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# Men's Serostatus Disclosure to Parents: Associations Among Social Support, Ethnicity, and Disease Status in Men Living with HIV

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## Abstract

**Background—**Directly disclosing a positive HIV serostatus to family members can affect psychological and disease status. Perceptions that one is in a supportive family environment may moderate these effects; however, ethnic differences may exist in the support processes of families coping with HIV.

**Methods—**We examined the role of serostatus disclosure to parents, HIV-specific family support, and ethnicity (Latino versus non-Hispanic White) in explaining disease status (HIV Viral Load, CD4 + cell count) in a sample of men living with HIV (MLWH). Men (n = 120) reported whether they

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had disclosed their serostatus to their mothers and fathers, rated their perceptions of HIV-specific social support received from family members, and provided morning peripheral venous blood samples to assess immune function. We also collected psychosocial and urinary neuroendocrine indicators of stress/distress as possible mediator variables.

**Results—**A three-way interaction emerged between serostatus disclosure to mothers, HIV-specific family support, and ethnicity in explaining both viral load and CD4+ cell count. Non-Hispanic White men who had disclosed to mothers and were receiving high family support had a lower viral load and higher CD4+ cell count, but Latino men who had disclosed to mothers and were receiving low family support had a higher viral load. These associations were not accounted for by men's medication adherence, psychological distress, or neuroendocrine hormones. Disclosure to fathers was not related to disease status.

**Conclusions—**The effects of serostatus disclosure on disease status may depend, in part, on ethnic differences in the interpersonal processes of men's close family relationships.

### Keywords

HIV Serostatus Disclosure; HIV-Specific Social Support; Ethnic Differences; Immune Function

## 1. Introduction

Compared to non-Hispanic White men, Latino men are two to three times more likely to be infected with HIV and in some cases show faster rates of disease progression (Hall, Byers, Ling, & Espinoza, 2007; Harawa et al., 2004). This health disparity cannot be fully explained by differences in sociodemographic factors or health behaviors, including sexual behaviors, and drug use (Harawa et al., 2004). Ethnic differences in interpersonal processes, such as disclosing one's positive serostatus to family members and the perception of HIV-specific support received from family members, may help to explain these health disparities in HIV disease progression. The current study examines HIV-specific social support from family members and ethnicity as moderators of the associations between serostatus disclosure to parents and immune function in a sample of Latino and non-Hispanic White MLWH.

### 1.1 The Process of Serostatus Disclosure

Serostatus disclosure is a form of self-disclosure, as it involves revealing personal information about the self (Yep, 2000; Zea et al., 2004). Individuals may disclose as a way of expressing trust and gaining intimacy in their personal relationships (Jourard, 1971). However, disclosing a positive serostatus can be a source of interpersonal stress, and individuals weigh the costs and benefits of the disclosure act prior to disclosing (Serovich, 2001). For both Hispanic (Latino) and non-Hispanic White (White) people living with HIV (PLWH), serostatus disclosure is less likely to occur when negative reactions are expected and more likely to occur when positive outcomes (e.g., social support) are expected (Mason et al., 1995; Zea, Riesen, Poppen, Bianchi, & Echeverry, 2007; Zea, Reisen, Poppen, & Díaz, 2003).

MLWH often disclose to friends more often than family members and to mothers more often than fathers (Kalichman, DiMarco, Austin, Luke, & DiFonzo, 2003). Disclosure is more likely to occur to individuals who already know of the male discloser's sexual orientation (Marks, Bundek, Richardson, Ruiz, Maldonado, & Mason, 1992). While some men prefer not to disclose to parents to protect their own privacy or their relationship with their parents, others will disclose to their parents out of a sense of obligation (Derlega, Winstead, Greene, Serovich, & Elwood, 2004; Mason et al., 1995). However, given that family members, particularly parents, are important sources of support for PLWH despite support from friends (Bor, Miller, & Goldman, 1993), it is important to examine patterns of serostatus disclosure to parents.

