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ORIGINAL PAPER

Factors Associated with Quality of Life Among Rural Women with HIV Disease

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Abstract This cross-sectional study examined physical, psychological, and social factors associated with quality of life (QOL) among a sample of 399 rural women with HIV disease living in the Southeastern United States. Of the socio-demographic variables, age ($p = .003$), race ($p < .0001$), and time of HIV diagnosis ($p = .03$) were significantly associated with QOL. In bi-variate analysis, HIV symptoms (frequency and extent symptoms were bothersome), perceived stigma, internalized stigma, and depression were significantly and negatively associated with QOL whereas social support, problem-focused coping, perceived situational control, and healthy lifestyles were significantly and positively associated with QOL (all $p < .0001$). In adjusted analysis, HIV symptom frequency, depression, problem-focused coping, perceived situational control, perceived stigma, healthy lifestyles, and race remained significant predictors of QOL and explained 55% of the variance in QOL among the study participants (model $F_{7,\ 390} = 66.7$; $p < .0001$). The study findings identify potential points of interventions to improve QOL among rural women with HIV disease.

Keywords Quality of life · HIV disease · Rural · Women

Introduction

The advent of highly active antiretroviral therapy (HAART) and improvements in disease management have resulted in significant decreases in mortality and morbidity related to human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) [1]. However, despite aggressive public health efforts to curb the epidemic, it is estimated that more than 560,000 new cases of HIV infection occur annually in the United States (U.S.) [2]. According to the Centers for Disease Control and Prevention (CDC), reduced HIV/AIDS-related mortality coupled with a stable HIV-incidence rate over the years is responsible for increased prevalence of HIV disease in the U.S. [3]. Transformation of HIV disease to a manageable chronic disease has shifted focus to quality of life (QOL) among persons living with HIV/AIDS (PLWHA). Assessment of quality of life is important for documenting the burden of the disease, evaluating treatments, tracking health-related changes over time, and gauging returns from healthcare investments [4]. Past research examining effects of HIV disease on various dimensions of health and QOL have predominantly focused on white homosexual or heterosexual men [5, 6]. A limited number of studies have focused on women with HIV disease [4, 7], and in particular, rural women. Available evidence suggests that women with HIV disease report lower quality of life compared to their male counterparts [7–9].

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In addition to the greater number of persons with HIV disease living longer, trends in the HIV/AIDS epidemic in the U.S. indicate the growing impact of the disease on women, racial/ethnic minorities, rural residents, and persons living in the South [10–14]. The proportion of the AIDS population that is female has increased from 8% in 1985 to 27% in 2007 [11, 15]. Given the increasing impact of the HIV/AIDS epidemic on women, particularly those living in rural areas of the South, it is imperative to identify factors that may influence QOL among women with HIV disease living in limited-resource settings. Identification of these factors is critical to be able to develop and test strategies aimed at improving the QOL of these women. Therefore, the purpose of this cross-sectional study was to examine factors associated with QOL in a sample of rural women with HIV disease living in the Southeastern U.S.

Background

QOL is a complex, multi-faceted concept which has been examined by many researchers from multiple disciplines without any consensus on its definition [16–18]. QOL is especially important in the context of chronic diseases since individuals are forced to change or adapt to new circumstances and demands of living with their disease on a daily basis. QOL has been defined in terms of a number of dimensions that include illness or disease status, socioeconomic status, personal goals, employment, social support, spiritual well-being, as well as overall life satisfaction and happiness [18]. Calman [19] defined QOL as a gap or difference between hopes and expectations of a person and the person's present experiences at a given moment in time. Despite numerous definitions, in general, the concept of QOL has positive connotations and is believed to be dynamic and subjective and thus, can be understood only from an individual perspective [17–19].

Research evidence indicates that there are significant individual differences in QOL of PLWHA that are accounted for by a number of factors across various domains, in particular physical, psychological, and social factors. Additionally, some individual differences are accounted for by demographic factors. For example, in a multi-site study examining health-related QOL among PLWHA, researchers found that lower scores on QOL were associated with being older, being female, and being Black or Hispanic, among other factors [8]. A review of psychosocial consequences of HIV disease impacting QOL suggested that poverty, HIV-related stigma, depression, substance abuse, and domestic violence influence a person's willingness to seek medical care and motivation to adhere to therapy, ultimately affecting his/her QOL [20]. Several studies involving PLWHA have indicated a strong negative association between HIV-related symptoms and QOL [4, 9, 21, 22]. A substantial body of research indicates that depression also has a significant negative impact on QOL among PLWHA [9, 22–26].

