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An omitted level: An examination of relational orientations and viral suppression among HIV serodiscordant male couples

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Abstract

Couples' adopting a relational orientation – when partners regard themselves as a collective unit – is associated with optimal health. HIV-positive men and their HIV-negative partners (N = 116 serodiscordant male couples) were surveyed. Logistic regression showed greater relational orientations of HIV-positive (aOR=7.87; 95% CI = 1.63, 38.05) and HIV-negative partners (aOR=6.16; 95% CI: 1.43, 26.59) and HIV-positive partners' higher income (aOR=2.95; 95% CI = 1.13, 7.70) and lower depression (aOR=0.39; 95% CI = 0.15, 0.97) were associated with viral suppression with no evidence of mediation by adherence. Incorporating relationship dynamics into biomedical strategies is a promising avenue for research and intervention.

Keywords

MSM; serodiscordant couples; viral suppression

INTRODUCTION

HIV disproportionately affects gay, bisexual and other men who have sex with men (MSM) in the U.S.¹ Recent data demonstrate the critical importance of antiretroviral therapy (ART), not only in promoting optimal health for those infected with HIV, but also in preventing the spread of new infections.² Nonetheless, deficits persist in ART adherence and retention in care.³ Ensuring that HIV-infected individuals are linked to care and provided with appropriate medications – often called Treatment as Prevention (TasP) – is a critical component of biomedical prevention.⁴ Research has focused on individual-level (e.g., psychiatric co-morbidities, substance use) and structural-level (e.g., poverty and stigma) barriers to care.^{3,5,6} However, less is known about the facilitators of optimal health outcomes.

Studies suggest that primary intimate relationships are fundamental in maintaining health and well-being,⁷ with relationship satisfaction and commitment shown to be important and independent predictors of positive health outcomes.^{8,9} Recognizing the relational context of HIV transmission,¹⁰ dyad-level theories based in relationship science offer potential understanding of the ways in which intimate partners positively influence each other's health.^{9,11–13} Interdependence Theory¹³ posits that communal coping arises out of transformation of motivation, which eschews individual self-interest in favor of long-term relational goals that promote one's own and one's partner's well-being. These processes are shaped by endorsing a relational orientation whereby each individual comes to think of the partner as part of the self, and regards himself as part of a collective unit that includes the partner.^{13,14} Partners' reports of relational orientations have been associated with positive adaptation among couples affected by lung cancer and heart disease.^{15,16} HIV prevention research suggests positive relationship dynamics, including relationship satisfaction and commitment, are associated with increased self-report ART adherence and viral suppression among male couples affected by HIV.¹⁹ To our knowledge, no study has examined whether relational orientations are associated with viral suppression among HIV-serodiscordant male couples.

Given the results of the HPTN 052 study¹⁷ and evidence that viral suppression lowers HIV transmission risk among MSM,¹⁸ identifying factors that might facilitate optimal adherence and improve immune functioning is critical to supporting biomedical approaches to HIV treatment and prevention. The current analyses were conducted to determine whether both partners relational orientations were associated with viral suppression among HIV-positive partners, over and above individual and structural factors, in a sample of HIV-serodiscordant male couples. Additionally, we were interested in whether self-reported ART adherence mediated the associations between both partners' reports of relational orientations and viral suppression among the HIV-positive partner.

METHODS

A convenience sample of 116 HIV-serodiscordant same-sex male couples completed computer-assisted self-interviews, and HIV-positive partners had blood drawn for HIV RNA viral load assays. The detailed methods of this study have been published previously.^{19,20} Viral load testing was performed using COBAS[®] AmpliPrep/COBAS[®] TaqMan[®] HIV test kits (Roche Molecular systems, Inc.), with a threshold of undetectability = <20 copies/mL. Couples were recruited in the U.S. San Francisco Bay Area using passive recruitment methods. Both partners attended the appointment together, but were consented and assessed separately. To be eligible, both partners must have reported each other as their primary partner for at least 3 months, defined as "someone to whom you feel committed above anyone else and with whom you have had a sexual relationship." In addition, participants were: (1) at least 18 years old; (2) born male and identified as male; (3) if HIV-positive, on an acknowledged ART regimen for at least 30 days; (4) English speaking; and (5) able to provide informed consent. All procedures were reviewed and approved by the senior author's Institutional Review Board.

