90.6
Random	3	9.4
Country of sample		
United States	19	59.4
Country other than United States	13	40.6
Type of sample		
HIV treatment center patients	16	50.0
Other health center/hospital patients	4	12.5
HIV service/advocacy organization	4	12.5
participants	5	15.6
Other	3	9.4
Not reported		
Gender of participants		
Men	7	21.9
Women	1	3.1
Men and women	24	75.0
Predominant race (>50%)		
Caucasian	9	28.1
Black/African-American	8	25.0
Asian	2	6.3
Hispanic	1	3.1
Mixed (none greater than 50%)	7	21.9
Not reported	5	15.6

Note. k: number of studies.

Table 2. Characteristics and Quality Scores of CAM Measures.

Study	Type Used	Number Used	When Used	Frequency
Agnoletto (2003)	0	4	1	0
Bica (20030	2	4	1	0
Burg (2005)	2	4	2	0
Chang (2003)	2	3	0	0
Cho (2006)	2	2	1	0
Chou ((2004)	0	2	0	0
Colebunders (2003)	2	2	0	0
De Visser (2000)	0	2	0	0
De Visser (2002)	2	2	2	0
Duggan (2001)	0	2	1	0
Fitzpatrick (2007)	2	2	1	0
Fogarty (2007)	2	2	1	0
Gore-Felton (2003)	2	4	1	1
Jernewall (2005)	2	4	2	0
Josephs (2007)	2	0	1	0
Kaufman (2007)	2	4	1	0
Kirksey (2002)	2	2	1	0
Knipples (2000)	2	4	2	0
Langlois-Klassen (2007)	2	3	0	0
London (2003)	2	2	1	1
Mikhail (2004)	2	4	1	0
Molassiotis (2004)	2	1	0	0
Nicholas (2007)	0	2	1	1
Sparber (2000)	2	2	2	0
Standish (2001)	2	4	1	0
Suarez (1997)	2	4	1	0
Suarez (2000)	2	4	2	0
Sugimoto (2005)	0	4	1	0
Sukati (2005)	2	1	0	0
Thomas (2007)	0	1	1	2
Wanyama (2007)	2	2	1	0
Wutoh (2001)	2	4	1	0

Table 2, cont.

Study	Dose	Duration	How Used	Reasons
Agnoletto (2003)	0	0	1	2
Bica (20030	0	0	0	0
Burg (2005)	0	0	0	0
Chang (2003)	0	0	0	0
Cho (2006)	0	0	0	2
Chou ((2004)	0	0	1	1
Colebunders (2003)	0	0	2	0
De Visser (2000)	0	0	2	0
De Visser (2002)	0	0	0	0
Duggan (2001)	0	1	0	0
Fitzpatrick (2007)	0	0	0	0
Fogarty (2007)	0	0	0	2
Gore-Felton (2003)	1	1	1	0
Jernewall (2005)	0	0	0	0
Josephs (2007)	0	0	0	0
Kaufman (2007)	0	0	0	0
Kirksey (2002)	0	0	0	2
Knipples (2000)	0	0	0	0
Langlois-Klassen (2007)	0	0	1	3
London (2003)	0	0	0	0
Mikhail (2004)	0	0	0	0
Molassiotis (2004)	0	0	0	0
Nicholas (2007)	0	0	1	0
Sparber (2000)	0	0	1	0
Standish (2001)	0	0	2	1
Suarez (1997)	0	0	0	0
Suarez (2000)	0	0	0	0
Sugimoto (2005)	0	0	0	1
Sukati (2005)	0	0	0	0
Thomas (2007)	0	0	0	2
Wanyama (2007)	0	0	1	0
Wutoh (2001)	0	0	1	1

Table 2, cont.

Study	Disclosure	Satisfaction	Perceived Efficacy	Info Source
Agnoletto (2003)	0	0	1	1
Bica (20030	0	0	0	0
Burg (2005)	0	0	0	0
Chang (2003)	0	0	0	0
Cho (2006)	2	0	2	2
Chou ((2004)	0	0	0	0
Colebunders (2003)	0	0	0	0
De Visser (2000)	0	0	2	2
De Visser (2002)	0	0	2	0
Duggan (2001)	2	0	2	1
Fitzpatrick (2007)	0	0	0	0
Fogarty (2007)	0	0	2	0
Gore-Felton (2003)	0	0	0	0
Jernewall (2005)	0	0	0	0
Josephs (2007)	0	0	0	0
Kaufman (2007)	0	0	0	0
Kirksey (2002)	0	0	1	2
Knipples (2000)	0	0	0	0
Langlois-Klassen (2007)	0	0	0	0
London (2003)	0	0	0	0
Mikhail (2004)	0	0	0	0
Molassiotis (2004)	0	0	0	0
Nicholas (2007)	0	0	1	0
Sparber (2000)	1	0	2	1
Standish (2001)	1	0	0	0
Suarez (1997)	0	0	0	0
Suarez (2000)	0	0	0	0
Sugimoto (2005)	0	0	0	2
Sukati (2005)	0	0	2	2
Thomas (2007)	2	0	2	0
Wanyama (2007)	0	0	0	0
Wutoh (2001)	0	0	0	0

Table 2, cont.

Study	Expense	Reliability	Validity	Q Score
Agnoletto (2003)	0	0	0	10
Bica (20030	0	0	0	7
Burg (2005)	0	0	0	8
Chang (2003)	0	0	0	5
Cho (2006)	0	0	0	13
Chou ((2004)	0	0	0	4
Colebunders (2003)	2	0	0	8
De Visser (2000)	0	1	0	9
De Visser (2002)	2	1	0	11
Duggan (2001)	0	0	0	9
Fitzpatrick (2007)	0	0	0	5
Fogarty (2007)	0	1	0	10
Gore-Felton (2003)	0	0	0	11
Jernewall (2005)	0	0	0	8
Josephs (2007)	0	0	0	3
Kaufman (2007)	0	0	0	7
Kirksey (2002)	0	0	0	10
Knipples (2000)	0	0	0	8
Langlois-Klassen (2007)	0	1	0	10
London (2003)	0	0	0	6
Mikhail (2004)	0	0	0	7
Molassiotis (2004)	0	0	0	3
Nicholas (2007)	0	0	0	6
Sparber (2000)	0	0	0	11
Standish (2001)	0	0	0	11
Suarez (1997)	0	1	0	8
Suarez (2000)	0	1	0	9
Sugimoto (2005)	0	0	0	8
Sukati (2005)	0	0	0	7
Thomas (2007)	1	0	1	12
Wanyama (2007)	0	0	0	6
Wutoh (2001)	0	0	0	9

Table 3. Summary of Characteristics of CAM Measures.

Study Characteristic	Number of measures	%
Reliability		
Assessed	6	18.8
Validity		
Assessed	1	3.1
Type used		
Closed-ended	12	37.5
Open-ended	7	21.9
Both	6	18.8
Unclear/Not assessed	7	21.9
Number used		
$\geq$ 5 modalities/$\geq$ 10 therapies	22	68.8
< 5 modalities/<10 therapies	9	28.1
Unclear/Not assessed	1	3.1
When used*		
Ever	7	21.9
Currently	16	50.0
Since diagnosis	7	21.9
ANR/RAND	1	3.1
Unclear/Not assessed	7	21.9
Frequency		
Assessed	1	3.1
ANR/RAND	3	9.4
Unclear/Not assessed	28	87.5
Dose		
Assessed	0	0
ANR/RAND	1	3.1
Unclear/Not assessed	31	96.9
Duration		
Assessed	0	0
ANR/RAND	2	6.3
Unclear/Not assessed	29	90.6
How used		
Both	3	9.4
One	5	15.6
No distinction	18	56.3
ANR/RAND	5	15.6
Unclear/Not assessed	1	3.1

Table 3, cont.

Study Characteristic	Number of measures	%
Reasons		
Assessed	6	18.8
ANR/RAND	3	9.4
Unclear/Not assessed	23	71.9
Disclosure		
Assessed	3	9.4
ANR/RAND	2	6.3
Unclear/Not assessed	27	84.4
Satisfaction		
Assessed	0	0
ANR/RAND	0	0
Unclear/Not assessed	32	100.0
Perceived efficacy		
Assessed	8	25.0
ANR/RAND	3	9.4
Unclear/Not assessed	21	65.6
Information source		
Assessed	5	15.6
ANR/RAND	3	9.4
Unclear/Not assessed	24	75.0
Expense		
Assessed	2	6.3
ANR/RAND	1	3.1
Unclear/Not assessed	29	90.6

* Percent sums to greater than 100% because, in some cases, studies assessed more than one construct.