### 1.2 Psychosocial and Disease Correlates of HIV Serostatus Disclosure

Men's serostatus disclosure to family members has been associated with both psychological and disease outcomes. Associations between serostatus disclosure and psychological outcomes appear to be largely dependent on the social context in which the disclosure occurs. Some research suggests that social support that is received as a result of serostatus disclosure accounts for the associations between serostatus disclosure and well-being (Zea, Reisen, Poppen, Bianchi, & Echeverry, 2005). However, other research suggests that improvements in individuals' social networks as a result of disclosing may buffer the stress of living with HIV (Cohen & Wills, 1985; Kalichman et al., 2003). Serostatus disclosures that yield positive or helpful reactions tend to be associated with lower levels of psychological distress whereas disclosures that yield negative or undermining reactions tend to be associated with increased levels of distress (Derlega, Winstead, Oldfield III, Barbee, 2003; Ingram, Jones, Fass, Neidig, & Song, 1999). Importantly, within families, mothers tend to provide more social support than fathers and other family members following disclosure (Kalichman et al., 2003).

Although research notes that men and women with higher rates of serostatus disclosure to family members report higher levels of medication adherence (Stirratt et al., 2006), little research has examined the links between serostatus disclosure and disease outcomes, including immune and virologic status. Research on *sexual orientation* disclosure, however, suggests that MLWH who conceal their sexual orientation experience faster disease progression (Cole, Kemeny, Taylor, Visscher, & Fahey, 1996) and that higher levels of sexual orientation disclosure coupled with high levels of satisfaction with support is associated with better immune function in MLWH (Ullrich, Lutgendorf, & Stapleton, 2003). Moreover, compared to MLWH who wrote about neutral topics, MLWH who were emotionally expressive in writing about traumatic events experienced gains in CD4+ cell counts over time (Petrie, Fontanilla, Thomas, Booth, & Pennebaker, 2004). Thus, it is plausible to assume that disclosing one's serostatus to family members has the potential to contribute to better disease status in MLWH and that men's social environment may promote or detract from these health benefits.

In our previous research in ethnic minority women who disclosed their serostatus to family members, we found that HIV-specific social support from family members modified the associations between disclosure to mothers and women's perceived stress, distress, and 24-hour urinary free cortisol. Specifically, women who had disclosed to mothers and were receiving adequate levels of HIV-specific social support from their family experienced less perceived stress, fewer depressive symptoms, and lower levels of 24-h urinary free cortisol (Fekete et al., under review). Disclosure to mothers in a less supportive family was not associated with less stress, depression or cortisol. Taken together, these studies suggest that the social context in which the process of disclosure occurs may play an important role in how disclosure is ultimately associated with disease status in MLWH.

### 1.3 Ethnic Differences in Serostatus Disclosure

Another limitation of research on serostatus disclosure in MLWH is a lack of research considering the role of ethnic differences in the disclosure process. Compared to non-Hispanic white men, Latinos living with HIV are more selective in who they disclosure to, and thus disclose their serostatus less frequently to social network members (Mason et al., 1995; Zea et al., 2004). This may be due, in part, to ethnic differences in cultural values.

Compared to White culture, Latino culture is more collectivist in nature and promotes close, nurturing, and supportive familial relationships (Marín & Marín, 1991; Yep, 1992). Latinos tend to rely strongly on their families as a source of support during times of stress (Keefe, Padilla, & Carlos, 1979; Raymond, Rhoads, & Raymond, 1980) and tend to have fewer social connections with individuals who are not part of their family unit (Keefe et al., 1979; Vernon

& Roberts, 1985). One might expect Latino MLWH to receive more support from family members than non-Hispanic White MLWH after disclosing an HIV positive serostatus.

However, Latino culture traditionally views homosexuality negatively (Marks et al., 1992), and the disclosure of sexual orientation is strongly associated with serostatus disclosure (Zea et al., 2004). In addition, Latino cultures also encourage a sense of *simpatía*, or attempts to promote harmony within interpersonal relationships and a desire to protect families from shame or embarrassment (Triandis, Marín, Lisansky, & Betancourt, 1984). This suggests that although Latino MLWH may have closer family ties than non-Hispanic White MLWH, they may experience more discord in their social relationships as a function of revealing their positive serostatus to close family members.

