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Impact of Pre-diagnosis Awareness of HIV-related Stigma and Dispositional Coping on Linkage to HIV Care among Newly Diagnosed HIV+ Peruvian Patients

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Abstract

A substantial body of literature has characterized how psychosocial factors, including HIV-related stigma and coping, are associated with HIV testing and HIV care utilization post diagnosis. Less is known about if certain psychosocial characteristics pre-diagnosis may also predict linkage to care among individuals who receive an HIV positive diagnosis. We examined if pre-diagnosis awareness/perception about HIV-related stigma and dispositional coping styles predicted linkage to HIV care within three months post-diagnosis with a secondary analysis of 604 patients from a randomized controlled trial (*STUDY TITLE*). Awareness/perception about HIV-related stigma, dispositional maladaptive and adaptive coping were measured before patients underwent an HIV test. Linkage to care was measured as receipt of care within three months of receiving the diagnosis. After adjusting for demographic, behavioral, and clinical variables, individuals who reported greater dispositional maladaptive coping pre-diagnosis had lower odds of linking to care, OR = 0.82, 95% CI [0.67, 1.00], $p = .05$. These preliminary data suggest the need for further longitudinal research concerning psychosocial characteristics pre- and post-diagnosis. They also highlight the potential utility of pre-diagnosis psychosocial assessment and tailored counseling when providing positive HIV diagnosis results.

Keywords

HIV stigma; Coping; linkage to care; Latinos

INTRODUCTION

Facilitating early linkage to ART among people living with HIV/AIDS (PLWHA) is essential. Early linkage to care has been tied to slower disease progression, decreased viral loads, and lower mortality risk (Moore, 2011; Mugavero, Amico, Horn, & Thompson, 2013; Ulett et al., 2009). Improved HIV control also leads to decreased rates of transmission (Andrews, Wood, Bekker, Middelkoop, & Walensky, 2012; Cohen et al., 2011). Community benefits are particularly relevant for concentrated epidemics like in Lima, Peru, where HIV estimates among men who have sex with men (MSM) and transgender women (TW) approach 20% and 33%, respectively (Sanchez et al., 2007).

The current study focuses on how psychosocial characteristics *pre-diagnosis* may be associated with linkage to care *post-diagnosis*. We focus on HIV-related stigma and dispositional coping styles (Bhatia, Hartman, Kallen, Graham, & Giordano, 2011; Pence et al., 2008; Rao et al., 2012; Vanable, Carey, Blair, & Littlewood, 2006). We define HIV-related stigma as “an enduring condition, status, or attribute that is negatively valued by a society and whose possession consequently discredits and disadvantages an individual” (Herek, Capitanio, & Widaman, 2002). We define coping styles as “thoughts and behaviors used to manage the internal and external demands of situations that are appraised as stressful” (Folkman and Moskowitz, 2004). We examine adaptive (i.e., strategies in response

to stressors that are associated with positive outcomes) or maladaptive (i.e., strategies in response to stressors that are associated with aversive outcomes) coping styles, in line with conceptualizations by Zeidener and Saklofske (Zeidner and Saklofske, 1996) and some HIV-specific coping research (McIntosh and Rosselli, 2012; Moskowitz, Hult, Bussolari, & Acree, 2009).

Figure 1 depicts our conceptual model. Predisposing psychosocial characteristics may be associated with post-diagnosis psychosocial characteristics and engagement with HIV care. Heightened awareness and perceptions about HIV-related stigma may have negative healthcare consequences among individuals who are seronegative or who don't know their status, including lower rates of HIV testing (Deblonde et al., 2010; Musheke et al., 2013) and, potentially, linkage to care post-diagnosis through greater anticipated HIV-related stigma. MSM and TW may be potentially vulnerable to such negative effects due to the overlap of HIV-related stigma and stigmas related to gender and sexual minority statuses (Herek, 1999). One's predisposition to cope with problems in general, via adaptive and/or maladaptive coping styles, may also be associated with the type of coping individuals use in response to their HIV positive diagnosis and linkage to care.

Current Study

We characterize the relationship between pre-diagnosis awareness/perception about HIV-related stigma and dispositional coping styles to linkage to care within three months of diagnosis via a secondary analysis of a Seek-Test-Treat-Retain (STTR) cohort study based in Lima, Peru.

