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Resilience, Stress, and Life Quality in Older Adults Living with HIV/AIDS

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Abstract

Objectives—This study tested the mediating effect of resilience on the relationship between life stress and health-related quality of life (HRQoL) in older people living with HIV/AIDS (OPLWHA) 50 years of age and older.

Method—Data from 299 OPLWHA were analyzed using structural equation modeling (SEM) to define a novel resilience construct (represented by coping self-efficacy, active coping, hope/optimism and social support) and assess mediating effects of resilience on the association between life stress and HRQoL (physical, emotional, and functional/global well-being).

Results—SEM analyses showed satisfactory model fit for both resilience and mediational models, with resilience mediating the associations between life stress and physical, emotional, and functional/global well-being.

Conclusion—Resilience may reduce the negative influence of life stress on physical, emotional, and functional/global well-being in OPLWHA. Interventions that build personal capacity, coping skills, and social support may contribute to better management of HIV/AIDS and increase HRQoL.

Keywords

Resilience; HIV/AIDS; older adults; quality of life; life stress

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Introduction

With the advent of highly active antiretroviral therapy (HAART) in the mid-1990s, HIV/AIDS has become a largely manageable chronic disease and people living with HIV/AIDS are living increasingly longer. It is estimated that by 2015, half of all HIV/AIDS cases in the United States will be persons over the age of 50 (Effros et al., 2008). As life expectancy increases for PLWHA, it is urgently important to enhance their health-related quality of life (HRQoL). HRQoL is a multidimensional construct of well-being that encompasses multiple domains of health such as physical well-being, emotional well-being, and functional well-being (Peterman, Cella, Mo, & McCain, 1997). Older people living with HIV/AIDS (OPLWHA) more often experience HIV-related stigma, co-morbid physical health problems, few social supports, and co-morbid psychiatric conditions compared to their younger counterparts (Cahill & Valadez, 2013; Emlet, 2006, 2007; Emlet, Fredriksen-Goldsen & Kim, 2013; Goulet et al., 2007; Heckman et al., 2002; Oursler et al., 2006; Schrimshaw & Siegel, 2003), resulting in poorer HRQoL (Slater et al., 2013). In spite of increasing HIV incidence and prevalence rates in older adults, few studies have systematically examined HRQoL in OPLWHA (Slater et al., 2013).

Elevated levels of life stress are common in persons living with HIV/AIDS. Life stressors among HIV-infected persons include HIV-specific stressors and non-HIV-specific life stressors (e.g., poverty, unemployment, homelessness, stigma/discrimination, violence), which are disproportionately experienced in this population (Moskowitz, Hult, Bussolari, & Acree, 2009). Life stress is inversely associated with both physical and mental HRQoL among HIV-infected persons (Gibson et al., 2011; Koopman et al., 2002) and is related to greater psychological distress, the onset of psychiatric disorders (Koopman et al., 2002), and other negative health outcomes (Murphy, Moscicki, Vermund, & Muenz, 2000). To date, little research has identified variables that lessen the impact of life stress on HRQoL in OPLWHA. Thus, the primary aim of this study is to understand the role of a psychosocial factor (resilience) in reducing the negative impact of life stress on quality of life in persons aging with HIV/AIDS.

Although the definition of resilience varies, most definitions of this construct share two core components: 1) exposure to significant adversity; and 2) positive adaptation despite the adversity (Betancourt, Meyers-Ohki, Charrow, & Hansen, 2013; Cicchetti, 2010; De Santis, 2008; Luthar, Sawyer, & Brown, 2006; Rutter, 2012). While resilience has been viewed as a dynamic developmental process rather than a fixed trait of an individual (Masten, Best, & Garmezy, 1990; Rutter, 1999, 2000), prior resilience studies across a variety of populations (e.g., HIV-infected children, academic performance) have proposed specific resilience characteristics such as self-esteem, self-efficacy, commitment, hope, coping, spirituality, and social support (Betancourt et al., 2013; Farber, Schwartz, Schaper, Moonen, & McDaniel, 2000; Howe, Smajdor, & Stockl, 2012; Martin & Marsh, 2006). Thus, taking into consideration the target population (OPLWHA) and the fundamental concept of resilience, the present study incorporated four measurement indicators of resilience: Self-efficacy; coping; hope/optimism; and social support (Betancourt et al., 2013; Tarakeshwar, Hansen, Kochman, Fox, & Sikkema, 2006).