Assessments

Participants completed the Inclusion of Other in the Self Scale (IOS), which assesses relational orientations (See Figure 1).²¹ Seven Venn diagrams with circles representing varying degrees of overlap; one circle is labeled as the self, and another circle is labeled as the partner. Participants select the diagram which best describes their relationship. Responses range from completely separate, nonoverlapping circles (A) to complete overlap (G). The IOS scores were moderately and positively skewed and were thus dichotomized at D, which was the median of both samples, such that A–C indicated lower relational orientation and D–G indicated a greater relational orientation.¹⁴ Participants also completed demographic questions, a four-item commitment scale²² (e.g., “I am committed to maintaining my relationship with my partner,” $\alpha = 0.96$) and the abbreviated dyadic adjustment scale (DAS) consisting of six items that assess each partner’s perception of overall relationship satisfaction (e.g., “How often do you think that things between you and your partner are going well?” $\alpha = 0.84$).^{19,23} Participants also completed a four-item scale that assessed sexual satisfaction (e.g., “How satisfied are you with your sexual relationship with your partner in general?” $\alpha = 0.84$).²⁰ For each scale, higher scores represent greater endorsement of the construct. CES-D depressive symptoms ($\alpha = 0.91$) with scores dichotomized at 16 (clinical cut-off point),^{24,25} and HIV-positive partners completed a visual analog scale (VAS)²⁶ for ART adherence behavior in the past 30 days.

Data analysis

First, we used logistic regression to predict the HIV-positive partner’s viral suppression from two blocks of correlates: (1) demographic (income, depression, relationship duration) and clinical (adherence, time since HIV diagnosis) variables followed by (2) relationship-oriented variables (high vs. low relational orientation, relationship satisfaction, sexual satisfaction, and commitment). Mediation of associations between relationship orientation and viral suppression by adherence was assessed by examining whether previously significant relationship orientation-viral suppression associations became non-significant after adherence was included in the model.²⁷ We also tested for a significant indirect effect of relational orientations on viral suppression through adherence behavior using structural equation modeling in Mplus with the 95% confidence interval of the indirect effect being based on the bootstrap with 5000 samples.²⁸ Finally, to assess whether partner differences in IOS scores could explain viral suppression, a difference score was created by subtracting the HIV-positive partner’s IOS score from the HIV-negative partner’s score; this difference score was not associated with viral suppression in an exploratory follow-up analysis¹.

RESULTS

The mean age was 46.70 years ($SD = 10.96$). In total, 16.8% identified as Latino and 11.6% as Black. Slightly less than half (40.5%) reported earning less than \$20,000 annually and 92.0% of the sample self-identified as Gay, 6.0% as Bisexual, and 2.0% as Other. The mean time since HIV diagnosis was 13.54 years ($SD = 8.01$) and relationship length was 7.53 years ($SD = 7.80$). Of the HIV-positive partners, 73 (62.9%) had an undetectable viral load.

¹We are grateful to an anonymous reviewer for suggesting this analysis.