### 1.4 Potential Mediators of the Associations Among Serostatus Disclosure, HIV-Specific Family Support, Ethnicity, and Disease Status

Research suggests psychosocial stressors are consistently associated with immune function through both biological and psychological mechanisms associated with stress appraisals. Adrenal hormones, including cortisol and norepinephrine, and psychosocial factors such as depressive symptoms and perceived stress have been proposed as mediators of the stressor-immune function relationship (Antoni, 2003; McEwen, 1998). Recently, reductions in cortisol and depressed mood following a cognitive behavioral stress management intervention (CBSM) were associated with sustained increases in immune function in MLWH (Antoni et al., 2005). It is possible that associations between psychosocial variables such as serostatus disclosure, support, and ethnicity and men's disease status may be mediated by neuroendocrine hormone regulation and psychological distress (Cole, Kemeny, Naliboff, Fahey & Zack, 2001).

### 1.5 The Current Study

The overarching goal of our study was to examine the extent to which associations between serostatus disclosure to parents and disease status (i.e., viral load and CD4+ cell count) are modified by HIV-specific family support and ethnicity in MLWH. Because we were specifically interested in examining ethnic differences in interpersonal processes within the familial relationships of MLWH, we chose to focus on serostatus disclosure to parents. Further, because prior research has noted that disclosure in general is not consistently associated with psychological health outcomes in PLWH, but disclosure to specific social network members is associated with psychological health outcomes (Kalichman et al., 2003), we chose to examine disclosure to each parent separately.

We hypothesized that the associations between serostatus disclosure to parents and disease status in MLWH would be modified by the amount of HIV-specific family support men perceived receiving. Specifically, we hypothesized that men who had disclosed to either their mothers or fathers and were receiving high levels of HIV-specific family support would have a better disease status, but men who had disclosed to either parent and were receiving low levels of HIV-specific family support would have poorer disease status. We also examined whether these associations would vary based on men's ethnicity. Because Latino culture promotes a more closely knit familial social environment than White culture, we hypothesized that the combination of serostatus disclosure and greater social support buffering would be more strongly associated with better disease status in Latino men than in non-Hispanic White men. We examined these associations while controlling for potential behavioral confounders such as Highly Active Antiretroviral Therapy (HAART) medication status. Finally, we explored whether the effects of these interpersonal processes on disease status were explained via stress/distress using psychosocial and neuroendocrine indicators.

# 2. Method

## 2.1 Participants and Procedure

Our study utilized baseline data from a larger study of MLWH conducted from 1998 to 2004, which examined psychosocial, behavioral and physiological factors in HIV+ persons on a HAART regimen. Participants who were prescribed medications with immunomodulatory effects (other than HAART), who had a history of chemotherapy or whole-body radiation for the treatment of a cancer that was not AIDS-related, or who had a history of chronic illness associated with permanent changes in the immune system were excluded from the study. Assessments were delayed for men who had been prescribed antibiotics to treat an acute infection within the past 2 weeks, had changes in their HAART regimen during the last month, had been hospitalized for surgery within the past 3 months, or who had reported intravenous drug use during the past 6 months (Antoni et al., 2006).

To be included in the study, men had to read at a six-grade level, have no significant cognitive impairment as measured by the HIV-Dementia Scale (Power, Selnes, Grim, McArthur, 1995), and have no current psychological disorders including psychosis, drug/alcohol dependence, or panic disorder as measured by the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon, & Williams, 1997). Men meeting these criteria signed an informed consent, completed psychosocial measures, provided morning peripheral venous blood samples, and a 24-hour urine sample. The current study was restricted to only non-Hispanic White and Latino men with complete data on all study variables, yielding a final sample size of 120 men.

Men in the current study had a mean age of 40.3 (*SD* = 8.4; range = 20 – 62) and had been HIV-positive for approximately 7.6 years (*SD* = 5.0; range = .30 – 22.0). Slightly over half of the men were Latino (*n* = 67, 55.8%) and the rest were non-Hispanic White (*n* = 53, 44.2%). Forty-five of the 67 Latino participants in the present analyses were administered psychosocial assessments in Spanish. All instruments that did not have pre-existing, published Spanish version were subjected to a multiple-step translation process that shadowed those steps suggested by Brislin and colleagues (e.g., Brislin, 1976; Brislin, 2000; Triandis & Brislin, 1984). Almost all of the men had a high school education or greater (97.5%), over half of the men were unemployed or receiving disability (60.0%), and the average yearly income was between $10,000 and $20,000. Most men reported their sexual orientation as exclusively homosexual (75.0%) and were not currently involved in a relationship (56.7%).

