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Non-conventional practices and immune functioning among individuals receiving conventional care for HIV

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Abstract

Objective—to examine the relationships among non-conventional practices, adherence and immune functioning in individuals with HIV.

Methods—92 participants completed an interview on non-conventional practices (complementary and alternative medicines (CAM), psychosocial therapies, and religious practice). They also completed the *Psychiatric Symptom Index* and the *AIDS Clinical Trials Group Adherence Follow-up Questionnaire*. Medical chart reviews determined CD4 count and viral load.

Results—Hierarchical logistic regressions revealed religious practice was associated with adherence and CAM was associated with viral load.

Conclusion—Participation in non-conventional practices in HIV populations may lead to positive health and health behaviors. Clinical implications are discussed.

Keywords

complementary and alternative medicines; HIV; immune functioning; psychological distress
psychosocial therapies; religious practice

Introduction

Several non-conventional practices, specifically, (1) engagement in complementary and alternative medicines (CAM), (2) psychosocial therapies, and (3) religious practice, are positively associated with immune functioning in individuals with HIV (McCain et al., 2008), whereas psychological distress has a negative impact on immunity and advances HIV disease progression (Carrico et al., 2007; Lapperriere et al., 2005). While HIV disproportionately affects African Americans and men who have sex with men (Lansky et al., 2010), it is not clear if individuals from these populations self-select these non-conventional practices and if they have adherence and immune functioning differences above and beyond the effects of conventional medicine. Additionally, the relation of psychological distress on antiretroviral therapies (ART) adherence and immune functioning in individuals who self-select these practices is not clear. Therefore, the purposes of the current study are to examine non-conventional practice demographic correlates and to

examine the relations among these non-conventional practices, adherence, and immune functioning in a predominately-urban African American sample, representative of all sexual orientations, receiving conventional medical treatment for HIV.

The National Center for Complementary and Alternative Medicines (NCCAM) defines CAM as a number of diverse medical and health care systems, practices, and products that are usually not part of conventional medicine (NCCAM, 2010). CAM is commonly practiced by individuals with HIV with reports from 50 to 71% (Fairfield et al., 1998; Knippels and Weiss, 2000) endorsing at least one practice, with vitamins, acupuncture, massage, and herbal remedies identified as the most commonly endorsed (Standish et al., 2001). Research on race/ethnicity in (2007) found significant differences between race/ethnicity and CAM use; however, this difference was not a highlight of their findings.

Overall, research indicates a positive relation between CAM and psychological health (Borman et al., 2006) and physical health (Irwin et al., 2007; McCain et al., 2008) in individuals with HIV. However, findings are inconsistent with some research indicating a negative relation between ART adherence and CAM use (Owen-Smith et al., 2007). This discrepancy is likely due to the way in which CAM is defined across studies and the self-selected nature of CAM versus random assignment in controlled studies. Specifically, some studies randomized participants to various stress reduction methods (Borman et al., 2006; McCain et al., 2008), while others examined self-selecting the use of herbal/natural immunity boosters (Owen-Smith et al., 2007). Also, reasons for engaging in specific types of CAM may be related to either using them as a complement to, or as an alternative to conventional medicine.

Psychosocial therapies were once included under the larger umbrella of CAM, but are now mainstream (NCCAM, 2010) and may be viewed as non-conventional practices engaged in to improve health status. Participation in psychosocial therapies is common in individuals with HIV with reports of up to 35% (Standish et al., 2001), and is positively related to ART adherence (Cook et al., 2009) and health status (Carrico and Antoni, 2008). Research has examined various psychosocial therapies including supportive-expressive group therapy (Belanoff et al., 2005), telephonic cognitive behavioral therapy (CBT) delivery (Cook et al., 2009), and individual CBT (Antoni et al., 2006; Belanoff et al., 2005) and all have similar conclusions: engagement in psychosocial therapy has a positive impact on ART adherence (Cook et al., 2009) and on biomarkers of HIV disease progression in individuals with HIV (Belanoff et al., 2005). Although these therapies are theoretically different and implemented differently, these differences add to the overall strength of psychosocial therapies on physical health outcomes in general.

Participation in religious practice may also be conceptualized as a non-conventional means of improving health status (MacMaster et al., 2007). Churches are traditionally a part of the African American experience (Pattillo-McCoy, 1998) and have been used as a medium for promoting positive health behaviors and improving health in various medical populations, including individuals with HIV (MacMaster et al., 2007; Marcus et al., 2004). Research indicates there is reduced morbidity and mortality in those who engage in religious practice (Fitzpatrick et al., 2007; Strawbridge et al., 2001), specifically reduced viral loads and increased CD4 count in individuals with HIV (Ironson et al., 2006; Woods et al., 1999). A better understanding of the relation between religious practice and health is necessary, especially since African Americans are at increased risk for HIV (Lansky et al., 2010) and identify religion as important (Pattillo-McCoy, 1998).

