Inhibited Interpersonal Coping Style Predicts Poorer Adherence to Scheduled Clinic Visits in Human Immunodeficiency Virus Infected Women at Risk for Cervical Cancer

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ABSTRACT

Background: One of the most common gynecologic conditions among HIV+ women is cervical dysplasia, the precancerous phase of cervical cancer. Therefore, adherence to gynecology visits may be among the most important health care practices for HIV+ women. However, no research has evaluated the psychosocial factors associated with health care practices among HIV+ women at risk for cervical cancer. **Purpose:** *This study examined the relationship between inhibited interpersonal coping style and adherence to primary care and obstetrics/gynecology visits in HIV+ women with Human Papillomavirus (HPV) infection.* **Methods:** *Twenty-eight HIV-1 seropositive Black, non-Hispanic women underwent a psychosocial interview, blood draw, and gynecologic examination. The Millon Behavioral Health Inventory was used to assess coping style. Medical chart review was used to assess adherence to scheduled special immunology clinic visits for 24 months following study entry.* **Results:** *Results suggested that greater inhibited coping style significantly predicted greater nonadherence to clinic visits during 1-year ($\beta = .45$, $p = .04$) and 2-year ($\beta = .58$, $p = .02$) follow-up, even after controlling for the possible confounding effects of recent depressed mood on adherence. Social support satisfaction did not mediate the relationship between inhibited coping style and nonadherence.* **Conclusions:** *These findings suggest that interpersonal coping style assessment may be a useful tool in predicting adherence in HIV+ women with HPV. Future research should assess the effect of psychosocial interventions on coping style, adherence, and cervical dysplasia in HIV+ women with HPV.*

INTRODUCTION

Human Immunodeficiency Virus (HIV) continues to affect individuals in the United States at alarming rates. At the end of 2001, an estimated 362,827 individuals were living with AIDS in the United States. Since 1994, the proportion of AIDS cases among African Americans and Hispanics, especially women, has increased steadily, and as of 2001, 78% of all women reported with AIDS were African American or Hispanic (1).

One of the most common gynecologic conditions among HIV+ women is cervical dysplasia, the precancerous phase of cervical cancer (2,3). Massad et al. (3) found that 73% of all HIV+ women had cervical cytological abnormalities during 5-year follow-up compared to 42% of HIV– women. Risk factors for the incidence and progression of an abnormal cytological smear in HIV+ women include Human Papillomavirus (HPV) infection, CD4+CD3+ cell count < 200 cells/mm^3, HIV RNA > 4000 copies/ml, smoking, and race, with African American women having greater risk than Caucasian women (3,4).

Given the relationship between biobehavioral risk factors and cervical dysplasia, it is very important for HIV+ African American women to adhere to gynecologic visits in order to prevent morbidity and mortality associated with HPV-related cervical dysplasia. The 2001 Consensus Guidelines for the Management of Women with Cervical Cytological Abnormalities recommend that all HIV+ women with abnormal cytological smears be referred for colposcopic evaluation, regardless of their degree of immunosuppression or HIV viral load (5).

Regrettably, HIV+ women of color experience numerous barriers to adhering to scheduled clinic visits, including lack of resources (e.g., insurance, transportation), competing demands (e.g., caring for children), and serious life stressors (e.g., bereavement, abuse, homelessness) (6). In spite of this, no research has systematically evaluated the psychosocial factors that are associated with adhering to scheduled clinic visits in HIV+ women at risk for cervical cancer.

Interpersonal coping style may be an especially important psychosocial construct to assess in this context. Interpersonal coping style describes the manner in which individuals approach and interact with their social network and community, including health care professionals, during times of stress. An individual's unique style of relating to her social network and community may either facilitate or hinder her ability to engage in positive health care practices, such as adhering to scheduled medical appointments.

The relationship between healthy interpersonal connections, mood, and adherence to clinic visits may be especially strong for women. It has been hypothesized that women often define themselves in relation to others (7) and achieve the motivation and energy to engage in self-care behaviors through their connections with others (6). In an influential article, Taylor et al. (8) coined the term "tend and befriend" to describe the tendency of women to nurture, create, and maintain social support networks in times of stress in order to reduce negative affect and promote safety for themselves and their offspring.

