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Cultural Influences on Antiretroviral Therapy Adherence Among HIV-Infected Puerto Ricans

Reuben N. Robbins, PhD [Assistant Professor of Clinical Psychology],

HIV Center for Clinical and Behavioral Studies, Department of Psychiatry, Columbia University and the New York Psychiatric Institute, New York, NY, USA

Erica D'Aquila, BA [Project Manager],

Department of Psychology, Fordham University, New York, NY, USA

Susan Morgello, MD [Professor],

Departments of Neuroscience and Pathology, Mount Sinai School of Medicine, New York, NY, USA

Desiree Byrd, PhD [Assistant Professor],

Departments of Psychiatry and Pathology, Mount Sinai School of Medicine, New York, NY, USA

Robert H. Remien, PhD [Professor of Clinical Psychology], and

HIV Center for Clinical and Behavioral Studies, Department of Psychiatry, Columbia University and the New York Psychiatric Institute, New York, NY, USA

Monica Rivera Mindt, PhD [Associate Professor]

Department of Psychology, Fordham University, Bronx, NY, USA and Departments of Psychiatry and Pathology, Mount Sinai School of Medicine, New York, NY, USA

Abstract

Adherence to antiretroviral therapy (ART) is integral to the successful treatment of HIV infection. Research has indicated that HIV-infected Latinos may have difficulty adhering to ART. While studies have demonstrated strong relationships between numerous psychosocial factors and ART adherence, no research has examined if cultural factors are also involved in ART adherence among Latinos. Our study examined the relationship between acculturation to mainstream U.S. culture, bicultural self-efficacy, and ART adherence among HIV-infected Puerto Rican adults living in the United States. Participants with 95% adherence scored higher on U.S.- and Latino-involvement acculturation scales and on a measure of bicultural self-efficacy compared to those with suboptimal adherence. Among bicultural HIV-infected Puerto Ricans both acculturation and self-efficacy to navigate between cultures were positively related to adherence. Understanding the role of an individual's sociocultural experience may help elucidate why HIV-infected Latinos have difficulties achieving optimal ART adherence and improve ART adherence interventions.

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Conflict of Interest.

The authors report no real or perceived vested interests that relate to this article (including relationships with pharmaceutical companies, biomedical device manufacturers, grantors, or other entities whose products or services are related to topics covered in this manuscript) that could be construed as a conflict of interest.

Keywords

acculturation; adherence; antiretroviral; bicultural; Hispanic; HIV; Latino; Puerto Rican; self-efficacy

Antiretroviral therapy (ART) adherence is crucial to treating and managing HIV, and is highly predictive of viral suppression, disease progression, drug resistance, and better health outcomes (Maggiolo et al., 2005). Although debate exists as to the most optimal level of adherence, there is wide agreement that higher adherence is better and that near perfect adherence of 95% is highly related to positive health outcomes (Mannheimer, Friedland, Matts, Child, & Chesney, 2002). Research has indicated that Latinos have difficulties achieving and maintaining optimal ART adherence. When compared to HIV-infected non-Latino Whites, HIV-infected Latinos from Central and South America and the Caribbean had: (a) fewer follow-up visits with 100% ART adherence (Oh et al., 2009), (b) lower rates of 95% ART adherence (Robbins et al., 2005), and (c) more ART medication errors (Arnsten et al., 2007).

Less than optimal adherence among the U.S. Latino population raises public health concerns, as Latinos already face numerous HIV-related challenges. Not only do new HIV infections disproportionately affect Latinos compared to non-Latino Whites, once infected, Latinos are more likely to progress to AIDS (Centers for Disease Control and Prevention [CDC], 2010). HIV is also the fifth and sixth leading cause of death among Latinos ages 35–44 and 25–34, respectively (CDC, 2010). Of particular concern among Latinos are Puerto Ricans, who have been estimated to have higher rates of HIV infection than Central and South American, Mexican, and Cuban populations in the United States (Espinoza, Hall, Selik, & Hu, 2008), and shown to have an almost five times higher death rate due to AIDS than other Latino populations in New York City (New York City Department of Health and Mental Hygiene [NYCDOHMH], 2004). Understanding the cultural dimensions of health behavior is important if we are to reduce the negative impact of HIV, improve adherence, and help disadvantaged and ethnically diverse groups live healthier lives.