HIV-related stigma, social support, and coping have also been found to be significantly associated with QOL among PLWHA. HIV-related stigma has been shown to compromise physical, psychological, and social health [27], which in turn affects QOL of PLWHA through multiple ways including interference in daily routine as well as the person's intention and ability to access health care services [28]. In a multi-site study, Holzemer et al. [29] found that perceived stigma explained a significant amount of variance in QOL among PLWHA in addition to that explained by HIV-related symptoms and severity of illness. Buseh et al. [30] also found a significant negative association between stigma and QOL among PLWHA. Social support is an important resource in buffering and managing stress [31] and has been shown to be significantly associated with QOL and life satisfaction among PLWHA [32–34]. In addition to social support, coping plays a critical role in shaping the outcomes of stressful situations such as living with HIV disease. Coping, defined as a person's ongoing cognitive and behavioral efforts to manage stress, is generally categorized as problem-focused coping (adaptive, active, or positive coping) or emotion-focused coping (avoidant, passive, or negative coping) [35, 36]. Although a large number of studies have examined the role of coping in the outcomes of HIV disease, there is little consistency across the studies with respect to measurement as well as results and conclusions [5, 37]. However, in general, problem-focused coping is associated with better psychological outcomes and QOL, whereas emotion-focused coping is associated with poor psychological outcomes and QOL among PLWHA [37, 38].

Two other concepts related to QOL have been examined in the context of HIV disease by a few researchers. These concepts include locus of control and healthy lifestyles (self-care behaviors). Locus of control, a construct derived from Rotter's social learning theory, is often used to predict perceived health, health behaviors, and health outcomes [39–41]. Internal locus of control, a general belief of control by self, has been found to be positively associated with both perceived health and QOL, whereas external locus of control (belief in control by powerful others or chance) has been found to be negatively associated with health and QOL among PLWHA [40, 41]. Although healthy lifestyles have been shown to be associated with improved QOL in general populations, little research has focused on the context of HIV disease [42]. Healthy lifestyles include not only behaviors related to nutrition and physical activity, but also health responsibility, stress management, and supportive/nurturing interpersonal relationships. In a study examining QOL among men with HIV-disease, Uphold et al. [42] found that health promoting behaviors were significantly and positively associated with QOL. In another study involving women with HIV disease, women who practiced more self-care behaviors including healthy diet, vitamin supplements, adequate sleep and exercise, and stress management reported better health and QOL [34].

Although several studies have examined QOL among PLWHA, a limited number of these studies focused exclusively on women with HIV disease [7, 34], particularly rural women. Rural women with HIV disease face unique challenges due to distinct stressors and contextual circumstances related to rural residence [43]. Further, because of their rural residence, they may confront many economic, social, and cultural difficulties that compromise their adjustment efforts following the HIV diagnosis [44] which ultimately may affect their QOL. We hypothesized that HIV-related symptoms, HIV-related stigma, depression, and emotion-focused coping would be significantly and negatively associated with QOL, whereas social support, perceived situational control, healthy lifestyle behaviors, and problem-focused coping would be significantly and positively associated with QOL in rural women with HIV disease living in the Southeastern U.S.

Methods

This cross-sectional study examined physical, psychological, and social factors associated with QOL among rural women with HIV disease, using baseline data from a longitudinal study of rural women with HIV disease residing in the Southeastern U.S. The research was approved by the institutional review boards at the investigators' home institutions [45]. Based on the Cognitive-Relational Theory of Stress, Appraisal, and Coping [35], the parent study was designed to evaluate a peer counseling intervention aimed at decreasing depression and improving QOL among rural women with HIV disease living in the Southeastern U.S.

Sample and Setting

Participants were recruited from community-based HIV/AIDS organizations that provided HIV care and supportive services to PLWHA in rural areas of South Carolina, North Carolina, and Alabama. The collaborative organizations were selected based on several criteria: (1) provision of HIV/AIDS services to rural communities; (2) a caseload of adult female clients in numbers large enough (20 or more) to justify the cost of hiring and training research assistants from the local area; and (3) an interest in and willingness to collaborate with the investigators.