Individuals with an inhibited or avoidant interpersonal style may be particularly vulnerable to difficulties with adherence to clinic visits. Inhibited individuals are characterized as shy and uncomfortable around others, often because they fear being hurt, rejected, or exploited. Despite that they wish for understanding, closeness, and reassurance from others, they defend themselves from being hurt by not disclosing problems, concerns, or feelings to others. As described, for example, by Cohen et al. (9), this interpersonal pattern may be associated with behavioral disengagement and nonadherence to self-care behaviors through the induction of negative affect, reduced motivation and energy, and/or reduced availability and receipt of tangible and informational support.

HIV+ individuals, in particular, may develop and utilize an inhibited or avoidant interpersonal style to cope with health-related demands due to the negative relational and economic consequences often associated with disclosure of their health status to partners, friends, family, and community members (6). Of importance, dimensions of coping associated with an inhibited interpersonal style (e.g., passive coping, lower perceived availability of social support, lower satisfaction with social support) are significant predictors of nonadherence to antiretroviral therapy (10–12), poorer immune status and functioning (13), and poorer health outcome (14) among HIV+ individuals. These data suggest that it is imperative to understand more fully the relationship among inhibited coping, health behaviors, and health status in HIV+ individuals.

The relationship between inhibition and poor adherence to clinic visits may be especially significant for HIV+ women with HPV. The progression of HPV-induced cervical dysplasia to cervical cancer can often be prevented through routine screening and treatment. However, HIV+ HPV+ women who rely on an inhibited interpersonal coping style may have difficulty adhering to medical appointments for Papanicolaou smears and colposcopic examination. Therefore, the purpose of our study was to examine the relationship between inhibited interpersonal coping style and adherence to primary care and obstetrics/gynecology visits in HIV+ women with HPV. The results of this research may inform the development of interventions to improve adherence to scheduled clinic visits in women at risk for cervical cancer.

MATERIALS AND METHODS

Participants were HIV-1 seropositive African American, Haitian, Jamaican, and Bahamian women between the ages of 15 and 50 enrolled in a National Cancer Institute funded study of psychosocial, viral, and immune risk factors for gynecologic disease. Fifty-two women were recruited from an immunology clinic in the Department of Obstetrics and Gynecology at the University of Miami between 1994 and 1997. The analyses presented here include 28 women who were scheduled for routine well-woman or illness-focused care at our clinic in the 2 years following study entry. Twenty-four of the original 52 women were excluded from these analyses for one or more of the following reasons: (a) inability to obtain complete psychological data at study entry due to interview time constraints (resulting in the absence of inhibited coping style scores) ($n = 13$), (b) lack of scheduled, routine well-woman visits or illness-focused care during the follow-up period ($n = 3$), (c) inability to obtain blood samples at study entry due to difficult venous access or blood work not completed or documented during the follow-up period (resulting in an inability to control for immune decline during follow-up) ($n = 6$), and (d) extremely low CD4+CD3+ counts at the study entry clinic visit (< 70 cells/mm^3), demonstrating advanced HIV disease ($n = 2$). Using independent *t*-test and chi-square analyses, we compared respondents who provided interpersonal coping style data with those who did not on demographic, behavioral, psychosocial, and health status variables. There were no statistically significant differences between women who provided coping style data and those who did not on any of these variables (all ps > .10). This research was conducted in accordance with the rules and regulations of the Human Subjects Committee of the Institutional Review Board at the University of Miami School of Medicine.

Inclusion criteria for recruitment included one abnormal Papanicolaou smear in the 2 years prior to study enrollment, CD4+CD3+ cell count ≥ 200 cells/mm^3, and fluency in English. Exclusion criteria included past or current clinical AIDS (i.e., Category C) diagnosis (11), a history of high-grade cervical dysplasia or cervical cancer, hysterectomy, treatment for cervical dysplasia in the year prior to enrollment, and intravenous drug use in the 6 months prior to enrollment.

Eligible participants attended a study entry clinic visit. At this visit, participants completed informed consent and underwent a face-to-face psychosocial assessment interview, peripheral venous blood draw, and a gynecologic examination, including a Papanicolaou smear.