## 2.2 Measures

**2.2.1 Serostatus disclosure—**Men indicated if their mother and father were present in their social network, and whether or not they had directly disclosed their serostatus to each parent using the HIV Disclosure Scale (HDS; Durán, 1998). The HDS measures both how and to whom persons disclosed their positive serostatus. For each parent, we created a dichotomous variable indicating whether or not men had disclosed to that parent. One hundred and thirteen of the 120 men indicated that they had a mother, and 69.0% of these men had directly disclosed their serostatus to her. Eighty-three of the 120 men indicated that they had a father, and 51.8% of these men had disclosed their serostatus to him.

**2.2.2 HIV-specific social support—**Social support from family members was measured using the UCLA Social Support Inventory (UCLA-SSI; Schwarzer, Dunkel-Schetter, & Kemeny, 1994). The UCLA-SSI measures how often individuals received four types of social support relevant to HIV-specific stress (i.e., information, assistance, encouragement, understanding) over the past month from close relatives. Responses were provided on a scale from 1 to 5, with higher scores indicating more support. In order to have a social support

measure that could be applied as a moderator of serostatus disclosure to individual family members we chose to use the family support scores as a collective indicator of the family support environment. Scores for perceived support available from individual family members were not available from this measure. The average amount of HIV-specific support men perceived receiving from their family was 9.9 (*SD* = 5.3; range = 1 – 20; α = .88).

**2.2.3 Disease Status—**Disease status was assessed via men's viral load and CD4+ cell counts. Morning peripheral venous blood samples were collected from participants in ethylenediaminetetraacetic acid (EDTA) tubes (Vacutainer-EDTA, Becton-Dickinson, Rutherford, NJ). HIV-1 viral load was determined on EDTA plasma using an in vitro reverse transcriptase polymerase chain reaction (RT-PCR) assay (AMPLICOR, Roche Laboratories, US #83088). This is an ultrasensitive assay that has a lower limit of 50 copies/mL. CD4+ Cell Count was determined using whole blood four-color direct immunofluorescence with a Coulter XL and flow cytometer (Fletcher, Maher, Patarca, & Klimas, 2000). Men had a mean viral load of 11,011.0 copies/$mm^3$ (*SD* = 28,874.4; range = 0 – 198,780.0) and a mean CD4+ cell count of 424.2 cells/$mm^3$ (*SD* = 247.6; range = 42.0 – 1184.0). Because viral load was not normally distributed, we conducted a square root transformation and used this transformed variable in analyses.

**2.2.4 Hypothesized Mediator Variables—**Norepinephrine, cortisol, perceived stress, and depressive symptoms were examined as potential mediators of significant interactions between serostatus disclosure, HIV-specific family support, and ethnicity in explaining men's disease status. Norepinephrine and cortisol were measured via 24-hour urine collection, and substance use and urine volume were monitored to assess compliance with urine collection.[1] Norepinephrine was determined using a high-pressure liquid chromatography with an electrochemical detection method to quantify the level of catecholamines (Kumar, Kumar, Fernandez, Mellman, & Eisdorfer, 1991;Kumar, Kumar, Fernandez, Schneiderman, & Eisdorfer, 1993). Urinary free cortisol was determined by radioimmunoassay with Diagnostic Products (Los Angeles, CA) kits with 50 ml of a 500-ml sample extracted with 10 ml of dichloromethin. Fifty microliters of urine was evaporated to dryness under nitrogen. One milliliter of $^{125}$I-labeled cortisol was added to tubes coated with antibodies, incubated for 45-min, decanted, and quantified for 1 minute with a gamma counter. Cortisol levels were calculated with a standard calibration curve and cortisol values are expressed as μg per 24 hours (Antoni et al., 2005).

Perceived stress was assessed with the 14 item Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983), which measured the extent to which men appraised life situations as being stressful over the past month on a scale of 0 (never) to 4 (very often). Positive items were reverse scored and items were summed to create a total PSS score. Men's mean PSS score was 23.70 (*SD* = 7.4; α = .85; range = 7– 43). Depressive symptoms were measured with the 13-item cognitive affective subscale of the Beck Depression Inventory (Beck & Steer, 1993), which measured men's depressive symptoms over the past week on a scale of 0 to 3. Men's mean depressive symptoms were 6.42 (*SD* = 5.7; α = .87; range = 0 – 27).

