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Complementary and Alternative Medicine Use Among HIV+ People: Research Synthesis and Implications for HIV Care

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Abstract

Use of complementary and alternative medicine (CAM) is prevalent among HIV+ individuals despite the success of antiretroviral treatments and limited evidence of CAM's safety and efficacy. To characterize the potential impact of CAM use on HIV care, we conducted a systematic review of 40 studies of CAM use among HIV+ people. The goals of this review are to: (a) describe the demographic, biomedical, psychosocial, and health behavior correlates of CAM use; (b) characterize patient-reported reasons for CAM use; and (c) identify methodological and conceptual limitations of the reviewed studies. Findings confirm that a high proportion of HIV+ individuals report CAM use ($M = 60\%$). Overall, CAM use is more common among HIV+ individuals who are men who have sex with men (MSM), non-minority, better educated, and less impoverished. CAM use is also associated with greater HIV symptom severity and longer disease duration. HIV+ CAM users commonly report that they use CAM to prevent or alleviate HIV-related symptoms, reduce treatment side-effects, and improve quality of life. Findings regarding the association between CAM use, psychosocial adjustment, and adherence to conventional HIV medications are mixed. While the reviewed studies are instrumental in describing the characteristics of HIV+ CAM users, this literature lacks a conceptual framework to identify causal factors involved in the decision to use CAM or explain implications of CAM use for conventional HIV care. To address this concern, we propose the use of health behavior theory and discuss implications of review findings for HIV care providers.

Despite the effectiveness of current antiretroviral therapies in suppressing disease progression, many HIV+ people report using complementary and alternative medicine (CAM) to manage HIV-symptoms and side-effects of conventional HIV medication. CAM refers to a group of diverse medical and health care systems, therapies, and products (e.g., nutritional supplements, herbal remedies, acupuncture, meditation) that are not presently considered a part of medical training or practice in countries where allopathic medicine forms the basis of the national health care system (Eisenberg et al., 1993; NCCAM, n.d.). Use of CAM in the general US population has steadily increased over the past 15 years (Barnes, Powell-Griner, McFann, & Nahin, 2004; Eisenberg et al., 1998; Eisenberg et al., 1993) and rates of CAM use are exceptionally high among individuals with life-threatening illness, including HIV (Wootton & Sparber, 2001). With little evidence supporting the safety and efficacy of CAM for HIV (Mills, Wu, & Ernst, 2005; Power, Gore-Felton, Vosvick, Israelski, & Spiegel, 2002), research that identifies factors associated with CAM use and the implications of CAM use for HIV care is of considerable importance.

On average, published research indicates that 60% of HIV+ individuals use CAM to treat HIV-related health concerns (e.g., Duggan, Peterson, Schutz, Khuder, & Charkraborty, 2001; Mikhail et al., 2004). In the context of conventional HIV care, where survival depends on

proper use of and adherence to highly-active antiretroviral treatment (HAART; Lohse et al., 2007), the potential for CAM use to interfere with the success of HAART is a pressing concern. Indeed, use of certain types of CAM may compromise the efficacy of HAART as a result of an unanticipated drug interaction or side-effect of CAM (Ernst, 2002; Hennessy et al., 2002). The potential for adverse outcomes may be amplified when HIV+ patients do not disclose their CAM use to their primary HIV care providers or when patients' preferences for CAM interfere with uptake of conventional HIV treatments (Gold & Ridge, 2001; Kremer, Ironson, Schneiderman, & Hautzinger, 2006). Prior to HAART, research investigating CAM use among HIV+ patients focused on describing the prevalence and types of CAM used and characterizing HIV+ CAM users on a range of demographic, biomedical, and psychosocial indices. More recently, CAM research has expanded to focus on patients' reasons for using CAM and to address how CAM is incorporated into conventional HIV care.

To characterize the factors associated with CAM use and synthesize the literature on the potential impact of CAM use on HIV care, we conducted a critical review of research investigating CAM use among people living with HIV. To date, only one review on CAM use among HIV+ individuals has been conducted (Wootton & Sparber, 2001). Since the publication of Wootton and Sparber's review, an additional 22 studies of CAM use have been published characterizing the demographic, biomedical, psychosocial, and health behavior correlates of CAM use. In addition to providing a concise synthesis of research dating back to the early stages of the HIV epidemic, important conceptual and methodological limitations in this literature are identified and implications of review findings for the provision of conventional HIV care are discussed.