The Millon Behavioral Health Inventory (MBHI) (15) was used to assess inhibited interpersonal coping style. The MBHI is a psychodiagnostic instrument to aid in the assessment and treatment of medical patients. It contains 150 self-descriptive true–false items and yields 20 clinical scales. Interpersonal coping style is measured by the following 8 scales: Introversive, In-

hibited, Cooperative, Sociable, Confident, Forceful, Respectful, and Sensitive. Of these coping style scales, we chose to investigate the relationship between inhibition and health care utilization in HIV+ women at risk for cervical cancer for several reasons. The Inhibited Coping Style scale taps into a nonclinical avoidant personality style. Higher scores are indicative of greater use of inhibited coping. Individuals who are interpersonally inhibited have the desire to reach out to others in times of need but actively restrain themselves from doing so, often because of the fear of negative interpersonal consequences. By this definition, it is likely that interpersonal inhibition is associated with health behaviors that occur within a social context, such as health care utilization. HIV+ women of color may be especially likely to demonstrate a relationship between interpersonal inhibition and lower health care utilization due to the stigma associated with an HIV diagnosis in the Black community. We also investigated the relationship between these constructs because prior research has demonstrated a relationship between inhibited coping style and cervical dysplasia in HIV uninfected women (16). It is possible that poor adherence to medical visits could mediate this relationship. Psychometric analyses of the MBHI have indicated acceptable reliability, with Kuder-Richardson formulas (KR–20) ranging from .66 to .90, and test–retest reliability ranging from .72 to .90.

The Profile of Mood States (POMS) (17) Depression–Dejection subscale was used as a measure of recent depressed affect. The POMS is a widely used, internally consistent ($\approx$.90) instrument that assesses recent affective mood states. The POMS contains a list of 65 adjectives describing mood states. Participants are asked to rate the degree to which they have experienced these mood states in the past week using a 5-point Likert scale. In this study, only the Depression–Dejection, Tension–Anxiety, and Fatigue–Inertia subscales were administered.

The Social Support Questionnaire (SSQ) (18) was used as a measure of perceived satisfaction with the provision of support by one's social network. On the SSQ, participants are asked to list all of the individuals who provide them with six different types of social support (e.g., "Who can you really count on to be dependable when you need help?"). Using a 6-point Likert scale, participants are then asked to rate the degree to which they are satisfied with the provision of support they receive. These six satisfaction ratings were then summed to provide a total perceived satisfaction score.

We used medical chart review to follow adherence to scheduled special immunology clinic visits for 24 months following study entry. All HIV+ women in southeastern Florida with Medicaid are referred to the Jackson Health Center/University of Miami Special Immunology Obstetric and Gynecologic Clinics for routine and illness-focused obstetric and gynecologic care. During the years in which we recruited, the majority of these patients also received primary care from the Jackson Health Center/University of Miami. Well-woman visits are routinely scheduled by Special Immunology on a quarterly to biyearly basis. Illness-focused visits are initiated and scheduled by patients. In this study, we followed adherence to scheduled visits for well-woman or illness-focused care obtained within primary care, obstetrics, and gynecology clinics for women with HIV.

The distribution of lymphocyte phenotypes at study entry was determined by flow cytometry as described elsewhere in detail (19). Given the relationship between greater immunosuppression and risk for HIV disease promotion in HIV+ women, we measured decline in CD4+CD3+ percentage as a possible control variable. CD4+CD3+ percentage after 1-year follow-up was abstracted using chart review.

We first conducted correlations between percentage of unattended clinic visits during 1- and 2-year follow-up and demographic (i.e., age, income, education), behavioral (e.g., medication use), and immune (i.e., CD4+CD3+% decline during 1-year follow-up) control variables. We obtained Pearson correlation coefficients to measure the degree of association between nonadherence and continuous control variables and Point-Biserial correlation coefficients to measure the assoiation between nonadherence and ordinal control variables. We then used hierarchical linear regression analysis to predict percentage of unattended clinic visits from inhibited coping style. If a control variable was correlated with nonadherence (at $p \leq .10$), it was entered as a covariate in the regression equation in the block prior to entry of inhibited coping style.

RESULTS

Demographic Characteristics

The 28 participants were African American (87%), Haitian (7%), Bahamian (3%), and Jamaican (3%) women with a mean age of 29.48 years (SD = 7.83 years). The majority of participants were single/never married (79%), and most reported having one current sex partner (66%). The mean level of education was a high-school diploma (M years of education = 11.66, SD = 1.63 years). Seventy-five percent of the participants reported a yearly income of less than $10,000.

Health Status

HIV-related clinical and immunologic status. As required by study eligibility criteria, all participants were in the asymptomatic or symptomatic (pre-AIDS) stage of HIV infection at study entry. The mean time since HIV diagnosis was 3.32 years (SD = 2.20 years), and 38% reported having at least one current HIV-related symptom at study entry.