In Step 1, HIV-positive partners' adherence behavior was positively associated with viral suppression (aOR = 1.05; 95% CI: 1.01, 1.10, $p < 0.05$), and depression was associated with a 65% decrease in the odds of having an undetectable viral load (aOR = 0.35; 95% CI: 0.15, 0.85; $p < 0.05$). The Step 2 block of relational variables were significant ($\chi^2(8) = 21.03$; $p < 0.01$). In Step 2, HIV-positive partners' relational orientation contributed an 8-fold increase in the odds of having an undetectable viral load (aOR = 7.87; 95% CI: 1.63, 38.05; $p = 0.01$). Similarly, HIV-negative partners' relational orientation had a 6-fold increase in odds of their partner having an undetectable viral load (aOR = 6.16; 95% CI: 1.43, 26.59; $p = 0.015$). HIV-positive partners higher income (\$20,000K or more annually) yielded a 3-fold increased odds of viral suppression (aOR = 3.42, 95% CI: 1.24, 9.41, $p = 0.017$) and depression was associated with a 64% decrease in the odds of viral suppression (aOR = 0.36, 95% CI: 0.14, 0.95, $p = 0.05$). Sexual satisfaction, relationship satisfaction, and commitment were not associated with viral suppression. There was no evidence of mediation by ART adherence, such that HIV-positive (aOR = 0.60, 95% CI: 0.12, 3.07, $p = 0.54$) and HIV-negative partners (aOR = 1.01, 95% CI: 0.18, 5.66, $p = 0.99$) relational orientations were not associated with ART adherence, and ART adherence was not related to viral suppression (aOR = 0.99, 95% CI: 0.30, 3.29, $p = 0.99$). The indirect effects through adherence behavior was non-significant for HIV-positive partners ($B = 0.04$, 95% CI = -0.19, 0.26, $p = 0.73$) or HIV-negative partners ($B = 0.17$, 95% CI: -0.15, 0.57, $p = 0.36$). The effect of IOS discrepancy on viral suppression was also non-significant (aOR = 1.43, 95% CI = 0.46, 4.39, $p = 0.54$).

DISCUSSION

Successful management of HIV disease and prevention of onward transmission depends on targeting barriers and facilitators to viral suppression. HIV prevention researchers have increasingly recognized the importance of dyadic contexts for MSM affected by HIV.^{10,11,29} While all of the HIV-positive men in this study had access to care and were prescribed ART medications, only 62.9% were virologically suppressed. Both partners' reports of higher relational orientations were independently and positively associated with the HIV-positive partner having a suppressed viral load. Notably, relationship satisfaction, commitment and sexual satisfaction were not associated with viral suppression. Relational orientations may be predictive of optimal coping efforts over and above other aspects of relationship quality. For example, research on other illnesses has documented that when couples face a shared threat, coping can become the responsibility of both partners.^{9,30} Among HIV-serodiscordant couples, those who appraise a stressor (HIV transmission or disease progression) as "our" issue rather than "yours" or "mine" and take cooperative "we"-based actions may achieve better health outcomes.

Interestingly, we found no evidence of ART adherence mediation; that is, the association between relational orientation and viral suppression was not accounted for by reported adherence. This could be an artifact of the self-report adherence measure, which focused only on the prior 30-day period and did not include other important indicators of engagement in care such as appointment attendance. Further, this study assessed relational orientation generally, not specific to adherence behavior; prior research using domain-specific measures of relational orientation has found associations with health behaviors,

including intentions for colorectal cancer screening.³¹ Studies demonstrate that being in a romantic relationship improves a range of health outcomes, including risks of cardiovascular disease, chronic illnesses, mobility limitations, self-reported health status, and depressive symptoms.³² When relationship quality is high, contact with a significant other can reduce the stress associated with a threatening situation.³³ Dyadic coping models propose that when partners endorse relational orientations, they engage in more effective coping efforts to alleviate health threats, and consequently have better health outcomes.⁹ Future research should examine whether ART adherence is perceived by both partners to be meaningful to the relationship, and if relational orientations mediate the association between coping efforts and immune functioning.

LIMITATIONS

This study relies on self-reported data, which may be subject to social desirability. The study is cross-sectional and therefore, causal interpretations cannot be inferred. Thus, while it is likely that relational orientations explained viral suppression, it is also possible that for one or both partners' higher relational orientation was the result of viral suppression. Moreover, all HIV-positive men in this study were prescribed ART medications and the couples were from one geographic region where efforts are made to ensure connection to comprehensive HIV care and access to ART for low-income individuals. The majority of the sample identified as white. These limitations restrict our ability to generalize these results to HIV-serodiscordant male couples of diverse racial/ethnic identities and in other regions.

CONCLUSIONS

Our findings point to the importance of integrating relational factors into models and interventions designed to promote improved HIV care outcomes. These findings suggest that providers should be attuned to partner's relational orientations and health appraisals. When one or both members of the couple feels there is a problem, efforts to determine where a discrepancy exists should be addressed so couples can achieve their health goals together. Allowing couples to work together to reach common goals and build solitary around their relationship and health should be incorporated into biomedical strategies, such as TasP and Pre-Exposure Prophylaxis (PrEP), to set the stage for innovative intervention efforts that capitalize on multidimensional approaches to HIV prevention.³⁴ Future research is necessary to investigate how relational orientations are associated with coping strategies, with other steps in the HIV care continuum, and with couples in other geographic settings.