The Development and Evaluation of a Complementary and Alternative Medicine Use Survey in African-Americans with Acquired Immune Deficiency Syndrome

Introduction

At the end of 2006, the Centers for Disease Control and Prevention (CDC) estimated that approximately 1.1 million adolescents and adults in the United States were living with Human Immunodeficiency Virus (HIV), the virus that causes Acquired Immune Deficiency Syndrome (AIDS), and evidence suggests that this population is still growing[1]. From 2004 to 2007, for example, the estimated number of newly diagnosed cases of HIV/AIDS in the 34 states who reported to CDC increased 15%[2]. However, the number of deaths of individuals with AIDS during this same time period decreased 17%[2] which is, in part, due to the success of highly active antiretroviral therapy (HAART) in extending the lifespan of those infected with HIV. In spite of pharmacological advances, however, many individuals still turn to complementary and alternative medicine (CAM) to manage HIV-related symptoms and side effects of HAART, improve HAART efficacy and/or survival and strengthen the body[3-5]. Indeed, one recent study reported CAM utilization rates among HIV-positive populations as high as 89%[6]. Vitamins, herbs, nutritional supplements, and spiritual/religious healing are among the most common CAM modalities employed by HIV-positive individuals[6-10].

Assessing CAM use among HIV-positive individuals is critical, as evidence suggests that some CAM modalities can interfere with conventional treatment regimens. For example, recent evidence suggests that St John's Wort, garlic and Vitamin C may reduce the concentrations of HAART in the blood, thus potentially lowering its effectiveness in controlling HIV viral load[11-13]. Other evidence suggests that HIV-

positive CAM users may be less likely to adhere to their conventional treatment regimens, although this literature is conflicting[14-16].

The risk of these adverse outcomes increases further when HIV healthcare providers are unaware of their patients' CAM use. In fact, many providers do not know that their patients are using CAM therapies. One recent study reported that more than half of HIV-positive individuals who reported using CAM had not told their providers[6]. One possible reason why HIV patients may underreport CAM use to providers is that providers often fail to ask their patients about whether they have used or are currently using CAM. Wynia and colleagues (1999) report that only 7% of HIV-treatment providers reported discussing CAM therapies with every new patient while only 5% reported discussing CAM at "most" or "every" follow-up visit[17]. Other recent studies report similar findings; for example, in more than 90% of cases where the provider was unaware of CAM use, HIV-positive patients reported that the provider had not inquired about their use[6].

Healthcare providers may not ask patients about their CAM use in part because they are uncomfortable with the topic due to the lack of knowledge about the efficacy and frequency of CAM use[18-20]. For example, 61% of physicians in one study reported that they do not feel sufficiently informed about CAM safety or efficacy[19]; more than 70% of providers in another study claimed that they had little or no knowledge about herbal remedies[18]. In spite of this lack of knowledge, most providers surveyed reported wanting to receive more education about CAM modalities[19] and would recommend it to a patient if they knew it was safe and effective[20]. Thus, the field of CAM research has a responsibility to thoroughly and rigorously assess CAM use among HIV-positive

individuals and disseminate these findings so as to further educate providers about their patients' CAM use and consequently facilitate more effective doctor-patient dialogues about CAM use.

Unfortunately, the quality of CAM assessment among HIV-positive populations is seriously lacking, thereby limiting the utility of research findings for investigators and healthcare providers. For example, in spite of the fact that prior research suggests that many CAM therapies are culturally-[21-24] and stage-of-disease specific[6, 25, 26], most researchers continue to implement CAM instruments that are not tailored to their study populations. Including CAM therapies on a survey that are not relevant to participants' experiences may result in poor face validity, causing lower participant motivation to perform well and provide accurate responses[27-29]. Failure to include therapies that are relevant to participants' experiences can result in the underestimation of the prevalence of CAM use.

Further, few studies report the reliability and/or validity of CAM measures. In their review of twelve studies on CAM use among breast cancer patients, Lengacher and colleagues reported that none of these studies cited any psychometric indices assessing the reliability or validity for CAM instruments[30]. In a recent systematic review of CAM use instruments implemented among HIV-positive study populations, the first author (AOS) found that 20% of the studies assessed the reliability and only 3% assessed the validity of the CAM instrument employed. These measurement-related limitations consequently diminish the degree to which research findings on CAM use can be compared across studies[31] and subsequently disseminated to HIV healthcare providers.

Given these limitations, the purpose of the current study was to develop and evaluate the psychometric properties of a new culturally- and stage-of-disease-appropriate measure of CAM use among a population of African-American individuals with AIDS using a mixed method design.

Methods

Overview of the Research Design

This mixed methods study used the Exploratory Design-Instrument Development model[32], a combining of qualitative and quantitative approaches for the purpose of developing and/or refining a measurement tool. This type of model in which initial qualitative data informs the development of a new, culturally-appropriate quantitative measure has been successful in prior research[33-36].

Data were collected in two phases. In Phase 1, qualitative (focus group) data were used to refine an already-existing validated CAM measure for the specific study population in the present study. In Phase 2, this refined quantitative instrument was then implemented in a larger sample. The resulting data were analyzed to evaluate the psychometric properties of the revised CAM instrument.

Phase 1

Participants

Focus group participants were recruited from the infectious disease program (IDP) clinic of a large, public, urban hospital in the Southeastern United States. Individuals were eligible to participate if they (1) were receiving their care from the IDP clinic, (2) had had an AIDS diagnosis (defined as having had a CD4+ count less than 200 T-lymphocytes/uL), (3) identified as African-American, (4) were 21 years of age or

older, (5) spoke English, (6) were not cognitively impaired (defined as answering all questions on a brief Mini-Mental State Examination correctly[37]) and (7) were "moderate" or "heavy" CAM users. "Moderate" or "heavy" CAM users were individuals who had used at least one type of CAM therapy in the past 12 months occasionally (some occasions per month) or on a regular basis (many occasions per week), respectively. Due to the fact that the focus groups evaluated and assisted in the refinement of an existing CAM measure, those recruited for this first phase were individuals who had experience using CAM and could therefore provide the most detailed and nuanced reflections. Such a purposive sampling technique in qualitative research is useful because it allows the researcher to access information-rich cases who can best generate the desired data[38].

IDP clinic patients' medical records were prescreened by the first author (AOS) for eligibility. If a patient's medical record indicated that he/she had had an AIDS diagnosis, identified as African-American and were 21 years of age or older a letter to his/her provider along with a recruitment flyer for the patient was inserted into his/her medical record the day before the patient was scheduled to be seen at the IDP clinic. Providers then distributed the flyers to the patient at the end of his/her clinic visit. Interested patients who called the investigator for additional information were then given the brief screening test verifying their study eligibility and, if eligible, were randomly assigned to one of the 5 focus groups.

Procedure

Following eligibility screening and enrollment and prior to participation, each participant read and signed a consent form describing the study and ensuring his/her confidentiality. All focus groups were held in a private conference room at the IDP

clinic, digitally-recorded, lasted approximately 60 minutes and were conducted by the first author (AOS). A research assistant (DHD) was present to assist with administrative needs as well as record notes during the focus groups.

Four of the five focus groups were conducted at the beginning of Phase 1. Two of these four groups were structured focus groups in which participants were given a paper-and-pencil version of the CAM survey used by Lengacher and colleagues[30], one of the only CAM measures available that has been methodically and rigorously evaluated for reliability and validity. Originally used with breast cancer patients, this measure was minimally edited to make it applicable for AIDS patients; however, the types of CAM therapies included and the structure of the questions (a 4-point Likert scale from 'never use the therapy' to 'use the therapy on a regular basis') remained the same as the original survey. Participants were first asked to complete the survey individually. Following this individual exercise the group discussed the strengths and limitations of the original survey, whether there were any CAM therapies listed that did and/or did not seem to belong and if so, why.

The two other focus groups were unstructured in which participants were not given the edited Lengacher and colleagues[30] CAM survey; instead they were asked to discuss their own conceptualization of CAM without having access to an a priori framework as did the prior two focus groups. Specifically, they were asked about what comes to mind when they think about CAM, what kinds of therapies they might include in this definition and what people use that they would consider CAM. Participants were also asked about when, where and why people use CAM, how and where people learn about CAM therapies, where people go to do/practice these therapies, and whether people

talk to their healthcare providers about their CAM therapies. The purpose of including two additional, unstructured focus groups was to provide a forum within which participants could define CAM on their own terms, thereby providing additional critical insight into the operationalization of CAM-related behaviors[39].

Both the refined CAM survey questions from the structured focus groups and domains generated from the unstructured focus groups were used to create a formative beta version of a revised CAM survey specifically tailored to the population in the present study. The fifth and final focus group completed this formative beta version using the same procedure as the prior structured focus groups except that participants completed the revised survey on laptop computers that used an audio computer-assisted self-interview (ACASI) program (as opposed to the more traditional paper-and-pencil format). In contrast to the first two structured focus groups during which the *content* of the survey was refined, the purpose of the fifth and final focus group was to evaluate the readability, clarity, and face validity of the survey using a cognitive assessment technique. A cognitive assessment is one method designed to evaluate how individuals understand, respond to and interpret items and whether their interpretation is similar to that of the instrument developer[40, 41]. Therefore, the purpose of this focus group was to further evaluate the survey before it was distributed to a larger sample in Phase 2. Any errors, misunderstood items/terms, or unclear elements of this version were addressed, resulting in a beta version ready to implement in Phase 2. Following completion of the focus groups all individuals answered several sociodemographic questions and were compensated for their time.