The mean CD4+CD3+ cells/mm^3 at baseline was 505.63 (SD = 252.75). Fifty-two percent had CD4+CD3+ cell counts between 200 and 500 cells/mm^3, and 44% had cell counts greater than 500 cells/mm^3.[1] The mean baseline CD4+CD3+ percentage was 26.37% (SD = 9.42%) with a statistically significantly decline to 22.90% (SD = 9.90%) at 1-year follow-up, $t(28) = -3.57$, $p = .001$. We followed decline in CD4+CD3+ percentage only because CD4+CD3+ cell counts were not available at 1-year follow-up.

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[1]One participant had a CD4+CD3+ count of 125 cells/mm^3 at the study entry clinic visit. Her data were retained in all analyses. Exclusion of her data did not alter our findings.

TABLE 1

Correlations Between Nonadherence to Scheduled Special Immunology Clinic Visits and Control Variables in HIV+ Women at Risk for Cervical Cancer

	% of Unattended Special Immunology Clinic Visits	
Control Variable	During 1-Year Follow-Up	During 2-Year Follow-Up
Age	.01	−.11
Income	.15	.14
Education	−.34*	−.26
Number of living children	.02	−.06
Number of HIV-related symptoms at study entry	.10	.16
HAART use at study entry	−.08	−.21
Length of time since HIV diagnosis at study entry	−.05	−.22
Alcohol consumption in month prior to study entry	.23	.13
Impact of negative life stress in year prior to study entry	−.03	−.09
SIL approximation at study entry	.41**	.33*
SIL approximation at 1-year follow-up	.10	.26
CD4+CD3+% at study entry	.27	.28
CD4+CD3+% at 1-year follow-up	.25	.21
CD4+CD3+% decline over 1-year follow-up	.16	.06
Inhibited coping style	.33*	.34*

Note. HAART = Highly Active Antiretroviral Therapy (0 = no HIV medications, 1 = monotherapy, 2 = combination therapy); SIL = squamous intraepithelial lesions.
*$p < .10$. **$p < .05$.

Gynecologic health. Our sample comprised HIV+ women with a recent history of abnormal Papanicolaou smears. Forty-five percent were positive for high-risk (oncogenic) HPV types. Papanicolaou smears at the study entry clinic visit revealed that 52% of the sample had low-grade squamous intraepithelial lesions (SIL). The Papanicolaou smear of 1 participant in our sample revealed the presence of high-grade SIL at the study entry clinic visit. Papanicolaou smears at 1 year revealed that 24% of the sample had SIL that had progressed or persisted (e.g., normal Papanicolaou smears at study entry that had progressed to low-grade SIL at 1 year or low-grade SIL at study entry that had persisted at 1 year).

Health-Related Behaviors

Because the majority of our sample was recruited prior to the widespread usage of highly active antiretroviral therapy (HAART), 48% reported no use of antiretrovirals or protease inhibitors. Twenty-eight percent reported use of 1 antiretroviral ("monotherapy"), and 24% reported use of double or triple combination therapy. Two women using combination therapy reported taking a protease inhibitor.

Reported current substance use was low in our sample at study entry. Sixty-nine percent reported no alcohol use in the month prior to study entry, and 90% reported no marijuana use. No participants reported use of crack cocaine in the month prior to study entry, although most reported a history of crack cocaine use.

The mean number of scheduled special immunology clinic visits was 3.45 (*SD* = 1.55) during 1-year follow-up and 6.39 (*SD* = 3.17) during 2-year follow-up, or approximately one visit every 4 months. The mean percentage of unattended scheduled

clinic visits was 56.82% (*SD* = 28.87) during 1-year follow-up and 52.36% (*SD* = 26.73) during 2-year follow-up. Sixty-four percent of the sample attended no more than 50% of scheduled clinic visits during 1-year follow-up. A similar pattern of non-adherence was noted during 2-year follow-up.

Correlations Among Nonadherence to Clinic Visits, Control Variables, and Psychosocial Variables

Pearson correlations revealed that greater number of years of education ($r = −.34$, $p = .06$) and more advanced SIL at study entry ($r = .41$, $p = .02$) were correlated with a lower percentage of attended clinic visits during 1-year follow-up. A similar, although less significant pattern emerged between these two control variables and clinic nonadherence during 2-year follow-up (Table 1). We controlled for these two variables when predicting percentage of unattended clinic visits during follow-up. We were concerned that HAART use and HIV disease progression over the follow-up periods could affect adherence to scheduled clinic visits. Therefore, we also controlled for HAART use at study entry and decline in CD4+CD3+ percentage over 1-year follow-up in our regression equations.[2] Table 2 presents the correlations among nonadherence, inhibited coping style, recent depressed mood, and social support satisfaction.