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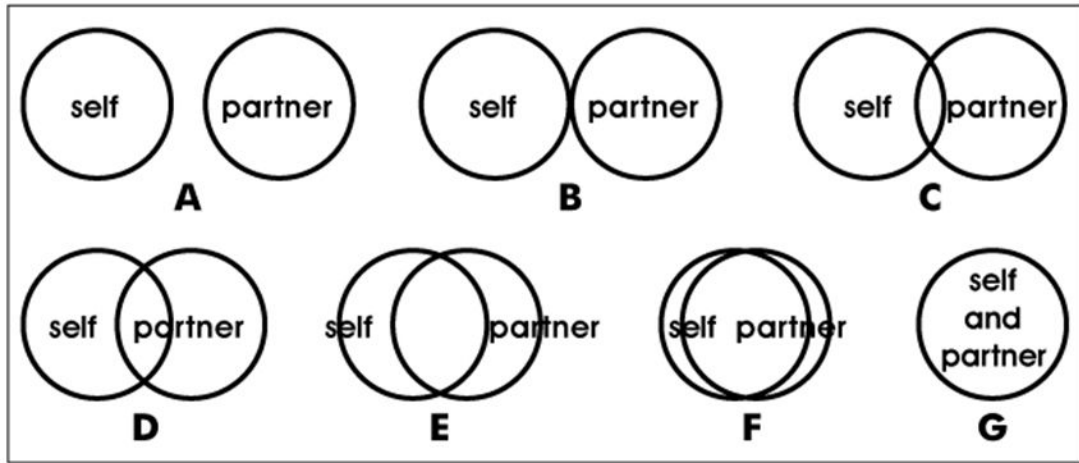


Figure 1.
Inclusion of Other in the Self (IOS) Scale

Table 1

Logistic Regression Predicting Viral Suppression (*N* = 1116)

| | HIV-positive partner | | HIV-negative partner | | HIV-positive partner | | HIV-negative partner | |
|------------------------------------|----------------------|------------|----------------------|------------|----------------------|-------------|----------------------|-------------|
| | Exp(B) | 95%CI | Exp(B) | 95%CI | Exp(B) | 95%CI | Exp(B) | 95%CI |
| <i>Step 1</i> | | | | | | | | |
| Income | 2.02 | 0.94, 5.13 | 1.65 | 0.61, 4.37 | 3.16* | 1.14, 8.76 | 2.19 | 0.74, 6.52 |
| Depression | 0.35* | 0.15, 0.80 | 0.86 | 0.36, 2.07 | 0.36* | 0.14, 0.95 | 1.15 | 0.34, 3.90 |
| Adherence | 1.05* | 1.01, 1.10 | — | — | 0.90 | 0.27, 3.12 | — | — |
| Relationship Duration ^a | 1.00 | 0.99, 1.01 | — | — | 1.01 | 0.99, 1.01 | — | — |
| Time since Diagnosis | 1.00 | 0.99, 1.01 | — | — | 1.00 | 0.99, 1.01 | — | — |
| <i>Step 2</i> | | | | | | | | |
| Relational Orientation | — | — | — | — | 7.87* | 1.61, 38.05 | 6.16** | 1.43, 26.59 |
| Relationship Satisfaction | — | — | — | — | 1.09 | 0.93, 1.29 | 0.90 | 0.78, 1.03 |
| Commitment | — | — | — | — | 1.07 | 0.94, 1.21 | 1.07 | 0.94, 1.17 |
| Sexual Satisfaction | — | — | — | — | 1.03 | 0.94, 1.13 | 1.06 | 0.95, 1.19 |

** p<0.01,

* p<0.05; Correctly classified 68.1% of cases.

^a Relationship duration is a couple-level variable, the mean of self-reported relationship length by both partners. Exp(B) is the adjusted odds ratio (aOR).