The majority of the theoretical and empirical literature on resilience is focused on childhood resilience based on a developmental psychology framework (Cicchetti, 2010). Few published studies examine resilience among adults, particularly those living with HIV (Luthar & Cushing, 2002; Tarakeshwar et al., 2006). In addition, most research on the mental health of adults living with HIV/AIDS has focused on risk factors and vulnerability among individuals. There is a need for a greater understanding of resilience in the context of HIV infection and aging, which can inform the conceptualization of interventions to build personal capacity, coping skills, and support that facilitate one's efforts to manage HIV-associated problems and increase HRQoL in OPLWHA. To address this gap, this research: a) Developed and tested a construct of resilience (see Figure 1); and b) Examined resilience as a mediator of the relationship between life stress and physical, emotional, and functional/global facets of HRQoL (see Figure 2).

Methods

Participants and Procedures

Participants were recruited as part of a randomized controlled trial (RCT) examining the efficacy of a group coping intervention to reduce depressive symptoms in OPLWHA (Heckman et al., 2011). Between November 2004 and February 2007, HIV-infected persons 50 years of age were recruited from New York City, Columbus, Ohio, and Cincinnati, Ohio. Of 405 individuals screened for study entry, 349 (86.2%) satisfied the inclusion criteria of: (1) being 50 years of age or older; (2) self-reporting HIV infection or AIDS; (3) presenting with at least mild depressive symptoms (Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996) > 10); and (4) little or no cognitive impairment (Modified Mini-Mental State Examination (3MS; Teng & Chui, 1987) > 75). Eligible participants were then administered a pre-intervention assessment battery using audio computer-assisted self-interview (ACASI). Of 349 eligible individuals, 310 completed the pre-intervention assessment. Participants with missing responses for a majority (90%) of the assessment questions from any relevant scale were excluded, yielding a final sample size of 299.

Measures

The present study analyzed pre-intervention data to model the resilience construct (Figure 1) and assess the mediational model of life stress, resilience and three facets of HRQoL: physical, emotional, and functional/global well-being (Figure 2). The observed variables were measured through the following pre-intervention scales. Coefficient alphas are based on the data from the present study.

Resilience Construct—Based on published research (Betancourt et al., 2013; Tarakeshwar et al., 2006), the hypothesized measurement model of resilience was constructed using four indicator variables: Coping self-efficacy, hope/optimism, active coping, and social support (Figure 1). Among these variables, coping self-efficacy and hope/optimism were observed variables, whereas active coping and social support were treated as latent variables constructed by observed variables from the baseline measures below. Latent variables based on active coping and social support were aggregated and treated as observed variables in the structural model (Figure 2).

Coping Self-Efficacy: Coping self-efficacy was assessed using the Coping Self-Efficacy Scale (CSS; Chesney, Folkman, & Chambers, 1996). The 26-item CSS measured participants' beliefs about their ability to cope with challenges and threats. Each item used an 11-point Likert scale from 0 ('*Cannot do at all*') to 10 ('*Certain can do*'). Overall coping self-efficacy scores were calculated by averaging all items. The scale demonstrated excellent internal consistency ($\alpha = .97$).

Hope/Optimism: An 8-item Future Orientation Scale (FOS) assessed participants' attitudes about the future. Three items were chosen from the Future Time Perspective Inventory (Heimber, 1963) and five positively-worded items reflecting hopeful attitudes were selected from the Beck Hopelessness scale (Beck, Kovacs, & Weissman, 1975). All items used a 4-point Likert scale 1 ('*Completely true*') to 4 ('*Completely false*'). The overall score of FOS was created by averaging all items and evidenced good internal consistency ($\alpha = .87$).

Active Coping: Sixty-one items assessed coping strategies that OPLWHA used to address life stressors (Hansen et al., 2013). Respondents indicated the extent to which they employed each coping strategy using a 4-point Likert scale 1 ('*Not used*') to 4 ('*Used a great deal*'). The coping factors used in the current study were based on the results of a previous study on the structure of coping using the same data set (Hansen et al., 2013). The study found five specific first order coping factors (*Distancing Avoidance*, *Social Support Seeking*, *Self-Destructive Avoidance*, *Spiritual Coping*, and *Solution-Focused Coping*), which were categorized into two general second order factors (*Active Coping* and *Avoidant Coping*). In the measurement model of resilience, only active coping factors (*Social Support Seeking* ($\alpha = .85$), *Spiritual Coping* ($\alpha = .91$), and *Solution-Focused Coping* ($\alpha = .88$)) were included to form a latent variable of active coping. We note that *Spiritual Coping* items in this factor reflected active behavior (e.g., "I talked to a member of the clergy," and "I attended a worship service"), and that *Spiritual Coping* was highly correlated with *Social Support Seeking* ($r = .40$) and *Solution-Focused Coping* ($r = .57$), while not being correlated with *Distancing Avoidance* ($r = .07$) and *Self-Destructive Avoidance* ($r = -.03$; Hansen et al., 2013).