**2.2.5 Control Variables—**To select covariates for our analyses, we tested for ethnic differences on sociodemographic, social, and physical health characteristics using t-tests. As shown in Table 1, compared to non-Hispanic White men in the sample (n = 53), Latino men (n = 67) were younger $t(118) = -2.99$, $p < .01$, had a lower income $t(118) = -3.14$, $p < .01$, and

[1]Three men had urine volumes between 270 mL and 400 mL and the remainder of men had urine volumes greater than 400 mL. Two men were found to have levels of morphine in their blood. Morphine use and norephinephrine levels were significantly correlated ($r = .30$, $p < .001$) Therefore, mediation analyses examining cortisol controlled for urine volume and mediation analyses examining norepinephrine controlled for both urine volume and morphine use.

had lived in the United States for fewer years $t(118) = -12.23$, $p < .001$. We also included several additional covariates in our analyses based on prior associations in the literature. Because prior work has shown that medication adherence is strongly associated with both disease indicators and social support (Weaver et al., 2005) in persons living with HIV, we controlled for percentage of medication adherence over the past four days as measured by The Adult AIDS Clinical Trial Group Adherence to Combination Therapy Guide (ACTG; Chesney, Ickovics, Chambers, & Gifford, 2000). Men's mean percentage of adherence was 94.23 (*SD* = 15.8; range = 0 – 100). In addition, because sexual orientation disclosure and serostatus disclosure are strongly related to one another, we covaried the extent to which men were open about their sexual orientation with their social network using a one-item indicator of sexual orientation disclosure in which men indicated the extent to which they had disclosed their sexual orientation to individuals of a similar sexual orientation on a scale from 1 (completely in the closet) to 5 (completely out of the closet). This type of classification of sexual orientation disclosure has been used in past research (Cole et al., 1996;Ullrich et al., 2003). Men's mean sexual orientation disclosure was 4.23 (*SD* = 1.1, range = 1 – 5). Finally, because our measure of serostatus disclosure did not assess how long ago men had disclosed their serostatus, we controlled for years since diagnosis, despite the fact that there were no ethnic differences in the length of time that men had been living with HIV. Thus all analyses controlled for age, income, years living in the United States, medication adherence, sexual orientation disclosure, and years since diagnosis.

### 2.3 Analysis Plan

Hierarchical multiple regression was used to test our hypotheses. Tests of interactions were conducted using moderated regression analyses (Baron & Kenny, 1986). Covariates were entered into the first step of the regression equation, followed by the predictor variable (i.e., serostatus disclosure) and both moderator variables (i.e., centered HIV-specific social support and ethnicity) in the second step. All possible two way interaction terms (disclosure × support, disclosure × ethnicity, and ethnicity × support) were entered into the third block. A final block included a three-way interaction term between disclosure, ethnicity, and support. We decomposed significant three way interaction terms by stratifying the sample based on ethnicity, and then examining associations between disclosure and immune function at high and low levels of HIV-specific family support (i.e., one standard deviation above and below the centered mean).

Finally, we conducted mediated moderation analyses for any significant three-way interactions. To test a mediated moderation model, the three-way interaction term between serostatus disclosure, HIV-specific family support, and ethnicity must be significantly associated with the dependent variable. In addition, the three-way interaction term between must be significantly associated with the proposed mediator (i.e., psychosocial and neuroendocrine indicators of stress/distress) and either the mediator or an interaction term between the mediator and each moderator (HIV-specific family support or ethnicity) must be significantly associated with the dependent variable and reduce the magnitude of the three-way interaction effect on the dependent variable (Muller, Judd, & Yzerbyt, 2005).

## 3. Results

### 3.1 Descriptive Statistics

We first examined descriptive statistics for key study variables. Latino MLWH were less likely to disclose to both their mothers ($\chi^2 = 9.41$, $p < .01$) and their fathers ($\chi^2 = 6.81$, $p < .01$) than were non-Hispanic White men. As shown in Table 2, Latino and White men did not differ in their perceived amount of HIV-specific family support, viral load, CD4+ cell count, perceived stress, depressive symptoms, cortisol, or norepinephrine.