Many factors have been associated with less than optimal ART adherence, including insufficient social support, poor medical knowledge, negative attitudes and beliefs about one's HIV treatment, inability to integrate ART into a daily routine, low adherence self-efficacy, and poor psychosocial functioning (Ammassari et al., 2002). However, the literature has not provided any explanation as to why Latino ethnicity is related to ART adherence, which would be important for developing strategies to ameliorate less than optimal medication-taking behaviors.

Recent reports suggest that culture may play a role in HIV treatment and care among Latinos in the United States (CDC, 2010; Willard & Angelino, 2008), which raises the question as to whether cultural factors could help explain the poor ART adherence observed in some U.S. Latino populations. Most of the research on cultural factors in Latino health behaviors have focused on acculturation, the process of psychological and behavioral change individuals and groups undergo as a consequence of long-term contact with another culture (Berry, 2003).

Studies examining the influence of acculturation to U.S. culture among Latino populations and across a variety of health behaviors (e.g., smoking, diabetes management, and diet) have been mixed, even among studies of the same behavior (Lara, Gamboa, Kahramanian, Morales, & Hayes Bautista, 2005). While no study to date has examined the influence of acculturation on ART adherence among Latinos, studies have found that greater acculturation

to U.S. culture was related to better adherence to and knowledge of prescribed health protocols among Latino immigrants (Borrayo & Jenkins, 2003), and fewer HIV risk behaviors among inner city Latinos (Kang, Deren, Mino, & Cortés, 2009).

Biculturalism, the extent to which individuals identify with their cultures of origin and the dominant U.S. culture (Tadmor & Tetlock, 2006), is another important cultural factor that may help explain aspects of Latino health behaviors. In fact, biculturalism may be particularly important among Latino populations because U.S. census data from 2005 indicated that 60% of individuals who identified as Latino were born in the United States (Passel & Cohn, 2008). Thus, most Latinos in the United States are likely bicultural to some extent in that they may speak both Spanish and English, have retained some of their cultural heritage, and adopted cultural knowledge and values of the larger, dominant U.S. cultural system.

Bicultural Latinos must continually make role adjustments depending on the cultural and contextual demands of the moment. Meeting the demands of both their cultures of origin and the U.S. culture, which are often at odds with one another, may place unique pressures on bicultural individuals when interacting with individuals from other cultural backgrounds (David, Okazaki, & Saw, 2009). The ability to navigate these distinct cultural worlds may have implications for health outcomes and behaviors within U.S. Latino populations. This may be particularly relevant to accessing and utilizing the U.S. health care system, a complex system typically built on the values and practices of the mainstream U.S. culture. Those who feel more comfortable with and confident navigating the health care system through integration of the cultural values, beliefs, and behaviors regarding health care from each of the cultures with which they identify may show better health outcomes than those who do not feel as comfortable and confident (Tadmor & Tetlock, 2006).

Successfully navigating the cultural values, norms, and behaviors of one's heritage culture, as well as with health professionals and institutions from the dominant U.S. culture, may be of particular importance in regard to ART adherence among HIV-infected Latinos. Not only do bicultural HIV-infected Latinos have to manage a stigmatizing disease and discrimination related to their ethnicity, they also face the challenges of trying to balance the cultural demands of being identified with their Latino culture as well as with the dominant U.S. culture. Further, HIV-infected Latinos on ART must balance the demands of frequent and consistent interaction with a health care system culture that may be at odds with or unfamiliar to their cultures of origin. If individuals feel less capable of navigating these cultural worlds, communication with health providers, regular access to care, and feeling supported by one's HIV providers may be diminished.

No research to date has examined acculturation and biculturalism in the context of ART adherence among Latinos, even though they have poorer HIV health outcomes compared to non-Latino Whites (CDC, 2010), and among U.S. Latinos, Puerto Ricans have a higher AIDS mortality rate than other HIV-infected Latino groups (NYCDOHMH, 2004). As the HIV epidemic continues to devastate Latino communities, it is increasingly important to understand the cultural contexts within which Latinos live and how those contexts influence HIV health and risk behaviors.

The purpose of our study was to examine the relationship between acculturation to both Puerto Rican and dominant U.S. culture, and the extent to which self-efficacy to navigate between one's culture of origin and the dominant U.S. culture (bicultural self-efficacy) influenced ART adherence. Based on the broader literature on acculturation, and biculturalism, we hypothesized that both more acculturation to the United States and higher bicultural self-efficacy would be related to optimal ART adherence. This study represents

the first attempt to provide a cultural framework from which to understand ART adherence among an urban dwelling, bicultural, HIV-infected Latino population in the United States.