In contrast, psychological distress is negatively related to ART adherence (Malta et al., 2008; Mellins et al., 2009; Schönnesson et al., 2004) and immune functioning (Antoni et al.,

2006; Chida and Vedhara, 2009). Schönnesson and colleagues (2004) developed an index to assess non-adherence and found psychological distress was the best predictor of the index in a sample of 193-HIV-positive adults. In a meta-analysis, Chida and Vedhara (2009) examined 36 articles and found a robust relationship between psychosocial factors, particularly psychological distress, and HIV disease progression.

Although the above discussed studies greatly contribute to the field, there remains a need for understanding self-selected practices in those who are currently receiving conventional care for their HIV. The aims of the present study were the following: (a) to explore relations between demographic variables and non-conventional practices to determine who chooses what practices, (b) to examine the inter-relationships of these non-conventional practices (e.g. relation between CAM and psychosocial therapies), (c) to examine the relation of these non-conventional practices with ART adherence, and immune functioning; and (d) to examine the possible interaction of psychological distress with CAM, psychosocial therapies, and religious practice as they relate to ART adherence and immune functioning. We do not propose directionality in the relationships among non-conventional practice usage and demographics as this is exploratory. We hypothesize: (a) those who engage in CAM, psychosocial therapies, and/or religious practice will be more adherent to ART and (b) have better immune functioning; and (c) those with greater levels of psychological distress will be less adherent to ART and be more likely to have detectable viral loads.

Methods

Procedures

Participants were patients attending an HIV/AIDS clinic at an urban medical center in Chicago, USA. Individuals were eligible to participate if they were adults currently prescribed ART and receiving care at the clinic. Research assistants handed out flyers to patients and briefly described the study as they entered the waiting room. Once patients agreed to participate, they were escorted to a private room and provided further information on the study and informed consent was obtained. Research assistants verbally administered the demographics questionnaire and the interview related to non-conventional practices, then participants completed the self-report questionnaires. A \$15 gift card was provided for compensation. Per consent, systematic medical chart reviews were undertaken by research assistants and checked for accuracy by the principal investigator. Recruitment continued for approximately six months. The study was approved by the Institutional Review Boards of both the medical center and the second author's home institution. A Certificate of Confidentiality was obtained from the National Institute of Health.

Participants

One hundred forty six patients of the clinic were approached to participate. Ninety two (63%) participated, 27 (18%) were ineligible due to not currently taking ART, 27 (18%) declined to participate due to limitations in their schedule ($n = 16$) and various other non-specified reasons ($n = 11$).

Measures

Demographics—Self-report demographics included age, gender, ethnicity, sexual orientation, education, employment, and date diagnosed with HIV.

Non-conventional practices—A structured - inter view based on current literature was created by the principal investigator in collaboration with research assistants, to obtain information about regular participation in non-conventional practices of interest in the study including CAM, psychosocial therapies, and religious practice. Participants were given the

opportunity to ask questions and research assistants provided information on what practices are considered non-conventional in the current study.

1. CAM: a single question related to regular participation in alternative and complementary treatments was asked and followed with some possible examples including herbal medicine, vitamins, minerals, yoga, and meditation. Participants listed all practices they regularly participated in over the past 12 months and a dichotomous variable was created.
2. Psychosocial therapies: a single questions was asked related to regular participation (at least two times per month) in psychosocial therapies including individual/group psychotherapy and/or support group. Participants listed therapies they regularly participated in over the past 12 months and a dichotomous variable was created.
3. Religious practice: engagement in religious activities and attending services was queried separately and included questions about frequency of attendance at services and frequency of activities such as prayer and reading sacred scriptures. Participants were considered to regularly participate in these if they endorsed at least regular weekly engagement in both attendance of services and religious activities. A dichotomous variable was created.

Psychological distress—The *Psychiatric Symptom Index (PSI)* (Ilfeld, 1976) was used to measure psychological distress including symptoms of depression, anxiety, anger, and cognitive disturbance. Responses are on a 4-point scale ('never' to 'very often') of how frequently they experienced 29 symptoms over the course of the last two weeks and yields a total score with a range from 0 to 87. Based on the expected prevalence of psychiatric disorders in the general population (Ilfeld, 1976) the author chose a total score of 20 or above (the top 15% of scores in the normative sample) to serve as the criterion for a high level of symptoms. The *PSI* has excellent concurrent validity with other measures assessing psychological distress. Prior research on internal consistency was alpha coefficient .91 for the total score (Ilfeld, 1976) and .94 for the current study.

