Risk and Protective Factors Associated with Health-Related Quality of Life Among Older Gay and Bisexual Men Living With HIV Disease

Charles A. Emlet, PhD,[*,1] Karen I. Fredriksen-Goldsen, PhD,[2] and Hyun-Jun Kim, PhD[2]

[1]Social Work Program, University of Washington Tacoma.
[2]School of Social Work, University of Washington, Seattle.

*Address correspondence to Charles A. Emlet, PhD, MSW, Social Work Program, University of Washington Tacoma, 1900 Commerce St. Campus Box 358425, Tacoma, WA 98402. E-mail: caemlet@u.washington.edu

Purpose: To identify risk and protective factors associated with mental and physical health-related quality of life, after controlling for key background characteristics, in a population of older gay and bisexual men living with HIV disease. Previous research examining quality of life among persons living with HIV rarely includes older adults. **Design and Methods:** Survey responses from 226 gay and bisexual men aged 50 and older, and living with HIV disease, which were part of the Caring and Aging with Pride study, were analyzed using multivariate linear regression models. **Results:** Findings reveal that comorbidity, limitations in activities, and victimization are significant risk factors for decreased physical and mental health-related quality of life. Stigma and HIV progression did not contribute to the overall outcome variables in multivariate models. Social support and self-efficacy serve as protective factors although social support was only significant with mental health-related quality of life. **Implications:** Comorbidity, functional limitations, and lifetime victimization are risks to quality of life among older gay and bisexual men with HIV disease. Self-efficacy and social support represent intrapersonal and interpersonal resources that can be enhanced through interventions to improve health-related quality of life.

HIV is increasingly recognized as a disease affecting older adults. Centers for Disease Control and Prevention (CDC) data indicate that the prevalence of HIV disease among adults aged 50 and older is growing dramatically (CDC, 2011). Recent estimates suggest by the year 2015, approximately half of all people living with HIV disease in the United States will be 50 years old or older (Effros et al., 2008). Seventeen percent of all new HIV diagnoses in the United States are persons aged 50 and older, based on the 40 states with name-based confidential reporting (Administration on Aging, 2012).

Onen, Shacham, Stamm, and Overton (2010) found that older adults living with HIV disease remained sexually active and, like their younger counterparts, reported inconsistent condom use despite HIV infection. Thus, sexual activity and at-risk sexual behavior among older adults is a common source of new HIV infections. In addition to the growing number of new HIV infections among older persons, the success of "combination

antiretroviral therapy" (cART) has allowed adults infected earlier in life to live into old age. cART is defined as the use of at least three antiretroviral drugs from at least two drug classes. Combination therapy has been found to be the best approach to preserve immune function and delay disease progression (NIH, 2011). The success of cART, first introduced in 1996, has moved HIV disease from a fatal to a chronic health condition in the developed world. This pattern is seen in CDC data showing increasing trends in the overall number of adults aged 50 and older living with HIV disease. In 2004, approximately 105,855 individuals aged 50 and older were living with HIV disease (based on the 40 states with confidential named-based reporting); by 2008, this figure had risen to 208,947 (CDC, 2011). Therefore, those long-term survivors, aging with HIV make up an increasing proportion of persons in the United States living with HIV. Considering the largest number of individuals living with HIV disease are 40–49 years of age (CDC, 2011), this pattern will continue into the future.

Although life expectancy for people living with HIV is uncertain, research suggests a dramatic shift in survival from days prior to cART. Van Sighem and colleagues (2010) recently estimated that an individual entering HIV care today may have a life expectancy nearing that of a non-HIV infected person their age. Considering these advancements in care and treatment, it is important for researchers and practitioners to better understand constructs such as health-related quality of life (HRQoL) among older adults living with HIV (Rueda et al., 2011; Vidrine, Amick, Gritz, & Arduino, 2005). HRQoL has become important to understand because of its relevance to disease management, social adjustment to illness, and use of services (Elliott, Russo, & Roy-Byrne, 2002; Havlik 2009). HRQoL is a multidimensional concept that describes one's well-being and may include physical, mental, emotional, and social functioning (Doyle, Weber, Atkinson, Grant, Woods, 2012). An improved understanding of HIV disease, and factors associated with quality of life (QoL), is needed if we are to begin to identify ways to improve life and functioning for older people living with HIV.