METHODS

Parent Study

The *SABES* Study was conducted by a collaboration of American and Peruvian researchers at the Fred Hutchinson Cancer Research Center (FHCRC), University of Washington (UW), University of California-Los Angeles (UCLA), the University of Illinois at Chicago (UIC), Epicentro, Asociación Civil Impacta Salud y Educación (IMPACTA), and Via Libre. The *SABES* Study consisted of three phases: Step 1 ("Screening"), wherein participants were screened for HIV infection (one-time survey administered); Step 2 ("Testing"), wherein participants undergo testing for HIV at monthly intervals; and Step 3 ("Treatment"), wherein newly diagnosed HIV-infected (HIV+) participants received antiretroviral therapy (ART) as well as ongoing medical evaluation and assessment. Participants were provided with fifteen soles (approximately 5.75 dollars) and transportation costs for each study visit.

Procedures

For the current study, we focused on individuals who had: 1) undergone the Step 1/Screening phase of the *SABES* Study; 2) experienced a confirmed HIV-positive diagnosis; and, 3) had available, clean data on study variables of interest (Figure 2).

Pre-diagnosis SABES Study procedures.—Peer educators recruited 3,108 participants from community venues. Participants were eligible if they were assigned male

sex at birth, reported sex with a male partner in the previous 12 months, were 18 years of age, were unaware of their HIV status, and were at high risk for HIV acquisition (e.g., inconsistent condom use, self-identification as sex worker). At screening, participants completed informed consent and survey measures, and underwent HIV testing. Results from point-of-care HIV tests were available at the visit; HIV RNA results were available within 1–2 days. Participants were contacted to return as soon as possible. Individuals who were uninfected during Step 1 enrolled into Step 2, wherein they engaged in monthly HIV testing and underwent similar processes for receiving results.

Post-HIV positive diagnosis SABES Study procedures.—A total of 882 individuals received an HIV-positive diagnosis. After a diagnosis, patients were screened for the *SABES* Step 3 program. Eligibility criteria were: either acute (defined as HIV seronegative and positive for HIV RNA), or recent (defined as HIV seropositive with a documented negative HIV test within the past 3 months) HIV-1 infection, no prior ART exposure, and normal hematological, renal and liver function. Peer navigators assisted participants who were eligible for Step 3 to link to this program for care. Participants who were not eligible for the Step 3 program, but were eligible for the national HIV treatment program were referred by peer educators to that program. Participants who were not eligible for either Step 3 or the national program were referred to other sources of care (e.g., private facilities, facilities for active military).

There were several differences between participants eligible for the TARGA versus *SABES* Step 3 program. First, most individuals with chronic infections who were eligible for the TARGA program were all identified during Step 1; for example, all participants with chronic infections in our final analytic sample were diagnosed during Step 1 testing. Most individuals with recent/acute infections were identified as eligible for the Step 3 program during Step 2; for example, 17% and 83% of our final analytic sample were respectively diagnosed with recent/acute infections during Step 1 and Step 2 testing. With regard to demographic, behavioral, and pre-diagnosis psychosocial factors, Step 3 and TARGA participants differed in sexual/gender identities ($p = 0.02$), education ($p = 0.05$), receipt of an HIV test within the past 12 months ($p < 0.0001$), pre-diagnosis awareness/ perception about HIV-related stigma ($p < 0.0001$), and pre-diagnosis dispositional adaptive coping ($p = 0.03$).

Available, clean data on linkage to care, pre-diagnosis awareness/perception about HIV-related stigma, and pre-diagnosis dispositional coping.—We could trace linkage only to the *SABES* Step 3 program and to the national HIV treatment program (referred to hereafter as the Tratamiento Antiretroviral de Gran Actividad or TARGA program) for participants who had enrolled before April 2015. Therefore, we could not ascertain linkage for participants who were referred to other programs (e.g. active members of the military, those with private insurance) or who were referred to the TARGA program after April 2015. We also excluded individuals who had a documented HIV diagnosis prior to screening and individuals who did not have viable data across all study variables. Relative to the 278 excluded cases, the analytic sample of 604 individuals were more likely to have experienced an acute/recent infection (8% vs 33%; $p < 0.0001$).