### 3.2 Interactions Between Serostatus Disclosure, HIV-Specific Family Support, and Ethnicity

No direct effects of serostatus disclosure to mothers or fathers, HIV-specific family support, or ethnicity emerged in explaining viral load or CD4+ cell count for MLWH. A significant three-way interaction emerged between serostatus disclosure to mothers, HIV-specific family support, and ethnicity in explaining viral load ($\beta = -.81$, $t = -2.55$, $p < .01$, $\Delta R^2 = .05$, $p < .01$) and CD4+ cell count ($\beta = .71$, $t = 2.14$, $p < .05$, $\Delta R^2 = .04$, $p < .05$) in MLWH. No significant three-way (or two-way) interactions emerged between serostatus disclosure to fathers, HIV-specific family support, and ethnicity in explaining viral load ($\beta = -.58$, $t = -1.82$, $p < .10$, $\Delta R^2 = .04$, $p < .10$) or CD4+ cell count ($\beta = .48$, $t = 1.46$, *ns*, $\Delta R^2 = .03$, *ns*).

To follow-up on these significant three-way interactions, we stratified the sample on ethnicity and decomposed the two-way interaction term between serostatus disclosure to mothers and HIV-specific family support in explaining both viral load and CD4+ cell count. Serostatus disclosure to mothers was not associated with viral load ($\beta = .11$, $t = .45$, *ns*) or CD4+ cell count ($\beta = -.30$, $t = -1.18$, *ns*) for Latino men who were receiving high levels of HIV-specific family support. For Latino men receiving low levels of HIV-specific family support, disclosure to mothers was associated with higher viral load ($\beta = .40$, $t = 2.07$, $p < .05$), but was not associated with CD4+ cell count ($\beta = -.02$, $t = -.13$, *ns*). For non-Hispanic White men, serostatus disclosure to mothers was associated with lower viral load ($\beta = -.64$, $t = -2.49$, $p < .05$) and higher CD4+ cell count ($\beta = .61$, $t = 2.31$, $p < .05$) among men who were receiving high levels of HIV-specific family support. Disclosure to mothers, however, was not associated with viral load ($\beta = .29$, $t = 1.34$, *ns*) or CD4+ cell count ($\beta = -.18$, $t = -.78$, *ns*) for non-Hispanic White men who were receiving low levels of HIV-specific family support.

### 3.3 Mediation Analyses

Cortisol, norepinephrine, depressive symptoms, and perceived stress were examined as potential mediators of the three-way interaction among serostatus disclosure to mothers, HIV-specific family support, and ethnicity in explaining viral load and CD4+ cell count in MLWH. The three-way interaction term was not significantly associated with any of the proposed mediator variables ($\beta = -.31$, $t = -1.05$, *ns* for cortisol; $\beta = -.01$, $t = -.03$, *ns* for norepinephrine; $\beta = .10$, $t = .30$, *ns* for depressive symptoms; and $\beta = -.31$, $t = -.99$, *ns* for perceived stress). These findings suggest that the moderating effects of ethnicity on the associations between serostatus disclosure, social support and disease status in MLWH are not explained by individual differences in neuroendocrine or psychosocial indicators of stress/distress.

## 4. Discussion

The results of our study suggest that the associations between serostatus disclosure to mothers, HIV-specific family support and disease status depend, in part, on men's ethnic background. Non-Hispanic White MLWH who had disclosed to their mothers and who were receiving high levels of HIV-specific family support experienced lower viral load and higher CD4+ cell counts, but disclosure coupled with low levels of HIV-specific family support was not associated with these disease status indicators in these men. In contrast, Latino men who had disclosed to their mothers and were receiving low levels of HIV-specific family support experienced poorer disease status (higher viral load); however, disclosure coupled with high levels of support had no significant effect on disease status in these men. Moreover, these associations remained significant despite controlling for medication adherence. Finally, psychological (perceived stress and depressive symptoms) and neuroendocrine (24-hr urinary norepinephrine and cortisol) variables known to be associated with virologic and immune status did not explain the significant interaction effects observed in this sample.

Although we expected to find that disclosure to both mothers and fathers would be associated with disease status as a function of variations in the HIV-specific support men received from family members, only combinations of disclosure to mothers and HIV-specific support from family members was important in explaining men's virologic and immune status. Prior research suggests that mothers are often disclosed to the most of any family member (Serovich, Esbensen, & Mason, 2005). Consistent with this research, almost three-quarters of MLWH had disclosed their serostatus to their mothers, whereas only about half had disclosed their serostatus to their fathers. Further, compared to Latino MLWH, non-Hispanic White MLWH were more likely to disclose their serostatus to both their mother and father. It is possible that not only did men disclose to their mothers more often, but that mothers were primary sources of family support or gateways of support for other family members in both Latino and non-Hispanic White men (e.g., Kalichman et al., 2003).