It has been suggested that declines in HRQoL among older adults living with HIV disease may differ from their younger counterparts (Doyle et al., 2012) in part due to more rapid progression to AIDS (CDC, 2011) and a higher number of comorbid health conditions (Havlik, 2009;

Justice, 2010; Martin, Fain, & Klotz, 2008). Previous research does not provide consistent patterns by age and HRQoL. For example, although some studies have shown an inverse relationship between age and HRQoL (Campsmith, Nakashima, & Davidson, 2003; O'Cleirigh, Skeer, Mayer, & Safren, 2009; Piette, Wachtel, Mor, & Mayer, 1995; Sousa, Holzemer, Henry, & Slaughter, 1999), the majority of these studies measured age as a continuous variable, with mean ages substantially less than 45 years. Other studies found age not to be significantly associated with HRQoL (Nokes et al., 2000; Worthington & Krentz, 2005). Piette and colleagues (1995) found a significant decrease in physical, social, and health scores on the Medical Outcome Study (MOS) among older adults living with HIV/AIDS, however, their study was conducted prior to the initiation of cART and the number of participants aged 50 and older was small. Recently, Skevington (2012) examined QoL in younger and older adults living with HIV finding that only sleep, fatigue, and sexual activity was significantly lower for older adults compared with younger adults.

Considering the paucity of empirical studies focusing on HRQoL in older persons with HIV, the purpose of this research is to examine risk and protective factors associated with physical and mental HRQoL among older gay and bisexual men who are living with HIV disease.

Conceptual Framework

This research is grounded in resilience theory, which posits that individuals can exemplify characteristics of resilience that reflect the "capacity for, or outcomes of, successful adaptation, despite challenging or threatening circumstances" (Masten, Best, & Garmezy, 1990, p. 426).

Resilience is a dynamic process involving the interplay of risk and protective factors (Fredriksen-Goldsen, 2007; Yates & Masten, 2004). Although risk factors are conceptualized as adverse experiences that can have negative effect on adaptive functioning, protective factors influencing resilience may emanate from individual, interpersonal, and environmental sources (Rochat & Hough, 2007) including temperament, sense of mastery, positive self-image, social networks, and adaptive and supportive relationships. Resilience theory also posits that resilient characteristics can be enhanced by modifying key risk and protective

factors that can influence successful adaptation (Fredriksen-Goldsen, 2007). Framed from the lens of resilience theory, we will analyze protective and risk factors in a sample of gay and bisexual men, aged 50 years and older living with HIV, examining the unique contributions of these variables to physical and mental HRQoL.

Risk factors affecting HRQoL in persons with HIV disease identified in previous research are disease progression, functional status (Campsmith et al., 2003; Rueda et al., 2012; Vidrine et al., 2005), comorbid health conditions (Havlik, 2009; Justice, 2010; Martin et al., 2008), and psychosocial issues such as stigma and disclosure concerns related to HIV disease (Emlet, 2006a, 2006b; Foster & Gaskins, 2009; Grov, Golub, Parsons, Brennan, & Karpiak, 2010). Gay and bisexual older adult men with and without HIV disease experience additional psychosocial risks, such as lifetime victimization due to stigmatized sexual identity, which are associated with poor physical and mental health (Fredriksen-Goldsen et al., 2011).

Protective factors that are important for promoting HRQoL among people with HIV disease are personal and social resources. Enhancing self-efficacy (Axelsson, Lötvall, Cliffordson, Lundgren, & Brink, 2012) including personal control (Rueda et al., 2012) is important to improve HRQoL among people with chronic illnesses. Self-efficacy has been documented as a predictor of health-promoting behaviors, including medication adherence (Brent, 2012; Johnson et al., 2003; Molassiotis et al., 2002), which promote HRQoL (Carballo et al., 2004). Campsmith and colleagues (2003) found that populations living with HIV infection have reported differing levels of HRQoL influenced by interpersonal characteristics such as social support (Clingerman, 2004; Reich, Lounsbury, Zaid-Muhammad, & Rapkin, 2010; Rueda et al., 2012; Worthington & Krentz, 2005).

Guided by the resilience conceptual model and a review of previous studies, this study will test two hypotheses. First, we hypothesize that HIV disease progression, comorbid conditions, limitations in activities, victimization, and stigma will be associated with lowered physical HRQoL, whereas increased self-efficacy and social support will contribute to improved physical HRQoL. Second, we hypothesize that increased disease progression, comorbidity, limitations in activities, victimization, stigma, and decreased self-efficacy and social support will be associated with decreased mental HRQoL.