Measures

Pre-diagnosis dispositional coping styles.—During Step 1, we administered twelve 2-item subscales from Carver's Brief COPE to assess participants' coping styles during stressful events pre-diagnosis (Carver, 1997 (Perczek, Carver, Price, & Pozo-Kaderman, 2000)). The prompt did not specify a specific stressor, but focused on coping in general. Response categories were provided on a 4-point Likert scale (1= "I haven't been doing this at all" to 4= "I've been doing this a lot"). We classified scales as adaptive and maladaptive, based on previous studies (Gibson et al., 2011; Lyimo et al., 2014; McIntosh and Rosselli, 2012; Moskowitz, et al., 2009; Pence, et al., 2008) and higher-order exploratory factor analyses with the entire parent study sample (e.g., eigenvalues: 5.3, 1.4; factor loadings of .40 or higher), as recommended by Carver. Given preliminary findings, 11 subscales were used. Adaptive and maladaptive coping summary scores represent standardized composite scores. Individual coping styles that positively loaded onto the higher-order adaptive coping factor included: self-distraction; active coping; emotional support; planning; acceptance; spirituality; positive reappraisal; and, humor. Individual coping styles that positively loaded onto the higher-order maladaptive coping factor included: denial; substance use; and, behavioral disengagement. Venting coping was not included in either composite, given it loaded on both adaptive and maladaptive coping factors and is not consistently theorized as either adaptive or maladaptive. Cronbach's alphas for these groupings of adaptive and maladaptive coping were respectively 0.91 and 0.66.

Pre-diagnosis awareness/perception about HIV-related stigma.—During Step 1, pre-diagnosis awareness/perception about HIV-related stigma was measured through a 15-item instrument developed among US-based HIV-positive and HIV-negative Latino GBT individuals (Molina & Ramirez-Valles, 2013; Ramirez-Valles, Molina, & Dirkes, 2013). Response categories were provided on a 4-point Likert scale (0= "Strongly disagree" to 3= "Strongly agree."). The Cronbach's alpha for this sample was 0.96.

Linkage to HIV care within three months of diagnosis.—We determined if individuals who attended their first HIV care visit, using the *SABES* Step 3 study records and TARGA registry data, did so within three months of receiving an HIV-positive diagnosis (Yes or No). For all analyses, "No" was the referent group.

Demographic, behavioral, and clinical/study-related variables.—During Step 1, participants answered standard demographic (age; education; sexual/gender identities; monthly income) and behavioral (HIV testing within past 12 months, condom use during most recent sexual activity) questions. Study records were used to obtain clinical information regarding type of infection diagnosed during Step 1 or Step 2 (Acute, Recent, Chronic).

RESULTS

Table 1 describes our sample's behavioral, demographic, clinical, and pre-diagnosis psychosocial characteristics. Regarding demographic factors, 49% of our sample was <25 years old, 64% identified as cisgender male and gay, 66% had obtained post-secondary

education (e.g., vocational training, college/university) and 53% made more than the Peruvian minimum wage. Regarding behavioral factors, 44% had used a condom during their most recent sexual activity and 83% had obtained an HIV test within 12 months of study enrollment. Regarding clinical variables, 66% were diagnosed with a chronic infection and 58% of our sample linked to care within 3 months post-diagnosis.

Table 2 depicts bivariate associations between demographic, behavioral, and clinical/study variables with study variables of interest. Participants with more education, who had not received an HIV test within 12 months of study enrollment, and who had an acute/recent infection were more likely to be linked to care than counterparts. Participants who had not received an HIV test within 12 months of study enrollment and who had an acute/recent infection had greater levels of pre-diagnosis awareness/perception about HIV-related stigma than counterparts. Participants with lower income and who had not received an HIV test within 12 months of study enrollment reported more pre-diagnosis dispositional maladaptive coping than counterparts. Participants with more education and who had a recent/acute infection reported more pre-diagnosis dispositional adaptive coping than counterparts.