Staff at collaborating organizations served as intermediaries for the investigators by distributing written information about the study to their female clients. The information distributed to clients also included information about who to contact if they were interested in participating in the study. Potential participants were linked with research assistants responsible for recruitment and data collection in their area. Potential participants were screened on selection criteria that included: (1) residence in rural area or towns with a population less than 50,000; (2) age 18 or older; (3) verified HIV positive status; (4) English-speaking; (5) no evidence of dementia verified by medical records; (6) no prior peer counseling experience; and (7) a score of 16 or higher on a measure of depressive symptoms (CES-D) [45]. The cut-off point of 16 was selected because the CES-D score at this level or higher has been shown to be significantly correlated with a clinical diagnosis of depression [48]. Of the 472 women screened, 403 (85%) met the inclusion criteria. Women who met the inclusion criteria were scheduled to complete written informed consent and the first interview. Because many of the women lacked transportation and lived some distance from the HIV/AIDS organization, research assistants traveled to meet participants at their homes or at other mutually agreed upon sites. The research assistants were all women who lived in the same local area or region as the participants.

Measures

All the study measures had been previously validated with the target population of rural women with HIV. Standard socio-demographic variables were measured including age, race, marital status, living situation (whether living alone or with others), education, employment, time since HIV diagnosis, annual household income, and whether they were receiving public assistance. Predictor variables measured included HIV-related symptoms, HIV-related stigma, depressive symptoms, coping, social support, perceived situational control, and healthy lifestyle behaviors.

HIV-Related Symptoms

HIV-related symptoms were measured using the 31-item HIV-symptom distress scale [46]. Each item was rated on two subscales, one which measured how frequently the symptom has been experienced on a 5-point response format ranging from "did not have" (0) to "almost always" (5), and one which measured how bothersome the symptom has been rated on 5-point response format ranging from "not at all bothersome" (0) to "very bothersome" (5). Items were summed for a total score for both frequency of symptoms experienced and how bothered one was by HIV symptoms. Internal consistency reliability for the frequency and bothersome subscales for the study sample were 0.93 and 0.94, respectively.

HIV-Related Stigma

HIV-related stigma was measured using two scales, one assessing perceived stigma and the other assessing internalized stigma. The perceived stigma scale [47] consisted of 12 items designed to assess participants' frequency of experiencing various aspects of HIV-related stigma within the previous 6 months measured on a four-point response format ranging from "never" (1) to "always" (4). Responses to all items were summed to obtain a total score, with higher scores indicating higher levels of perceived stigma (range 12–48). The internal consistency reliability for the study sample was 0.88.

Internalized stigma was measured using 10-items that described negative self perceptions associated with HIV infection rated on a 5-point response format ranging from "strongly disagree" (1) to "strongly agree" (5). A total score was obtained by summing responses to all items, with higher scores indicating higher levels of internal stigma (range 10–50). The internal consistency reliability of the measure for the study sample was 0.91.

Depression

Depression was measured using the 20-item Centers for Epidemiological Studies Depression (CES-D) scale which assessed depressive symptoms experienced in the past week [48]. The items represented a range of depressive symptoms which were rated on a four-point response format of the frequency experienced ranging from "rarely or none of the time" (0) to "most or all of the time" (3). Four items represented positive symptoms that were reverse coded so that items could be summed for a total score (range 0–60). Higher scores indicated higher levels of depressive symptoms. The internal consistency reliability for the study sample was 0.78.

Coping

Coping was measured using a 54-item scale designed to assess coping within the context of HIV disease [49]. The items represented both problem-focused (seeking information, seeking social support, managing the illness, positive thinking, and spiritual activities) and emotion-focused (avoidance, focusing on others, and focusing on the present) coping strategies. The items were rated on a four-point response format of the frequency of using a strategy ranging from "never" (0) to "always" (3). Total scores are obtained for both problem-focused and emotion-focused subscales by summing across items. Scores range from 0–108 on the 36-item problem-focused coping subscale, and from 0–54 on the 18-item emotion-focused coping subscale. Internal consistency reliabilities of the problem-focused and emotion-focused subscales for the study sample were 0.90 and 0.72, respectively.

Social Support

Social support was measured using the 19-item Medical Outcomes Study Social Support Survey (MOS-SSS), designed to measure participants' perception of the availability of functional support along 4 dimensions: emotional, affectionate, tangible, and positive social interaction [50]. Items were rated on a five-point response format of availability ranging from "none of the time" (1) to "all of the time" (5). A total score was obtained by summing responses to all items (range 19–95), with higher scores reflecting greater available support. The internal consistency reliability for the study sample was 0.95.

Perceived Situational Control

Perceived situational control was measured using a four-item measure developed for use in the context of HIV disease [45]. Two items measured perceptions of current control and two measured expectancy of control in the future. Items were measured on a six-point response format of the degree of perceived control ranging from "no control" (1) to "complete control" (6). Items were summed for a total score (range 4–14). Internal consistency reliability for the study sample was 0.82.