Method

Literature available in *MEDLINE* and *PsychINFO* was searched using the following keywords: HIV and complementary medicine, alternative medicine, complementary therapy, or alternative therapy. References from the studies retrieved from the computer assisted search were consulted to identify additional studies not detected in either database. Seventy-eight English language articles published in peer-reviewed journals were screened for inclusion. Studies were included if they assessed HIV+ patients' use of CAM using qualitative or quantitative methodology and defined CAM use as a *purposeful* action taken to treat, cope with, or alleviate HIV-symptoms or side-effects of conventional HIV treatment. Studies exploring CAM use not specifically directed at treatment of HIV and studies examining the efficacy of CAM were excluded. According to these criteria, 40 studies were included.

Review Findings

Review findings are organized as follows. First, we describe the demographic, biomedical, and psychosocial correlates of CAM use among HIV+ individuals. Second, a synthesis of research describing HIV+ patients' reasons for using CAM is provided. Third, we review literature investigating whether HIV+ patients' use of CAM interferes with conventional HIV care. For cross-reference, Table 1 summarizes the sample size, recruitment source, assessment methodology, rate of CAM use, types of CAM used, and primary study findings for each study.

Demographic Correlates of CAM Use

Our review indicates that CAM use among HIV+ people is disproportionately higher among Caucasians as compared to minority respondents (Bates, Kissinger, & Bessinger, 1996; Gore-Felton et al., 2003; Hsiao et al., 2003; Risa et al., 2002; Smith, Boyd, & Kirking, 1999; Suarez & Reese, 1997, 2000; Wutoh et al., 2001), men who have sex with men as compared to respondents of other sexual orientations (Bica et al., 2003; Hsiao et al., 2003; London, Foote-Ardah, Fleishman, & Shapiro, 2003; Smith et al., 1999; Suarez & Reese, 2000), individuals

with more education (Bates et al., 1996; Bica et al., 2003; Chang, van Servellen, & Lombardi, 2003; Colebunders, Dreezen, Florence, Pelgrom, & Schrooten, 2003; de Visser & Grierson, 2002; Fairfield, Eisenberg, Davis, Libman, & Phillips, 1998; Hsiao et al., 2003; Mikhail et al., 2004; Ostrow et al., 1997; Smith et al., 1999; Tsao, Dobalian, Myers, & Zeltzer, 2005), and those who have higher incomes (Bica et al., 2003; Duggan et al., 2001; London et al., 2003; Ostrow et al., 1997). Research is inconclusive with regard to the role of gender and age in predicting CAM use. This pattern of findings suggests that CAM use (and presumably, access to CAM) is more likely among individuals who have greater education and financial resources.

Health-related Correlates of CAM Use

Describing the relationship between CAM use and health status is an important step toward understanding the role of illness experiences in the decision to use CAM among HIV+ people. Research examining the relationship between CAM use and health status indicates that HIV+ individuals who have been diagnosed with AIDS (Jernewall, Zea, Reisen, & Poppen, 2005), experienced symptoms of HIV (Knippels & Weiss, 2000; Mikhail et al., 2004; Suarez, Raffaelli, & O'Leary, 1996), or have longer disease duration (Anderson, O'Connor, MacGregor, & Schwartz, 1993; Colebunders et al., 2003; Mikhail et al., 2004; Woolridge et al., 2005) are more likely to use CAM than healthier individuals or those with shorter disease duration. In addition, several studies indicate that CAM use is associated with greater HIV-symptom severity (Chang et al., 2003; Ostrow et al., 1997) and a higher degree of disability (Burg, Uphold, Findley, & Reid, 2005; Woolridge et al., 2005). Taken together, findings suggest that patients who have experienced HIV-related symptoms are most likely to pursue CAM, presumably to alleviate such symptoms.

Psychosocial Correlates of CAM Use

Research seeking to determine whether HIV+ CAM users differ from non-users with respect to depressive symptomology and coping approaches has yielded mixed findings. With respect to psychological adjustment, only one study found higher levels of distress among CAM users as compared to non-users (Risa et al., 2002). There is more evidence to suggest that CAM use is associated with fewer depressive symptoms (Gore-Felton et al., 2003; Suarez & Reese, 2000) and better mental health (Sugimoto et al., 2005). Several studies suggest that CAM use is associated with the use of more adaptive approaches to coping with HIV-related stressors, including problem-focused coping, positive reinterpretation and growth, seeking social support, planning, and turning to religion (Knippels & Weiss, 2000; Suarez & Reese, 1997, 2000). In addition, HIV+ CAM users are more likely than non-users to appraise HIV as a *controllable* stressor (Suarez & Reese, 1997, 2000). Finally, a number of studies report null findings for coping and depression outcomes (Bica et al., 2003; Burg et al., 2005; Fairfield et al., 1998; Ostrow et al., 1997; Singh et al., 1996; Suarez et al., 1996). Needed now is research that examines the extent to which CAM use is linked to HIV-specific coping behaviors.