Analyses

First, all digitally-recorded focus group conversations and notes were transcribed. Following transcription, the resulting data were analyzed using a content analysis technique, a method "for making inferences by objectively and systematically identifying specified characteristics of messages"[42]. Specifically, this technique is most appropriate when the researcher wishes to approach narrative analysis with pre-identified themes[43]. All narratives were then coded for the presence of any of the following themes: (1) misunderstanding of/confusion about a survey item, (2) belief that a therapy should not be included on the survey, and (3) belief that a therapy should be included on the survey. All items that were identified as confusing or unclear were edited; all items identified as not belonging on the survey (either because they were irrelevant, upsetting, confusing, etc.) were eliminated from the survey only if identified in more than one focus group. Items identified as belonging on the survey were kept or added, even if just identified in one focus group. This approach aimed to be conservative, whereby all types of and reasons for using CAM were added more freely than they were subtracted so the instrument would be able to capture the most diverse set of experiences. Added items had the same Likert response format as those items in the original survey.

Phase 2

Participants

In contrast to the Phase 1 recruitment strategy (which involved recruiting individuals who were CAM users), the Phase 2 strategy focused on recruiting both users and non-users so that the study population was more representative of the IDP clinic patient population. Eligible individuals for Phase 2 (1) had not participated in Phase 1,

(2) were receiving their HIV/AIDS care from the IDP clinic, (3) had had an AIDS diagnosis, (4) identified as African-American, (5) were 21 years of age or older and (6) spoke English.

Participants were recruited from the first floor of the IDP clinic where patients were required to check-in/check-out for their appointments. The research assistant (DHD) actively recruited patients by conducting preliminary screening and, if the patient were eligible to participate, referred him/her to a conference room where the survey was administered. Most patients completed the survey following their clinic appointment on the same day they were initially recruited.

Procedure

Following eligibility screening and enrollment and prior to participation, each participant read and signed a consent form describing the study and ensuring his/her confidentiality. Participants then completed the CAM instrument developed during Phase 1 on ACASI-programmed laptops which took approximately 30-45 minutes to complete. Following completion of the survey all individuals answered several brief sociodemographic questions and were compensated for their time.

To evaluate the stability (test-retest reliability) of the CAM survey, approximately one-third of the initial survey participants were randomly selected to complete the CAM survey again 2-4 weeks after completing the initial survey. This time between administrations of the survey was specifically selected because it decreased the chance that participants remembered their responses from the first administration (and answered consistently on subsequent surveys) but was not such a delay so as to risk actual changes in CAM use[44]. Randomly selected individuals were contacted via telephone, asked

whether they would be willing to complete the survey again and, if they were, they returned to the same IDP clinic conference room to participate again. Test-retest participants were similarly compensated for their time.

Analyses

Following Phase 2 data collection, data were imported and cleaned in SPSS version 17.0. The 'frequency of CAM use' scale was then coded such that participants were assigned a '0' for each of the 14 CAM therapies they reported "never" using, a "1" for each they reported "seldom" using, a "2" for each they reported "occasionally" using and a "3" for each they reported using on a "regular basis." Survey data were then analyzed to assess the reliability of the 'frequency of CAM use' scale using two methods. First, an estimate of internal consistency using Cronbach's alpha was calculated. This method provided an indication of the interrelatedness of the items. Second, Pearson correlations were calculated on the responses from those participants who completed the CAM survey on two occasions to examine the scale's test-retest reliability.

Data were also analyzed to assess the validity of the 'frequency of CAM use' scale. Specifically, in order to (1) evaluate whether there are any underlying dimensions and/or subscales and (2) identify any weak survey items, an exploratory factor analysis was conducted using a maximum likelihood factor analysis with oblique rotation. Oblique rotation is the most appropriate method when factors are expected to be correlated as in the present analysis of CAM use[44]. To determine the number of meaningful factors to retain, Eigenvalues of 1.0 or greater were identified and scree plots were examined. Estimates of internal consistency were computed for all resulting factors. Finally, construct validity was assessed using a known-groups approach. In this

approach, participants are selected based on their membership in a group that is expected to differ on the construct of interest; if the participants' scores on the instrument differ in the hypothesized way, there is evidence of construct validity[45]. Given that research indicates that CAM use is consistently positively associated with female gender[6, 46-48], there would be evidence of construct validity if female participants reported more frequent CAM use than male participants. Construct validity was assessed using a one-way analysis of variance.

Results

Phase 1

Content Analysis

The five focus groups conducted had approximately 6-8 participants in each (N=35) and were similar with respect to the sociodemographic characteristics of the participants. Participants in both structured focus groups identified many therapies listed on the original CAM survey that they did not feel were relevant to their experiences (and, in fact, there were several therapies they reported having never heard of prior to the focus group). For example, participants in both groups did not feel that HIV-positive individuals used special diets (e.g., macrobiotic), practiced cleansing regimens (e.g., fasting, using enemas) or took health food supplements (e.g., shark cartilage, barley grass). Though several participants had heard of biofeedback, electrostimulation and light treatments, no one knew of anyone who had ever used these therapies. Most participants had never heard of ozone, metabolic or Chelation therapy. Therefore, these therapies, in addition to several others, were eliminated from the revised survey because they were identified as irrelevant in both structured focus groups and no participants in

the unstructured groups offered any conflicting information supporting the inclusion of these therapies.

Participants in the structured focus groups commented that though they felt that vitamins should be included, the examples provided on the original survey (vitamin E and selenium) were not the most commonly used vitamins by HIV-positive patients. Multivitamins, vitamin C and calcium were the suggested examples and were therefore included on the revised survey. Similarly, herbal supplements were commonly used, though several participants felt that the revised survey should specifically include Yellow root and milk thistle which were not mentioned on the original survey (which provided Ginkgo biloba and St John's Wort as examples).

Participants in the structured focus groups consistently agreed that vitamins, herbs, chiropractic and acupuncture were important CAM therapies to include and this sentiment was validated by participants in the unstructured groups. Only one of the structured groups felt that aromatherapy should be included (individuals in the other structured group reported not being familiar with the therapy); however, because it was identified by one group it was retained in the revised survey. Meditation, massage, prayer/spiritual healing and counseling/support groups were identified as being relevant therapies in both structured groups. Interestingly, after one participant in an unstructured group identified spiritual healing as an important CAM therapy, several other participants spent some time discussing whether prayer/spiritual healing should even be categorized as CAM. This debate is certainly commonplace in the field of CAM research and some researchers have decided to exclude prayer/spiritual healing when assessing CAM use among various populations[49]. However, this therapy was retained in the revised survey

because there was some consensus that prayer/spiritual healing was practiced frequently for health-related purposes.

Participants in all four groups discussed using dietary supplements such as Boost, Ensure and other protein drinks, likely due to the fact that many healthcare providers at the IDP clinic occasionally recommend them to patients struggling with wasting. Several participants in the unstructured groups spoke at great length about the various home remedies they used on occasion such as Kaolin and baking soda for indigestion, Epsom salts for muscle pain and vinegar for yeast infections. Finally, tai chi and marijuana were suggested as additional therapies not reflected on the original survey that several participants thought might be important to include (see Table 1).

Cognitive Assessment

Participants' feedback about the readability of the revised CAM survey was generally positive and few edits were necessary. Participants felt that the survey clearly and thoroughly assessed CAM use, providing evidence of adequate face validity, and did not feel that there were any confusing or unclear questions asked. Additional readability analyses in Microsoft Word indicated that the survey was accessible for a person with a 7^{th}-grade reading level. Several participants did struggle, however, with using the laptop keyboard mouse, so an external mouse was provided for individuals participating in Phase 2.

Phase 2

Sociodemographics

One hundred and eighty-two individuals participated in the survey; approximately one-third (N=59) of these individuals also participated in the test-retest process. The

mean participant age was 45.4 years (SD=6.86). Participants were predominantly male (69.8%), single (80.7), not working (83.8%), had a high school education or less (60.6%), made less than $15,000 per year (82.0%) and rented their apartment or house (40.6%; see Table 2).

CAM Use

Approximately 94% of participants (N=171) reported currently (within the last 12 months) using any CAM. The most common types of CAM used included prayer/spiritual healing, vitamins (multivitamins and calcium), counseling/support groups, meditation and dietary supplements (Boost/Ensure, energy drinks, protein shakes). The least common types of CAM used included acupuncture, tai chi, yoga, and chiropractic (see Table 3).

Reliability and Validity

The means of the individual scale items ranged from 0.10 to 1.69 with standard deviations ranging from 0.46 to 1.45. The inter-item correlations ranged from 0.15 to 0.44, suggesting that there was no redundancy among items, defined as an inter-item correlation greater than 0.85[44]. The mean inter-item correlation was 0.24.

The item-to-total correlations ranged from .05 to 0.56 with a mean item-to-total correlation of 0.41. All items except acupuncture demonstrated high correlations with the total scale score (see Table 3). Due to the fact that acupuncture was not significantly correlated with the total scale score it was not included in subsequent analyses. The scale mean was 8.68 with a standard deviation of 5.56. The internal consistency of the entire scale, excluding acupuncture, was α=0.67 and the test-retest reliability was r=.79 ($p<0.01$).