Healthy Lifestyles

Healthy lifestyles were assessed with the 48-item Health Promoting Lifestyle Profile (HPLP) which measured the frequency of performance of health promotion behaviors [51]. Each item described a specific health-promoting behavior that was rated on a four-point response format of performance ranging from "never" (1) to "routinely" (4). Items were summed for a total score (range 38–192) with higher scores indicating more frequent behavior. The internal consistency reliability for the study sample was 0.94.

Quality of Life

The study outcome, quality of life, was measured by the Chronic Illness Quality of Life Ladder (CIQOLL) that measured quality of life along seven dimensions (physical, emotional, financial, family and friends, spiritual well-being, peace of mind, and overall life satisfaction) and across four time periods (present, past, future, life without a diagnosis of HIV) [52]. Only the present (current) quality of life subscale was used in the present analysis. The seven items were rated on a 10-point scale ranging from "worst possible life" (0) to "best possible life" (10). Items were summed for a total subscale score (range 0–70) with higher scores indicating higher present quality of life. Internal consistency reliability for the subscale was 0.86.

Analysis

All analyses were performed using Statistical Analysis Software (SAS) version 9.2 [53], and significance was set at a 95% confidence level ($\alpha = 0.05$). Descriptive statistics were conducted to describe sample characteristics using frequency distribution for categorical variables and means, standard deviations, and ranges for continuous variables. T-tests were performed to identify significant differences in QOL based on dichotomous categorical socio-demographic variables. Pearson's correlations were performed to identify significant associations between the QOL and continuous independent variables of interest. The variables found to be significantly associated with QOL were then entered into regression analysis to examine which variables were significant predictors of QOL.

Results

Sample Characteristics

The socio-demographic characteristics of the participants are indicated in Table 1. The study sample was predominantly African American women (85.2%) with an average age of 41.5 years (SD = 9.6). A majority of the participants were single (77.2%), living with children, family members, or friends (79.9%), unemployed (79.7%), and receiving some kind of public assistance (69.1%). Further, a majority had high-school or less education (67.3%) and an annual household income of less than $10,000 (71.5%). More than two thirds of the participants were diagnosed during post-HAART era (1996 and later).

Descriptive statistics for each of the study variables are presented in Table 2. For the outcome variable, quality of life, participants reported an average score of 45.5 (SD = 13.5) with scores ranging from 7 to 70 (out of a possible range of 0–70). During the analyses assessing the association of socio-demographic variables to the QOL, age was found to be positively correlated with QOL ($r = .15$, $p = .00$) such that as age increased, QOL also increased. Significant differences in QOL were found by race ($t = 4.04$, $p < .0001$, DF 1) and time since HIV diagnosis ($t = -2.23$, $p = .03$, DF 1). African American participants reported better QOL (mean = 46.6) compared to white or other participants (mean = 39.1) and those who were diagnosed in the post-HAART era reported lower QOL (mean = 44.4) compared to those diagnosed in the pre-HAART era (mean = 47.7).

Table 1 Socio-demographic characteristics of study participants ($N = 399$)

Characteristic	Frequency (*n*)	Percentage (%)
Age in years (mean=41.5, SD=9.6, range=19–71)		
18–30	51	12.9
31–45	218	54.9
>45	128	32.2
Race		
African American	340	85.2
White	59	14.8
Year of HIV diagnosis[a]		
1996 or later (Post-HAART)	269	68.4
1995 or earlier (Pre-HAART)	124	31.6
Marital status		
Single[b]	308	77.2
Married[c]	91	22.8
Living situation[a]		
Living alone	80	20.1
Living with others	318	79.9
Educational attainment[a]		
High-school or less	268	67.3
College or more	130	32.7
Employment		
No	318	79.7
Yes	81	20.3
Annual household income[a]		
<$10,000	284	71.5
≥$10,000	113	28.5
Receiving public assistance[a]		
No	123	30.9
Yes	275	69.1

[a] *n* varies due to missing responses

[b] This category included never married, separated, divorced, or widowed

[c] This category included married or living with a partner

Correlations Among Study Variables

Pearson's correlations indicated statistically significant associations between QOL and all predictor variables of interest except emotion-focused coping (Table 3). HIV symptoms (number of symptoms reported and degree to which one is bothered by symptoms), perceived stigma, internalized stigma, and depression were significantly and negatively associated with QOL whereas social support,

Table 2 Characteristics of predictor and outcome variables of interest ($N = 399$)

