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Positive Affect Promotes Engagement in Care After HIV Diagnosis

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Abstract

Objective—Revised Stress and Coping Theory proposes that positive affect serves adaptive functions and its beneficial effects are heightened during stressful periods. This study examined the prospective relationship between positive affect and engagement in care during the 18 months following a HIV seropositive diagnosis.

Methods—The Coping, HIV, and Affect Interview (CHAI) cohort study enrolled 153 individuals who had recently received a HIV seropositive diagnosis. Using logistic and linear regression, baseline positive affect was examined as a predictor of linkage to HIV care, anti-retroviral therapy (ART) persistence (i.e., starting ART and remaining on it during subsequent follow-up assessments), and mean $\log_{10}$ HIV viral load over follow-up.

Results—After controlling for education, T-helper (CD4+) count, HIV viral load, and negative affect, higher baseline positive affect independently predicted increased odds of linkage to HIV care at 3 months post-diagnosis (adjusted OR [AOR] = 1.10; 95% CI = 1.01 – 1.21) and ART persistence over the 18-month follow-up period (AOR = 1.08; 95% CI = 1.01 – 1.16). Positive affect was not directly associated with lower mean HIV viral load over follow-up. However, one standard deviation higher positive affect indirectly predicted 6.7% lower HIV viral load via greater odds of ART persistence ($\beta_{indirect} = -0.18$, $p < .05$).

Conclusions—Greater positive affect predicts linkage to HIV care and ART persistence. ART persistence, in turn, is associated with lower HIV viral load. Clinical research is needed to examine if interventions designed to enhance positive affect can boost the effectiveness of HIV treatment as prevention.

Keywords

AIDS; Adherence; HIV; Positive Affect; Resilience; Treatment as Prevention

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In the era of HIV treatment as prevention (TasP), initiating anti-retroviral therapy (ART) at higher T-helper (CD4+) counts can optimize health outcomes among HIV-positive persons and decrease onward HIV transmission rates (Cohen, 2011). Consequently, current guidelines recommend ART for all HIV-positive persons, especially those with a CD4+ count of 500 cells/μl or less (Thompson et al., 2012). Because expanded access to ART will likely have substantial clinical and public health benefits, efforts to enhance engagement in HIV care are critical to boost the effectiveness of TasP. Recent conceptualizations of the "HIV care cascade" highlight that efficient linkage to HIV care and greater time on ART following initiation (i.e., ART persistence) are key elements of engagement in care (Bae, Guyer, Grimm, & Altice, 2011; Gardner, McLees, Steiner, Del Rio, & Burman, 2011). Linkage to HIV care should occur within three months following HIV diagnosis (Volberding et al., 2012), but individuals often encounter obstacles such as homelessness and substance use (Craw et al., 2008). Among those enrolled in HIV care, difficulties with ART persistence predict HIV virologic rebound and more rapid HIV disease progression (Bae et al., 2011). Recent findings also indicate that the effects of depressive symptoms and stimulant use on higher HIV viral load are partially mediated by decreased odds of ART persistence (Carrico et al., 2011). Although there are established risk factors for difficulties with engagement in HIV care, little is known about the role of positive psychological resources that have been shown to predict less rapid HIV disease progression (Ironson & Hayward, 2008).

Revised Stress and Coping Theory as well as the Broaden-and-Build Theory of positive emotions delineate the cognitive, behavioral, and social pathways whereby positive affect could serve adaptive functions (Folkman & Moskowitz, 2000; Fredrickson, 2001). Consistent with these theories, positive affect has been shown to broaden cognitive capacity, reinvigorate cognitive-behavioral coping efforts, and build social resources (Lyubomirsky, King, & Diener, 2005; Moskowitz, Hult, Bussolari, & Acree, 2009). Bearing in mind these beneficial consequences, the present study examined if positive affect independently predicts linkage to HIV care, ART persistence, and lower viral load among those recently diagnosed with HIV.