Maximum likelihood analysis resulted in a three-factor solution with 4 items loading on factor conceptualized as "home-based CAM", 4 items loading on a factor conceptualized as "ingested/inhaled CAM" and 4 items loading on a factor conceptualized as "body-based CAM." Counseling/support groups loaded poorly and thus was considered an equivocal item based on the fact none of the loadings on any of the factors was 0.30 or higher, the recommended minimum criteria for a factor loading[50]. Internal consistency estimates for each of the subscales generated by the factor analysis were: α=0.54 for the "home-based CAM" subscale, α=0.56 for the "ingested/inhaled CAM" subscale, and α=0.59 for the "body-based CAM" subscale (see Table 4).

Results from the known-groups analyses suggest that female participants did report using CAM more frequently (mean=4.22, SD=2.29) than male participants (mean=3.40, sd=2.25) though these groups did not significantly differ [F=2.32 (2,181), p=0.10].

Discussion

This study presents results from the development and evaluation of a new instrument to assess CAM use among African-Americans with AIDS. Using a mixed method approach, this instrument was developed to be tailored to the specific study population and evaluated for its psychometric properties, thereby addressing two measurement-related limitations found in so many prior CAM studies. The instrument had satisfactory face validity, suggesting that participants judged the survey to be an appropriate assessment of CAM use, as well as adequate test-retest reliability, suggesting that CAM use was a relatively stable phenomenon over the course of 2-4 weeks and that the instrument reliably measured this phenomenon.

Further, in spite of the fact that the frequency of CAM use among this population was skewed (skewness ranged from -0.28 to 4.86), all but one survey item factored in a manner that was interpretable and generally consistent with recent theoretical conceptualizations[51] and findings from prior factor analyses[16]. Home remedies, meditation, prayer and aromatherapy all loaded together on what was characterized as a "home-based CAM" factor. These are all CAM therapies that are typically practiced in the home and cost very little. Vitamins, supplements, herbs and marijuana all loaded together on the "ingested/inhaled CAM" factor, as these are all therapies that typically enter the body orally and are expected to produce physiological changes. Chiropractic, yoga, tai chi, and massage all loaded together on what was characterized as a "body-based CAM" factor, as these are therapies that involve the manipulation or movement of the body in some way and can be higher in cost than the other therapies. It is not surprising that counseling/support groups did not consistently load on one factor, as this therapy was the most negatively-skewed item on the survey (skewness=-0.28) and did not logically fit any of the factors (it is seldom practiced in the home, is not ingested or inhaled and rarely involves any manipulation or movement of the body). Perhaps if individual therapy, group therapy and support groups had been included separately on the survey, as opposed to collapsed together as one CAM modality, these items would have formed a fourth, "mental health CAM" factor.

Unfortunately, the internal consistency reliability of each of the subscales from the factor analysis was less than adequate which may, in part, be due to small number of items (N=13), the skewness of the items or the relatively small sample size. Future research could add more therapies to each subscale or administer the instrument to more

heterogeneous sample. In the meantime, it is suggested that this instrument be used as a total scale and that the total score be used in analyses instead of scores from the individual subscales[45]. Additionally, there was only marginal evidence of construct validity. However, female participants did report more frequent CAM use compared to male participants; the lack of statistically significant findings is likely due to the small number of females in the sample (28.6%). Future research could assess construct validity using a similar known-groups approach with a larger sample size.

Limitations

The present study was conducted among African-Americans with AIDS who were receiving their healthcare from a large, public, urban hospital in the Southeastern United States. Therefore, these findings concerning the prevalence and the underlying dimensions of CAM use should not be generalized to other study populations, other research settings or other regions of the country. Additional psychometric analyses are needed to further examine the underlying dimensions of CAM use and could included both exploratory and confirmatory factor analyses and item analysis using item response theory[45].

Conclusion

This research addressed several important gaps in the literature including a lack of culturally- and stage-of-disease-specific CAM instruments and an absence of psychometric assessments of these instruments. For HIV healthcare providers to provide the best care possible to their patients, they need to be informed about the types and frequency of CAM use among their patient population. This can be accomplished by methodically developing CAM instruments, rigorously implementing and assessing these

instruments and then consistently disseminating the findings to both researchers and practitioners.

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Table 1. Results from focus group content analysis.

Therapy	Eliminated	Kept But Edited	Kept Unchanged	Added
Acupuncture			X	
Aromatherapy			X	
Art Therapy	X			
Biofeedback	X			
Chelation Therapy	X			
Chiropractic			X	
Cleansing Regimens	X			
Colored Light Treatments	X			
Counseling/Support Groups			X	
Dietary Supplements				X
Electrostimulation	X			
Guided Imagery	X			
Health Food Supplements	X			
Herbal Supplements		X		
Home Remedies				X
Humor Therapy	X			
Hypnosis	X			
Magnetic Therapy	X			
Marijuana				X
Massage			X	
Meditation			X	
Metabolic Therapy	X			
Music Therapy	X			
Naturopathy	X			
Ozone Therapy	X			
Prayer/Spiritual Healing			X	
Reflexology	X			
Special Diets	X			
Tai Chi				X
Traditional Chinese Medicine	X			
Vitamins		X		
Yoga			X	

Table 2. Sociodemographic characteristics of the survey participants (N=182).

Characteristic	Total N (%)
Age (yrs)	
≤ 45	90 (49.5)
> 45	92 (50.5)
Sex	
Male	127 (69.8)
Female	52 (28.6)
Marital Status	
Single	146 (80.7)
Divorced or separated	27 (14.9)
Married or partnered	8 (4.4)
Employment Status	
Working	21 (11.5)
Unemployed	57 (31.1)
Disabled	96 (52.7)
Other	8 (4.4)
Education	
≤ High school	109 (60.6)
> High school	71 (39.4)
Yearly Income	
<$15,000	146 (82.0)
≥$15,000	32 (18.0)
Housing Status	
Rent	73 (40.6)
Own	4 (2.2)
Live with others	52 (28.9)
Homeless	51 (28.3)

Table 3. Frequencies and Item Correlations of CAM Therapies.

Therapy	Frequency of CAM Use (%)				Item Correlations With Total Score
	Never	Seldom	Occasionally	Regular Basis	
Vitamins	46.3	1.4	4.8	47.6	.425**
Herbs	91.2	0.7	4.1	4.1	.358**
Home remedies	74.1	7.5	11.6	6.8	.435**
Chiropractic	91.2	3.4	2.0	3.4	.483**
Massage	88.4	2.0	7.5	2.0	.509**
Supplements	46.9	8.2	19.7	24.5	.475**
Aromatherapy	87.1	0.7	5.4	6.8	.556**
Marijuana	90.5	2.7	4.8	2.0	.236**
Counseling	35.4	3.4	25.9	35.4	.481**
Meditation	63.3	1.4	10.2	25.2	.556**
Yoga	93.2	1.4	2.7	2.7	.385**
Tai Chi	95.2	1.4	2.0	1.4	.249**
Acupuncture	98.0	0.7	0.7	0.7	.050
Prayer	40.8	2.7	4.1	52.4	.510**

** $p<0.01$

Table 4. Factor Loadings of CAM Therapies.

Exploratory Factors and Therapies	Factor Loadings		
	Factor 1	Factor 2	Factor 3
Factor 1 (Home-Based CAM)			
Home remedies	0.68	0.17	0.01
Meditation	0.66	0.38	0.14
Prayer	0.68	0.04	0.09
Aromatherapy	0.37	0.14	0.25
Factor 2 (Ingested/Inhaled CAM)			
Vitamins	0.26	0.46	0.18
Supplements	0.20	0.72	-0.12
Herbs	0.25	0.48	-0.09
Marijuana	0.18	0.51	0.52
Factor 3 (Body-Based CAM)			
Chiropractic	-0.14	0.08	0.72
Yoga	0.44	0.04	0.57
Tai Chi	0.29	-0.38	0.63
Massage	0.24	0.20	0.71
Equivocal			
Counseling/support groups	0.26	0.28	0.27
Internal consistency*	0.54	0.56	0.59

*Estimates resulting from internal consistency analyses of each subscale consisting of the highlighted items.

Prevalence and Predictors of Complementary and Alternative Medicine Use in African-Americans with Acquired Immune Deficiency Syndrome

Introduction

The use of complementary and alternative medicine (CAM), a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine[1], has steadily increased over the last 15 years[2, 3], with utilization rates among the general population as high as 67.6%[4]. Some reports suggest that these rates are even higher among individuals with chronic diseases and life-threatening illnesses. For example, research indicates that individuals with Human Immune Deficiency Virus (HIV) may be more likely to use CAM compared to healthy populations. One study reported that while 36% of people with HIV used therapies only 5% of the general population used them[5]. More recent evidence indicates that as many as 87% of individuals with or at risk for HIV infection reported using some form of CAM within the past 6 months[6].