Variable	Mean	SD	Minimum	Maximum
HIV-related symptoms				
Frequency	35.4	22.7	0	97
Botheration	35.6	24.1	0	120
Perceived stigma	24.4	8.2	11	48
Internalized stigma	32.3	9.8	10	50
Depression	27.8	9.3	3	50
Social support	66.6	19.1	19	97
Problem-focused coping[a]	71.7	17.3	19	105
Emotion-focused coping[b]	32.2	7.5	11	51
Perceived situational control	17.2	5.2	4	24
Health promoting lifestyles	117.9	22.9	66	186
Quality of life (current)	45.5	13.5	7	70

[a] Problem-focused coping included seeking information, seeking social support, using spiritual activities, managing illness, and positive thinking

[b] Emotion-focused coping included avoidance, focusing on others, and focusing on present

problem-focused coping, perceived situational control, and healthy lifestyles were significantly and positively associated with QOL.

Regression Analysis

Multiple stepwise regression analysis was conducted to identify which independent variables were significant predictors of QOL. All variables significantly associated with QOL were entered into the model, which included age, race, time since HIV diagnosis, HIV symptom frequency and degree of botheration, perceived and internalized stigma, depression, social support, problem-focused coping, perceived situational control, and healthy lifestyles. The full model was statistically significant ($F_{12, 369} = 37.99$ and $p < .0001$) and explained 55% of the variability in QOL.

We performed several selection methods (such as stepwise backward and forward) to find the best reduced models. The final reduced model included race, HIV symptom frequency, depression, problem-focused coping, perceived situational control, perceived stigma, and healthy lifestyle behaviors. The model was statistically significant ($F_{7, 390} = 66.7$ and $p < .0001$) and explained 54% of the variance in QOL among the study participants (Table 4).

Discussion

This study explored the physical, psychological, and social factors associated with current QOL among rural women with HIV disease living in the Southeastern U.S. Results from bi-variate analyses indicated that African American women with HIV disease reported higher scores on QOL compared to their white counterparts. This finding was counter to previous research reporting that black race predicted poor QOL among PLWHA [8]. A possible explanation for this finding can be found in the definition of QOL. As previously noted, QOL is defined as a gap between hopes and expectations of a person and the person's present experiences at a given moment in time and can be understood only from an individual perspective [19]. It is possible that, in general, African American women may have lower expectations compared to their white counterparts to begin with and therefore; there may be less difference between their expectations and life situations after the HIV diagnosis. Another unexpected finding was that participants diagnosed with HIV in the post-HAART era (1996 or later) reported lower scores on QOL compared to those diagnosed before 1996. This

Table 3 Pearson's correlations among variables of interest

	1	2	3	4	5	6	7	8	9	10	11
1. HIV-symptom frequency	1.00										
2. HIV-symptom botheration	.95*	1.00									
3. Perceived HIV-stigma	.24*	.26*	1.00								
4. Internalized HIV-stigma	.24*	.19*	.57*	1.00							
5. Depression	.34*	.35*	.29*	.28*	1.00						
6. Perceived social support	−.06	−.12*	−.20*	−.22*	−.24*	1.00					
7. Problem-focused coping	−.02	−.05	−.17 *	−.29*	−.12*	.50*	1.00				
8. Emotion-focused coping	.01	.03	.28*	.36*	.21*	.00	.10*	1.00			
9. Perceived control	−.16*	−.19*	−.27*	−.35*	−.13*	.26*	.46*	.08	1.00		
10. Healthy lifestyles	−.08	−.10*	−.18*	−.33*	−.15*	.42*	.69*	.03	.44*	1.00	
11. Quality of life	−.29*	−.31*	−.38*	−.38*	−.34*	.37*	.56*	.00	.52*	.53*	1.00

* Statistically significant correlations: $p < .05$

Table 4 Final multiple regression model of current quality of life among study participants ($N = 399$)

Variable	Variable statistics			Model statistics			
	Beta	Standard error	p	F	p	R^2	Adjusted R^2
HIV symptom frequency	−.07	.02	.001	66.7	<.0001	.54	.54
Depression	−.23	.05	<.0001				
Problem-focused coping	.24	.04	<.0001				
Perceived situational control	.55	.10	<.0001				
Perceived HIV-stigma	−.26	.06	<.0001				
Healthy lifestyles	.09	.03	.001				
Race	−4.4	1.3	.001				

finding is counterintuitive as one would expect that availability of effective treatments that significantly improve physical health status should also improve overall QOL. There are several possible explanations for this finding. First, women who were diagnosed with HIV in the pre-HAART era lived with the real threat of dying from the disease and the availability of effective treatment could greatly increase their QOL. Second, those diagnosed in the pre-HAART era who received treatment were likely to have experienced more severe side effects and pill burden than that which is common with HAART; thus they may be more likely to view HAART in a positive light than those who did not experience treatment in the pre-HAART era. Another possible explanation for this finding is that age may have acted as a confounding factor. Older women may have reported higher QOL scores, as they may not have experienced the same stressors as younger women who, in all likelihood, had younger children and were balancing family responsibilities and work with the stressors of living with HIV disease.