Methods

Procedures

The Coping, HIV, and Affect Interview (CHAI) cohort study aimed to document the occurrence, predictors, and consequences of positive affect among people coping with a new HIV diagnosis. To be eligible for participation in CHAI, individuals were required to: 1) have been informed that they were HIV-positive within the past 8 weeks; 2) speak English or Spanish; 3) be 18 years or older; and 4) have the ability to provide informed consent. Screening and enrollment for CHAI began in October of 2004 and follow-up assessments were completed in December of 2009. Of the 253 individuals who were determined to be eligible after a brief telephone screen, 153 (60%) completed a baseline interview conducted at approximately 1 month post-diagnosis. Follow-up assessments were administered at 2, 3, 6, 9, 12, and 18 months after diagnosis. Follow-up rates for these assessments were 92, 82, 77, 71, 73, and 59 percent respectively. On average, participants completed 4.5 (SD = 1.0) follow-up assessments over the 18-month investigation period. Data from these assessments

were aggregated to examine ART persistence and mean $\log_{10}$ HIV viral load over the 18-month follow-up period.

Measures

Demographics—Age, ethnicity, gender, education, income, sexual orientation, and time since HIV diagnosis were assessed by questionnaire.

Positive and negative affect—The modified Differential Emotions Scale (DES) was administered at baseline to assess positive and negative affect (Fredrickson, Tugade, Waugh, & Larkin, 2003). Participants rated how frequently they felt a particular affect in the past week from 0 (never) to 4 (most of the time). The nine positive affect items (Cronbach's α = .89) and seven negative affect items (Cronbach's α = .86) demonstrated adequate internal consistency.

Linkage to HIV care—At the 3-month follow-up assessment, participants who reported that they had utilized any medical or psychosocial services related to HIV/AIDS were classified as being linked to HIV care (1) and compared to those who did not report utilizing any services (0). This is consistent with current recommendations that HIV-positive persons be linked to medical care by 3 months post-diagnosis as well as linked to mental health and substance abuse treatment where indicated (Volberding et al., 2012).

ART persistence—Consistent with previous studies (Bae et al., 2011; Carrico et al., 2011), participants who initiated ART and remained on it during all subsequent assessments that were completed over the 18-month investigation period were classified as engaging in ART persistence (1) and compared to those who didn't initiate or inconsistently utilized ART (0).

HIV disease markers—CD4+ count and HIV viral load were obtained at baseline as well as 9 months and 18 months post-diagnosis. In order to measure CD4+ count and HIV viral load, participants provided peripheral venous blood samples, completed a signed release to access records from another cohort study, or completed a signed release to extract these data from their medical record. Average $\log_{10}$ HIV viral load over the 18-month follow-up was examined.

Statistical analyses

Logistic regression analyses examined predictors of linkage to HIV care and ART persistence. To facilitate the interpretation of the adjusted odds ratio (AOR), scores for positive affect and negative affect were transformed into z-scores ($M = 0$, $SD = 1$). A linear regression analysis examined predictors of lower mean $\log_{10}$ HIV viral load over follow-up. Informed by these results, we examined whether positive affect indirectly predicted lower $\log_{10}$ HIV viral load via decreased odds of ART persistence. Even in the absence of a direct effect of positive affect on HIV viral load, it is possible for the total indirect effect (via ART persistence) to be statistically significant (Preacher & Hayes, 2004). This linear regression analysis to test the significance of the indirect effect of positive affect on lower viral load via ART persistence utilized probit regression weights via the weighted least squares mean and

variance-adjusted estimator with the theta parameterization in MPlus (version 7.0). Using a simple formula [100 ($10^B - 1$)], the percent reduction in mean HIV viral load was calculated. Each analysis utilized maximum likelihood estimation procedures to obtain parameter estimates from all available data.

Results

The mean age of the 153 participants was 38 (SD = 9) years. Most participants were male (89%), and 76% of these were gay or bisexual. Forty-seven percent of participants were Caucasian, 27% were African American, 12% were Hispanic/Latino, and 5% were Asian or Pacific Islander. Fifty-two percent did not graduate from college and half (57%) made less than $30,000 per year. Participants had been diagnosed with HIV for 6.5 (SD = 3.1) weeks on average. At baseline, the average CD4+ count was 467 (SD = 280) cells/μl and approximately half of participants (59%) had a CD4+ count less than 500 cells/μl. The mean $\log_{10}$ HIV viral load at baseline was 4.34 (SD = 0.90). Two-thirds of participants (69%) reported being linked to any HIV care. Of the 73 participants (48%) who initiated ART, 67 persisted with ART.