Table 3 depicts associations between pre-diagnosis psychosocial factors and linkage to care, after adjusting for age, gender/sexual identity, education, income, condom use, receiving an HIV test within 12 months of diagnosis, and type of HIV infection. Pre-diagnosis dispositional maladaptive coping was associated with lower odds of linkage to care. There was also a non-significant association between pre-diagnosis dispositional adaptive coping and linkage to care. We replicated adjusted models by including the 11 coping styles in one model with covariates. Greater pre-diagnosis dispositional spiritual coping was associated with greater odds of linkage to care. Other associations with pre-diagnosis dispositional coping styles and linkage to care were not significant.

DISCUSSION

The current study offers a first, preliminary understanding of how pre-diagnosis awareness/perceptions about HIV-related stigma and dispositional coping may be associated with decisions to link to HIV care after a positive diagnosis. We found that dispositional maladaptive coping was significantly associated with lower linkage to care, in line with other research along other points in the HIV continuum (McIntosh and Rosselli, 2012; Moskowitz, et al., 2009; Pence, et al., 2008; Vosvick et al., 2002). There was a weaker relationship between dispositional adaptive coping and linkage to care, which has also been documented (McIntosh and Rosselli, 2012; Moskowitz, et al., 2009). One potential explanation is that maladaptive coping may be a stronger predictor than adaptive coping. Some coping research in HIV and other conditions support this possibility (McIntosh and Rosselli, 2012; Moritz et al., 2016; Vosvick, et al., 2002). Sensitivity analyses further highlight differences in how adaptive and maladaptive coping styles may intersect with each other and affect health behaviors. The cumulative effects of dispositional maladaptive coping styles appeared to be related to each other and predicted linkage to care, but the effects of any given maladaptive coping style did not predict linkage to care. Whereas the cumulative effects of dispositional adaptive coping styles did not significantly predict linkage to care, spiritual coping was associated with linkage to care after adjusting for other coping styles,

demographic, behavioral, and clinical variables. These findings highlight the importance of future research that characterize individual and multiplicative effects of different coping styles on optimal healthcare utilization along the HIV continuum.

Awareness/perceptions about HIV-related stigma and linkage to care were not related in our sample. One potential reason regards the dimension and time-point we selected for measurement. Awareness of societal stigma against PLWHA among individuals who do not have a documented positive HIV diagnosis is different from anticipated, experienced, and internalized stigma among individuals with a documented diagnosis. HIV-related stigma may be particularly relevant for health, if individuals believe it is directed toward them. Alternatively, item wording may underlie the lack of relationships, as participants were asked to respond to statements concerning how people responded to PLWHA – not how those responses affected them personally. Relatedly, pre-diagnosis awareness/ perceptions about HIV-related stigma may not be associated or may be weakly associated with post-diagnosis dimensions of HIV-related stigma, which would be the underlying mechanisms between the relationships assessed in this study. This aligns with some of our recent work, wherein there was a non-significant association between pre-diagnosis awareness/ perceptions about HIV-related stigma and experienced HIV stigma six months post-diagnosis (SABES). A final explanation may be our study's limited generalizability, given we were focused on individuals who enrolled in a STTR trial. The relationship between awareness/perceptions about HIV-related stigma and linkage to care may exist- but may exist through a lack of overall HIV testing. In this case, individuals who suffer the negative consequences of particularly high awareness/perception about HIV-related stigma may not have joined the parent study due to fears about testing.

There were several limitations in our data set. Our study design affects the generalizability of our findings, as the parent study used convenience-based recruitment strategies, mostly via clinics and community venues. The current study also could not include all HIV-positive individuals, due to the restriction of analysis to a specific time period and inability to abstract linkage data outside of the parent study and TARGA registry. For example, there are major differences regarding the HIV/AIDS care available to the participants we analyzed as compared to Peruvians who are active members of the military or who have private insurance. Active members of the military may be more likely than study participants to be linked to care, as they have access to HIV prevention, education, and treatment services within the same healthcare system. Conversely, some Peruvian private insurance companies do not cover HIV treatment. Others do so under certain restrictions (e.g., HIV diagnosis within time period of coverage). Thus, patients with private insurance may be less likely to link to care and socioeconomic factors may be stronger predictors of linkage to care than psychosocial factors. Our sample also includes a relatively high proportion of individuals who had engaged in HIV testing before. Our findings may not be generalizable, as these participants may be situated within communities where conversations about HIV are more common and HIV is less stigmatized. Only 34% of our sample had secondary education, whereas 2017 Peruvian census data suggest that approximately 66% of the Peruvian population at large have secondary education (INEI, 2018). This distribution of education may also have affected our findings, especially since post-secondary education was associated not only with linkage to care but also with more adaptive coping pre-diagnosis.