Methods

Sample

The sample for this analysis consisted of 226 gay and bisexual men aged 50 and older, who participated in the Caring and Aging with Pride study (Fredriksen-Goldsen et al., 2011). The Caring and Aging with Pride study consisted of a cross-sectional survey of LGBT adults, aged 50 and older, recruited from 11 community-based agencies across the country serving LGBT older adults. The overall goal of the Caring and Aging with Pride study was to better understand the risk and protective factors affecting the physical and mental health of LGBT older adults. Participating agencies distributed surveys via their agency mailing lists to LGBT older adults. The self-administered questionnaire consisted of several sections including background characteristics, physical and mental health, life satisfaction, QoL, health conditions, health behaviors, health screenings, health care access, disclosure, victimization, discrimination, stigma, characteristics of caregiving and care receiving, and services needed. The total N for the survey is 2,560. Data were gathered from June to November, 2010.

As part of the survey, individuals were asked to report physical illnesses and diagnoses. Of the 2,560 LGBT older adults who completed the survey, 233 (9%) identified as having HIV disease (including AIDS). These individuals responded affirmatively to the following statements: Has a physician ever told you that you have HIV and if so, the year of diagnosis. They were also asked if they had ever been told they had AIDS and if so, the year of diagnosis. Of those with HIV disease, 226 (97%) were men. The analysis being reported here is based on data from these 226 gay and bisexual men. All study procedures were reviewed and approved by the University of Washington Institutional Review Board.

Measures

The dependent variables in this analysis included physical and mental HRQoL. QoL was measured using the SF-8 Health Survey, a validated metric based on the SF-36, consisting of eight questions (general health, physical functioning, role limitations due to physical health problems, body pain, vitality, social functioning, mental health, and role limitations due to emotional problems; Ware, Kosinski, Dewey, & Gandek, 2001). We summarized mean scores of physical and mental

HRQoL with the range of 0–100 (Hays & Shapiro, 1992; Stewart et al., 1992; Ware & Sherbourne, 1992). Higher scores indicate better HRQoL.

The independent variables in this analysis were classified as risk and protective factors. Variables categorized as risk factors included HIV progression, comorbid conditions, limited activities, lifetime victimization, and stigma. HIV progression was measured by one question asking respondents whether they had been diagnosed with AIDS. Comorbid conditions were determined by whether participants had been diagnosed by a physician with any of the following conditions: high blood pressure, high cholesterol, heart attack, angina, stroke, cancer, asthma, arthritis, or diabetes. The total number of comorbid conditions was calculated, which ranges 0–9. Limited activities was measured by asking whether participants were limited in any activities due to physical, mental, or emotional problems (CDC, 2012a). Victimization was measured using the Lifetime Victimization Scale developed by D'Augelli and Grossman (2001). Participants were asked how many times in their lives, due to their perceived sexual orientation, they had experienced victimization including being verbally insulted; being physically threatened; having an object thrown at them; being punched, kicked, or beaten; being threatened with a weapon; being attacked sexually; or being threatened by others to disclose their sexual orientation. A 4-point Likert scale (0 = never; 1 = once; 2 = twice; 3 = three or more times) was used, with summed score ranging from 0 to 21 ($\alpha = 0.80$). Stigma was measured using the Homosexual Stigma Scale (Liu, Feng, & Rhodes, 2009). Participants were asked to rate the extent to which they agree or disagree with statements such as "I wish I weren't lesbian, gay, bisexual or transgender." Summary scores ranged from 1 (*strongly disagree*) to 4 (*strongly agree*), with higher scores indicating higher levels of internal stigma ($\alpha = 0.78$).

Protective factors included self-efficacy and social support. Self-efficacy was measured using a single item that asked "In the last month, how often have you felt that you were unable to control the important things in your life?" with the responses on a 5-point Likert scale. The score ranges from 0 (*very often*) to 4 (*never*) with higher scores indicating greater self-efficacy. Social support was measured using a four-item abbreviated Social Support Instrument (Gjesfjeld, Greeno, & Kim, 2008), including whether they had someone they could turn to for instrumental support (i.e.,

"to help with daily chores if you were sick") and emotional support (i.e., "to do something enjoyable with"). The summary score ranges from 1 to 4 with higher scores indicating higher degrees of social support ($\alpha = 0.85$).