Assessing the prevalence and predictors of CAM use among HIV-positive populations is critically important, as research suggests that some CAM therapies may jeopardize the efficacy of the conventional HIV medication regimen, highly active antiretroviral therapy (HAART). For example, there is some evidence that Echinacea may increase HIV viral load[7], Kava may cause hepatotoxicity[8], garlic[9], vitamin C[10] and St John's wort[11, 12] may put an individual at risk of sub-therapeutic HAART levels, Aloe Vera[13] may reduce HAART drug absorption and Ginkgo biloba[14], Ginseng[15] and Milk thistle[16] may intensify HAART-related side effects. Given that many patients are unlikely to disclose CAM use to their providers[17], the onus is often on the providers to initiate these conversations. Unfortunately, evidence suggests that providers do not feel

sufficiently informed about CAM[18]. Therefore, (1) thoughtfully and (2) thoroughly assessing CAM use and then disseminating this information to HIV healthcare providers is essential in facilitating informed and effective doctor-patient communication, thereby ultimately improving HIV-positive individuals' quality of care.

Unfortunately, much of the research on CAM use, in general, and among HIV-positive populations, in specific, has been lacking on both accounts. First, most CAM studies are atheoretical in spite of the fact that theory is arguably one of the most important components of health research[19]. Theory allows us to organize ideas, formulate sound hypotheses, and design investigations in a coherent and cohesive way, as we are compelled to think critically and systematically about the connections between variables of interest. Further, theoretical frameworks force researchers to be deliberate in study design, methodology, statistical analysis, and interpretation. Without an explicit acknowledgement of one's hypothesized pathways from exposure to outcome, for example, the researcher can be all too tempted to examine many variables haphazardly, hoping that some will end up statistically significant. This results in lazy research, whereby statistical significance (and one's statistical software) dictates variables of interest rather than one's own intellectually-generated and evidence-based hypotheses. Therefore, theory forces us to be explicit about our hypotheses and about the connection between phenomena. By using theory to guide CAM research, it can become more thoughtful and purposeful.

Second, the majority of studies continue to dichotomize CAM use such that participants are categorized as either "users" or "non-users" based on whether they responded affirmatively to any questions about CAM use. Given that CAM use among

HIV-positive individuals may be fairly common, this is not a useful approach theoretically or analytically. The more thorough method would be to assess the frequency of CAM use on a continuum, thereby developing a more nuanced understanding of the *degree* of CAM use among this population. Further, many studies ask patients about the types of CAM they are using but stop short of investigating additional aspects of CAM use. Though investigating the types of CAM used is undoubtedly essential information, so are many other dimensions, including the frequency, dose, and duration of and reasons for CAM use as well as the frequency of discussion about CAM use with healthcare providers. A more thorough assessment should therefore employ continuous measures of CAM use and examine multiple dimensions of CAM use.

Given these limitations in the literature, the aim of the present study was to investigate the prevalence and predictors of CAM use in a theory-driven, multi-dimensional manner.

Methods

Conceptual Model

The present analysis was based on the CAM Healthcare Model[20] which is a modification of Andersen's Behavioral Model for Health Services Use[21, 22]. According to the CAM Healthcare Model, CAM use is dictated by both "push" and "pull" related factors. Factors that may "push" an individual away from conventional care include dissatisfaction with conventional care and financial issues (e.g., cost of care, low income, lack of health insurance); factors that may "pull" an individual towards CAM may include personal values that prioritize self-care and positive beliefs about CAM being

"natural." These individual-level determinants of CAM use can be classified into three main categories: predisposing factors, enabling factors and need-based factors.

According to the model, predisposing factors are those that influence whether an individual will use CAM. These factors are divided into demographic characteristics (e.g., gender, age and marital status), social structure (e.g., education), beliefs and values (e.g., satisfaction with conventional healthcare) and personal factors (e.g., perceived self-efficacy and perceived control over health/healthcare). Enabling factors (resources) are those that either facilitate or impede an individual's use of CAM. For example, individuals must have the financial means (e.g., income and employment) and the "know-how" to access CAM (e.g., health literacy). Finally, need-based factors refer to an individual's health status or illness state and are divided into perceived need factors and evaluated need factors. Perceived need factors are subjective assessments of health status (e.g., perceived symptom severity, self-reported quality of life, etc.); evaluated need factors include those that are based on objective assessments of disease status (e.g., date of diagnosis, number of doctor's office visits, etc.). Using these categories, the model aims to identify factors associated with CAM use and enhance understanding of factors that predict CAM use[20].

Though the present study examined whether these individual-level determinants predicted CAM use, it is important to note that the model also accounts for the potential impact of social and system-based factors on CAM use such as changes in the availability of CAM therapies in conventional healthcare settings, availability of CAM-related training in schools of medicine, nursing, pharmacy and public health and health insurance reimbursement policies for CAM therapy utilization.

Participants

Individuals were recruited from the infectious disease program (IDP) clinic of a large, public, urban hospital in the Southeastern United States. Eligible individuals (1) were currently receiving their HIV/AIDS care from the IDP clinic, (2) had had an AIDS diagnosis, (3) identified as African-American, (4) were 21 years of age or older and (5) spoke English.

Participants were recruited from the appointment check-in area of the IDP clinic. The research assistant (DHD) actively recruited patients by conducting preliminary screening and, if the patient were eligible to participate, referred him/her to a conference room where the survey was administered. Most patients completed the survey prior to or following their clinic appointment on the same day they were initially recruited.

Procedure

Following eligibility screening and enrollment and prior to participation, each participant read and signed a consent form describing the study and ensuring his/her confidentiality. Participants then completed the survey on audio computer-assisted self-interview (ACASI)-programmed laptops which took approximately 30-45 minutes to complete. Following completion of the survey all individuals were compensated for their time.

To conduct a test-retest reliability analysis on the stability of the frequency of CAM use scale, approximately one-third of the initial survey participants were randomly selected to complete the CAM survey again 2-4 weeks after completing the initial survey. This time period between administrations of the survey was specifically selected because it decreased the chance that participants remembered their responses from the first

administration (and answered consistently on subsequent surveys), but was not such a delay so as to risk actual changes in CAM use[23]. Randomly selected individuals were contacted via telephone, asked whether they would be willing to complete the survey again and, if they were, they returned to the same IDP clinic conference room to participate again. Test-retest participants were similarly compensated for their time.

Instruments

CAM Survey

The CAM questions were based on the survey used by Lengacher and colleagues[24], one of the few CAM measures available that has been methodically and rigorously evaluated for reliability and validity. Originally used with breast cancer patients, this instrument was edited to make it applicable for AIDS patients. Specifically, focus groups were used to assist both in revising this instrument as well as in generating additional CAM-related items. The result was a new set of CAM questions that were tailored to the study population in the present research but were otherwise similar to the original survey in length and item response format (Likert).

Participants were asked first about their frequency of CAM use for each of the following 14 types of CAM: vitamins, herbs, home remedies, chiropractic, massage, dietary supplements, aromatherapy, marijuana, counseling/support groups, meditation, yoga, tai chi, acupuncture and prayer/spiritual healing. If participants responded that they "never" used a therapy, a programmed skip pattern took them to the next CAM therapy; if participants responded that they "seldom used" (some occasions per year), "occasionally used" (some occasions per month) or used the therapy on a "regular basis" (many occasions per week), they were asked follow-up questions concerning the duration

of use (whether they had been using the therapy for less than a month, 1-12 months or more than a year) and reasons for use (whether they used the therapy to reduce stress, boost the immune system, boost energy/appetite or gain weight, detoxify the body, gain control over their HIV treatment or as a nutritional supplement). Participants were also asked about whether they had used the therapy prior to their HIV diagnosis, how they used the therapy (as a complement or an alternative to their HIV healthcare) and whether they had discussed using the therapy with their HIV healthcare providers.

For the purpose of subsequent regression analyses participants were assigned a '0' for each CAM therapy they reported "never" using, a "1" for each therapy they reported "seldom" using, a "2" for each therapy they reported "occasionally" using and a "3" for each therapy they reported using on a "regular basis." These scores were summed for each participant, resulting in a total 'frequency of CAM use' variable (range: 0-42), with higher numbers representing more frequent CAM use.

Predisposing Characteristics

The predisposing characteristics evaluated in the present study included age, gender, marital status, highest level of educational attainment, satisfaction with conventional healthcare, coping self-efficacy and health locus of control. Age, gender, marital status and education were assessed on the sociodemographic section of the survey. Age was included in subsequent regression models as a continuous variable; gender (male=0, female=1), marital status (0=other; 1=married/partnered) and educational attainment (high school education or less=0, more than a high school education=1) were entered as categorical (dummy) variables.

Satisfaction with conventional healthcare was assessed using the 9-item Satisfaction with Healthcare Scale[25] that was minimally edited so that it was applicable to HIV-positive patients. On a Likert scale from 1 ("Strongly disagree") to 6 ("Strongly agree"), participants were asked about their perceived quality of and satisfaction with their HIV-related healthcare (e.g., "My HIV healthcare providers have always treated me with the utmost respect"). The scale has been demonstrated to have good internal consistency (α=0.82) and moderate test-retest reliability (ICC=0.62). Responses were reverse coded, where appropriate, and summed to generate a total score with higher numbers indicating a greater satisfaction with conventional care. Satisfaction with healthcare was included in regression models as a continuous variable.