The parent study's STTR design, in which acutely/recently infected individuals had access to peer navigators to help link them to care, could have impacted our study, especially findings shown in Table 2 in terms of HIV testing and type of HIV infection. Altogether, our findings are limited in terms of generalizability and vulnerable to selection bias. We focused on HIV-related stigma and coping styles in this study, given these variables were available; however, there are other psychosocial predictors that are likely determinants of linkage to care, including mental and behavioral health indicators before and at the point of diagnosis. This pilot project did not collect data on important variables that may underlie or confound our analyses, including pre-diagnosis coping in response to specific stressors (e.g., sexual and gender minority stigma; HIV testing). Given our relatively small samples, we were unable to stratify between participants who linked to the TARGA vs clinics associated with the *SABES* Step 3 program. Our study leveraged one conceptualization of coping. There are however other types of groupings (e.g., problem- versus emotion-based coping) and some conceptualizations emphasize that coping is largely context-dependent (Lazarus, 1993; Lazarus and Folkman, 1984). Finally, our focus concerned sexual and gender minorities living in Peru – who likely have distinct needs and experiences in terms of coping, awareness/perception about HIV-related stigma and linkage to care.

Future studies should continue to characterize pre-diagnosis behaviors, attitudes, and coping styles that impact post-diagnosis psychosocial characteristics, engagement in care and well-being. Trials such as *SABES* Study provide an opportunity to do so. There is also a need to replicate findings in non-experimental studies with large, diverse samples in order to assess these relationships when interventions are not occurring. Studies may also consider different grouping of coping styles and the unique contributions of individual coping styles, as sample size permits. This research will help us understanding complex relationships and, ultimately, will aid in the development of evidence-based interventions for high-risk communities that can improve coping with stressful life events, including HIV infection if it occurs.

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REFERENCES

- Andrews JR, Wood R, Bekker LG, Middelkoop K, & Walensky RP (2012). Projecting the benefits of antiretroviral therapy for HIV prevention: the benefits of population mobility and linkage to care. *Journal of Infectious Diseases*, 206, pp. 543–551. [PubMed: 22711905]
- Bhatia R, Hartman C, Kallen MA, Graham J, & Giordano TP (2011). Persons Newly Diagnosed with HIV Infection are at High Risk for Depression and Poor Linkage to Care: Results from the Steps Study. *AIDS & Behavior*, 15, pp. 1161–1170. [PubMed: 20711651]
- Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, ... al., e (2011). Prevention of HIV-1 infection with early antiretroviral therapy. *New England Journal of Medicine*, 365, pp. 493–505. [PubMed: 21767103]