As expected, HIV-symptoms (frequency and extent to which they were bothersome), perceived stigma, internalized stigma, and depression were found to be significantly and negatively associated with QOL. These findings were consistent with previous reports that HIV symptoms, stigma, and depression are associated with poor QOL among PLWHA [9, 20, 22, 29]. On the other hand, social support, problem-focused coping, perceived situational control, and healthy lifestyles were found to have significant positive association with QOL which is also consistent with the existing literature [34, 37, 42]. Although, theoretically, we expected that that emotion-focused coping would be negatively associated with QOL, this was not supported by the findings for our participants. There are several possibilities for this finding. First, it is possible that with the availability of effective treatment and longer life expectancy, there is less need to use emotion-focused coping strategies such as avoidance or denial. Emotion-focused coping strategies are more appropriate when one has little control of a situation. The participants scored high on perceived situational control, perhaps due to availability of effective treatment, indicating that they felt more in control of their lives and better able to employ problem-focused coping.

In the final regression analysis, race, HIV symptom frequency, depression, problem-focused coping, perceived situational control, perceived HIV-related stigma, and healthy-lifestyle behaviors were significant predictors of quality of life, accounting for a substantial portion of the variance in QOL. Race was found to be a significant predictor of QOL among the study sample. However, since African American women constituted a majority of the sample, this finding needs to be confirmed in a racially heterogeneous sample. Consistent with past research, greater perceived control over HIV disease and use of problem-focused coping mechanisms were found to be significant and positive predictors of QOL among the study participants. As expected, HIV-related symptoms, depression, and perceived stigma indicated a significantly negative influence on QOL.

Unexpected was the finding that age, time since HIV diagnosis, extent to which HIV symptoms were bothersome, internalized stigma, and social support were not significant predictors of QOL. This can be explained by possible collinearity effect or possible mediation-moderation effect among the independent variables. For example, HIV symptom frequency and extent bothered by HIV symptoms were both strongly associated ($r = .95$) as well as perceived stigma and internalized stigma ($r = .60$) which suggests collinearity effect, such that only HIV symptom frequency and perceived stigma remained significant predictors of the QOL in adjusted analysis. For social support, there is a possibility that some of the significant predictors may have mediated or moderated its effect on QOL. Future analysis using structural equation modeling or mediation-moderation analysis may explain such effects.

The study has several limitations. First, the cross-sectional nature of the study limits the ability to establish causality among the variables. There is also the possibility of the desirability response operating since all measures depended on self-report. Additionally, since the study sample included only rural women from the Southeastern U.S., and were predominantly African American, the findings cannot be generalized to other PLWHA.

Implications and Conclusion

The findings have implications for the development of interventions supportive of QOL in PLWHA, with intervention strategies aimed at factors associated with positive QOL. For example, health care providers and case managers should screen patients with HIV disease for HIV-related symptoms and depressive symptoms and offer necessary referrals and/or treatment. Cognitive-behavioral interventions including support groups and peer counseling approaches may help women reframe their cognitive appraisals and encourage them to use problem-focused coping strategies and healthy lifestyle behaviors, which may improve their perceptions regarding perceived situational control over HIV disease. Continued efforts are needed to reduce stigmatizing attitudes and behaviors towards PLWHA in the general population and improve support networks for PLWHA, particularly in rural areas where HIV-related stigma is an often-cited barrier to seeking necessary health care and support. Additionally, cognitive strategies such as reframing individual perceptions of the disease and the responses from others may be particularly effective in reducing the impact of perceived stigma on quality of life.

Much remains to be understood about the factors that impact the quality of life for women with HIV disease. Descriptive, exploratory studies are still needed to generate information that improves understanding of QOL in the context of the lives of women with HIV disease.