Adherence—The *AIDS Clinical Trials Group Adherence Follow-up Questionnaire (ACTG)* (Chesney et al., 2000) was used to assess ART adherence. The adherence index was used to calculate adherence (Reynolds et al., 2007). Scores range from 0 to 100 with higher scores indicating greater levels of adherence. Based on current recommendations that 95% adherence is necessary to sustain healthy immune functioning (Paterson et al., 2000) we dichotomized the composite score at the 95th adherence percent, a common practice in HIV research (e.g. Racey, 2010).

Immune functioning—Viral load and CD4 cell count were derived from a review of medical records for the most recent results of immune functioning.

In the current study, the lower limit of quantification for viral load tests varied between 50 copies and 400 copies. For consistency, and because most tests' lower limit of quantification in this study were 400 copies, viral load under 400 copies, a clinically meaningful cutoff, was defined as undetectable, and viral load 400 and above was classified as detectable. Thus, viral load was examined as a dichotomous variable. CD4 count below 200 is AIDS defining (CDC; 2009); therefore, CD4 count was also examined as a dichotomous variable and split at 200. Dichotomizing viral load and CD4 count in this manner is familiar in HIV research (e.g. Funck-Brentano et al., 2005; Racey et al., 2010).

Statistical analyses—All analyses were conducted using SPSS 18.0. Pearson and Spearman correlation analyses and Pearson Chi-square tests were used to conduct the

exploratory analyses. Hierarchical logistic regressions were used to examine the hypotheses, odds ratios (OR) and 95% confidence intervals (CI) were computed.

Results

There were no missing values for demographic variables, self-selected non-conventional variables, and immune functioning. Examination of outliers and missing data on the measures of psychological distress and adherence was conducted. It was determined data were missing at random; thus, they were handled with regression imputation, a process in which first, the model is fitted using maximum likelihood (ML) and parameters are equal to their ML estimates. Second, linear regression is used to predict missing values for each case as a linear combination of the observed values for the same case. After regression imputation, total scores were calculated.

Demographic and descriptive information

Participants were on average 45.29 ($SD = 9.27$) years old and ranged from 23 to 69 years old. The majority of participants were Black $n = 81$ (88%), males $n = 72$ (78%), and representative of all sexual orientations $n = 46$ (50% heterosexual). Further, $n = 51$ (55%) participants were either currently receiving or had an application pending for disability and had been living with HIV/AIDS on average 11 years ($SD = 6$) and ranged from less than one year to 23 years. Table 1 provides details of participant characteristics.

In total, 64 (70%) participants were engaging in at least one of the non-conventional practices under examination. Forty-two (46%) participants engaged in CAM, 34 (37%) engaged in psychosocial therapies, and 34 (37%) engaged in religious practice. Thirty (33%) engaged in one practice, 22 (24%) engaged in two practices, and 12 (13%) engaged in all three practices. Many of the participants, who endorsed engaging in psychosocial therapies, utilized these services through the clinic from which they also received their HIV care. The average score on the PSI was 21.47 ($SD = 14.09$) and ranged from 0.60 to 77.00. Forty-three (47%) participants were experiencing clinically significant levels of psychological distress (Ilfeld, 1976). Further, in spite of less than half of the study participants ($n = 43$; 47%) reporting 95% or greater ART adherence; overall, immune functioning was good as indicated by 64 (70%) with undetectable viral loads and 70 (76%) with CD4 counts above 200.

Bivariate analyses were conducted for all demographic and study variables. Adherence was significantly related to heterosexual orientation: (Pearson $\chi^2 = 7.38$, $p = .007$). Undetectable viral load was significantly related to older age: (Spearman $r = -.22$, $p = .034$), years with diagnosis: (Spearman $r = -.27$, $p = .010$), and adherence: (Pearson $\chi^2 = 7.64$, $p = .006$). CD4 count was significantly related to age: (Spearman $r = .26$, $p = .014$), years with diagnosis: (Spearman $r = .32$, $p = .002$), and adherence: (Pearson $\chi^2 = 4.40$, $p = .036$).

Study aims

The first aim was to determine who chooses what practices. Based on bivariate analyses (not shown here¹), there were no demographic differences in those who self-selected any of the practices under examination. Although not significant, participants attending psychosocial therapies were near significance in their association with being female: (Pearson $\chi^2 = 3.57$, $p = .059$) and being unemployed: (Pearson $\chi^2 = 3.62$, $p = .057$). The study may be underpowered to detect a significant relationship due to the small sample size.