Key background characteristics included in multivariate analyses were age (measured in years), race/ethnicity, household income, and education. The categories of race/ethnicity were dichotomized into non-Hispanic white and other due to small sample sizes of racial/ethnic minorities. Household income was calculated by utilizing the midpoints of the intervals with the highest category using the same interval length as the proceeding interval. Education was grouped into three levels including "high school or less," "college 1 year to 3 years," and "college 4 years or more."

Other background characteristics included living arrangement (living alone vs. living with others), relationship status (partnered or married vs. other), and the receipt of informal care (yes/no). Participants were asked to self-identify their sexual orientation; the responses included gay, bisexual, or other (such as queer).

Statistical Analysis

Analyses were performed using STATA/IC for Windows (Version 11.2). First, we examined descriptive statistics of background characteristics, the outcome variables, and risk and protective factors. The proportion of missing cases for each variable was less than 4%, with the highest proportion of missing cases observed in stigma (3.98%) and social support (2.65%). We used listwise deletion on the missing cases for multivariate analyses. Categorical and ordinal variables were dummy coded for further analyses. Second, we examined bivariate relationships between physical HRQoL and risk and protective factors utilizing bivariate linear regressions. Next, we conducted a series of multivariate linear regression models in order to examine the contributions of risk and protective factors in the prediction of physical HRQoL after controlling for key background characteristics including age, race/ethnicity, income, and education, which are well-documented socioeconomic indicators of health disparities (Campsmith et al., 2003; Piette et al., 1995; Rueda et al., 2012; Vidrine et al., 2005; Worthington & Krentz, 2005). In Model 1, in order to examine the contribution of risk factors, HIV progression, comorbid conditions, limited activities, lifetime

victimization, and stigma were added to the model; in Model 2, the contribution of protective factors was examined by adding self-efficacy and social support to the model; in Model 3, both risk and protective factors were added to test the full model to examine the unique contributions of risk and protective factors. Statistical significance of standardized coefficients was interpreted. For each model, R^2 change was also calculated to examine the increased proportion of variance explained by adding the risk and protective factors to the model controlling for key background characteristics. The same multivariate models were then applied to mental HRQoL. No multicollinearity issues were detected in the multivariate linear regression models.

Results

Table 1 shows the characteristics of the sample. The age range was 50–86 years; and mean age was 62.97 (SD = 7.32) years. The majority identified themselves as gay (93%) and non-Hispanic white (77%).

The average household income was $40,777.03 ($SD$ = $28,977.46), and the majority (64%) had 4 years or more of college education. About two thirds (65%) were living alone; a third (34%) were married or partnered. Only a fifth (20%) were receiving informal care. The descriptive information of physical and mental HRQoL and the covariates are summarized in Table 2.

Predictors of physical HRQoL.—As shown in Table 3, the results of bivariate linear regression analyses indicate that physical HRQoL is significantly and negatively associated with progression to AIDS, number of comorbid conditions, limited activities, and increases in lifetime victimization and stigma. Physical HRQoL was also significantly and positively correlated with self-efficacy and social support.

We conducted a series of multivariate regression analyses to test for the incremental variance in physical HRQoL explained by risk factors and protective factors after controlling for key background characteristics including age, income, education, and race/ethnicity (Table 3). In Model 1, risk factors (HIV progression, comorbid conditions, limited activities, lifetime victimization, and stigma) explained 36% of variance in physical HRQoL (F = 28.82; p < .001) in addition to the contribution of key background characteristics to the model. In this model, comorbid conditions limited activities and lifetime victimization were significant predictors of physical HRQoL, whereas HIV progression and stigma were not. In Model 2, by adding protective factors (self-efficacy and social support) to the model, the proportion of variance in physical HRQoL explained by the model increased by 10% (F = 13.20; p < .001). In Model 2, self-efficacy was a significant predictor of physical HRQoL but social support was not. In the full model, including both risk and protective

Table 1. Characteristics of Older Gay and Bisexual Men With HIV disease

	Mean (SD) or %
Age (years; range: 50–86)	62.97 (7.32)
Sexual orientation	
Gay	92.92
Bisexual	6.19
Other	0.88
Non-Hispanic white	77.33
Income ($)	40777.03 (28977.46)
Education	
≤ High school	10.67
Some college	25.78
≥ 4 years of college	63.56
Living arrangement	
Living alone	65.04
Living with others	34.96
Relationship status	
Married or partnered	34.07
Other	65.93
Receiving informal care	19.82