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References

1. Este JA, Cihlar T. Current status and challenges of antiretroviral research and therapy. Antivir Res. 2010;85(1):25–33.
2. Hall HI, Song R, Rhodes P, et al. Estimation of HIV incidence in the United States. JAMA. 2008;300(5):520–9.
3. Centers for Disease Control and Prevention. HIV prevalence estimates—United States, 2006. Morbidity and mortality weekly report (MMWR). 2008; Report no.: 57(39). http://cdc.gov/mmwr/preview/mmwrhtml/mm5739a2.htm. Accessed 15 Feb 2009.
4. Hays RD, Cunningham WE, Sherbourne CD, et al. Health-related quality of life in patients with human immunodeficiency virus infection in the United States: results from the HIV Cost and Services Utilization Study. Am J Med. 2000;108(9):714–22.
5. Brown JL, Vanable PA. Cognitive-behavioral stress management interventions for persons living with HIV: a review and critique of the literature. Ann Behav Med. 2008;35(1):26–40.
6. Scott-Sheldon LA, Kalichman SC, Carey MP, Fielder RL. Stress management interventions for HIV+ adults: a meta-analysis of randomized controlled trials, 1989 to 2006. Health Psychol. 2008;27(2):129–39.
7. McDonnell KA, Gielen AC, Wu AW, O'Campo P, Faden R. Measuring health related quality of life among women living with HIV. Qual Life Res. 2000;9(8):931–40.
8. Campsmith ML, Nakashima AK, Davidson AJ. Self-reported health-related quality of life in persons with HIV infection: results from a multi-site interview project. Health Qual Life Outcomes. 2003;1:12.
9. Kemppainen JK. Predictors of quality of life in AIDS patients. J Assoc Nurses AIDS Care. 2001;12(1):61–70.
10. Whetten K, Reif S. Overview: HIV/AIDS in the deep south region of the United States. AIDS Care. 2006;18(Suppl 1):S1–5.
11. Centers for Disease Control and Prevention. HIV/AIDS surveillance report, 2007. 2009. http://www.cdc.gov/hiv/topics/surveillance/resources/reports/. Accessed 23 Feb 2009.
12. Centers for Disease Control and Prevention. Cases of HIV infection and AIDS in urban and rural areas of the United States, 2006. HIV/AIDS surveillance supplemental report 2008, no. 13(2). http://www.cdc.gov/hiv/topics/surveillance/resources/reports/#supplemental. Accessed 10 Feb 2009.
13. The Henry J. Kaiser Family Foundation. The HIV/AIDS epidemic in the United States. 2009. http://kff.org/hivaids/us.cfm. Accessed 4 Feb 2010.
14. Qian HZ, Taylor RD, Fawal HJ, Vermund SH. Increasing AIDS case reports in the South: U.S. trends from 1981–2004. AIDS Care. 2006;18(Suppl 1):S6–9.
15. The Henry J. Kaiser Family Foundation. Women and HIV/AIDS in the United States: fact sheet. 2009. http://kff.org/hivaids/us.cfm. Accessed 4 Feb 2010.
16. Farquhar M. Definitions of quality of life: a taxonomy. J Adv Nurs. 1995;22(3):502–8.
17. Carr AJ, Gibson B, Robinson PG. Measuring quality of life: is quality of life determined by expectations or experience? BMJ (Clin Res Ed). 2001;322(7296):1240–3.
18. Holmes S. Assessing the quality of life—reality or impossible dream? A discussion paper. Int J Nurs Stud. 2005;42(4):493–501.
19. Calman KC. Quality of life in cancer patients—an hypothesis. J Med Ethics. 1984;10(3):124–7.
20. Aranda-Naranjo B. Quality of life in the HIV-positive patient: implications and consequences. J Assoc Nurses AIDS Care. 2004;15(5 Suppl):20S–7S.
21. Lorenz KA, Cunningham WE, Spritzer KL, Hays RD. Changes in symptoms and health-related quality of life in a nationally representative sample of adults in treatment for HIV. Qual Life Res. 2006;15(6):951–8.
22. Bader A, Kremer H, Erlich-Trungenberger I, Rojas R, Lohmann M, Deobald O, et al. An adherence typology: coping, quality of life, and physical symptoms of people living with HIV/AIDS and their adherence to antiretroviral treatment. Med Sci Monit. 2006;12(12):CR493–500.
23. Eller LS. Quality of life in persons living with HIV. Clin Nurs Res. 2001;10(4):401–23.
24. Marcellin F, Preau M, Ravaux I, Dellamonica P, Spire B, Carrieri MP. Self-reported fatigue and depressive symptoms as main indicators of the quality of life (QOL) of patients living with HIV and Hepatitis C: implications for clinical management and future research. HIV Clin Trials. 2007;8(5):320–7.

