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Determinants of physical and global functioning in adult HIV-positive heterosexual men

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Abstract

Little is known about the psychosocial factors that might impact the functioning ability of heterosexual men living with HIV. We examined positive and negative coping, social support, and HIV stigma as predictors of physical and global functioning in a cross-sectional sample of 317

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HIV-infected adult heterosexual male patients recruited from clinical and social service agencies in New York City. Study participants were primarily minority and low income. Sixty-four percent were African-American, 55% were single, and 90% were 40 years of age or older. The majority had long-term HIV (LTHIV), with an average duration of 15 years since diagnosis. After controlling for participant characteristics, structural equation modelling analyses revealed that positive coping and social support had a significant positive direct effect on global functioning, while stigma had a significant negative direct effect on global functioning. The physical functioning model revealed that negative coping and HIV stigma had significant negative direct effects, whereas social support had a significant positive indirect effect. Age and duration of HIV diagnosis were not associated with physical and global functioning. In conclusion, we found that heterosexual men living with LTHIV who have ineffective coping, less social support, and greater stigma have reduced functioning ability. Study findings have implications for developing interventions aimed at increasing and retaining functioning ability with the end goal of improving successful aging in this population.

Keywords

social support; coping skills; stigma; physical and global functioning HIV; heterosexual men

Introduction

People living with HIV (PLWH) have reduced functioning ability and are at increased risk of functional decline even at younger ages (Desquilbet et al., 2007; Effros et al., 2008; Onen & Overton, 2011). While recent research on HIV and functioning ability that was mainly focused on gay men suggests an important role for psychosocial factors, such as coping skills, social support, and HIV/AIDS stigma (Lyons, Pitts, & Grierson, 2012; Lyons, Pitts, Grierson, Thorpe, & Power, 2010; Rosenfeld, Bartlam, & Smith, 2012; Slater et al., 2013, 2014), less is known about the impact of these factors on functioning ability among PLWH who are heterosexual, or who are living with long-term HIV infection (LTHIV). Coping is a self-monitoring effort directed at reducing the adverse consequences of stressors (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000). Two categories of coping that can be useful for research on PLWH are *positive* coping—engaging with the source of stress and adapting to the situation, and *negative* coping—disengaging through avoidance and denial. Generally, using positive coping is associated with less depression, and using negative coping is associated with more depression among PLWH (Rodkjaer et al., 2014; Varni, Miller, McCuin, & Solomon, 2012; Yeji et al., 2014). Low social support among PLWH can translate into negative HIV-related health outcomes, including mortality (Ashton et al., 2005; Greysen et al., 2013). Since social support can provide resources that help individuals perform daily tasks (Shippy & Karpiak, 2005), it should also be associated with improved functioning ability. PLWH often experience HIV/AIDS-related stigma, which can isolate them from supportive networks (Sayles et al., 2008).

The present study tested a coping, social support and HIV stigma model of functioning ability in a sample of adult heterosexual men living with LTHIV. A better understanding of

the risk and protective factors could inform the development of more effective interventions to improve and retain functioning ability of heterosexual PLWH.

Methods

Sampling, eligibility and recruitment procedures

Study data were from the “Men’s Talk on HIV Risk” (MENTOR) Project, a cross-sectional retrospective survey of 317 heterosexual African American and Latino men with self-reported HIV/AIDS, recruited through a random sample of 76 health and social services agencies in Harlem and the South Bronx, NY, from 2011 to 2012. Eligibility criteria were: (1) male, (2) HIV-positive by self-report, (3) aged 18–60, (4) conversant in English or Spanish, (5) self-identified as heterosexual, and (6) had vaginal or anal sex with a woman in the last three months. All participants signed an IRB-approved informed consent form and were compensated \$50 USD. Structured quantitative interviews were administered in either English or Spanish by trained bilingual interviewers using computer-assisted personal interview (CAPI) software (QDS ver. 6.2.1, Nova Research) in a private office.

Outcome measures

Physical and global functioning—The Revised Functional Assessment of Human Immunodeficiency Virus Infection (R-FAHI) quality of life (QoL) instrument was used to examine functioning ability outcomes (Peterman, Cella, Mo, & McCain, 1997). Two R-FAHI subscales were measured: (1) physical functioning ability (7 items selected from 12), which taps into a physical functioning construct incorporating pain, fatigue, and illness; and (2) global functioning ability (7 items selected from 13), which encompasses work and life satisfaction, ability, motivation and contentment. Cronbach’s alpha reliability analysis showed that the scales were internally consistent, with values of 0.83 and 0.81, respectively.