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[2]We were unable to obtain CD4+CD3+ percentage at 2-year follow-up through chart review for 16 participants in this sample. Non-adherence to clinic visits during 2-year follow-up was not correlated with decline in CD4+CD3+ percent during 2-year follow-up ($r = −.03$, $p = .88$, $n = 23$). Therefore, we controlled for decline in CD4+CD3+ percent during 1-year follow-up when predicting nonadherence to scheduled clinic visits during 2-year follow-up.

TABLE 2

Correlations Between Nonadherence to Scheduled Special Immunology Clinic Visits and Psychosocial Variables in HIV+ Women at Risk for Cervical Cancer

	Inhibited Coping Style	*Recent Depressed Mood*	*Social Support Satisfaction*	*Nonadherence to Clinic Visits During 1-Year Follow-Up*
Inhibited coping style	—			
Recent depressed mood	.33**	—		
Social support satisfaction	−.18	.41*	—	
Nonadherence to clinic visits during 1-year follow-up	.33*	.20	.09	—
Nonadherence to clinic visits during 2-year follow-up	.34*	.30*	.23	.89**

*$p \le .10$. **$p \le .05$.

TABLE 3

Predicting Nonadherence to Scheduled Special Immunology Clinic Visits During 1-Year Follow-Up in HIV+ Women at Risk for Cervical Cancer

Step No. and Predictor	R^2	β	ΔR^2	*F of ΔR^2*
1 Demographic and biobehavioral control variables	.28		.28	2.28*
No. of years of education		−.19		
SIL approximation at study entry		.44**		
HAART use at study entry		−.01		
Decline in CD4+CD3+ % over 1-year follow-up		.14		
2 Psychological variable				
Inhibited coping style	.41	.45**	.13	4.85**

Note. $N = 28$. Inhibited Interpersonal Coping Style was assessed using the Millon Behavioral Health Inventory (15). Significance of the overall model, $F(5, 22) = 3.10$, $p = .03$. SIL = squamous intraepithelial lesion (0 = no SIL, 1 = low-grade SIL, 2 = high-grade SIL); HAART = Highly Active Antiretroviral Therapy (0 = no HIV medications, 1 = monotherapy, 2 = combination therapy).
*$p \le .10$. **$p \le .05$.

TABLE 4

Predicting Nonadherence to Special Immunology Clinic Visits During 2-Year Follow-Up in HIV+ Women at Risk for Cervical Cancer

Step No. and Predictor	R^2	β	ΔR^2	*F of ΔR^2*
1 Demographic and biobehavioral control variables	.17		.17	1.20
No. of years of education		−.12		
SIL approximation at study entry	.36*			
HAART use at study entry	−.13			
Decline in CD4+CD3+ % over 1-year follow-up		.07		
2 Psychological variable				
Inhibited coping style	.39	.58**	.22	7.64**

Note. $N = 28$. Inhibited Interpersonal Coping Style was assessed using the Millon Behavioral Health Inventory (15). Significance of the overall model, $F(5, 22) = 2.77$, $p = .05$. SIL = squamous intraepithelial lesion (0 = no SIL, 1 = low-grade SIL, 2 = high-grade SIL); HAART = highly active antiretroviral therapy (0 = no HIV medications, 1 = monotherapy, 2 = combination therapy).
*$p \le .10$. **$p \le .05$.

Predicting Nonadherence to Scheduled Clinic Visits Over Follow-Up With Inhibited Coping Style

After controlling for demographic and biobehavioral control variables, greater inhibited coping style significantly predicted greater nonadherence to scheduled clinic visits during 1-year follow-up (β = .45, $p = .04$; Table 3). The overall model