In the structural model, coping was treated as an observed variable through aggregation of the three active coping factors ($\alpha = .92$), for the purpose of internal validity and improving model fit.

Social Support: Social support was measured using the Provision of Social Relation Scale (PSR; (Turner, Frankel, & Levin, 1983). The 15-item PSR consisted of two subscales: Support from *Friends* (nine items, $\alpha = .88$) and Support from *Family* (six items, $\alpha = .86$). All items used a 6-point Likert scale 0 ('*Very much like me*') to 5 ('*Not at all like me*'). In the measurement model of resilience, items from the PSR-Friends subscale were randomly divided into two parcels so that the latent variable of social support could be formed with three indicators, which aimed to enhance the reliability of the latent variable. Overall scores for each of the PSR-Friends parcels and the PSR-Family subscale were calculated by averaging all items. As with the coping variable, social support was treated as an observed variable through aggregation of PSR-Friends and PSR-Family in the structural model ($\alpha = .89$).

Life Stress—A 19-item Life Problems and Concerns Checklist (DeMarco, Ostrow, & DiFranceisco, 1999) measured general life stressors and HIV-related stressors across several domains (e.g., health care, housing, finance, HIV-related discrimination, health, family, and employment). Respondents indicated the extent to which they perceived each domain to be personally problematic using a 5-point Likert scale 1 (*‘Not a problem’*) to 5 (*‘Most serious problem’*). The overall score was calculated by averaging all the item ratings. In the structural model, the individual items of the checklist were randomly divided into three parcels to construct a latent variable to correct the biasing effects of measurement error (Coffman & MacCallum, 2005). Parceling was completed by randomly assigning and aggregating items within parcels, then loading the three parcels together to create the life stress latent variable. The scale evidenced very good internal consistency ($\alpha=.85$).

Health-related Quality of Life—The revised Functional Assessment of Human Immunodeficiency Virus Infection (FAHI) quality of life instrument assessed participants’ health-related quality of life (HRQoL; (Peterman et al., 1997). This 44-item measure included five subscales: 10-item *Physical Well-Being* (PWB, $\alpha = .90$), 10-item *Function and Global Well-Being* (FGWB, $\alpha = .88$), 13-item *Emotional Well-Being* (EWB, $\alpha = .88$), 8-item *Social Well-Being* (SWB, $\alpha = .88$) and 3-item *Cognitive Functioning* (CF, $\alpha = .74$). Each item used a 5-point Likert 0 (*‘Not at all’*) to 4 (*‘Very much’*).

In the present study, the PWB, EWB, and F/GWB subscales were used to create outcome variables in the structural model. Two subscales, SWB and CF, were excluded as SWB overlapped with the resilience construct and CF was not strongly associated with other predictors of HRQoL and reduced model fit. As with the life stress latent variable, the items of the PWB, EWB, and F/GWB subscales were parceled to construct their respective latent variables.

Statistical Analyses

Structural equation modeling (SEM) performed confirmatory factor analysis for the measurement model of Resilience (Figure 1) and analysis of mediation for the structural model (Figure 2). SEM is a highly efficient method for these types of analyses because it allows both observed variables and latent variables, accounts for measurement error (Hoyle, 1995), simultaneously accounts for multiple regression equations and variances, and provides a more effective and direct way of modeling mediation, indirect effects, and other complex relationships among variables (Kline, 2010).

The models were evaluated for goodness of fit using the following fit indices: comparative fit index (*CFI*), incremental fit index (*IFI*), Tucker-Lewis coefficient (*TLI*), and root mean square error of approximation (*RMSEA*). Multiple fit indices have been shown to be an effective way to evaluate model fit. A model is considered acceptable if *CFI* > .93 (Bryne, 1994), *IFI* > .90, *TLI* > .90, and *RMSEA* < .08 (Browne & Cudeck, 1993). An ideal model is indicated when *CFI* > .95, *IFI* > .95, *TLI* > .95, and either *RMSEA* < .05 (Steiger, 1990) or the upper bound of *RMSEA* should not exceed 0.08 (Hu & Bentler, 1995). Modification indices (*MI*s) were examined to isolate sources of ill fit and correlate error terms with high covariance.