¹Readers may contact the corresponding author for a copy of the correlation matrix.

The second aim was to examine the interrelationships between the self-selected practices. Participants who endorsed regular participation in psychosocial therapies were more likely to also regularly participate in religious practice: (Pearson $\chi^2 = 11.07$, $p = .002$). The relation between psychosocial therapies and CAM was not significant: (Pearson $\chi^2 = 3.77$, $p = .082$) and CAM and religious practice was not significant: (Pearson $\chi^2 = 1.16$, $p = .386$).

The third aim was to examine the relations between self-selected practices and adherence and immune functioning. First, analyses were conducted to examine relations between self-selected practices and adherence. Adherence was significantly related to religious practice: (Pearson $\chi^2 = 6.16$, $p = .013$) but was not significantly related to CAM: (Pearson $\chi^2 = .99$, $p = .320$) or psychosocial therapies: (Pearson $\chi^2 = 3.16$, $p = .075$). Second, logistic regressions were conducted to predict CD4 count and viral load. In the univariate models, psychosocial therapies was a significant predictor for both CD4 count and viral load while CAM and religious activities were significant predictors for viral load. The hierarchical multivariate model examining viral load was significant. Specifically, when controlling for the effects of number of years since HIV-positive diagnosis and adherence on viral load, the full model was significant: ($\chi^2 = 27.64$, $df = 5$, $p < .001$). Further, participants using CAM were 3.73 times more likely to have undetectable viral loads than those not using CAM (OR = 3.73, 95% CI = 1.19–8.66, $p = .024$). Further, although the multivariate model examining CD4 count was significant: ($\chi^2 = 16.78$, $df = 5$, $p = .005$), only number of years since HIV-positive diagnosis remained a significant predictor. Individuals with HIV for longer periods of time were more likely to have higher CD4 counts: ($\chi^2 = 7.89$, $p = .005$). See Table 2.

The fourth aim was to examine the relation between psychological distress and adherence and immune functioning. Based on bivariate analyses (not shown here²) psychological distress was not significantly related to any of the predictors or outcomes. However, 43 (47%) participants had clinically significant scores on the PSI.

Discussion

The purpose of this study was to examine the relations among self-selected non-conventional practices and ART adherence and immune functioning in a sample of urban HIV-positive, primarily African American adults. Study findings support and contribute to the current literature on the use of non-conventional practices in individuals receiving conventional treatment for HIV. First, after examining these non-conventional practices and their associations with ART adherence and immune functioning, results indicate that some of these practices are related to adherence and some are related to immune functioning. Second, although many of the participants in the current study were experiencing clinically significant level of psychological distress, this distress was not significantly related to adherence or immune functioning. Findings are discussed within the context of their scientific contributions and their cultural and clinical significance.

Participants who reported regular religious practice were more likely to report at least 95% ART adherence. There are several possible contributing explanations for findings. It may be that those who engage in religious practice have a build-in social network that promotes healthy behaviors (Strawbridge et al., 2001). Alternatively, attendance to religious practice and ART adherence may be perceived similarly in that they both require respect for a higher authority (i.e. God and physicians) and those who are compliant to God may also be compliant to physicians (Batson, 2004). Apart from these possible explanations, it is important to recognize that HIV disproportionately affects African Americans (Lansky, 2010) and that religion and religious organizations play an important role in the African

²Readers may contact the corresponding author for a copy of the correlation matrix.

American community (Pattillo-McCoy, 1998) and has a strong potential to influence its members (MacMaster et al., 2007; Marcus et al., 2004). In light of our findings related to ART adherence, engagement of faith-based organizations in culturally appropriate prevention and treatment of HIV may lead to improved health at the community level for African Americans.

Immune functioning was significantly related to all of the self-selected practices in univariate models. However, CAM, even after controlling for the effects of time since HIV-positive diagnosis and ART adherence is the only one that remained significant in the multivariate model. There may be several mechanisms by which CAM affects health. First, it may be biological, specifically the supplements, including vitamins and minerals, may have a direct relationship with immune functioning. Second, regular engagement in meditation and yoga may reduce the secretion of stress hormones (Levin, 1994), thus having an indirect impact on immune functioning. It is important to note that the clinic from which these data were derived offers ongoing comprehensive physical and psychological care to all patients including individual and group psychotherapy and psychotropic medication management. Although it is not possible to determine the unique contribution of each practice due to their non-conventional nature as well as the overlap of use for these practices, future research should compare the outcomes of those randomized to specific practices to those whose practice is determined by developing culturally appropriate individualized programs. It may be that those who are engaging in practices with which they are most comfortable and that are culturally appropriate will be able to sustain participation over time, thus maintaining improvements in physical health.