Reasons for CAM Use Among HIV+ People

Understanding why some HIV+ people choose to use CAM is of importance because of the potential for CAM use to interfere with the success of HAART. Sixteen of the reviewed studies assessed HIV+ patients' reasons for using CAM. In Table 2, we describe five themes that emerged from our synthesis of these studies. In brief, HIV+ patients report that they use CAM primarily for practical reasons: to alleviate HIV-symptoms and HAART side-effects and to improve quality of life. For some HIV+ people, CAM offers a means of addressing their concerns with conventional treatment and engaging in healthcare practices that align with their health beliefs. To clarify why some HIV+ patients use CAM whereas others do not, quantitative research into the relationship between CAM use and patients' reasons for CAM use is needed.

Implications of CAM Use for Conventional HIV Care

While many HIV+ individuals use CAM to treat HIV symptoms and HAART side-effects, the extent to which these self-directed health care practices impact the success of conventional HIV care is largely unknown. In the following sections, research evaluating the relationship between CAM use and adherence to conventional treatment, attitudes toward conventional medicine, and disclosure of CAM use are reviewed.

HAART adherence and CAM use—Seven studies have evaluated the association between CAM use and adherence. Two studies identified an association between CAM use and treatment nonadherence. Jernewall and colleagues (2005) found that users of “Latino CAM” (i.e., traditional healing practices in Latino culture such as Curanderismo, Espiritismo, and Santeria) were less likely to attend medical appointments and had lower rates of HAART adherence for past 3 days. In addition, users of plant-based remedies had lower rates of adherence to HAART (Jernewall et al., 2005). More recently, HIV+ women who reported using orally-administered CAM to treat their HIV (primarily vitamins and immunity boosters) were more likely to report missing at least one dose of their prescribed HIV medications in the past 30 days (Owen-Smith, Diclemente, & Wingood, 2007). The remaining studies found no differences in HAART adherence between CAM users and non-users (Bica et al., 2003; de Visser & Grierson, 2002; Knippels & Weiss, 2000; Risa et al., 2002; Wutoh et al., 2001).

Attitudes toward conventional medicine and the decision to use CAM—Early in the HIV epidemic, research suggested that HIV+ CAM users were more likely than non users to perceive conventional HIV medications as ineffective (Langewitz, Ruttimann, Laifer, Maurer, & Kiss, 1994). Although HAART provides substantial clinical benefits, concerns about side-effects and long-term health consequences of HAART contribute to less favorable attitudes toward conventional medicine and poorer medication adherence (Johnson et al., 2005; Remien et al., 2003). Negative attitudes toward HAART may also influence the decision to use CAM. For example, CAM use was strongly associated with more favorable attitudes toward CAM (e.g., the perception that CAM delays illness progression and boosts immune functioning) and less favorable attitudes toward HAART (de Visser & Grierson, 2002). In another study, patients who believe that conventional HIV medications are “*definitely* not worth taking” were eight times more likely to use CAM as a substitute for conventional treatment as compared to those who believe that conventional treatments are “worth taking” (Hsiao et al., 2003). Given that data collection for these studies was completed prior to widespread use of HAART, findings may not be representative of patients' beliefs about HAART today. Further research exploring the interplay between HAART beliefs, CAM use, and adherence is needed.

Non-disclosure of CAM use to conventional care providers—Patient-provider communication about CAM use would presumably reduce the risk for adverse health outcomes that may result from drug interactions or misuse of conventional medication. CAM disclosure rates vary substantially across studies, with between 38 to 90% of patients reporting that their physician is aware of their CAM use (Chang et al., 2003; Duggan et al., 2001; Fairfield et al., 1998; Furler, Einarson, Walmsley, Millson, & Bendayan, 2003; Hsiao et al., 2003; Risa et al., 2002; Sparber et al., 2000; Standish et al., 2001). Although no studies have investigated the link between CAM use disclosure and HIV-related health outcomes, research strongly suggests a need for routine assessment and discussion of CAM use among HIV+ patients.

Discussion

While the efficacy of many CAM approaches has yet to be demonstrated, this review confirms that CAM use is highly prevalent among people living with HIV. Review findings indicate

that CAM use is more common among HIV+ individuals with greater education and financial resources. CAM users are more likely to have experienced symptoms of HIV disease progression and to have longer disease duration. Findings with respect to the association of CAM use with depressive symptoms and the use of active coping strategies are mixed. The most commonly cited reason for CAM use has to do with the management of HIV-related symptoms and HAART side-effects. In addition, for some HIV+ patients, the principles of CAM align with their health beliefs and CAM use provides an increased sense of control and participation in the management of their illness. By identifying underlying motives for CAM use, our review provides promising directions for quantitative studies seeking to clarify critical factors involved in CAM-related treatment decisions among HIV+ people.