- Deblonde J, De Koker P, Hamers FF, Fontaine J, Luchters S, & Temmerman M (2010). Barriers to HIV testing in Europe: a systematic review. *European Journal of Public Health*, 20, pp. 422–432. [PubMed: 20123683]
- Folkman S, & Moskowitz JT (2004). Coping: pitfalls and promise. *Annual Reviews of Psychology*, 55, pp. 745–774.
- Gibson K, Rueda S, Rourke SB, Bekele T, Gardner S, Fenta H, & Hart TA (2011). Mastery and coping moderate the negative effect of acute and chronic stressors on mental health-related quality of life in HIV. *AIDS Patient Care and STDs*, 25, pp. 371–381. [PubMed: 21492004]
- Herek G, Capitania J, & Widaman K (2002). HIV-related stigma and knowledge in the United States: prevalence and trends, 1991–1999. *American Journal of Public Health*, 92, pp. 371–377. [PubMed: 11867313]
- Herek GM (1999). AIDS and stigma. *American Behavioral Scientist*, 42, pp. 1106–1116.
- INEI. (2018). Peru: Perfil Sociodemografico Informe Nacional, Censos Nacionales 2017: XII de Poblacion, VII de Vivienda, y III de Comunidades Indigenas Lima, Peru.
- Lazarus RS (1993). Coping theory and research: Past, present, and future. Fifty years of the research and theory of RS Lazarus: An analysis of historical and perennial issues (pp. 366–388).
- Lazarus RS, & Folkman S (1984). *Stress, appraisal, and coping* New York: Springer.
- Lyimo RA, Stutterheim SE, Hospers HJ, de Glee T, van der Ven A, & de Bruin M (2014). Stigma, disclosure, coping, and medication adherence among people living with HIV/AIDS in Northern Tanzania. *AIDS Patient Care and STDs*, 28, pp. 98–105. [PubMed: 24517541]
- McIntosh RC, & Rosselli M (2012). Stress and coping in women living with HIV: a meta-analytic review. *AIDS and Behavior*, 16, pp. 2144–2159. [PubMed: 22434282]
- Molina Y, & Ramirez-Valles J (2013). HIV/AIDS stigma: Measurement and relationships to psycho-behavioral factors in Latino gay/bisexual men and transgender women. *AIDS & Behavior*, 25, pp. 1559–1568.
- Moore RD (2011). Epidemiology of HIV infection in the United States: implications for linkage to care. *Clinical Infectious Diseases*, 52, pp. S208–S213. [PubMed: 21342909]
- Moritz S, Jahns AK, Schröder J, Berger T, Lincoln TM, Klein JP, & Göritz AS (2016). More adaptive versus less maladaptive coping: What is more predictive of symptom severity? Development of a new scale to investigate coping profiles across different psychopathological syndromes. *Journal of Affective Disorders*, 191, pp. 300–307. [PubMed: 26702520]
- Moskowitz JT, Hult J. r., Bussolari C, & Acree M (2009). What works in coping with HIV? A meta-analysis with implications for coping with serious illness. *Psychological Bulletin*, 135, pp. 121–141. [PubMed: 19210056]
- Mugavero MJ, Amico K, Horn T, & Thompson M (2013). The state of engagement in HIV care in the United states: from cascade to continuum to control. *Clinical Infectious Diseases*, 57, pp. 1164–1171. [PubMed: 23797289]
- Musheke M, Ntalasha H, Gari S, Mckenzie O, Bond V, Martin-Hilber A, & Merten S (2013). A systematic review of qualitative findings on factors enabling and deterring uptake of HIV testing in Sub-Saharan Africa. *BMC Public Health*, 11, p 220.
- Pence BW, Thielman NM, Whetten K, Ostermann J, Kumar V, & Mugavero MJ (2008). Coping strategies and patterns of alcohol and drug use among HIV-infected patients in the United States Southeast. *AIDS Patient Care and STDs*, 22, pp. 869–877. [PubMed: 19025481]
- Perczek R, Carver CS, Price AA, & Pozo-Kaderman C (2000). Coping, mood, and aspects of personality in Spanish translation and evidence of convergence with English versions. *Journal of Personality Assessment*, 74, pp. 63–87. [PubMed: 10779933]
- Ramirez-Valles J, Molina Y, & Dirkes J (2013). Stigma towards PLWHA: the role of internalized homosexual stigma in Latino gay/bisexual male and transgender communities. *AIDS Education and Prevention*, 25, pp. 179–189. [PubMed: 23631713]
- Rao D, Feldman BJ, Fredericksen RJ, Crane PK, Simoni JM, Kitahata MM, & Crane HM (2012). A structural equation model of HIV-related stigma, depressive symptoms, and medication adherence. *AIDS & Behavior*, 16, pp. 711–716. [PubMed: 21380495]
- Sanchez J, Lama JR, Kusunoki L, Manrique H, Goicochea P, Lucchetti A, ... Celum C (2007). HIV-1, sexually transmitted infections, and sexual behavior trends among men who have sex with men in

Lima, Peru. *J Acquir Immune Defic Syndr*, 44(5), pp. 578–585. doi:10.1097/QAI.0b013e318033ff82 Retrieved from 10.1097/QAI.0b013e318033ff82http://www.ncbi.nlm.nih.gov/pubmed/17279049 Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17279049 [PubMed: 17279049]