In spite of evidence for the relation between psychological distress and poor adherence and immune functioning (Malta et al., 2008), the current study did not find a significant relation. Though many of the participants were experiencing clinically significant psychological distress; this did not appear to have a negative effect on adherence or immune functioning. Although our findings do not provide evidence that participation in these non-conventional practices acts as a buffer against the typical consequences of psychological distress, we speculate this may be possible, especially in light of the comprehensive care model utilized by the clinic providing services to this sample of individuals as this type of comprehensive care does lead to overall better health (Malta et al., 2008).

Limitations

Findings should be understood within the limitations of the current study. The study was cross-sectional in design, therefore directionality of relationships and causality in relationships cannot be stated. Additionally, changes in medication regimen and time since regimen initiation were not assessed. Another limitation was the way in which CAM was assessed. Specifically, although examples of CAM were provided, the use of a single-item question measuring multiple diverse practices is a major limitation. Further, regular participation was not adequately defined; therefore, participants' were left to individually determine what 'regular participation' over the last 12 months encompassed, thus interpretation of findings related to CAM should be done with caution.

In conclusion, this is the first study to examine the relationships among several self-selected non-conventional practices and their relations with ART adherence and immune functioning in individuals receiving conventional treatment for HIV. Although a significant relation among the various self-selected practices and demographics was not found, this is likely due to unequal distribution in groups and small sample size. Future research should continue to examine this important issue. Of additional seriousness, especially in light of the aging HIV population in the United States (Kirk and Goetz, 2009), older participants and those living with HIV for longer periods of time had better overall immune functioning. These findings

are in contrast to previous research (e.g. Kirk and Goetz, 2009) and should be examined further in future research. Findings are from a largely African American urban sample and represent all sexual orientations, and are representative of those who are currently most infected and affected by HIV/AIDS in the United States (Lansky et al., 2010). This study provides direction to clinicians currently treating individuals living with HIV by demonstrating the importance of assessing for the usage of these non-conventional practices and openness to usage. Patient engagement in health promoting practices outside of the clinic encourages a multifaceted treatment approach that places an emphasis on the *individual* living with HIV/AIDS.

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Table 1Participant Demographics ($N = 92$)

Variable	Frequency (%)	Mean (SD)
Age	45.29	(9.27)
Gender		
Female	20	(22)
Male	72	(78)
Race		
Black/African American	81	(88)
Caucasian	4	(4)
Hispanic	2	(2)
Asian	1	(1)
Other	4	(4)
Sexual Orientation		
Heterosexual	46	(50)
Gay/lesbian	32	(35)
Bisexual	12	(13)
Other	2	(2)
Education		
Less than high school	20	(22)
High school graduate	28	(30)
Some college	33	(36)
College graduate	5	(5)
Graduate school	6	(7)
Employment status		
Employed	26	(29)
Unemployed	8	(9)
Student	2	(2)
Retired	5	(5)
Disabled	51	(55)
Years since HIV diagnosis	11	(6)

Table 2

Logistic Regression Models Predicting CD4 Count and Viral Load

	CD4 Count			Viral Load				
	Wald χ^2	p	OR	CI	Wald χ^2	p	OR	CI
<i>Univariate Models</i>								
CAM	3.72	.054	2.29	(0.99–5.32)	6.53**	.011	3.62	(1.35–9.91)
Psychosocial Interventions	5.18*	.023	2.79	(1.15–6.77)	5.84**	.016	3.81	(1.30–11.28)
Religious Practice	2.42	.120	2.41	(0.78–7.26)	3.99*	.046	2.85	(1.02–7.98)
<i>Multivariate Model</i>								
Number of Years Since Diagnosis	7.89*	.005	1.17	(1.05–1.30)	7.92*	.005	.856	(0.77–0.95)
95% Adherence	2.58	.108	2.56	(0.81–8.03)	4.53*	.033	3.40	(1.10–10.51)
CAM	0.46	.497	1.47	(0.82–4.74)	5.13*	.024	3.73	(1.19–8.66)
Psychosocial Interventions	0.60	.439	1.66	(0.46–6.03)	1.76	.185	2.34	(0.67–8.23)
Religious Practice	0.89	.345	1.87	(0.51–6.87)	1.09	.296	1.96	(0.56–6.89)

Note. CAM = Complementary and Alternative Medicines.

* = $p < .05$,** = $p < .01$.