Table 2. Descriptive Statistics of the Main Variables

Variables	% or M (SD)	Range in sample
Outcome variables		
Physical HRQoL	66.74 (22.09)	10–100
Mental HRQoL	64.91 (21.61)	12.5–100
Risk factors		
HIV progression		
HIV	56.19%	—
AIDS	43.81 %	—
Number of comorbid conditions	1.86 (1.63)	0–8
Limited activities	51.57	—
Lifetime victimization	6.01 (5.19)	0–21
Stigma	1.52 (0.62)	1–4
Protective factors		
Self-efficacy	2.46 (1.04)	0–4
Social support	2.85 (.84)	1–4

Note. HRQoL = health-related quality of life.

Table 3. Results of Bivariate and Multivariate Linear Regression Predicting Physical Health-Related Quality of Life (HRQoL)

Correlates	Bivariate analysis, β (*p* value)	Multivariate analysis, β (*p* value)		
		Model 1	Model 2	Model 3
Risk factors				
HIV progression	−0.292 (<.001)	−0.104 (.054)	—	−0.090 (.091)
Number of comorbid conditions	−0.352 (<.001)	−0.176 (.002)	—	−0.185 (.001)
Limited activities	−0.666 (<.001)	−0.562 (<.001)	—	−0.514 (<.001)
Lifetime victimization	−0.182 (<.001)	−0.127 (.016)	—	−0.109 (.038)
Stigma	−0.141 (.037)	0.004 (.944)	—	0.010 (.858)
Protective factors				
Self-efficacy	0.430 (<.001)	—	0.352 (<.001)	0.160 (.008)
Social support	0.173 (.010)	—	−0.018 (.788)	−0.032 (.574)
R^2 (*p* value)	—	0.506 (<.001)	0.243 (<.001)	0.523 (<.001)
ΔR^2 (*p* value)	—	0.364 (<.001)	0.101 (<.001)	0.381 (<.001)

*Note*s. β = standardized coefficient; All the multivariate analyses controlled for key background characteristics including age, income, education, and race/ethnicity; ΔR^2 indicates the increased proportion of variance in physical HRQoL explained by adding risk and protective factors to the model controlling for key background characteristics.

Table 4. Results of Bivariate and Multivariate Linear Regression Predicting Mental Health-Related Quality of Life (HRQoL)

Correlates	Bivariate analysis, β (*p* value)	Multivariate analysis, β (*p* value)		
		Model 1	Model 2	Model 3
Background characteristics				
Risk factors				
HIV progression	−0.212 (.001)	−0.054 (.351)	—	−0.009 (.856)
Number of comorbid conditions	−0.246 (<.001)	−0.079 (.193)	—	−0.089 (.079)
Limited activities	−0.568 (<.001)	−0.496 (<.001)	—	−0.367 (<.001)
Lifetime victimization	−0.244 (<.001)	−0.175 (.002)	—	−0.126 (.010)
Stigma	−0.158 (.020)	−0.036 (.518)	—	0.040 (.419)
Protective factors				
Self-efficacy	0.661 (<.001)	—	0.553 (<.001)	0.423 (<.001)
Social support	0.306 (<.001)	—	0.147 (.011)	0.150 (.005)
R^2 (*p* value)	—	0.419 (<.001)	0.463 (<.001)	0.589 (<.001)
ΔR^2 (*p* value)	—	0.265 (<.001)	0.309 (<.001)	0.434 (<.001)

Note. All the multivariate analyses controlled for key background characteristics including age, income, education, and race/ethnicity; ΔR^2 indicates the increased proportion of variance in mental HRQoL explained by adding risk and protective factors to the model controlling for key background characteristics.

factors, comorbid conditions, limited activities, lifetime victimization, and self-efficacy were significant. More than a half of the variance in physical HRQoL (52%) was explained by the full model (*F* = 17.72; *p* < .001) and 38% was explained specifically by risk and protective factors (*F* = 22.13; *p* < .001).

Predictors of mental HRQoL.—As shown in Table 4, the results of bivariate linear regression analyses indicate that mental HRQoL is significantly and negatively associated with risk factors and positively associated with protective factors.