was significant, $F(5, 22) = 3.10$, $p = .03$, and accounted for 41% of the variance in nonadherence to clinic visits. A significant relationship also emerged between inhibited coping style and poorer adherence to clinic visits during 2-year follow-up (Table 4). Figure 1 presents a scatterplot demonstrating the relationship between inhibited coping style and greater nonadherence during 2-year follow-up with biobehavioral control variables included.
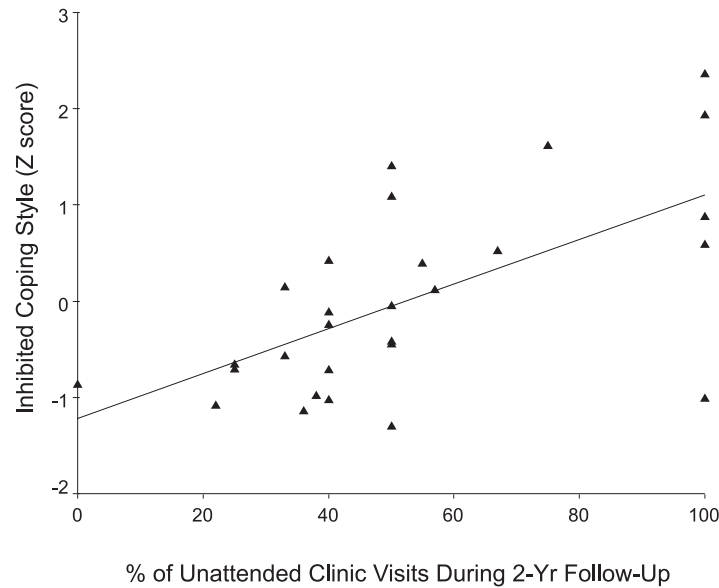
FIGURE 1   Relationship between inhibited interpersonal coping style and greater nonadherence to scheduled clinic visits during 2-year follow-up in HIV+ women at risk for cervical cancer. *Note:* Inhibited Interpersonal Coping Style was assessed using the Millon Behavioral Health Inventory

Because recent depressed mood was significantly positively correlated with inhibited coping style, we next sought to determine whether the relationship between inhibited coping style and nonadherence to clinic visits persisted after controlling for recent depressed mood. Regression analyses revealed that greater inhibited coping style remained a significant predictor of greater nonadherence to clinic visits during both 1 (β = .45, p = .05) and 2-year (β = .54, p = .02) follow-up, even after controlling for recent depressed mood.

To test social support satisfaction as a mediator of the relationship between inhibited coping style and nonadherence, it was first necessary to demonstrate significant relationships between (a) inhibited coping style and social support satisfaction, and (b) social support satisfaction and nonadherence (20). After partialling out the effects of recent depressed mood on inhibited coping style, a significant negative correlation emerged between inhibited coping style and social support satisfaction (pr = –.37, p = .04). However, as shown in Table 2, social support satisfaction was not significantly correlated with nonadherence at either 1- or 2-year follow-up. Therefore, social support satisfaction did not meet criteria as a mediator of the relationship between inhibited coping style and nonadherence to clinic visits in this sample.

DISCUSSION

In study presented here, we sought to examine the relationship between interpersonal coping style and adherence to clinic visits in HIV+ women infected with HPV, a commonly sexually transmitted virus that increases risk for cervical cancer. Specifically, we investigated the relationship between inhibited interpersonal coping style and adherence to special immunology primary care and obstetrics/gynecology clinic visits.

Adherence to clinic visits was very low in our sample, thus demonstrating the need to assess the psychosocial factors associated with nonadherence in this population. On average, participants were scheduled for approximately three visits per year, but 60% of our participants attended less than 50% of their scheduled visits. Of our potential control variables, both number of years of education and more advanced SIL at baseline were negatively correlated with adherence, relationships that initially appeared to be counterintuitive. However, in our clinical experience with this population, we have noted that women with greater education who are employed outside the home often report having difficulty attending physician's appointments. Many of our participants have reported that they are frequently (a) not offered paid sick leave and cannot financially afford to take leave without pay and (b) are reluctant to request sick leave because they fear that it may jeopardize their employment status or the confidentiality of their HIV status. It is somewhat less surprising that women with more advanced SIL at baseline had lower adherence across the follow-up period; rather, it is possible that SIL at baseline among HIV+ HPV+ women is, in part, due to a chronic pattern of nonadherence to medical regimens.

As predicted, women with an inhibited interpersonal coping style had poorer adherence to clinic visits during 1-year follow-up. Strikingly, the relationship between inhibited coping style and poor adherence not only persisted, but they also strengthened in significance during the 2-year follow-up period. Of importance, this finding emerged even after controlling for the possible confounding effects of HAART use, HIV disease progression during the 1st year of follow-up, and recent depressed mood. Although inhibited coping style was significantly negatively correlated with social support satisfaction, social support satisfaction was not significantly associated with nonadherence. Therefore, in contrast to our hypothesis, social

support satisfaction did not mediate the relationship between inhibited coping style and nonadherence. Surprisingly, however, participants reported a high degree of overall satisfaction with their social support network on the SSQ. The restricted range of satisfaction scores on the SSQ may have attenuated a possible correlation between social support and nonadherence in this sample. Future research should examine the relationship between social support and nonadherence in HIV+ HPV+ women using more sensitive measures of social support.