An overarching conclusion from this review is the need for research exploring the intersection between CAM use and conventional treatment for HIV. Two primary concerns have received attention: (1) the potential for CAM use to interfere with use of and adherence to conventional HIV medications and (2) non-disclosure of CAM use to medical care providers. While there was only mixed support for an association between CAM use and HAART adherence, patients' beliefs about HAART may influence whether CAM is used as an adjunct or alternative to conventional medications. Further investigation of patient-provider interactions regarding CAM use is needed to clarify whether non-disclosure of CAM use contributes to adverse health outcomes.

Limitations of the Reviewed Literature

A number of methodological and conceptual limitations in the reviewed literature merit consideration. CAM use was usually treated as a dichotomous outcome variable in statistical models that compare respondents who have used *any* CAM since their HIV diagnosis with those who have not. This approach obscures the heterogeneity of healthcare practices included under the rubric of CAM and diminishes the complexity and meaning of these health behaviors. In addition, nearly all of the reviewed studies include at least one *currently* accepted medical intervention (e.g., vitamins; Drain, Kupka, Mugusi, & Fawzi, 2007) in their definition of "CAM use" which may produce inflated estimates of CAM use and spurious associations. For example, rates of CAM use were significantly higher when either vitamins or exercise were considered CAM as compared to rates of CAM use with these activities excluded (e.g., Furler et al., 2003; Suarez & Reese, 2000). The list of health practices considered CAM evolves as evidence of safety and efficacy accumulates. Thus, as recommended by the National Center for Complementary and Alternative Medicine (NCCAM, n.d.), future research should employ a standardized categorical framework of CAM therapies that is consistent with contemporary research.

Reviewed studies rely solely upon cross-sectional research designs. The absence of more sophisticated statistical modeling that establishes causal direction and psychological mediators is not surprising given the absence of theory-based conceptual frameworks in this literature. Indeed, with few exceptions (Hsiao et al., 2003; Smith et al., 1999; Tsao et al., 2005), reviewed studies did not employ health behavior theory in the selection of explanatory constructs or interpretation of results. As a result, the reviewed studies examine a narrow range of factors and yield an incomplete understanding of CAM use among HIV+ individuals.

Qualitative research suggests that patients' perceptions of HIV and HAART may influence CAM decisions. Patients' perceptions of their illness and its treatment have been shown to influence psychological adjustment, coping, and treatment adherence (Horne, 2003; Horne et al., 2004; Leventhal, Brissette, & Leventhal, 2003), but have not been examined in quantitative investigations of CAM use among HIV+ people. Theory-driven research investigating patients' beliefs about HIV and HAART may help to clarify the relationship between CAM use and HAART adherence and identify CAM users vulnerable to adherence problems.

Implications for HIV Care Providers

Review findings point to several important implications for HIV care providers. First, disclosure of CAM use to HIV care providers is clearly the first step toward ensuring patients' safety. Providers are encouraged to regularly and systematically assess their patients' use of CAM. At a minimum, providers should document the types, sources, and expected benefits of CAM, as well as the patients' experiences with each type of CAM, including the duration and frequency of use and perceived effects of CAM. Second, providers who understand their patients' reasons for using CAM may be in a better position to address the potential risks associated with CAM use (e.g., poor adherence to HAART). For example, CAM use and non-disclosure of CAM use may stem from mistrust of the healthcare system and, by proxy, the providers in it. Alternatively, CAM use may signal a desire for increased involvement in one's healthcare, misperceptions concerning conventional treatment, or idiosyncratic health beliefs. In sum, assessment of CAM use gives clinicians a chance to provide accurate and unbiased information on CAM and to work collaboratively with CAM users to develop treatment plans that optimize adherence to prescribed treatments, satisfaction with care, and health outcomes.

Final Conclusions

The cumulative research on CAM use among HIV+ people focuses on characterizing CAM users, describing reasons for CAM use, and exploring the implications of CAM use for conventional HIV care. To advance this important area of study, theory-based research is needed to clarify how patients' beliefs about HIV and HAART guide their decisions to use CAM. Using theory to conceptualize how patients' beliefs influence treatment decisions will help to inform the development of interventions designed to improve patient-provider communication regarding CAM and reduce the potential for CAM use to interfere with proper use of conventional treatments. Many HIV+ patients view CAM as an important part of their care. As such, providers should strive to incorporate routine assessment of CAM use as a means of informing treatment planning and maximizing long-term health outcomes for their HIV+ patients.