- Ulett KB, Willig J, Lin HY, Routman JS, Abrams S, Allison J, ... Mugavero MJ (2009). The therapeutic implications of timely linkage and early retention in HIV care. *AIDS Patient Care and STDs*, 23, pp. 41–49. [PubMed: 19055408]
- Vanable PA, Carey MP, Blair DC, & Littlewood RA (2006). Impact of HIV-related stigma on health behaviors and psychological adjustment among HIV-positive men and women. *AIDS & Behavior*, 10, pp. 473–482. [PubMed: 16604295]
- Vosvick M, Gore-Felton C, Koopman c., Thoresen C, Krumboltz J, & Spiegel D (2002). Maladaptive coping strategies in relation to quality of life among HIV+ adults. *AIDS and Behavior*, 6, pp. 97–106.
- Zeidner M, & Saklofske D (1996). Adaptive and maladaptive coping. In Zeidner M & Endler NS (Eds.), *Handbook of coping: theory, research, applications* (pp. 505–531). Oxford, England: John Wiley.

Figure 1.
Conceptual Framework.

Figure 2.

A visual diagram of study time periods, variables for analytic sample, and rationale for exclusion.

Table 1.

Study sample characteristics (n = 604).

	n (%)	
BEHAVIORAL		
Age		
<25 years	294 (49)	
25–34 years	240 (40)	
35 years	70 (12)	
Gender/Sexual Identity		
Cisgender Male/Gay	388 (64)	
Cisgender Male/Bisexual	165 (27)	
Transgender	51 (8)	
Education		
Secondary education	204 (34)	
>Secondary education ¹	400 (66)	
Monthly Income		
<Minimum wage (<708 soles/\$219 USD a month)	286 (47)	
Minimum wage (708 soles/\$219 USD a month)	318 (53)	
BEHAVIORAL		
Condom during most recent activity prior to study enrollment ¹		
No	341 (56)	
Yes	263 (44)	
Tested for HIV <12 months of study enrollment ¹		
No	104 (17)	
Yes	500 (83)	
CLINICAL		
Confirmed type of HIV infection		
Chronic	400 (66)	
Recent	133 (22)	
Acute	71 (12)	
Linkage to care		
No	252 (42)	
Yes	352 (58)	
PRE-DIAGNOSIS PSYCHOSOCIAL²		
	Mean (SD)	Range
Perceptions/awareness about HIV-related stigma ³	34.73 (13.25)	15.00, 60.00
Dispositional maladaptive coping ⁴	0.00 (1.00)	–2.02, 2.43
Dispositional adaptive coping ⁴	0.00 (1.00)	–1.08, 3.86

¹ Post-secondary education may include vocational training or college/university education.

²Relative to when respondent completed the pre-diagnosis survey/Step 1.

³Variable is a sum of 15 items with 4-point Likert response categories (0 = Strongly disagree to 3 = Strongly agree).

⁴Variable is a standardized composite score of the subscales from Carver's Brief COPE, which were sums of 2 items with 4-point Likert response categories (1= "I haven't been doing this at all" to 4= "I've been doing this a lot").

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Table 2.

Associations between demographic, behavioral, and study/clinical variables with post-diagnosis linkage to care, pre-diagnosis awareness/perceptions of HIV-related stigma, and pre-diagnosis dispositional coping, using chi-square tests, linear regressions, and analyses of variance (n= 604).