Although not examined in this study, it is possible that engagement in passive coping strategies may have mediated the relationship between interpersonal inhibition and poor adherence. Highly inhibited women may engage in passive coping strategies, such as denial, avoidance, and mental and behavioral disengagement. Research on coping and antiretroviral therapy in HIV+ individuals indicates that reliance on these strategies may hinder adherence to medical regimens. Singh et al. found that adaptive and active-behavioral coping was associated with greater adherence to antiretroviral therapy (11,12), whereas avoidant coping was related to poorer adherence to HIV medication refills (11). Reliance on passive coping in HIV+ women with HPV is exceptionally disconcerting, because cervical dysplasia is a precancerous condition that can be largely prevented from progressing into cervical cancer through routine screening and treatment. Future research should examine relations among interpersonal inhibition, active/passive coping, and adherence to health care practices in HIV+ HPV+ women.

This is the first study to demonstrate that a psychosocial factor predicts adherence to clinic visits in individuals with the "quadruple whammy" (6), or four strong risk factors for disease: (a) low socioeconomic status, (b) minority racial group membership, (c) female gender, and (d) risk for cervical cancer in the context of a preexisting HIV infection. These findings emphasize the importance of assessing interpersonal functioning and coping strategies in HIV+ women, an underserved, female medical population, at the point of entry into the health care system.

Our study has several limitations. First, the low sample size may have produced unstable findings, lack of generalizability, and low power to detect some potentially important statistical relationships. Replication with a larger sample is needed. Second, most of our participants were not taking HAART at study entry or at follow-up. Given that HAART can have profound positive effects on disease status and both positive and negative effects on quality of life, replication should also occur with a contemporary cohort of women taking HAART. Third, the prospective design of our research necessitated the use of chart review to assess adherence to scheduled clinic visits. Although we controlled for HIV disease progression during follow-up, the quantity and quality of follow-up data in charts may be confounded with illness factors. Therefore, our data may be biased in unknown ways. Finally, we have a subset of participants on which we were unable to collect full data. This included several participants that did not have any chart-documented well-woman or illness-focused visits during follow-up. The possibility exists that participants who withdrew from clinical care or did not schedule clinical care visits during the follow-up period

were the most interpersonally inhibited. However, we are unable to determine this without having coping style data on all participants. If true, it is possible that our findings underestimate the relationship between inhibited coping style and nonadherence.

Overall, these findings suggest that psychosocial assessment, including interpersonal coping style assessment, should be implemented at the point of a woman's entry into the health care system for the medical management of HIV. For many women, entry occurs during pregnancy, suggesting that psychosocial assessment should be performed at a woman's first prepartum visit. Based on the results of these assessments, brief coping skills interventions could be delivered to women with vulnerable coping styles throughout the prepartum period by nursing health care providers. Given the amount of stress many women experience after childbirth, HIV+ HPV+ women may benefit from more intensive psychosocial interventions postpartum. Both cognitive-behavioral stress management and interpersonal therapy interventions have demonstrated efficacy on psychosocial functioning and health status in HIV+ individuals (21–24). Future research should examine the effects of such interventions on coping style, adherence to clinic visits, and ultimately cervical cancer risk in HIV+ women with HPV.

REFERENCES

(1) Centers for Disease Control and Prevention: *HIV/AIDS Surveillance Report.* 2001, *13*(2):1–44.

(2) Minkoff H, Eisenberger-Matityahu D, Feldman J, Burk RD, Clark L: Prevalence and incidence of gynecologic disorders among women infected with human immunodeficiency virus. *American Journal of Obstetrics and Gynecology.* 1999, *180:*824–836.

(3) Massad LS, Ahdieh L, Benning L, et al.: Evolution of cervical abnormalities among women with HIV-1: Evidence from surveillance cytology in the women's interagency HIV study. *Journal of Acquired Immune Deficiency Syndromes.* 2001, *27*(5):432–442.

(4) Palefsky JM, Minkoff H, Kalish LA, et al.: Cervicovaginal human papillomavirus infection in human immunodeficiency virus-1 (HIV)-positive and high-risk HIV-negative women [Comment]. *Journal of the National Cancer Institute.* 1999, *91*(3):226–236.