Coping self-efficacy was assessed using the 13-item Coping Self-Efficacy Scale[26]. The scale has three subscales, each of which has demonstrated high internal consistency. The first subscale, "used problem-focused coping" (α=0.91), reflects an individual's self-efficacy with respect to addressing problems by analyzing the nature of the problem and using cognitive strategies to make the individual's perception of the problem less severe (e.g., "When things are going well for you or when you are having problems, how certain are you that you can take an upsetting problem and break it down into smaller parts?") The second subscale, "stopped unpleasant emotions and thoughts" (α=0.91), reflects an individual's willingness to alter his/her emotional response to a problem rather than addressing the characteristics of the problem itself (e.g., "When things aren't going well for you or when you are having problems, how certain are you that you can take your mind off unpleasant thoughts?") The third subscale, "received support from friends and family" (α=0.80), reflects an individual's ability to seek help from friends and family to

cope with problems (e.g., "When things aren't going well for you or when you are having problems, how certain are you that you can get help from friends to help you with the things you need?"). Participants responded to each question on a scale of 1 ("Never") to 5 ("Always"); responses were summed to generate a total score, with higher numbers indicating a higher coping self-efficacy. Coping self-efficacy was included in regression models as a continuous variable.

Health Locus of Control was assessed using a revised version of the Multidimensional Health Locus of Control (MDHLOC) scale developed by Wallston, Wallston, and DeVellis[27]. This scale measures the extent to which respondents believe their health is controlled by themselves ('Internality' subscale), chance or luck ('Chance' subscale) or powerful others such as doctors ('Powerful Others' subscale). Items from the initial scale that ask participants about their beliefs with respect to their "condition" were edited so as to be HIV-specific. Questions from the 6-item 'Internality' subscale included "If my HIV worsens, it is my own behavior which determines how soon I will feel better again"; items from the 6-item 'Chance' subscale included "Most things that affect my HIV happen to me by chance"; items from the 6-item 'Powerful Others' subscale included "If I see my doctor regularly, I am less likely to have problems with my HIV." Participants responded to each question on a scale of 1 ("Strongly Disagree") to 6 ("Strongly Agree"); responses from each subscale were summed to generate a total score, with higher scores indicating a greater endorsement of that subscale's philosophy. Reliability and validity analyses indicate that the 'Internality' and 'Powerful Others' subscales are moderately reliable (α=0.68 and α=0.70, respectively); the 'Chance' subscale has demonstrated poor internal consistency (α=0.49) and was therefore not

administered in the present study[28]. The 'Internality' and 'Powerful Others' subscales were included in regression models as continuous variables.

Enabling Resources

The enabling resources evaluated in the present study included yearly income, employment status and health literacy. Yearly income and employment status were assessed on the sociodemographic section of the survey. Both variables were included in regression models as categorical variables (income: less than $15,000 per year=0, $15,000 per year or more=1; employment status: unemployed/disabled=0, working=1). Health literacy was assessed using The Newest Vital Sign, a tool intended for identifying individuals at risk for low health literacy in a clinical setting. Individuals were asked to answer 6 questions using the information provided from an image of a nutritional label from the back of an ice cream container (e.g., "If you are allowed to eat 60 grams of carbohydrates as a snack, how much ice cream could you have?") The greater the number of questions answered correctly the more likely the respondent had adequate health literacy. The instrument has adequate reliability (Cronbach's α=0.76) and criterion validity with the Test of Functional Health Literacy in Adults ($r = 0.59$, $P < .001$)[29]. Health literacy was included in regression models as a continuous variable.

Need for Care

Participants' 'perceived need for care' was evaluated in the present study by assessing their quality of life and severity of HIV-related symptoms/side effects. Perceived quality of life was assessed using the Health-Related Quality of Life Survey from the HIV Cost and Services Utilization Study[30]. This survey consists of a set of subscales that aim to assess individuals' perceptions of well-being in physical, mental

and social domains of life. The 9-item 'Physical Functioning' subscale (α=0.91) asked participants to report the extent to which their health has limited their ability in the last 4 weeks to engage in various activities including "climbing one flight of stairs", "walking one block", "bathing or dressing yourself", and "preparing meals or doing laundry." Participants reported that they were limited "a lot", "a little" or "not limited." The 7-item 'Emotional Well-Being' subscale (α=0.90) asked participants to report how often they have experienced various emotional responses in the last 4 weeks, including feeling "calm and peaceful", "downhearted and blue", "depressed" and "anxious and worried." Participants responded on a scale of 1 ("all of the time") to 6 ("none of the time"). Responses from both subscales were summed to generate a total score, with higher scores indicating greater perceived physical functioning and emotional well-being, respectively. Both subscales were included in regression models as continuous variables.

Perceived severity of HIV-related symptoms was assessed using the 20-item HIV Symptom Index[31]. Participants were asked to report the degree to which they have felt bothered by various commonplace HIV-related symptoms in the last 4 weeks, including fatigue/loss of energy, fevers/chills/sweats, nausea, diarrhea and skin problems. Participants responded on a scale of 1 ("It hasn't bothered me at all") to 4 ("It has bothered me a lot"). Responses were summed to generate a total score, with higher scores indicating greater perceived symptom severity. Symptom severity was included in regression models as a continuous variable.

Participants' 'evaluated need for care' was assessed by their most recent CD4+ cell count (cells/mm^3) and HIV RNA (copies/mL). Data were abstracted from patients' electronic medical records by the fourth author (JL). Data were available for 102 patients

(56.7%); however, an additional 10 patients were excluded because either their CD4+ or HIV RNA data was not collected during or within 3 months of the study period; therefore, the final sample size for the evaluated need for care variables was 92.

Analyses

First, descriptive statistics were conducted to examine the characteristics of the study population, the frequency and duration of CAM use and the reasons for CAM use. When participants used CAM (prior to and/or after their HIV diagnosis), how they used CAM (as a complement or as an alternative) and whether they discussed their CAM use with their healthcare providers was also assessed using descriptive statistics.

Second, an estimate of internal consistency using Cronbach's alpha was calculated to examine the reliability of the 'frequency of CAM use' scale. This method provided an indication of the interrelatedness of the items. Additionally, Pearson correlations were calculated on the responses from those participants who completed the CAM survey on two occasions to examine the scale's stability (test-retest reliability).

Finally, linear regression analyses proceeded in two phases. Initially, all continuous variables were examined to determine the fit between their distributions and the assumptions of multivariate analysis. Specifically, the normality (skewness and kurtosis) of these variables were evaluated. Viral load and CD4 count both had significant positive skewness and kurtosis and were therefore logarithmically transformed. Subsequent residual scatterplots were also inspected as an additional test of assumptions of normality, linearity and homoscedasticity between the predicted CAM frequency scores and the errors of prediction; the residuals were all normally distributed[32]. Next, variables identified as associated with CAM use in bivariate analyses

at $p<0.10$ and for which there was no evidence of collinearity (characterized by a conditioning index greater than 30 for a given dimension coupled with variance proportions greater than 0.50 for at least 2 variables)[33] were retained in the subsequent multivariable linear regression model to assess the independent contribution of the predisposing, enabling and need-based factors in explaining frequency of CAM use. Analyses were conducted using SPSS Version 16.0.

Results

Characteristics of the Study Population

One hundred and eighty-two individuals participated in the survey. The mean participant age was 45.37 (SD=6.86). Participants were predominantly male (69.8%), identified as mostly or completely heterosexual (53.6%), were single (80.7), not working (83.8%), had a high school education or less (60.6%), made less than $15,000 per year (82.0%) and rented their apartment or house (40.6%). Approximately one-third of participants was currently on HAART (30.9%) and 94% of participants (N=171) reported currently (within the last 12 months) using any CAM (see Table 1).

Frequency of CAM Use

Psychometric analyses of the 'frequency of CAM use' scale indicated that the item-to-total correlations ranged from 0.05 to 0.56 with a mean item-to-total correlation of 0.41. All items except acupuncture demonstrated high correlations with the total scale score. Due to the fact that acupuncture was not significantly correlated with the total scale score it was not included in subsequent regression analyses. The internal consistency of the entire scale, excluding acupuncture, approached the cut-off of 0.70 for

adequate reliability (α=0.67) and the test-retest reliability was satisfactory (r=0.79, p<0.01).

The majority of participants (94%) reported using at least 1 type of CAM therapy in the last 12 months. Even when prayer/spiritual healing was excluded, CAM use in the last 12 months was extremely common (91.2%). The most frequently used types of CAM included vitamins (multivitamins and calcium), counseling/support groups, prayer/spiritual healing and dietary supplements (Boost/Ensure, energy drinks, protein shakes). The least common types of CAM used included acupuncture, tai chi, yoga, and chiropractic (see Table 2).