The results of a series of multivariate linear regression analyses demonstrate that risk factors and protective factors significantly predicted mental HRQoL after controlling for key background characteristics (Table 4). In Model 1 with risk factors as predictors, the proportion of variance in mental HRQoL explained by the model increased by 27% (*F* = 17.88; *p* < .001). Of risk factors, limited activities and lifetime victimization were significant

predictors of mental HRQoL, but HIV progression, the number of comorbid conditions and stigma were not. According to Model 2, by adding protective factors, the total proportion of variance in mental HRQoL explained by the model increased by 31% ($F = 57.32$; $p < .001$), and both self-efficacy and social support significantly predicted mental HRQoL. In the full model, limited activities, lifetime victimization, self-efficacy, and social support remained as significant predictors of mental HRQoL. About 59% of variance in mental HRQoL was explained by the full model ($F = 23.13$; $p < .001$) and 43% was explained specifically by risk and protective factors ($F = 29.25$; $p < .001$).

Discussion

This study provides important information on risk and protective factors that contribute to and detract from physical and mental HRQoL among older gay and bisexual men living with HIV disease. With deaths from HIV declining (CDC, 2011), increasing numbers of adults are aging with HIV disease. Men who have sex with men continue to be a major risk group for HIV infection (CDC, 2012b), underscoring the importance of studies that examine ways to improve their QoL. Our findings, which accounted for 50%–60% of the variance in both physical and mental HRQoL indicate that there are factors that can be protective against lowered HRQoL and that both the risk and protective factors emanate from intrapersonal as well as interpersonal sources.

As seen in Table 3, both risk and protective factors contributed to the overall variance in physical HRQoL. We had hypothesized that (HIV) disease progression, comorbid conditions, and limited activities would act as risk factors and be associated with lower physical HRQoL. We found that after controlling for background characteristics and covariates, an increase in limitation of activities and a higher number of comorbid conditions resulted in poorer physical HRQoL. It is important to note that HIV status (having HIV rather than a progression to AIDS) was not a significant predictor of physical HRQoL. Therefore, functional status and comorbidity, as opposed to an AIDS diagnosis, appears to be most significant in predicting physical HRQoL for older gay or bisexual men living with HIV. It may also be that long-term survival with an AIDS diagnosis attenuates the relationship between HIV status and HRQoL (Brashers et al., 1999).

These findings have important practice and research implications. First, HIV infected older adults are at greater risk of comorbid conditions than their younger counterparts (Goulet et al., 2007; Oursler et al., 2011) and often these comorbid conditions are non-HIV related (Hasse et al., 2011). Such conditions, sometimes referred to as multimorbidity, include diabetes mellitus, cardiovascular disease, non-AIDS malignancies, and osteoporosis (Hasse et al., 2011); all of which may limit activities of daily living. Therefore, it is important for future research to investigate the potential consequences of comorbid conditions as they relate to functional status and for HIV and geriatric clinicians to take limitations of activities into account when considering strategies to promote HRQoL.

These findings are consistent with recent research on aging and HIV disease. Dray-Spira and colleagues (2012) found that the diagnosis of comorbid conditions, including both physical and emotional ailments, rather than clinical markers of HIV disease, were associated with an increased likelihood of work cessation in adults living with HIV. Hasse and colleagues (2011) examined members of the Swiss HIV Cohort study and noted a significant increase in non-HIV related comorbidity among its older members and concluded that non-HIV-associated conditions will become increasingly important in HIV care. Havlik (2009), in examining data from the Research on Older Adults with HIV study, found higher comorbid conditions associated with lower physical HRQoL in their sample of adults aged 50 and older.

Another important finding for physical HRQoL was its significant association with victimization. There is a growing body of literature documenting the role of victimization as a social determinant of health (Kaiser Family Foundation, 2001). Among older adults in a population-based study, discrimination was associated with increased mortality risk (Barnes et al., 2008). Furthermore, research documents that gay and bisexual older adults living with HIV are significantly more likely to have experienced victimization than gay and bisexual older adults who were HIV negative (Fredriksen-Goldsen et al., 2011).

With regard to protective factors, we hypothesized that increased social support would be associated with improved physical HRQoL. This hypothesis was not supported by our findings. The findings that social support was not associated with physical HRQoL (but was with mental HRQoL) may indicate important differences in

how social support interacts with various components of HRQoL. It is possible that use of a more robust or HIV-specific social support scale may have yielded different findings. We did find self-efficacy to be associated with improved physical HRQoL. This speaks to the importance of self-efficacy as a protective factor against the deleterious effects of HIV disease on physical HRQoL. This finding is important for two reasons. First, our findings are supported by other research that suggests self-efficacy as it relates to a sense of personal control can moderate negative consequences among persons living with HIV. For example, Rueda and colleagues (2012) found that personal control moderated the negative effects of stigma on depression among 825 adults living with HIV disease, whereas Gibson and colleagues (2011) found mastery moderated stressful life events and was associated with improved QoL among 758 persons living with HIV. Second, our findings point to the potential to promote self-efficacy in intervention development for older adults living with HIV. Skills to develop improved self-efficacy can be taught and strengthened through tailored interventions (Hyde, Hankins, Deale, & Marteau, 2008).