Although we did not find ethnic differences in the amount of HIV-specific family support that men perceived receiving, it is likely that Latino MLWH relied on their immediate family members as primary sources of support more so than non-Hispanic White MLWH (Keefe et al., 1979; Raymond et al., 1990; Vernon & Roberts, 1985). The White MLWH in our study may not have disclosed to their parents with the intention of gaining or receiving continued support from family members. However, the illness-specific support that they received, possibly in response to having disclosed their serostatus, may have further enhanced men's support network and promoted better disease status. Conversely, if men disclosed to mothers and did not receive adequate HIV-specific support from their families, they likely had other social networks to draw support resources from.

In contrast to the social network structure of White cultures, Latino cultural norms prescribe close familial ties and fewer connections with social contacts outside of the family relationship (Vernon & Roberts, 1985). Thus, if men needed or desired support to help them manage their illness from family members, but received inadequate levels of support, they may have felt stigmatized, out of alternative support options, and socially isolated as a result of their illness. These feelings of stigma or social isolation in combination with a lack of social resources in coping with their illness may explain impairments in Latino MLWH's virologic and immune status.

Contrary to our expectations, our results did not find that disclosures to mothers coupled with high levels of HIV-specific social support from family members explained disease status in Latino MLWH. Although Latino MLWH were less likely than non-Hispanic White MLWH to disclose their serostatus to either parent, it is possible that Latino MLWH were more comfortable disclosing to their mothers than their fathers because their mothers were seen as being more understanding, accepting, and supportive. In Latin culture, men and women often adopt the behavioral gender roles of *machismo* and *marianismo*, which prescribe that men may hold various forms of social power over women, but women are morally superior to men and are therefore often revered by adult male children (Wood & Price, 1997). It is possible that the Latino MLWH in our study disclosed to mothers with the expectation of receiving the same amount of acceptance and support from their family as they did prior to the disclosure. If these expectations were met, the continued displays of support as a result of knowing about men's illness may not have explained disease status because men were already reaping the benefits of being in a supportive family environment.

Our study also examined the possibility that the interactive associations between serostatus disclosure to parents, HIV-specific family support, and ethnicity in explaining disease status were mediated by men's psychological or physiological indicators of stress. However, we did not find support for this hypothesis. This suggests that there may be other behavioral or psychosocial variables accounting for the associations between disclosure, support, ethnicity

and disease status. For example, although our study controlled for medication adherence and monitored men for recreational drug use, it is possible that disclosure and support processes and disease status were explained by ethnic differences in alcohol consumption. Beyond health behavior explanations there may have been cognitive appraisal variables that mediated these findings. For instance, Latino MLWH may have experienced increased feelings of guilt, shame, or embarrassment (i.e., *simpatía*) as a result of disclosing their serostatus. Negative cognitions, particularly those that center on self-blame, have been linked to declines in immune function in MLWH (Kemeny & Dean, 1995; Segerstrom, Taylor, Kemeny, Reed, & Visscher, 1996). Unfortunately, our study did allow for us to test the possibility that shame and guilt may function as mediators of disclosure, support, ethnicity and disease status. It will be important for future research to examine the importance of how cognitive processes may accompany the process of serostatus disclosure.

There are several limitations to the current research that should be noted. Because of the cross-sectional design of the study, there is no way of determining if men's disease status was an antecedent or consequence of serostatus disclosure to parents and HIV-specific support from these network members. Some research indicates that individuals may only disclose their serostatus when their disease progresses to a point where they can no longer hide it (Babcock, 1998); however, other research indicates that individuals disclose to close network members when the benefits of disclosing outweigh the costs (Serovich, 2001). Moreover, social support consistently predicts well-being in HIV+ individuals (e.g., Catz, Gore-Felton, & McClure, 2002; Cederfjäll, Langius-Eklöf, Lidman, & Wredling, 2001; Gielen, McDonnell, Wu, O'Campo, & Faden, 2001; Hudson, Lee, Miramontes, & Portillo, 2001). We did not ask men to indicate when they had disclosed their serostatus to each social network member; given the range of years that men in our sample had been living with their HIV-diagnosis, it is likely that a great deal of heterogeneity existed in how long ago men had disclosed their serostatus. Although we did control for the number of months since men were diagnosed with HIV, it is still unclear how our results would differ in men who recently initiated the process of serostatus disclosure versus men who began the process some time ago.