	Post-diagnosis Linkage to Care ^J			Pre-diagnosis Awareness/Perceptions about HIV-related Stigma			Pre-diagnosis Dispositional Maladaptive Coping			Pre-diagnosis Dispositional Adaptive Coping		
	n (%)	X ²	p	M (SD)	Eta ² /R ²	p	M (SD)	Eta ² /R ²	p	M (SD)	Eta ² /R ²	p
DEMOGRAPHIC												
Age		0.80	0.67		0.001	0.23		0.000	0.40		0.003	0.09
<25 years	168 (57)			34.70 (12.86)			0.01 (0.99)			0.02 (0.96)		
25–34 years	145 (60)			35.38 (13.75)			–0.001 (0.98)			0.05 (1.03)		
35+ years	39 (56)			32.63 (13.05)			–0.04 (1.11)			–0.26 (1.03)		
Gender/Sexual Identity		0.25	0.88		0.06	0.33		0.04	0.69		0.08	0.18
Cisgender/Gay	229 (59)			34.14 (13.35)			–0.02 (0.97)			0.05 (0.99)		
Cisgender/ Bisexual	94 (57)			35.92 (12.80)			0.01 (1.05)			–0.06 (1.01)		
Transgender	29 (57)			35.41 (13.85)			0.10 (1.09)			–0.18 (1.02)		
Education		5.87	0.02		0.01	0.81		0.06	0.11		0.27	<0.0001
Secondary	105 (52)			34.55 (13.66)			0.09 (1.11)			–0.37 (0.99)		
>Secondary	247 (62)			34.82 (13.05)			–0.05 (0.93)			0.19 (0.95)		
Monthly Income		0.01	0.91		0.000	0.26		0.02	0.002		–0.001	0.50
<Minimum wage	166 (58)			34.65 (13.18)			0.10 (1.06)			–0.11 (0.99)		
Minimum wage	186 (59)			34.73 (13.25)			–0.09 (0.94)			0.10 (1.00)		
BEHAVIORAL												
Condom Use		2.11	0.15		0.01	0.09		0.004	0.12		0.05	0.27
No	190 (56)			33.93 (13.03)			0.06 (1.05)			–0.04 (0.96)		
Yes	162 (62)			35.77 (13.48)			–0.07 (0.93)			0.05 (1.04)		
HIV test <12 months ^J		63.26	<0.0001		0.36	<0.0001		0.09	0.04		0.03	0.48
No	97 (93)			45.19 (12.27)			0.19 (1.15)			0.06 (0.99)		
Yes	255 (51)			32.55 (12.39)			–0.04 (0.96)			–0.01 (1.00)		
TYPE OF HIV INFECTION												
Recent or Acute		137.09	<0.0001		0.24	<0.0001		0.06	0.16		0.09	0.03
	184 (92)			43.90 (12.16)			0.08 (1.01)		0.16		0.12 (1.00)	

Post-diagnosis Linkage to Care ¹		Pre-diagnosis Awareness/Perceptions about HIV-related Stigma			Pre-diagnosis Dispositional Maladaptive Coping			Pre-diagnosis Dispositional Adaptive Coping		
n (%)	X ²	p	M (SD)	Eta ² /R ²	p	M (SD)	Eta ² /R ²	p	M (SD)	Eta ² /R ²
Chronic	168 (42)		30.16 (11.25)			-0.04 (0.99)			-0.06 (1.00)	

¹ Percentages reflect column proportions (i.e., % of demographic/behavioral/clinical group that was linked to care).

² Variables were analyzed continuously for linear regressions concerning pre-diagnosis stigma and dispositional coping styles, but means are presented categorically to facilitate interpretability. Non-significant associations ($p < .10$) are *italicized*. Significant associations ($p < .05$) are in **bold**.

Table 3.

Associations of pre-diagnosis awareness/perceptions of HIV-related stigma and pre-diagnosis dispositional coping with linkage to care, adjusted for demographic, behavioral, and clinical variables, using logistic regression (n = 604).

	Adjusted Models^I		
Primary Analyses	OR	95%CI	p-value
Perceptions/awareness about HIV-related stigma	1.00	0.98, 1.01	0.59
Dispositional maladaptive coping	0.82	0.67, 1.00	0.05
Dispositional adaptive coping	<i>1.21</i>	<i>0.99, 1.49</i>	<i>0.07</i>
Sensitivity Analyses with Individual Coping Styles	OR	95%CI	p-value
Dispositional adaptive coping styles			
Self-distraction	1.06	0.94, 1.18	0.35
Active coping	1.06	0.91, 1.24	0.45
Emotional support	1.00	0.88, 1.14	0.99
Planning	1.00	0.83, 1.21	0.99
Acceptance	1.02	0.85, 1.21	0.87
Spirituality	1.14	1.00, 1.30	0.05
Positive reappraisal	0.93	0.78, 1.12	0.44
Humor	1.00	0.86, 1.16	0.98
Dispositional maladaptive coping styles			
Denial	0.93	0.79, 1.09	0.36
Substance use	0.91	0.79, 1.06	0.23
Behavioral disengagement	0.94	0.80, 1.11	0.48

^ITo address joint confounding, adjusted models included: age, sexual/gender identity, education, income, condom use, receipt of an HIV test within the past 12 months, and type of HIV infection.

Significant associations (p<.05) are in **bold**.