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Table 1
Overview of Studies on CAM Use among HIV+ Individuals

First author (year)	Sample	Method	% CAM Users	Most Common Types of CAM (% of sample)	Findings
Agnoletto, V. (2003)	Convenience sample: n = 632 Europeans (65% male)	Quantitative: Self-administered survey	100% ^b	Nutritional supplements (20%) Mind-body (18%) Herbal remedies (10%) Acupuncture (5%) Herbopathy (4%) Immune-enhancement agents (83%) Dietary modifications (42%) Imagery (41%) Bodywork (41%) Religious healing (including prayer) (39%) Vitamins (30%) Vitamins & Minerals (80%) Imagery & Meditation (37%) Herbal therapy (21%) Massage (12%) Non-prescribed prescription medication (8%)	N/A
Anderson, W. (1993) ^d	Clinic sample: n=184 (94% men)	Quantitative: Self-administered survey	40%		CAM use more common in MSM and those with longer HIV disease duration
Bates, B. R. (1996) ^d	Clinic sample: n=287 (76% men)	Quantitative: Self-administered survey	31%		CAM use more common in women, Caucasians, and those with more than high-school education
Bica, I. (2003)	Convenience sample: n=642 (75% male) Surveys completed: n=2000 (unit of analysis was the survey, not the participant)	Quantitative: Survey completed every 6 months for 4 years	Ingested CAM use reported in 60% of surveys	B-complex stress formula (28%) Antioxidants (27%) Garlic-based products (18%) Ginseng-based supplements (10%) Glutamine (9%) Protein powder preparation (8%) Meditation (32%) Dietary supplements (31%) Faith healing (20%) Massage therapy (18%) Herbs (17%) Megavitamin therapy (15%) Chiropractor (11%) Acupuncture (6%) Self-help (63%) Touch Therapies (50%) Relaxation (49%) Spiritual (28%) Ingested CAM (28%) Diet (22%)	Ingested CAM use more common among MSM, people with more education, and those who have secure housing Prevalence of ingested CAM use decreased from 71% to 52% from 1995 to 1999, whereas prevalence of HAART use increased from 0% to 70%
Burg, M. (2005)	Clinic sample: n=226 (100% male)	Quantitative: Method of data collection not specified	64%		CAM use associated with more disability days in past 4 weeks, more visits to clinician, lower role and social functioning, and higher scores on health-promoting lifestyle profile
Carwein, V. L. (1997) ^d	Clinic sample: n=127 (87% male)	Quantitative: Self-administered survey	100%		N/A
Chang, B. L. (2003)	Clinic sample: n = 182 (60% male) patients receiving HAART	Quantitative: Semi-structured interview	88%	Religious activities (79%) Herbs, Vitamins, or Nutritional Supplements (67%) Physical/Body-mind therapy (37%)	Use of physical and mind/body therapies associated with self-reported HIV-related symptoms (e.g. difficulty sleeping, stomach pain, nausea) In analyses that combined both cohorts: use of
Colebunders, R. (2003) ^d	Two community-based cohorts	Quantitative: Self-administered survey	N/A	Percentage of users for each cohort:	

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	recruited from 8 European countries: 1995-97: n = 1161 1998-99: n = 899			Vitamins/minerals (58%); Herbal products (25%); 20%) Herbal products (21%); 15%)	homeopathy associated with longer time since HIV diagnosis and lower CD4+ count and use of herbal products associated with longer time since diagnosis and more advanced disease stage. CAM use more common among females, those who have more education, a major co-morbid health condition, read HIV/AIDS media, and spend more time with other HIV + individuals CAM use associated with more favorable attitudes toward CAM and less favorable attitudes toward HAART CAM use associated with income greater than \$15,000 per year and discontinuation of HIV medication for any reason
de Visser, R. (2002)	Community sample: n = 924 Australians (91% male)	Quantitative: Self-administered survey	55%	Vitamin, mineral, nutrient supplements (46%) Massage therapy (28%) Meditation (20%) Herbal Medicine (19%) Acupuncture (8%)	
Duggan, J. (2001)	Clinic sample: n=191 (88% male)	Quantitative: Self-administered survey	67%	Lifestyle change (38%) Diet change or dietary supplements (37%) Megavitamins (24%) Massage (24%) Prayer therapy (22%) Acupuncture (19%) Yoga (19%) Chiropractor (15%) Supplements (68%) CAM providers (45%) Marijuana (24%)	
Fairfield, K. M. (1998)	Clinic sample: n=180 (87% male)	Quantitative: Structured Phone Interview	76%		CAM provider use more likely among respondents who have a college and those who experience HIV-related fatigue Marijuana use associated with HIV-related weight loss Supplement use associated with HIV-related memory impairment Reasons for CAM use included management of HIV-symptoms, HAART side effects, and need to increase sense of control over HIV treatment AIDS activism identified as a major force in disseminating information about CAM in HIV+ MSM
Foote-Ardah, C. E. (2003)	Convenience sample: n = 62 (74% male)	Qualitative: Semi-structured interview	65%	Not specified	Use of any CAM is more common among female respondents Use of CAM activities is more common among respondents who are female, unemployed, receiving disability benefits, and report more overall drug use
Furin, J. F. (1997) ^d	Community sample: n=26 (100% MSM)	Qualitative: Semi-structured interviews	65%	Not reported	
Furler, M. D. (2003)	Canadian clinic sample: n = 104 (53% male)	Quantitative: Semi-structured interview	89% any CAM or vitamin 77% not including vitamins	Vitamins & Minerals (89%) Activities (64%) Naturopathic products (39%) Practitioners (38%)	