Method

Participants

Seventeen Puerto Rican participants were recruited from two larger longitudinal studies examining the neurocognitive and neurologic effects of HIV (the Manhattan HIV Brain Bank, R24MH59724, U01MH083501; and CNS HIV Anti-Retroviral Therapy Effects Research studies, N01MH22005) between 2007 and 2008. Participants who identified as Latino in the parent studies were approached about participation in our study. Individuals eligible for the current study were: infected with HIV, self-identified as Puerto Rican, fluent English-speakers, prescribed ART for at least 12 weeks, taking ART on their own, not using a pillbox to manage their ART, and willing to use a special medication bottle cap and bottle with their most frequently dosed ART medication for a 4-week period. Exclusion criteria included presence of cognitive impairment attributable to brain trauma with loss of consciousness greater than 30 minutes, other neuromedical comorbidities, active substance abuse or dependence within the previous 30 days, and evidence of learning disabilities, schizophrenia, or bipolar I disorder. Of the 33 individuals approached, nine identified as Latino, but not Puerto Rican, two were not willing to use the electronic medication-event monitoring device, three stated they were not interested, one had stopped taking ART 3 years prior, and one was currently living in an assisted nursing home and unable to come to the study location.

All 17 participants self-reported their ethnicity as Puerto Rican. Fourteen of the 17 participants were born in the continental United States. The three who were not born in the continental United States reported being born in Puerto Rico. Two reported moving to New York City before the age of 10, and one reported moving to New York City at the age of 19; all three had lived in the continental United States for the majority of their lives (more than 20 years). Similarly, the age at which these participants began learning English mostly coincided with their moves to New York City. Only one participant reported having a parent (the father in this case) who was born in the continental United States. All other parents of participants were born in Puerto Rico.

Procedure

Participants meeting eligibility requirements were provided an overview of the study procedures and, if still interested, informed consent was obtained. Participants underwent a brief ART medication interview, a brief training in use of the adherence measure (see below), and completed paper-and-pencil measures of cultural variables by trained research personnel. Viral load and CD4+ T cell counts were obtained through research chart abstraction. Participants were remunerated \$10 upon completion of the first visit and \$40 after the follow-up visit 4-weeks later. Institutional review board approval from the study site (Mount Sinai School of Medicine) was granted.

Measures

Background characteristics—Demographic information, such as age, education, and gender, were collected during participant interviews. Participants were also asked where they were born and if not born in the continental United States, when they had moved to the United States. Additionally, participants were asked where their birth parents had been born and, if not born in the continental United States, when they had moved to the United States.

Acculturation—The Bicultural Scale for Puerto Ricans (BSPR; Cortes, Rogler, & Malgady, 1994) was used to assess acculturation to non-Latino U.S. culture and to Puerto Rican culture. The BSPR is a 20-item, 4-point Likert-type scale, paper-and-pencil, self-report measure assessing two domains of acculturation: U.S.-involvement (e.g., *How proud are you of being American?*), and involvement in Puerto Rican culture (e.g., *How proud are you of being Puerto Rican?*). Domain scores range from 10–40 where higher scores on the domain subscales indicate more acculturation to either U.S. culture or Puerto Rican culture. High scores on both subscales indicate biculturality. The BSPR has been used with inner city Puerto Rican drug users at high risk for acquiring HIV-infection (Cortes et al., 2003; Kang et al., 2009), with reliability coefficients for the U.S.-involvement subscale of .78 and the Puerto Rican-involvement subscale of .73. Within our study, Cronbach's alpha for the U.S.-involvement scale was .79 and .78 for the Puerto Rican-involvement scale.

Bicultural self-efficacy—The Bicultural Self-Efficacy Scale (BISES; Soriano & Bandura, 1994) was used to assess the extent to which individuals felt they could effectively navigate the cultures within which they lived (Latino and U.S. cultures). The BISES is a 13-item measure using a 5-point Likert-type rating scale (e.g., *Tell Whites, like peers and friends, how important my culture is, Stick up for my culture when put down by those in my own culture, Make friends with peers who are White*). Scores range from 13–65, where higher scores indicate more bicultural self-efficacy. In one study with Latino adolescents, Cronbach's alpha was .82 (Hazen & Soriano, 2007). Within our study, Cronbach's alpha was .89.