Predictors

Manifest variables included age and years since diagnosis. Latent variables were measured using the following scales: Coping with HIV: Concerns and Coping with HIV Scale (Jenkins & Guarnaccia, 2003) contains 22 items measuring the frequency of thoughts, feelings and behaviors in response to receiving an HIV diagnosis. A subset of 17 items were selected and categorized as either positive coping (11 items) or negative coping (6 items). Cronbach’s alpha values were 0.89 and 0.67, respectively. Scores on the two factors were not highly correlated ($r = -0.09$, $p=0.08$). Social support: Revised Lubben Social Support scale (Lubben, 2004) contains 12 items assessing the numbers of friends and family members with whom respondents are in contact, and with whom they have close social ties. Cronbach’s alpha was 0.81. HIV-related stigma: We adopted the HIV Stigma scale (Sayles et al., 2008) using 12 items to assess internalized stigma related to being HIV-positive. Cronbach’s alpha was 0.82.

Covariates

The following covariates were included in all models: race/ethnicity, level of education, employment status, marital/relationship status, stability of housing, current drug use, and self-reported CD4 levels from their most recent CD4 test.

Statistical Analysis

We developed structural equation models (SEMs) to assess physical functioning and global functioning conceptual models (Fig. 1) using Mplus (ver. 7.22) software, with maximum likelihood estimation and unstructured correlation matrices. Regression-based single imputation was used to remedy <1% missing data. Results of sensitivity analysis comparing models with and without imputed data were similar. No multicollinearity was revealed among independent variables based on variance inflation factors. Final models were selected based on theoretical soundness and empirical support from the literature.

Results

A total of 314 heterosexual men who reported HIV-positive status completed the assessment (3 enrollees had mostly incomplete data and were removed). Table 1 presents participant characteristics. The correlation between the two latent outcome variables, physical functioning and global functioning, was modest ($r=0.17$, $p<0.001$).

Model of physical functioning

As shown in Table 2 and Figure 2, higher levels of negative coping and stigma were associated with lower levels of physical functioning. In addition, social support had a significant positive effect on physical functioning, but only indirectly through HIV-related stigma. PLWH with higher social support tended to report less HIV-related stigma, which in turn led to better physical functioning outcomes. Age and years since HIV diagnosis showed no evidence of an association with physical functioning, although each was related to positive coping. Contrary to our conceptual model, positive coping did not have a direct effect on physical functioning. None of the covariates were significantly associated with physical functioning.

Model of global functioning

As shown in Table 3 and Figure 3, positive coping strategies and social support had significant positive direct effects and HIV-related stigma had a significant negative direct effect on global functioning. Social support also had a significant indirect effect on global functioning through stigma. PLWH with greater social support tended to report less HIV-related stigma and more reliance on positive coping strategies, each of which were associated with better global functioning. Years since HIV diagnosis was associated with poorer global functioning indirectly through positive coping. Those living with an HIV diagnosis longer tended to rely less on positive coping strategies, which in turn had a deleterious effect on global functioning. There was no evidence of a direct or indirect effect of age on global functioning. Contrary to our conceptual model, there was no evidence of a direct effect of negative coping on global functioning. Use of illicit drugs in the past six months, the only significant covariate in the model, was associated with poorer global functioning.

Discussion

Results suggest that greater social support and coping skills, and less HIV-related stigma may help to improve or maintain functioning ability among heterosexual male PLWH. While generally consistent with previous research on PLWH, (Breet, Kagee, & Seedat, 2014; Slater et al., 2013; Varni et al., 2012), our results also revealed that the relationship between social support and physical functioning was mediated by stigma. Those with higher social support tended to report less HIV-related stigma and higher physical functioning. Considering that social support plays an important role in the lives of PLWH, this finding should be further investigated. Previous research shows that greater social support is associated with less perceived stigma among PLWH (Galvan, Davis, Banks, & Bing, 2008; Vyavaharkar et al., 2010). PLWH with higher levels of social support feel more positive self-appraisal which may reduce their feelings of stigma (Pitts, Grierson, & Misson, 2005). The study also demonstrates the importance of coping skills on the relationship between social support and functioning ability as this relationship was mediated by individual differences in coping skills.

While age and years since HIV diagnosis were not associated with functioning ability, older age was associated with *greater* positive coping, and more years since HIV diagnosis was associated with *less* positive coping. Aging may be associated with an increase in positive coping due to aging-related maturity (Aldwin, 1991; Hamarat et al., 2002); however, age has also been associated with negative coping (Brennan, Holland, Schutte, & Moos, 2012) as explained by age-related efforts to conserve energy, and a decline in active confrontation. People with LTHIV may have declining appraisal of personal and social resources or motivation fatigue leading to decay in actively confronting the stressors.