Our second hypothesis was that increased disease progression, limitations in activities, increased stigma, and victimization would be associated with lowered mental HRQoL, whereas increased social support and self-efficacy would be associated with improved mental HRQoL. As seen in Table 4, after controlling for background characteristics and covariates, comorbid conditions, limitations of activities, and victimization (but not stigma) were associated with lower mental HRQoL, partially supporting our hypothesis. A possible explanation regarding stigma is the fact that many older gay men have been stigmatized and even presumed to have HIV disease for many years. Coping and personal stigma management strategies may have been in place for many years.

Research documents the pervasive negative mental health consequences of victimization among persons living with HIV (Bogart et al., 2011; Heckman et al., 2000). Because lifetime victimization is a significant predictor of lowered mental and physical HRQoL, it has important implications for the well-being of gay and bisexual older men living with HIV. The elevated rates of lifetime victimization among gay and bisexual men with HIV must be addressed in the development of services and community-level interventions designed to improve HRQoL. In previous research, stigma has also been significantly linked to poor mental health outcomes (Kang, Rapkin, Remien, Mellins, & Oh, 2005; Logie & Gadalla, 2009; Vanable, Carey, Blair, & Littlewood, 2006). Interestingly, in this study, stigma was not associated with decreased physical or mental HRQoL.

It is possible the relationship between stigma and physical and mental HRQoL may be accounted for by other covariates in the model, such as victimization, which will need to be assessed in future research. Because we found multimorbidity, limited activities, and victimization to negatively affect mental HRQoL, these findings speak to the deleterious nature of these characteristics as they affect both mental and physical HRQoL.

As hypothesized, social support was found to be important as a protective factor associated with improved mental HRQoL. This is consistent with findings from Clingerman (2004) and Brennan and colleagues (2011) who found social support associated with improved general and mental HRQoL, respectively. Reich and colleagues (2010) noted the significance of having the support of an important person, in addition to general social support as being associated with improved mental health in a sample of 626 individuals living with HIV disease. Social support can be fostered and older adults living with HIV can be taught strategies for enhancing social support. Again, self-efficacy played an important role as a protective factor fostering mental HRQoL, consistent with findings from Rueda and colleagues (2012). These findings reinforce the importance of both interpersonal (social support) and intrapersonal (self-efficacy) elements in improving both physical and mental HRQoL.

Our findings support the relevance and utility of resilience theory for examining risk and protective factors that affect physical and mental HRQoL. This study identified personal factors such as disease processes and multimorbidity, and intra/interpersonal factors such as self-efficacy, social support, and victimization as factors that can contribute or detract from both physical and mental HRQoL.

Limitations

Although our study explained a considerable amount of variance in physical and mental HRQoL among gay and bisexual older men living with HIV, it has a number of limitations that must be acknowledged. First, although individuals were recruited from agencies throughout the

United States serving LGBT older adults, this was not a representative population-based sample. It is therefore possible that study participants are less isolated than peers not associated with LGBT aging organizations and may differ from those not willing to participate. The findings cannot therefore be generalized to the population of gay and bisexual older adult men living with HIV. The data gathered from the participants were compiled through self-report surveys and could not be independently verified. Therefore, estimates of activity limitations, cormorbid diagnoses, and assessments of social support are subjective measures.

Future research can build upon this study through a number of strategies. First, research can utilize population-based samples that will help improve generalizability. Second, these findings set the stage to begin the development of interventions aimed to improve physical and mental HRQoL for older adults living with HIV. Our results demonstrate the importance of both self-efficacy and social support—both elements that are modifiable and amenable to change through interventions for older adults living with HIV. In addition, community-level interventions targeted to reduce victimization are desperately needed.

As the prevalence of HIV continues to increase with improved treatment and dramatically declining death rates, more adults will be living into old age with HIV disease. This study provides important insight into ways we can improve HRQoL for older gay and bisexual men living with HIV.

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