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Gillett, J. (2001)	Community sample: n=46 (78% male)	Qualitative: Semi-structured interview	100% ^b	Not specified	Use of CAM providers is more common among respondents with more education and higher viral load. Social background characteristics and stigmatizing experiences related to sexual identity and HIV status, cultural background, gender, and drug use history were identified as important themes guiding decisions to use CAM and conventional HIV treatments. CAM users more likely to be female, Caucasian, and less depressed (CES-D)
Gore-Felton, C. (2003)	Community and clinic sample n = 179 (54% male)	Quantitative: Self-administered survey	67%	Multivitamin (50%) Acupuncture (31%) Meditation (28%) Massage (23%) Mineral Supplements (17%) Chinese herbs (12%)	
Hsiao, A. (2003)	HCSUS sample ^d n = 2466 (78% male)	Quantitative: Computer-assisted interview	53%	Non-Ingested: Relaxation (22%) Spiritual Healing (21%) Self-help (16%) Massage (14%) Acupuncture (6%) Ingested: Herbal Medicine (15%) Megavitamins (13%) Unlicensed drugs (5%) Folk remedy (4%) Herbopathy (3%) "Asian" CAM (72%) Plant-based CAM (42%) "Latino" CAM (13.5%)	Ingested CAM use (22%) more common among participants who are white, male, and more educated. Use of CAM as a substitute for traditional treatment (2.5%) associated with a greater desire for involvement in medical decision-making and belief that antiretroviral medication is "definitely not worth taking."
Jernewall, N. (2005)	Community-based sample: n=152 (100% Latino MSM)	Quantitative: Self-administered survey	80%		Use of Latino and plant-based CAM associated with having AIDS diagnosis. Users of Latino CAM were less likely to attend medical appointments, follow physician advice, and had lower rates of adherence for past 3 days. Users of plant-based CAM also had less overall adherence to traditional HIV medication. CAM use more common among respondents who were female or African-American (compared to Caucasians and Hispanics)
Kirksey, K. M. (2002)	Convenience sample: n = 422 (71% male)	Quantitative: Self-administered survey	36%	Mind-body interventions (54%) Biological-based therapies (53%) Alternative medical systems (40%) Exercise/Yoga/Tai Chi (34%) Manipulative and body-based methods (7%)	

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Knippels, H. (2000) ^d	Community and clinic sample: n=70 (100% MSM)	Quantitative: Self-administered survey	71%	Energy Therapies (<1%) Food supplements (63%) Herbal medicine (17%) Yoga, meditation, imagery, massage (16%) Acupuncture (6%)	CAM use associated with disease stage (symptomatic patients use more CAM), use of active coping, use of emotion-focused coping, and lower levels of self-reported pain (MOS-pain)
Langewitz, W. (1994) ^d	Clinic sample: n=100 (76% male)	Quantitative: Self-administered survey	56%	Supportive counseling (23%) Herbs (9%) Meditation (9%) Relaxation therapies (9%) Massage (8%) Types of alternative therapists were not specified	CAM use associated with higher anxiety and depression scores and lower ratings of perceived efficacy of conventional treatments
London, A. S. (2003)	HCSUS sample ^d n=2864 (78% male)	Quantitative: Computer-assisted interview	15%		Use of alternative therapist more common among gays/lesbians, higher income earners, and residents of northeast and west (compared to south)
Mikhail, I. S. (2004)	Clinic sample: n=391 (100% women)	Quantitative: Self-administered survey	59%	Vitamins (36%) Religious Healing (27%) Dietary Supplements (22%) Herbs (16%) Bodywork (10%)	CAM use associated with higher education, no health insurance coverage, longer disease duration, higher number of HIV-related infections
Nicholas, P. K. (2002)	Patients with HIV-related peripheral neuropathy: n=49 (71% male)	Quantitative: Self-administered survey	69%	Massage, Acupuncture, Reflexology, Meditation, or Vitamins (69%) Exercise (12%) Recreational Drug Use (8%) Vitamins, relaxation, humor, spirituality, and meditation	N/A
Nokes, K. M. (1995) ^d	Convenience sample: n=145; 97% male	Quantitative: Self-administered survey	100%	Dietary Supplements (22%) Herbal Therapies (22%) Relaxation Techniques (20%)	N/A
Ostrow, M. J. (1997) ^d	Clinic sample: n=657 (94% male)	Quantitative: Self-administered survey	39%		CAM use more common among respondents who are younger, more educated, earn higher incomes, report greater pain, and report spending less time out of bed during the day
Owen-Smith, A. (2007)	Clinic sample: n=366 (100% female)	Quantitative: Self-administered survey	60%	Oral CAM: Immunity Boosters or Vitamins (40%) Body/Healing CAM: Religious or psychic healing, bodywork (30%)	CAM use more common among respondents who are older, more educated, and earn higher incomes Use of Oral CAM associated with greater nonadherence to HAART in past 30 days