(5) Wright Jr. TC, Cox JT, Massad LS, Twiggs LB, Wilkinson EJ: Conference AS-SC. 2001 Consensus Guidelines for the management of women with cervical cytological abnormalities [Comment]. *Journal of the American Medical Association.* 2002, *287*(16):2120–2129.

(6) Pereira DB: Interventions for mothers during pregnancy and postpartum: Behavioral and pharmacological approaches. In Chesney M, Antoni MH (eds), *Innovative approaches to health psychology: Prevention and treatment—Lessons learned from AIDS.* Washington DC: American Psychological Association Press, 2002.

(7) Jordan JV, Kaplan AG, Miller JB, Stiver IP, Surrey JL: *Women's Growth in Connection.* New York: Guilford, 1991.

(8) Taylor SE, Klein LC, Lewis BP, et al.: Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review.* 2000, *107*(3):411–429.

(9) Cohen S, Gottlieb BH, Underwood LG: Social relationships and health: Challenges for measurement and intervention. *Advances in Mind–Body Medicine.* 2001, *17*(2):129–141.

(10) van Servellen G, Chang B, Garcia L, Lombardi E: Individual and system level factors associated with treatment nonadherence in human immunodeficiency virus-infected men and women. *AIDS Patient Care STDS.* 2002, *16*(6):269–281.

(11) Singh N, Berman SM, Swindells S, et al.: Adherence of Human Immunodeficiency Virus-infected patients to antiretroviral therapy. *Clinical Infectious Diseases.* 1999, *29:*824–830.

(12) Singh N, Squier C, Sivek C, et al.: Determinants of compliance with antiretroviral therapy in patients with human immunodeficiency virus: Prospective assessment with implications for enhancing compliance. *AIDS Care.* 1996, *8*(3):261–269.

(13) Goodkin K, Fuchs I, Feaster D, Leeka J, Rishel DD: Life stressors and coping style are associated with immune measures in HIV-1 infection—a preliminary report. *International Journal of Psychiatry in Medicine.* 1992, *22*(2):155–172.

(14) Leserman J, Petitto JM, Gu H, et al.: Progression to AIDS, a clinical AIDS condition and mortality: Psychosocial and physiological predictors. *Psychological Medicine.* 2002, *32*(6):1059–1073.

(15) Millon T, Green CJ, Meagher RB: The MBHI: A new inventory for the psychodiagnostician in medical settings. *Professional Psychology.* 1979, *10:*529–539.

(16) Antoni MH, Goodkin K: Host moderator variables in the promotion of cervical neoplasia—II. Dimensions of life stress. *Journal of Psychosomatic Research.* 1989, *33:*457–467.

(17) McNair D, Lorr M, Droppleman L: *EITS Manual for the Profile of Mood States.* San Diego, CA: EITS, 1981.

(18) Sarason IG, Levine HM, Basham RB, Sarason BR: The Social Support Questionnaire. *Journal of Personality and Social Psychology.* 1983, *44:*127–139.

(19) Byrnes DM, Antoni MH, Goodkin K, et al.: Stressful events, pessimism, and natural killer cell cytotoxicity in HIV+ Black women at risk for cervical cancer. *Psychosomatic Medicine.* 1998, *60:*714–722.

(20) Baron RM, Kenny DA. The moderator-mediator distinction in social psychology research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology.* 1986, *51:*1173–1182.

(21) Antoni MH, Cruess DG, Klimas N, et al.: Stress management and immune system reconstitution in symptomatic HIV-infected gay men over time: Effects on transitional naive T cells (CD4(+)CD45RA(+)CD29(+)). *American Journal of Psychiatry.* 2002, *159*(1):143–145.

(22) Cruess SE, Antoni MH, Cruess DG, et al.: Reductions in herpes simplex virus type 2 antibody titers after cognitive behavioral stress management and relationships with neuroendocrine function, relaxation skills, and social support in HIV-positive men. *Psychosomatic Medicine.* 2000, *62*(6):828–837.

(23) Cruess DG, Antoni MH, Schneiderman N, et al.: Congnitive-behavioral stress management increases free testosterone and decreases psychological distress in HIV-seropositive men. *Health Psychology.* 2000, *19*(1):12–20.

(24) Markowitz JC, Klerman GL, Perry S: Interpersonal psychotherapy of depressed HIV-positive outpatients. *Hospital and Community Psychiatry.* 1992, *43:*885–890.