Despite its limitations, our study strengthens and extends research on serostatus disclosure and social support processes in MLWH in at least two ways. First, prior research on serostatus disclosure in MLWH is limited in that it does not consider the social context of the disclosure and does not examine associations among disclosure, social processes, and both virologic and immune indicators of disease. Second, little research has examined ethnic differences in the process of serostatus disclosure or the ways disclosure and social support interact in predicting disease status in MLWH. Our work highlights the complexity of associations between direct disclosures to specific family members and perceptions of illness related family support in different ethnic groups.

Our results may have implications for interventions aimed at alleviating stress and improving disease status in MLWH. Cognitive behavioral stress management (CBSM) interventions can improve both psychological and physical health in persons living with HIV by changing the way individuals appraise stress, including social stress, and teaching interpersonal skills for assertively communicating concerns to others in their social network (Carrico, Antoni, Weaver, Lechner, & Schneiderman, 2005; Antoni et al., 2005). However all of this prior work focused the intervention on persons infected with HIV rather than members of their immediate social environment. Psychosocial interventions that include family members may be advantageous for men who have disclosed to family members but are not receiving adequate levels of social support. Our results also suggest that these interventions would likely benefit from being sensitive to cultural and ethnic differences in the social processes that accompany disclosure in the families of MLWH.

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## Table 1

**Ethnic Differences in Men's Sociodemographic and Health Characteristics**

| | Latino Men (n = 67) Mean (*SD*) | Non-Hispanic White Men (n = 53) Mean (*SD*) | *t* |
|---|---|---|---|
| Age | 38.33 (8.3) | 42.81 (8.0) | -2.99** |
| Education | 4.42 (1.8) | 4.49 (1.4) | -.24 |
| Employment | 3.32 (1.7) | 3.56 (1.8) | -.74 |
| Income | 2.43 (1.5) | 3.42 (1.9) | -3.14** |
| Years Living in the United States | 17.48 (14.3) | 42.72 (8.0) | -12.23*** |
| Years With HIV | 7.10 (5.1) | 8.34 (4.9) | -1.34 |
| Sexual Orientation | 1.49 (.74) | 1.29 (.56) | 1.67 |
| Sexual Orientation Disclosure | 4.01 (1.2) | 4.51 (.84) | -2.66** |
| Percent Medication Adherence | 92.62 (19.1) | 96.26 (10.2) | -1.25 |

Note. Education was measured on a continuous scale of 1 ‘did not graduate high school’ to 7 ‘graduate degree’, employment was measured on a scale of 1 ‘work full time’ to 5 ‘on disability’, income was measured on a scale of 1 ‘less than $5000’ to 5 ‘over $50,000’, sexual orientation was measured on a scale of 1 ‘exclusively homosexual’ to 5 ‘exclusively heterosexual’, and sexual orientation disclosure was measured on a scale of 1 ‘completely in the closet’ to 5 ‘completely out of the closet’.

** p< .01.

*** p < .001.

## Table 2

### Ethnic Differences in Key Study Variables

| | Latino Men (n = 67) Mean (*SD*) | Non-Hispanic White Men (n = 53) Mean (*SD*) | *t* |
|---|---|---|---|
| HIV-Specific Family Support | 10.17 (5.9) | 9.62 (4.4) | .58 |
| Viral Load (copies/$mm^3$) | 7711.37 (20374.6) | 15182.33 (36732.9) | -1.33 |
| CD4+ Cell Count (cells/$mm^3$) | 400.60 (225.2) | 454.05 (272.5) | -1.18 |
| Perceived Stress | 24.03 (7.5) | 23.30 (7.3) | .54 |
| Depressive Symptoms | 7.10 (5.9) | 5.56 (5.3) | -1.35 |
| Cortisol (μg per 24 hours) | 63.88 (45.9) | 50.81 (33.5) | 1.74 |
| Norepinephrine (μg per 24 hours) | 220.83 (186.9) | 175.50 (194.7) | 1.30 |