ART adherence—Objective measurement of ART adherence was accomplished via use of the Medication Event Monitoring System (MEMS; AARDEX Ltd, Union City, CA). MEMS is a microchip embedded bottle cap that records the date and time the cap is removed from its bottle that has been used extensively in ART adherence research. For our study, the most frequently dosed ART for each participant was monitored for a 4-week period with MEMS. Adherence rate estimates are based on total percent of prescribed doses taken. To account for doses taken without MEMS, and consistent with ART adherence research using MEMS (Remien et al., 2006), upon return of the MEMS, participants were asked if during the previous 4 weeks they had taken their ART medications without using MEMS. Typical reasons for not using MEMS were being away from home for one or multiple dosing events. Adherence rates were adjusted for dosing events occurring without use of MEMS.

Statistical analyses—Univariate analyses were conducted to provide participant descriptive statistics. To test our hypotheses, participants were categorized into either an *optimal* adherence group (where estimated individual adherence rate was ≥95%) or a *suboptimal* adherence group (where estimated individual adherence rate was <94%). Chi-square was computed to examine viral load and CD4+ T cell counts between the adherence groups. Due to small sample size and non-normally distributed dependent variables, bivariate Mann-Whitney *U* tests were conducted to compare group means on each of the dependent variables. All analyses were conducted with SPSS version 18.0.

Results

The mean age of participants was 46 years ($SD = 5.3$). Eighty-two percent ($n = 14$) of the sample was male. The mean years of completed education was 12 ($SD = 2.55$). Twenty-six percent ($n = 5$) of the sample had a CD4+ T cell count of less than 200 cells/mm³. Participants were prescribed a mean of 2.5 ($SD = .83$) HIV medications with a mean of 3.5 ($SD = 1.16$) total daily doses. The most commonly monitored medications in this study were combination pills of zidovudine and lamivudine, lopinavir and ritonavir, or a single pill of

ritonavir. Most participants dosed twice a day with one pill of the monitored medication. The mean rate of adherence for the sample was 70.1% ($SD = 35.58$) and ranged from 0% to 100% of prescribed doses taken with a median of 79.3%. Forty-seven percent ($n = 8$) of participants had an estimated adherence rate of 95% or greater. Chi-square comparisons of CD4+ T cell counts and viral loads between adherence groups indicated that the *optimal* group had marginally significant more individuals with CD4+ T cell counts higher than 200 cells/mm³ (7 vs. 1, respectively, $\chi^2 = 3.44$, $p = .06$) and significantly more individuals with viral loads lower than 500 copies/mL (7 vs. 1, respectively, $\chi^2 = 7.24$, $p < .05$) than the *suboptimal* group.

The mean score on the BSPR U.S.-involvement subscale for the sample was 31.88 ($SD = 4.39$) and 31.29 ($SD = 4.62$) for the Puerto Rican-involvement subscale. The median (interquartile range) score for the U.S.-involvement subscale was 33 (30 to 35), and 33 (28.5 to 35) for the Puerto Rican-involvement subscale. Subscale score means were very similar and a highly significant positive Pearson product-moment correlation between the subscales was observed ($r(17) = .85$, $p < .001$). Both of these findings indicated that the sample was predominantly bicultural, identifying as high in both U.S.- and Puerto Rican-involvement. The mean score on the BISES for the sample was 54.94 ($SD = 8.44$) and the median (interquartile range) score was 55 (48 to 63).

Mann-Whitney U tests were conducted to evaluate the hypotheses that Puerto Ricans with optimal ART adherence would be more acculturated to U.S. culture than Puerto Rican culture and have higher bicultural self-efficacy. The results indicated that the optimal adherence group had significantly higher scores on both the BSPR U.S.-involvement subscale and the BSPR Latino-involvement subscale compared to the suboptimal adherence group (see Table 1). These results provided some support for our first hypothesis. However, contradictory to our expectations, the optimal group was also more acculturated to Puerto Rican culture than the suboptimal group, although the optimal adherence group had much less variability in BSPR subscale scores than the suboptimal group. This may have indicated that the optimal group was more homogeneous than the suboptimal group. As Table 1 illustrates, we also found support for our second hypothesis, as the optimal adherence group had a significantly higher mean BISES score than the suboptimal adherence group.