Prior to analysis, distributions of the observed variables were examined; severe non-normality was not detected. Scale reliability was assessed for all scales and subscales. For the measurement model of resilience, test of measurement invariance assessed if the same measurement model was applicable across all demographic groups. The SEM analysis was conducted using AMOS 21.0.

Results

Descriptive Results

Participants (mean age=55.0 years) had been living with HIV for an average of 12 years. Sixty-percent had been diagnosed with AIDS and 58% had at least mild depressive symptoms. Most participants were male (67.6%), African American (57.9%), had received at least a high school education (76.3%), and had an annual income of less than \$20,000 (87.2%). Slightly more than half (55%) reported being in a sexual relationship. As indicated in Table 1, women were more likely to be African American, from New York City, and have less education than men. Additionally, African American participants were more likely to be from New York City and have less education. Finally, participants from Ohio were more likely to have had more education than those from New York City.

Measurement Model of Resilience

Prior to analyzing the structural model, a measurement model of resilience was formed using two latent (active coping and social support) and two observed variables (coping self-efficacy and hope/optimism) described above (Figure 1). An initial test of the measurement model suggested satisfactory model fit, $\chi^2 (18, N = 299) = 41.2, p = .001, CFI = .98, IFI = .98, TLI = .96, RMSEA = .066$ (95% CI [.039, .092]). All factor loadings were significant (p 's < .001), and resilience had reasonable loadings on its four indicators, ranging from .61 to .86. Additionally, test of measurement invariance showed that the factor loadings of resilience were not significantly different across all the demographic groups (race, sex, education, income, relationship status, sexual relationship status, lifetime AIDS diagnosis, and study site) (p 's > .05). The results indicated the resilience construct was well-defined.

Resilience Mediation Model

A structural model was tested to determine whether resilience mediated the relationships between life stress and three facets of HRQoL (physical well-being, emotional well-being, and functional/global well-being). The model and corresponding total, direct, and indirect effects, are shown in Figure 2 and Table 2, respectively. The modification indices for the structural model suggested a disturbance error covariance between the dependent variables *physical well-being* and *emotional well-being*, which, when allowed to correlate, resulted in a significant improvement in the model fit. The final model had an adequate fit, $\chi^2 (96, N = 299) = 226.9, p < .001, CFI = .96, IFI = .96, TLI = .95, RMSEA = .068$ (95% CI [.056, .079]). The path from life stress to functional/global well-being was non-significant ($\beta = -.10, p = .134$). The other parameter estimates were all significant (p 's < .001). The model accounted for 73% of the variance in functional/global well-being, 61% in emotional well-being, and 40% in physical well-being.

Life stress negatively predicted resilience. Furthermore, the direct effects of resilience on HRQoL outcomes revealed that OPLWHA with greater resilience had significantly better physical, emotional, and functional/global well-being. The positive effect was greater on functional/global well-being than on the other two latent outcome variables. The indirect paths were all significant ($p's < .001$), indicating that resilience significantly reduced the negative effects of life stress on HRQoL outcomes. Results demonstrated that: a) Resilience largely mediated the negative effect of life stress on functional/global well-being (percent mediated = 83.7%), with the mediated direct effect becoming non-significant; and b) Resilience mediated 36.5% of the total effect of stress on physical well-being and 30.2% on emotional well-being, though the mediated direct effects were still significant.

Conclusions and Implications

This study explored the construct of resilience and examined whether resilience mediated the relationship between life stress and physical, emotional, and functional/global facets of HRQoL in OPLWHA, a group rapidly increasing in size and who have considerable psychosocial needs. SEM assessed the total, direct, and indirect effects of life stress on three HRQoL dimensions in the mediation model. Results supported a multifaceted model of resilience based on coping self-efficacy, active coping, hope/optimism, and social support. In addition, participants with greater resilience had better physical, emotional and functional well-being, indicating that resilience may diminish the negative effects of stress in this group.

Study results have several implications for research and clinical practice. Specifically, interventions to improve HRQoL in OPLWHA should consider establishing and enhancing resilience through promoting active coping strategies and coping self-efficacy, building social supports, and encouraging hope for the future. More specifically, three components of active coping (social support seeking, spirituality, and solution-focused coping) should be incorporated into interventions that focus on strengthening active coping strategies among OPLWHA.