Conclusions from this study may be limited by the cross-sectional nature of the data, and we did not assess generalizability to the PLWH population. Nonetheless, these findings shed light on a growing population of PLWH who may need interventions to ensure adequate psychosocial support and resources to improve and maintain functioning ability and promote healthy aging.

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Figure 1.
Conceptual model showing determinants of HIV-related functioning outcomes.

Figure 2. Estimated full SEM model showing determinants of HIV-related physical functioning (only significant pathways shown).

Figure 3. Estimated full SEM model showing determinants of HIV-related global functioning (only significant pathways shown).

Table 1

Description of study sample and standardized coefficients of bivariate associations with physical and global functioning.

Characteristic	N (%)	Physical Functioning Beta coefficient (95% confidence interval)	Global Functioning Beta coefficient (95% confidence interval)
Age	314 Mean=47.65 (Std Dev 6.61), Range 20–59	0.038 (–0.082, 0.158)	0.112 (–0.010, 0.234)
Age Group			
20–29	9 (2.87)		
30–39	23 (7.32)		
40–49	137 (43.63)		
50–59	145 (46.18)		
Race/ethnicity ^a	317		
Hispanic/Latino	94 (29.7)	Reference	Reference
Black/AA	204 (64.4)	0.143* (0.019, 0.267)	0.045 (–0.083, 0.173)
White	6 (1.9)	0.039 (–0.085, 0.163)	0.000 (–0.128, 0.128)
Mixed Race/Other	13 (4.1)		
Education (highest)	314		
Less than high school	110 (35.0)	Reference	Reference
High school or equivalent	172 (54.8)	–0.016 (–0.146, 0.114)	–0.081 (–0.211, 0.049)
College graduate or higher	32 (10.2)	0.004 (–0.126, 0.134)	0.002 (–0.130, 0.134)
Marital Status	314		
Single	267 (85.0)	Reference	Reference
Married	47 (15.0)	–0.001 (–0.121, 0.119)	0.142* (0.022, 0.262)
Relationship Status	314		
No main female sexual partner	192 (61.2)	Reference	Reference
Has main female sexual partner	122 (38.8)	–0.002 (–0.122, 0.118)	0.052 (–0.062, 0.166)
Employment Status	314		
Unemployed/disabled/retired	286 (91.1)	Reference	Reference
Employed or self-employed	28 (8.9)	–0.043 (–0.163, 0.077)	0.097 (–0.025, 0.219)
Housing Status	314		
Unstable housing	203 (64.6)	Reference	Reference
Stable housing	111 (35.4)	–0.039 (–0.159, 0.081)	0.071 (–0.051, 0.193)
Any illicit drug use past 6 months	314		
No	170 (53.5)	Reference	Reference
Yes	144 (46.5)	–0.086 (–0.206, 0.034)	–0.219*** (–0.337, –0.101)
Years since HIV diagnosis:	317	–0.086 (–0.206, 0.034)	0.045 (–0.077, 0.167)

Characteristic	N (%)	Physical Functioning Beta coefficient (95% confidence interval)	Global Functioning Beta coefficient (95% confidence interval)
	Mean=15.0 (Std Dev 7.1), Range 0.23, 30.3		
CD4 count	315	0.086 (−0.034, 0.206)	0.079 (−0.043, 0.201)

^aWhite and mixed race/other collapsed into a single category for bivariate analysis

*
p<0.05

**
p<0.01

p<0.001

Table 2
Full model SEM with direct, indirect (mediational), and total effects of independent variables and covariates on HIV-related physical functioning