First author (year)	Sample	Method	% CAM Users	Most Common Types of CAM (% of sample)	Findings
Pawluch, D. (2000)	Community sample n=66 (83% male)	Qualitative: Semi-structured interview	100% ^b	Not specified	CAM is construed by HIV+ respondents as a: Part of a health maintenance strategy Alternative to Western medicine Way to mitigate side effects of HAART Strategy for improving quality of life or coping with stress Way of resisting mainstream medical care which is seen as oppressive and untrustworthy CAM use associated with higher levels of distress, problem-focused coping, lower belief in efficacy of HAART, and being Caucasian CAM users who started using CAM after initiation of HIV meds were more likely to be African-American and have higher income compared with prior users CAM users more likely to be over the age of 35 and use recreational drugs
Risa, K. J. (2002)	Clinic sample: n=118 (99% male) patients receiving HAART	Quantitative: Self-administered survey	38%	CAM use prior to HAART use: Megavitamins (14%) Relaxation (10%) Spiritual Healing (8%) CAM use + HAART use: Megavitamins (9%) Massage (7%) Herbal Remedies (5%)	
Singh, N. (1996) ^d	Clinic sample: n=56 (100% male)	Quantitative: Self-administered survey	30%	Meditation (47%) Herbs (29%) Special Foods (29%) Vitamin therapy (29%) Imagery (24%) Acupuncture (12%) Vitamins (68% of full sample)	
Smith, S. R. (1999)	ACUS sample ^c n=1385 (81% male)	Quantitative: Structured interview	Not reported	Nonprescription drugs (54%) Herbs (10%) Recreational drugs (5%)	Vitamin, herbal product, and recreational drug use more common among Caucasians Herbal product use more common among those with more than high-school education and those receiving psychological care Perceived benefits of CAM included: relief from HIV-symptoms, improved coping, increased sense of control, and enhanced treatment outcomes.
Sparber, A. (2000) ^d	NIH HIV/AIDS clinical trial sample: n=100 (98% male)	Quantitative: Structured interview	84%	Mind-body (38%) Structural or energetic (35%) Lifestyle, diet, nutritional (35%) Traditional medicine (10%) Pharmacologic or biologic (6%) Lifestyle change (Vitamin use, exercise; 93%) Mind/Body medicine (prayer, meditation, support groups, psychotherapy; 89%) Herbal medicine (87%) Manual healing (e.g., massage; 53%) CAM Providers (e.g., acupuncture; 45%) Bio-electro magnetic (e.g., crystals; 11%)	CAM users who also use HAART (63%) were less likely to be employed and more likely to have an AIDS-diagnosis, lower CD4 counts, more HIV symptoms, and lower MOS scores (indicating poor quality of life, physical functioning, and emotional well-being)
Standish, L. J. (2001)	Community and clinic sample: n=1675 (79% male)	Quantitative: Self-administered survey	100% ^b		