Duration of CAM Use

Among those participants who reported using various CAM therapies, the duration of use was relatively lengthy, with the majority of participants reporting that they used most of the therapies (12 out of the 14 therapies) for longer than one year. Specifically, home remedies (77.8%), marijuana (88.9%) and prayer/spiritual healing (88.8%) were all therapies that had been used for a longer duration. Though less frequently used, acupuncture, tai chi and chiropractic therapies were among those that were more recently initiated (within the last 1-12 months; see Table 3).

Reasons for CAM Use

Stress reduction was among the most common reasons for CAM use reported by participants, particularly among massage (81.8%), aromatherapy (69.6%), meditation (73.1%), yoga (50.0%), tai chi (66.7%), acupuncture (66.7%), counseling/support group (57.6%) and prayer/spiritual healing (44.9%) users. Participants also indicated that they used counseling/support groups (28.8%) and prayer/spiritual healing (37.4%) to gain

control over their HIV treatment. Using CAM to boost energy/appetite or gain weight was common among vitamin (40.6%), dietary supplement (55.8%) and marijuana (50.0%) users. The majority (46.7%) of home remedy users reported using the modality to boost their immune system (see Table 4).

Other Dimensions of CAM Use

Of those individuals who reported currently using CAM, approximately half (52.7%) used at least one type of CAM therapy prior to their HIV diagnosis. There were some therapies, however, that were not initiated until patients received their HIV diagnosis. For example, 69.2% of those using chiropractic, 67.4% of those using dietary supplements and 72.9% of those receiving counseling or attending support groups reported not using these therapies prior to their HIV diagnosis. Home remedies (88.9%) and spiritual healing/prayer (86.0%) were the therapies most commonly practiced both before and after a HIV diagnosis.

The majority (79.7%) of study participants who were currently taking HIV-related medications reported using CAM therapies as a complement, as opposed to an alternative, to their medications. However, 9 participants (4.9%) who reported taking vitamins, 11 participants (6.0%) who reported taking dietary supplements and 6 participants (3.3%) who reported practicing spiritual healing and/or prayer did so as an alternative to some or all of their HIV-related medications.

Half (50%) of study participants who reported using any CAM had not discussed the CAM use with HIV healthcare providers. The greatest percent of CAM users not discussing CAM use with their healthcare providers practiced spiritual healing/prayer (24.7%). The most common reason (57.8%) provided for not discussing spiritual

healing/prayer with providers was because participants "did not think it was important to mention." Twenty participants (11%) who reported taking vitamins, 19 participants (10.4%) who reported meditating, 14 participants (7.7%) who reported taking dietary supplements and 13 participants (7.1%) who reported taking home remedies did not discuss the CAM therapy with their providers. The most common reasons provided for not discussing these forms of CAM therapies with providers were because participants "did not think it was important to mention" (41.4%) and "he/she never asked" (37.2%).

Predictors of CAM Use

Results from preliminary bivariate analyses revealed that six variables in the original model were not associated with frequency of CAM use at the $p<0.10$ level and therefore excluded in subsequent multivariate regression models. Specifically, among the Predisposing Characteristics, marital status, satisfaction with healthcare, coping self-efficacy and 'powerful others' health locus of control were excluded; among the Enabling Factors, employment was excluded; among the Need for Care variables CD4+ cell count was excluded. Nine variables were retained in the model: among the Predisposing Characteristics, age, gender, education and 'internality' health locus of control were retained; among the Enabling Factors, income and health literacy were retained; among the Need for Care variables, HIV RNA, emotional well being and symptom severity were retained. Analyses examining possible collinearity among the retained variables in the model indicated that there were no collinearity problems (there were no conditioning indices greater than 30 and no variance proportions greater than 0.50 for any two dimensions)[33].

Results from the multivariate linear regression indicated that being female, having a yearly income of $15,000 per year or more, having higher health literacy and higher HIV RNA levels were associated with a greater frequency of CAM use while having stronger emotional well being was associated with a lower frequency of CAM use, even after controlling for all other variables in the model (see Table 5). Participants' age, education, 'internality' health locus of control and symptom severity were not associated with frequency of CAM use.

Discussion

The present study aimed to investigate the prevalence and predictors of CAM use among a population of African-Americans with AIDS in a theory-driven, multidimensional manner. Results support and extend findings from prior research as well as highlight additional gaps of knowledge in the field that warrant further investigation.

CAM use in the present study was very common, even when prayer/spiritual healing was not included in the analyses. This is one of the highest known estimates of CAM use among HIV-positive study populations in the published literature, though one recent study with individuals with or *at risk for* HIV infection reported similar findings[6]. The types of CAM therapies found to be used most frequently – vitamins, counseling/support groups, prayer/spiritual healing and dietary supplements – are congruent with findings from prior research[17, 34-37]; the fact that acupuncture, tai chi, yoga, and chiropractic were reportedly used less often is not surprising, as evidence suggests these are uncommon CAM modalities among African-American populations[38-41].

Prior evidence from non-HIV-infected study populations suggests that most individuals use CAM as a complement rather than as an alternative to their conventional healthcare[3, 42, 43] and recent research with HIV-positive individuals, including findings from the present study, provide congruent results[6]. Interestingly, many authors describe these findings in a positive tone, suggesting that the use of CAM as a complement to conventional healthcare is the preferred approach when in fact, particularly among HIV-positive populations, using these therapies as a complement to conventional care can be just as risky as using these therapies as an alternative. It is potentially dangerous for HIV-positive individuals to use CAM therapies as an *alternative* to HAART given the critical importance of HAART adherence for the health and well-being of HIV-positive patients[44]. However, it is equally as important to consider the impact of using CAM therapies as a *complement* to HAART given the possibility of serious drug interactions[45]. Regardless, the potential for either deleterious effect of CAM use – HAART non-adherence or CAM-drug interactions – can be considerably minimized through consistent and effective doctor-patient communication. It is important to highlight, then, that half of CAM users in the present study had not discussed their use with any healthcare provider, which supports prior research that African-Americans, in particular, are less likely to disclose CAM use to their providers[46]. Therefore, one priority for both research and clinical practice should be on assessing and increasing the frequency of doctor-patient dialogues about CAM use so that either type of risk, whether it is from complementary or alternative therapy use, can be evaluated and addressed.

It is not surprising that being female and having a higher income was associated with an increased frequency of CAM use, as these are two commonly reported

sociodemographic predictors of CAM use in prior research[47-50]. The association between health literacy and CAM use, however, has not yet been investigated in prior research nor included in prior applications of the CAM Healthcare Model, though there is some evidence that health literacy is associated with other preventative health practices[51]. The use of most CAM therapies, excluding some home remedies, often requires the user to identify how and where to seek out information about the modality, understand the retrieved information and evaluate its credibility and then make use of that information in accessing and using the modality appropriately. Though this process may also be common among individuals seeking additional conventional health information[52, 53], it may be even more likely among CAM users as the internet and print materials may be the *only* sources of information about CAM modalities because conversations about CAM with conventional healthcare providers are so infrequent. Given the complexity and poor readability of many internet and print health materials[54, 55], it is therefore reasonable to conclude that higher health literacy levels may be needed for more extensive CAM use. Future research is needed to explore this relationship further.

Prior research suggests that there is an association between numbers of clinic visits, lower helper T cell counts and higher viral load and CAM use among HIV-positive individuals[17, 56, 57]; results from the present study indicating that higher HIV RNA levels were associated with a greater frequency of CAM use are congruent with these findings. Further, the fact that greater emotional well being was associated with a *lower* frequency of CAM use is also compatible with these results, suggesting that having a greater burden of illness[58] and being more emotionally distressed[59] may lead to a more frequent use of alternatives. Thus, CAM use may occur not just as a result of the "push" and "pull"

factors discussed earlier but as a coping mechanism, a way for HIV-positive individuals to reconstruct normal lives and manage their disease[60, 61] and assert some control in their healthcare[62], particularly when they are experiencing greater physical or emotional suffering.

Limitations

The present study has several limitations. First, the data are cross-sectional, thereby limiting our ability to be certain about the temporal relationship between the predisposing, enabling and need-based variables and the frequency of CAM use. For example, individuals with a higher HIV RNA viral load may be more likely to use CAM because, as stated above, they are seeking out additional means of coping and/or managing their disease burden. Alternatively, CAM users may be more likely to have a higher viral load due to HAART non-adherence or CAM-drug interactions that are compromising the efficacy of their conventional treatment regimens. Future longitudinal cohort studies are needed to provide evidence for temporality. Second, excluding the CD4+ and HIV RNA viral load variables, the data were largely self-report. However, participants completed the surveys individually on ACASI-programmed laptops, an approach which has been demonstrated to improve the quality of self-report information by increasing responses to sensitive questions, decreasing socially desirable responses and by preventing null responses[63]. Third, results may be subject to selection bias, as those individuals interested in participating in a survey about CAM may be more interested in CAM, more informed about CAM and/or more likely to use CAM compared with individuals who were not interested in participating. Finally, the findings are derived from a sample of African-American individuals with AIDS residing in the

southern region of the United States. Thus, caution is urged in generalizing the findings to other ethnic groups or regions of the country. Further research with ethnically and geographically diverse populations will be needed to corroborate the observed findings.