Variables	Standardized beta coefficients						
	Independent Variables (IV)	Mediator 1	Mediator 2	IV on mediator 1	Mediator 1 on DV	Mediator 2 on DV	Total effects
Age							0.032 [†]
Age	Coping positive			0.117 [*]	0.010		0.001
Age	Coping negative			-0.010	-0.147 [*]		0.002
Age	Social support			0.100	0.014		0.001
Age	Stigma			-0.067	-0.273 ^{***}		0.018
Age	Social support		Coping positive	0.100		0.153 [*]	0.000
Age	Social support		Coping negative	0.100		-0.187 [*]	0.003
Age	Social support		Stigma	0.100		-0.254 ^{***}	0.007
Years since diagnosis							-0.091
Years since diagnosis	Coping positive			-0.243 ^{***}	0.010		0.019 [†]
Years since diagnosis	Coping negative			0.040	-0.147 [*]		-0.003
Years since diagnosis	Social support			-0.028	0.014		-0.006
Years since diagnosis	Stigma			-0.113	-0.273 ^{***}		0.000
Years since diagnosis	Social support		Coping positive	-0.028		0.153 [*]	0.031
Years since diagnosis	Social support		Coping negative	-0.028		-0.187 [*]	0.000
Years since diagnosis	Social support		Stigma	-0.028		-0.254 ^{***}	-0.001
Social support							-0.002
Social support	Coping positive			0.153 [*]	0.010		0.098 [†]
Social support	Coping negative			-0.187 [*]	-0.147 [*]		0.002
Social support	Stigma			-0.254 ^{***}	-0.273 ^{***}		0.027
Stigma							0.069 ^{**}
Coping positive							-0.273 ^{***}
Coping negative							0.010
							-0.147 [*]
							-0.273 ^{***}

Variables	Standardized beta coefficients						
	Independent Variables (IV)	Mediator 1	Mediator 2	IV on mediator 1	Mediator 1 on DV	Mediator 2 on DV	Total effects
Covariates							
	Race/ethnicity African-American				0.121		0.121
	Race/ethnicity, Other				0.017		0.017
	Race/ethnicity, Hispanic				Ref		Ref
	Education, College				-0.048		-0.048
	Education, High school				-0.035		-0.035
	Education, No high school				Ref		Ref
	Employed				-0.054		-0.054
	Illicit drug use past 6 mo.				-0.079		-0.079
	Married				-0.027		-0.027
	CD4 count				0.060		0.060

[†]Total indirect effect; DV, Dependent variable (FAHI physical functioning scale)

* p<0.05

**

p<0.01

p<0.001

Table 3

Full model SEM with direct, indirect (mediational), and total effects of independent variables and covariates on HIV-related global functioning

Variables	Standardized beta coefficients						
	Independent Variables (IV)	Mediator 1	Mediator 2	IV on mediator 1	Mediator 1 on DV	Mediator 2 on DV	Total effect
Age							0.072 ^{***†}
Age	Positive coping			0.117 [*]	0.224 ^{***}		0.026 ^a
Age	Negative coping			-0.010	0.039		0.000
Age	Social support			0.101	0.117 [*]		0.012
Age	Stigma			-0.068	-0.346 ^{***}		0.023
Age	Social support	Positive coping		0.101		0.224 ^{***}	0.003
Age	Social support	Negative coping		0.101		0.039	-0.001
Age	Social support	Stigma		0.101		-0.346 ^{***}	0.009
Years since diagnosis							-0.020 [†]
Years since diagnosis	Positive coping			-0.243 ^{***}	0.224 ^{***}		-0.054 ^{**}
Years since diagnosis	Negative coping			0.040	0.039		0.002
Years since diagnosis	Social support			-0.028	0.117 [*]		-0.003
Years since diagnosis	Stigma			-0.113 ^a	-0.346 ^{***}		0.039
Years since diagnosis	Social support	Positive coping		-0.028		0.224 ^{***}	-0.001
Years since diagnosis	Social support	Negative coping		-0.028		0.039	0.000
Years since diagnosis	Social support	Stigma		-0.028		-0.346 ^{***}	-0.002
Social support							0.115 ^{***†}
Social support	Positive coping			0.153 [*]	0.224 ^{***}		0.117 [*]
Social support	Negative coping			-0.187 [*]	0.039		0.034 ^a
Social support	Stigma			-0.254 ^{***}	-0.346 ^{***}		-0.007
Stigma							0.088 ^{**}
Coping positive							-0.346 ^{***}
Coping negative							0.224 ^{***}
							0.039
							0.232 ^{***}

Standardized beta coefficients							
Variables	Independent Variables (IV)	Mediator 1	Mediator 2	IV on mediator 1	Mediator 1 on DV	Mediator 2 on DV	Total effect
Covariates							
	Race/ethnicity, African-American					0.051	0.051
	Race/ethnicity, Other					-0.015	-0.015
	Race/ethnicity, Hispanic					Ref	Ref
	Education, College					-0.066	-0.066
	Education, High school					-0.109	-0.109
	Education, No high school					Ref	Ref
	Employed					0.086	0.086
	Illicit drug use past 6 mo.					-0.193***	-0.193***
	Married					0.083	0.083
	CD4 count					0.053	0.053

[†]Total indirect effect; DV, Dependent variable (FAHI global functioning scale)

^ap<0.100

*p<0.05

**p<0.01

***p<0.001