This study has several strengths that should be noted. First, this is the only study of which we are aware that has examined resilience and its relationships with life stress and HRQoL in OPLWHA. Second, the focus of the study was on participant strengths and protective factors, as opposed to risk factors, vulnerabilities, and deficits. Third, our study provided a multidimensional, empirically-based way to measure resilience. The predictors of resilience, as measured in this study (including coping self-efficacy, active coping, hope/optimism, and social support) provide support for future interventions that strengthen resilience in OPLWHA as well as a measurement model to guide the assessment of resilience. Fourth, data were collected via ACASI interviews, enhancing reliability. Finally, the study examined resilience, life stress and quality of life across different geographic locations and demographic groups, all of which increase the generalizability of findings.

This study also has several limitations. First, the study is cross-sectional, limiting the ability to make inferences regarding causal and temporal relations among the variables. Second, as part of an intervention trial, participants were seeking a behavioral intervention and

exhibiting symptoms of depression (though a diagnosis of depression was not required for participation). Thus, while recruitment material did not mention depression as a focus of the study in an attempt to draw a broader, non-clinical sample, this inclusion criterion does potentially limit the generalizability of study findings. Additionally, it is possible that these inclusion criteria may have excluded OPLWHA who demonstrate the most resilience, potentially limiting the range of resilience observed in the current study. Third, all participants were recruited from urban settings (i.e., NYC, and Columbus and Cincinnati Ohio), which may limit the generalizability of study findings to small urban and rural settings. Future research should address these limitations by using a longitudinal design, sampling a large and more geographically diverse population, and considering more complex models with additional relevant variables such as medical co-morbidities and depression.

Taken as a whole, this study underscores the importance of resilience in OPLWHA and suggests that interventions designed to increase resilience through enhancing coping self-efficacy, active coping, social support and hope/optimism may be efficacious in the improvement of physical, emotional and functional well-being in this growing population. As a growing number of OPLWHA confront challenges associated with normal aging, HIV-specific stressors, age- and HIV-related stigma, and comorbid health conditions (High et al., 2012), age-appropriate interventions that increase resilience in this group will be increasingly needed.

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Figure 1.

Measurement model of Resilience (N = 229). Standardized parameter estimates are shown beside the single-directional arrows. Squared multiple correlations are shown beside latent and observed variables, representing the portions of variable variance explained in the endogenous variables. e1 – e10 are residual terms.

Figure 2.

Final model of relationships among Resilience, Life Stress and three dimensions of HRQoL. Standardized parameter estimates are shown beside the single-directional arrows. Squared multiple correlations are shown beside latent and observed variables, representing the portions of variable variance explained in the endogenous variables.

Table 1

Associations among demographic variables for older adult PLWHA (N=299)

	Male (<i>n</i> = 202)	Female (<i>n</i> = 97)	
Variable	Freq (%)	Freq (%)	χ^2
Race			
African American	96 (47.5)	77 (79.4)	27.3***
Non-African American	106 (52.5)	20 (20.6)	
Study sites			27.9***
New York City	142 (70.3)	94 (96.9)	
Ohio	60 (29.7)	3 (3.1)	
Education			18.9***
<high school	33 (16.3)	38 (39.2)	
>=high school	169 (83.7)	59 (60.8)	
	African American (<i>n</i> = 173)	Non-African American (<i>n</i> = 126)	
Variable	Freq (%)	Freq (%)	χ^2
Study sites			28.1***
New York City	155 (89.6)	81 (64.3)	
Ohio	18 (10.4)	45 (35.7)	
Education			10.8**
<high school	53 (30.6)	18 (14.3)	
>=high school	120 (69.4)	108 (85.7)	
	New York City (<i>n</i> = 238)	Ohio (<i>n</i> = 63)	
Variable	Freq (%)	Freq (%)	χ^2
Education			7.0**
<high school	64 (27.1)	7 (11.1)	
>=high school	172 (72.9)	56 (88.9)	

^a. Percentages do not sum to 100 due to rounding error.^b. Frequencies do not sum to 299 due to missing data.^c. ** $p < .01$ *** $p < .001$

Table 2

Standardized total and indirect effects for structural model (N=299)

Independent variable	Dependent variable		
	Physical Well-Being	Emotional Well-Being	Functional and Global Well-Being
Life Stress	Total effects		
	-.578***	-.735***	-.606***
	Indirect effects		
	-.211***	-.222***	-.507***
Percent mediated through stress (Indirect effect/Total effect)			
	36.5%	30.2%	83.7%

 $p < .001$ (two-tailed).