As shown in Table 1, one standard deviation higher positive affect independently predicted a 10% increase in the odds of linkage to HIV care and 8% greater odds of ART persistence. Because the interaction of positive and negative affect did not significantly predict linkage to care (AOR = 1.01, 95% CI = 0.99 – 1.02) or ART persistence (AOR = 0.99, 95% CI = 0.98 – 1.00), it was not included in the final models. In a multiple linear regression analysis, positive affect did not directly predict lower mean $\log_{10}$ HIV viral load (Model $R^2 = 0.11$). Similarly, the interaction of positive and negative affect did not significantly predict lower $\log_{10}$ HIV viral load ($\beta = -.24$, $p > .05$) and was not included in the final model. After controlling for education, baseline viral load, and negative affect, one standard deviation higher positive affect indirectly predicted a 6.7% lower $\log_{10}$ HIV viral load over the 18-month follow-up period ($\beta_{indirect} = -0.18$, $p < .05$; Model $R^2 = 0.25$).

Discussion

Informed by Revised Stress and Coping Theory as well as the Broaden-and-Build Theory of positive emotions (Folkman & Moskowitz, 2000; Fredrickson, 2001), findings lend support to the adaptive role of positive affect with respect to engagement in HIV care. Higher positive affect independently predicted increased odds of linkage to HIV care at 3 months post-diagnosis and greater odds of ART persistence over the 18 months following diagnosis. On the other hand, negative affect did not independently predict either marker of engagement in HIV care. Although the adaptive significance of positive affect is theorized to be heightened during periods of increased stress (Folkman & Moskowitz, 2000), the effects of positive affect on engagement in HIV care and HIV viral load were not moderated by negative affect in this cohort of recently diagnosed HIV-positive persons. Finally, higher positive affect was indirectly linked to lower $\log_{10}$ HIV viral load via greater odds of ART persistence. This underscores the role of ART persistence as one key behavioral pathway whereby positive affect may predict less rapid HIV disease progression (Ironson & Hayward, 2008). Taken together, positive affect appears to assist HIV-positive persons with

optimizing their own health, which may have important implications for onward HIV transmission rates (Cohen, 2011).

Prior clinical research has focused extensively on developing and testing interventions that are designed to address risk factors such as depression that have been consistently shown to impair HIV disease management. At the same time, there is burgeoning interest in developing interventions that cultivate important sources of resilience, social and psychological factors that facilitate successful adaptation in the midst of difficult life circumstances (Herrick, Stall, Goldhammer, Eager, & Mayer, 2013). The role of positive affect as a source of resilience is further supported by emerging evidence that positive affect interventions may increase psychological adjustment and promote behavior change (Saslow, Cohn, & Moskowitz, in press).

Findings from this study should be interpreted in context of some important limitations. Because this sample was comprised predominantly of MSM, research is needed to examine whether and how positive affect predicts engagement in care among other HIV-positive populations. It is also noteworthy that the measure of self-reported linkage to HIV care in the present study did not separately assess enrollment in HIV medical care from the utilization of other psychosocial support services related to HIV/AIDS. Future studies should address the limitation by obtaining medical records to verify enrollment in HIV medical care. Finally, further research is needed to examine other biological and behavioral pathways whereby positive affect may lower HIV viral load. Despite these limitations, the present study will inform clinical research to examine whether and how positive affect may enhance engagement in HIV care. Randomized controlled trials are needed to examine the efficacy of positive affect interventions for improving psychological adjustment, promoting engagement in HIV care, and boosting the effectiveness of TasP with HIV-positive persons.