Conclusions

Prior research on CAM use among HIV-positive populations has been generally atheoretical and lacked depth by dichotomizing CAM use outcomes and failing to assess multiple dimensions of CAM use. The present study sought to address these limitations by using and extending the CAM Healthcare Model to direct the research, examining CAM use on a continuum and investigating additional CAM-related variables such as duration of and reasons for use, how CAM was used (as a complement or an alternative to conventional care) and the frequency of discussion about CAM use with healthcare providers.

Our findings highlight several important issues that warrant future study. First, though the CAM Healthcare Model was a useful guide, future research could use structural equation modeling, a procedure that evaluates the correspondence between empirically observed relationships and the relationships predicted by a theory[64], to statistically examine the degree to which the model can explain CAM use. Second, findings, including those from the present study, consistently indicate that, in spite of widespread use of CAM among HIV-positive populations, doctor-patient communication about CAM is infrequent. Therefore, subsequent research is needed to develop, implement and assess the effectiveness of provider education interventions and clinical screening tools aimed at facilitating more informed, useful doctor-patient dialogues about CAM. Finally, more randomized control trials are needed to assess the efficacy of

various CAM therapies in ameliorating disease- and medication-related side effects, improving biological (e.g., CD4+ and RNA viral load) and psychological (e.g., depression, anxiety) outcomes and extending the length and quality of life of those infected.

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Table 1. Characteristics of the study population (N=182).

Characteristic	N (%)
Age, N (%)	
≤ 45 years	90 (49.5)
> 45 years	92 (50.5)
Sex, N (%)	
Male	127 (69.8)
Female	52 (28.6)
Intersex	3 (1.6)
Sexual Orientation, N (%)	
MCHe*	97 (53.6)
Bisexual	30 (16.6)
MCHo**	54 (29.8)
Refused to answer	1 (0.5)
Marital Status, N (%)	
Single	146 (80.7)
Divorced or separated	27 (14.9)
Married or partnered	8 (4.4)
Refused to answer	1 (0.5)
Employment Status, N (%)	
Working	21 (11.5)
Unemployed	57 (31.1)
Disabled	96 (52.7)
Other	8 (4.4)
Education, N (%)	
≤ High school	109 (60.6)
> High school	71 (39.4)
Refused to answer	2 (1.1)
Yearly Income, N (%)	
<$15,000	146 (82.0)
≥$15,000	32 (18.0)
Refused to answer	4 (2.2)
Housing Status, N (%)	
Rent	73 (40.6)
Own	4 (2.2)
Live with others	52 (28.9)
Homeless	51 (28.3)
Refused to answer	2 (1.1)
On HAART, N (%)	
Yes	56 (30.8)
No	123 (67.6)
Missing	3 (1.6)

Table 1, cont.

Characteristic	N (%)
Log_{10} CD4+ Cell Count, cells/mm^3, Mean(SD)^	2.28 (0.47)
Log_{10} HIV RNA, copies/mL, Mean(SD)^	2.74 (1.17)
CAM Use, N (%)	
None	11 (6.0)
1-3 therapies	88 (48.4)
≥4 therapies	83(45.6)

* Mostly or completely heterosexual
**Mostly or completely homosexual
^N=92.

Table 2. Frequency of CAM Use (N=182).

Therapy	Frequency of Use N (%)			
	Never	Seldom	Occasionally	Regular Basis
Vitamins	86 (47.3)	4 (2.2)	9 (4.9)	83 (45.6)
Herbs	165 (90.7)	2 (1.1)	7 (3.8)	8 (4.4)
Home remedies	137 (75.3)	13 (7.1)	19 (10.4)	13 (7.1)
Chiropractic	169 (92.9)	5 (2.7)	3 (1.6)	5 (2.7)
Massage	160 (87.9)	5 (2.7)	13 (7.1)	4 (2.2)
Dietary supplements	96 (52.7)	14 (7.7)	31 (17.0)	41 (22.5)
Aromatherapy	159 (87.4)	1 (0.5)	11 (6.0)	11 (6.0)
Marijuana	164 (90.1)	5 (2.7)	8 (4.4)	5 (2.7)
Counseling/Support Groups	64 (35.2)	5 (2.7)	48 (26.4)	65 (35.7)
Meditation	115 (63.2)	5 (2.7)	18 (9.9)	44 (24.2)
Yoga	170 (93.4)	2 (1.1)	6 (3.3)	4 (2.2)
Tai Chi	173 (95.1)	2 (1.1)	5 (2.7)	2 (1.1)
Acupuncture	179 (98.4)	1 (0.5)	1 (0.5)	1 (0.5)
Prayer/Spiritual Healing	75 (41.2)	4 (2.2)	7 (3.8)	96 (52.7)

Table 3. Duration of CAM Use.

Therapy	Total N (%)	Duration of Use N (%)		
		< 1 Month	1-12 Months	> 1 Year
Vitamins	96 (52.7)	4 (4.2)	32 (33.3)	60 (62.5)
Herbs	17 (9.3)	3 (17.6)	6 (35.3)	8 (47.1)
Home remedies	45 (24.7)	2 (4.4)	8 (17.8)	35 (77.8)
Chiropractic	13 (7.1)	5 (38.5)	1 (7.7)	7 (53.8)
Massage	22 (12.1)	1 (4.5)	10 (45.5)	11 (50.0)
Dietary supplements	86 (47.3)	12 (14.0)	21 (24.4)	52 (60.5)
Aromatherapy	23 (12.6)	5 (21.7)	6 (26.1)	12 (52.2)
Marijuana	18 (9.9)	0 (0)	2 (11.1)	16 (88.9)
Counseling/Support Groups	118 (64.8)	8 (6.8)	28 (23.7)	82 (69.5)
Meditation	67 (36.8)	7 (10.4)	10 (14.9)	50 (74.6)
Yoga	12 (6.6)	3 (25.0)	2 (16.7)	7 (58.3)
Tai Chi	9 (4.9)	1 (11.1)	7 (77.8)	1 (11.1)
Acupuncture	3 (1.6)	1 (33.3)	0 (0)	2 (66.7)
Prayer/Spiritual Healing	107 (58.8)	3 (2.8)	9 (8.4)	95 (88.8)

Table 4. Reasons for CAM Use.

Therapy	Total N (%)	Reasons N (%)					
		Reduce stress	Boost immune system	Boost energy/appetite or gain weight	Detoxify the body	Gain control over HIV treatment	Nutritional supplement
Vitamins	96 (52.7)	1 (1.0)	31 (32.3)	39 (40.6)	0 (0)	4 (4.2)	21 (21.9)
Herbs	17 (9.3)	2 (11.8)	6 (35.3)	3 (17.6)	2 (11.8)	0 (0)	4 (23.5)
Home remedies	45 (24.7)	5 (11.1)	21 (46.7)	6 (13.3)	6 (13.3)	0 (0)	7 (15.6)
Chiropractic	13 (7.1)	5 (38.5)	2 (15.4)	5 (38.5)	0 (0)	1 (7.7)	0 (0)
Massage	22 (12.1)	18 (81.8)	1 (4.5)	3 (13.6)	0 (0)	0 (0)	0 (0)
Supplements	86 (47.3)	4 (4.7)	20 (23.3)	48 (55.8)	1 (1.2)	1 (1.2)	12 (14.0)
Aromatherapy	23 (12.6)	16 (69.6)	2 (8.7)	5 (21.7)	0 (0)	0 (0)	0 (0)
Marijuana	18 (9.9)	8 (44.4)	0 (0)	9 (50.0)	0 (0)	1 (5.6)	0 (0)
Counseling	118 (64.8)	68 (57.6)	4 (3.4)	10 (8.5)	2 (1.7)	34 (28.8)	0 (0)
Meditation	67 (36.8)	49 (73.1)	4 (6.0)	3 (4.6)	0 (0)	11 (16.4)	0 (0)
Yoga	12 (6.6)	6 (50.0)	1 (8.3)	1 (8.3)	2 (16.7)	2 (16.7)	0 (0)
Tai Chi	9 (4.9)	6 (66.7)	0 (0)	2 (22.2)	1 (11.1)	0 (0)	0 (0)
Acupuncture	3 (1.6)	2 (66.7)	0 (0)	1 (33.3)	0 (0)	0 (0)	0 (0)
Prayer	107 (58.8)	48 (44.9)	4 (3.7)	6 (5.6)	9 (8.4)	40 (37.4)	0 (0)

Table 5. Predictors of frequency of CAM use (N=182).

Variable	*B*	SE *B*	*p*
Predisposing Variables			
Age	-0.02	0.02	0.30
Gender	0.53	0.26	0.05
Education	-0.01	0.25	0.98
Internality*	0.02	0.02	0.23
Enabling Variables			
Income	1.38	0.42	0.01
Health Literacy	0.97	0.08	<0.001
Need Variables			
Log_{10} HIV RNA, copies/mL^	0.35	0.17	0.04
Emotional Well-Being	-0.06	0.03	0.03
Symptom Severity	-0.01	0.01	0.77

*Internality subscale of the Multidimensional Health Locus of Control (MDHLOC) scale.
^N=92.