Discussion

Among the HIV-infected Puerto Rican participants in this study, the mean adherence rate was suboptimal ($M = 70.12\%$), with only about half of the sample demonstrating adherence rates at or above the recommended 95%. While much less than optimal, this finding is not that uncommon, as estimates have indicated that as many as 50% of some ART patients cannot achieve optimal adherence (Nieuwkerk, et al., 2001). Consistent with our hypotheses, the current findings suggest that more U.S.-acculturation is related to better ART adherence among biculturally-identified Puerto Ricans of similar demographic backgrounds and that greater bicultural self-efficacy is also related to better adherence. Contrary to our expectations, higher Puerto Rican acculturation was also significantly related to better ART adherence. However, in the context of a biculturally identified sample, this makes sense, especially in light of the results on our measure of bicultural self-efficacy. While acculturation appears to be related to adherence, there is perhaps a more important aspect to the culture/adherence picture among this group of Latinos. Among bicultural Puerto Ricans who were born in or lived most of their lives in the United States, the ability to navigate between the two cultures they live within and are (or are not) identified with may be particularly important to ART adherence behaviors.

It is important to note that this study had several limitations. The small sample size, and thus low power, may have limited our ability to detect other differences between the adherence groups, restricted our ability to use more complex multivariate statistical models, provided less reliable parameter estimates, and may have caused us to erroneously reject the null hypothesis. Furthermore, the sample was a fairly homogeneous sample of Puerto Ricans, which is not necessarily reflective of the larger Latino population in the United States. Thus, any conclusions drawn and interpretations from these data must be made with caution. Nonetheless, these findings make a compelling case for future studies with larger samples to replicate our findings. And while these findings were limited to a small sample of HIV-infected Puerto Ricans, they provided some initial evidence that cultural factors may influence ART adherence behaviors among a particularly at-risk and disproportionately-affected Latino subpopulation. Similar cultural factors may also influence ART adherence behaviors among other HIV-infected Latino subpopulations.

Findings from this small study raise important implications for future research and intervention with HIV-infected Latinos. First, despite the limitations of this study, it represents an important step forward in ART adherence research in that it was the first study of its kind that explicitly examined the relationship between cultural variables and adherence among bicultural HIV-infected Latinos using an objective measure of medication adherence. Exploring sociocultural variables and the cultural experience of HIV-infected Latinos may enhance our understanding of health behaviors among this disproportionately affected and culturally diverse community. Heeding the recommendations of the CDC (2010), which has highlighted the need to consider cultural factors in health promoting behaviors, may help to reduce the disparities of HIV health outcomes in this population.

Second, provided future studies can replicate these findings, researchers and clinicians may wish to develop culturally appropriate adherence interventions. At the individual level, it may be important for providers to be aware of and address the cultural experiences of their Latino patients' lives and the extent to which patients feel capable of navigating between the cultural environs where they live and seek services. At the institutional level, developing institutional policies to educate patients – not just about their diseases, but about how to get the services they need in a complex health system – may empower those individuals who feel intimidated by or discriminated against by the health care system, a system that may seem foreign and incompatible with their values (Gee, 2008; Williams, Neighbors, & Jackson, 2003).

Conclusions

As the demographics of the HIV epidemic and the U.S. population change and become increasingly more diverse, understanding the role culture plays in health behaviors is becoming even more important. With an increasingly domestic diaspora made up of many different cultural beliefs and values, it may prove relevant to understand the experience of how an individual's cultural beliefs and attitudes interface with the larger, mainstream culture. Among Latinos, it is important to consider the unique aspects of each Latino subculture (Mexican, South American, Caribbean, etc.) and immigrant versus citizen status to more closely examine cultural dimensions of HIV care. If individuals feel that their cultural beliefs, behaviors, and attitudes are not well accepted by the health care system or that they cannot effectively navigate between the cultural worlds of the health care system and the cultural systems of their heritage, individuals may be less likely to engage in care and benefit from the most optimal health behaviors.

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Table 1

Comparison of Adherence Groups

	Optimal (<i>n</i> = 8)	Suboptimal (<i>n</i> = 9)	χ^2 or <i>U</i>	<i>p</i>
CD4+ T cell count < 200 cells/mm ³ , ^a No. (%)	1 (13%)	5 (56%)	3.44	.064
Viral Load > 500 copies/mL, ^a No. (%)	1 (13%)	7 (78%)	7.24	.007
BSPR ^b				
U.S. involvement, mean (<i>SD</i>)	34.50 (1.31)	29.56 (4.90)	10.50	.012
Puerto Rican involvement, mean (<i>SD</i>)	34.00 (2.39)	28.89 (4.88)	10.00	.012
BISES ^b , mean (<i>SD</i>)	61.13 (4.97)	49.44 (6.98)	5.50	.003

Note.

^aChi-square test,

^bMann-Whitney *U* test;

BSPR = Bicultural Scale for Puerto Ricans; BISES = Bicultural Self-Efficacy Scale