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References

Bae JW, Guyer W, Grimm K, Altice FL. Medication persistence in the treatment of HIV infection: a review of the literature and implications for future clinical care and research. AIDS. 2011; 25(3): 279–290. [PubMed: 21239892]

Carrico AW, Riley ED, Johnson MO, Charlebois ED, Neilands TB, Remien RH, Chesney MA. Psychiatric risk factors for HIV disease progression: the role of inconsistent patterns of antiretroviral therapy utilization. Journal of Acquired Immune Deficiency Syndromes. 2011; 56(2): 146–150. [PubMed: 21116186]

Cohen J. Breakthrough of the year: HIV treatment as prevention. Science. 2011; 334:1628. [PubMed: 22194547]

Craw JA, Gardner LI, Marks G, Rapp RC, Bosshart J, Duffus WA, Schmitt K. Brief strengths-based case management promotes entry into HIV medical care: results of the antiretroviral treatment access study-II. Journal of Acquired Immune Deficiency Syndromes. 2008; 47(5):597–606. [PubMed: 18285714]

Folkman S, Moskowitz JT. Positive affect and the other side of coping. American Psychologist. 2000; 55(6):647–654. [PubMed: 10892207]

Fredrickson BL. The role of positive emotions in positive psychology. The broaden-and-build theory of positive emotions. American Psychologist. 2001; 56(3):218–226. [PubMed: 11315248]

Fredrickson BL, Tugade MM, Waugh CE, Larkin GR. What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. Journal of Personality and Social Psychology. 2003; 84(2):365–376. [PubMed: 12585810]

Gardner EM, McLees MP, Steiner JF, Del Rio C, Burman WJ. The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. Clin Infectious Diseases. 2011; 52(6):793–800.

Herrick AL, Stall R, Goldhammer H, Egan JE, Mayer KH. Resilience as a research framework and as a cornerstone of prevention research for gay and bisexual men: Theory and evidence. AIDS and Behavior. 2013; doi: 10.1007/s10461-012-0384-x

Ironson G, Hayward H. Do positive psychosocial factors predict disease progression in HIV-1? A review of the evidence. Psychosomatic Medicine. 2008; 70(5):546–554. [PubMed: 18541905]

Lyubomirsky S, King L, Diener E. The benefits of frequent positive affect: does happiness lead to success? Psychological Bulletin. 2005; 131(6):803–855. [PubMed: 16351326]

Moskowitz JT, Hult JR, Bussolari C, Acree M. What works in coping with HIV? A meta-analysis with implications for coping with serious illness. Psychological Bulletin. 2009; 135(1):121–141. [PubMed: 19210056]

Preacher KJ, Hayes AF. SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behavior Research Methods, Instruments, and Computers. 2004; 36(4):717–731.

Saslow, LR.; Cohn, M.; Moskowitz, JT. Positive affect and interventions to reduce stress: Harnessing the benefit while avoiding the pollyanna. In: Gruber, J.; Moskowitz, JT., editors. The Dark and Light Sides of Positive Emotion. New York: Oxford University Press; (in press)

Thompson MA, Aberg JA, Hoy JF, Telenti A, Benson C, Cahn P, Volberding PA. Antiretroviral treatment of adult HIV infection: 2012 recommendations of the International Antiviral Society-USA panel. Journal of the American Medical Association. 2012; 308(4):387–402. [PubMed: 22820792]

Volberding, PA.; Aidala, AA.; Celentano, D.; Das, M.; DeGruttola, VG.; Del Rio, C.; Wirth, D. Monitoring HIV Care in the United States: Indicators and Data Systems: Institute of Medicine. 2012.

Table 1

Positive affect predicts engagement in care following HIV diagnosis (N = 153)

	Linkage to Care	ART Persistence	Log_{10} HIV Viral Load
	AOR (95% CI)	AOR (95% CI)	β
Education	0.57 (0.39 – 0.85) **	1.03 (0.80 – 1.32)	.06
Baseline HIV Viral Load	1.01 (0.69 – 1.50)	1.15 (0.85 – 1.56)	.07
CD4+ ≤ 500 cells/μl	0.71 (0.25 – 2.03)	9.80 (3.79 – 25.37) **	−.25 **
Positive Affect	1.10 (1.01 – 1.21) *	1.08 (1.01 – 1.16) *	−.18
Negative Affect	0.95 (0.84 – 1.06)	1.04 (0.95 – 1.13)	−.08

* $p < .05$;

** $p < .01$