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Suarez, M. (1996) ^d	Clinic sample: n=76 (67% male; 100% Hispanic)	Quantitative: Semi-structured interview	66%	Prayer (52%) Use of healing items: Candles (38%) Holy water (34%) Oils or Incense (22%) Herbs (18%) Consult spiritualist (16%) Meditation, Imagery, Relaxation (19%) Mega-dose vitamins (17%) Spiritual/Religious healing (15%) Homeopathic remedies (7%) Special Diet (5%) Acupuncture/Acupressure (4%)	Use of folk healing practices more likely among individuals with symptomatic HIV CAM use associated with appraisal of HIV-related stress as controllable and as a challenge Greater # of CAM procedures associated with being Caucasian, having been diagnosed longer, and use of planning and humor coping strategies
Suarez, T. (1997) ^d	Clinic sample n=73 (100% male)	Quantitative: Self-administered survey	63%	Exercise (27%) Spiritual/Religious healing (20%) Mega-dose vitamins (12%) Meditation (10%) Herbs (9%) Special Diet (5%) Chiropractic Care (4%) Not Specified	Greater use of CAM among MSM and Caucasian males CAM use associated with use of a number of adaptive coping strategies, appraisal of HIV-related stress as controllable, and greater life satisfaction
Suarez, T. (2000)	Convenience sample: n=127 (82% male)	Quantitative: Self-administered survey	69%		Use of herbs associated with better general mental health, especially among women who were widowed, symptomatic, have low social support and receive government subsidies CAM use more likely among Caucasians and individuals who are older, more educated, report HIV-related pain, and experience depressive symptoms Use of cannabis more likely among those with longer disease duration and higher degree of disability None
Sugimoto, N. (2005)	HIV+ support group participants: n=132 (27% male; 100% Thai)	Quantitative: Self-administered survey	34%		
Tsao, J. (2005)	HCSUS sample ^d n=2466 (77% male)	Quantitative: Computer-assisted interview	53%	Mind-Body (39%) Biological (26%) Manipulative/Body-Based (17%) Alternative Medical Systems (10%) Energy Healing (4.2%) Cannabis	
Woolfidge, E. (2005)	Clinic sample: n=523 (92% male)	Quantitative: Self-administered survey	27%		
Wutth, A. K. (2001)	Clinic sample: n=100 (78% male)	Quantitative: Structured interview	21%	High-dose megavitamins (8%) Garlic (5%) Spiritual healing (4%) Herbal teas (4%)	

Notes. Parenthetical percentages in the 'Most Common Types of CAM' column reflect the portion of identified CAM users who endorse specific types of CAM, as opposed to the portion of the entire sample. Primary results from bivariate and multivariate statistical analyses are reported in the 'Findings' column. N/A, not applicable; MSM, men who have sex with men; HAART, Highly-active antiretroviral treatment.

^a Indicates that all or some of the data were collected before 1996, prior to the advent of HAART. All other studies use data collected after 1996 or eligibility criteria required current receipt of a treatment regimen that includes at least one antiretroviral medication.

^b Participants were selected on the basis of their CAM use, thus, 100% of the sample were CAM users.

^c AIDS Costs and Services Utilization Study, a panel survey of patients from 1991-1992.

^d HIV Cost and Services Utilization Study, a nationally representative sample of patients who received conventional HIV care in 1996.

Table 2

Themes from Qualitative Research Describing HIV+ Patients' Reasons for CAM Use

Theme	Description of Thematic Findings	Representative Studies
General physical and psychological health maintenance and benefits	CAM is used as a general method of promoting health or to improve or maintain quality of life	Bates et al., 1996; Carwein & Sabo, 1997; Furler et al., 2003; Gillett et al., 2001; Langewitz et al., 1994; Pawluch et al., 2000
HIV-specific benefits	CAM used to treat nutritional deficiencies, fatigue, and nausea, and to alleviate pain related to peripheral neuropathy progression CAM used to augment the effects of conventional HIV treatments	Agnoletto et al., 2003; Anderson et al., 1993; Fairfield et al., 1998; Langewitz et al., 1994; Pawluch et al., 2000; Sparber et al., 2000; Tsao et al., 2005; Woolridge et al., 2005
CAM use to alleviate medication side-effects	CAM used concurrently with conventional HIV medications to prevent or ameliorate side-effects (e.g., gastrointestinal and dermatological problems, fatigue, neuropathy, and lipodystrophy) CAM is viewed as safe alternative to conventional HIV medications	Agnoletto et al., 2003; Bates et al., 1996; Foote-Ardah, 2003; Pawluch et al., 2000; Standish et al., 2001
Concerns with conventional HIV treatment	CAM used as a way of responding to or counteracting the potential long-term adverse effects of HAART CAM is used because it is more congruent with patients' culture or health beliefs	Foote-Ardah, 2003; Gillett et al., 2001; Pawluch et al., 2000; Standish et al., 2001; Suarez et al., 1996
Desire for greater involvement in healthcare	CAM use provides a way of being more actively involved in one's healthcare and treatment decisions	Foote-Ardah, 2003; Gillett et al., 2001; Sparber et al., 2000