25. Tate D, Paul RH, Flanigan TP, et al. The impact of apathy and depression on quality of life in patients infected with HIV. AIDS Patient Care STDs. 2003;17(3):115–20.
26. Tostes MA, Chalub M, Botega NJ. The quality of life of HIV-infected women is associated with psychiatric morbidity. AIDS Care. 2004;16(2):177–86.
27. Kang E, Rapkin BD, Remien RH, Mellins CA, Oh A. Multiple dimensions of HIV stigma and psychological distress among Asians and Pacific Islanders living with HIV illness. AIDS Behav. 2005;9(2):145–54.
28. Kinsler JJ, Wong MD, Sayles JN, Davis C, Cunningham WE. The effect of perceived stigma from a health care provider on access to care among a low-income HIV-positive population. AIDS Patient Care STDs. 2007;21(8):584–92.
29. Holzemer WL, Human S, Arudo J, et al. Exploring HIV stigma and quality of life for persons living with HIV infection. J Assoc Nurses AIDS Care. 2009;20(3):161–8.
30. Buseh AG, Kelber ST, Stevens PE, Park CG. Relationship of symptoms, perceived health, and stigma with quality of life among urban HIV-infected African American men. Public Health Nurs. 2008;25(5):409–19.
31. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. Psychol Bull. 1985;98(2):310–57.
32. Heckman TG, Somlai AM, Sikkema KJ, Kelly JA, Franzoi SL. Psychosocial predictors of life satisfaction among persons living with HIV infection and AIDS. J Assoc Nurses AIDS Care. 1997;8(5):21–30.
33. Nunes JA, Raymond SJ, Nicholas PK, Leuner JD, Webster A. Social support, quality of life, immune function, and health in persons living with HIV. J Holist Nurs. 1995;13(2):174–98.
34. Gielen AC, McDonnell KA, Wu AW, O'Campo P, Faden R. Quality of life among women living with HIV: the importance violence, social support, and self care behaviors. Soc Sci Med. 2001;52(2):315–22.
35. Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer; 1984.
36. Lazarus RS. Coping theory and research: past, present, and future. Psychosom Med. 1993;55(3):234–47.
37. Moskowitz JT, Hult JR, Bussolari C, Acree M. What works in coping with HIV? A meta-analysis with implications for coping with serious illness. Psychol Bull. 2009;135(1):121–41.
38. Vosvick M, Koopman C, Gore-Felton C, Thoresen C, Krumboltz J, Spiegel D. Relationship of functional quality of life to strategies for coping with the stress of living with HIV/AIDS. Psychosomatics. 2003;44(1):51–8.
39. Ubbiali A, Donati D, Chiorri C, et al. The usefulness of the Multidimensional Health Locus of Control Form C (MHLC-C) for HIV+ subjects: an Italian study. AIDS Care. 2008;20(4): 495–502.
40. Preau M, Vincent E, Spire B, et al. Health-related quality of life and health locus of control beliefs among HIV-infected treated patients. J Psychosom Res. 2005;59(6):407–13.
41. Simoni JM, Ng MT. Abuse, health locus of control, and perceived health among HIV-positive women. Health Psychol. 2002;21(1): 89–93.
42. Uphold CR, Holmes W, Reid K, Findley K, Parada JP. Healthy lifestyles and health-related quality of life among men living with HIV infection. J Assoc Nurses AIDS Care. 2007;18(6):54–66.
43. Ball J, Tannenbaum L, Armistead L, Maguen S. Coping and HIV infection in African-American women. Women Health. 2002; 35(1):17–36.
44. Heckman TG, Carlson B. A randomized clinical trial of two telephone-delivered, mental health interventions for HIV-infected persons in rural areas of the United States. AIDS Behav. 2007; 11(1):5–14.
45. Moneyham L. A telephone intervention for rural women with HIV. National Institute of Nursing Research, National Institutes of Health, grant # RO1 NR 04956. 2003.
46. Murdaugh C, Walther S. Development of a scale to measure symptom frequency and distress in persons with HIV/AIDS. 1995. Unpublished Manuscript.
47. Sowell RL, Lowenstein A, Moneyham L, Demi A, Mizuno Y, Seals BF. Resources, stigma, and patterns of disclosure in rural women with HIV infection. Public Health Nurs. 1997;14(5): 302–12.
48. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Meas. 1977;1:385–401.
49. Moneyham L, Demi A, Mizuno Y, Sowell RL, Seals B, Guillory J. Development and testing of a contextually and culturally relevant measure of coping for use with women infected with HIV. OMEGA: J Death Dying. 1997–98; 35(4):359–74.
50. Sherbourne CD, Stewart AL. The MOS social support survey. Soc Sci Med. 1991;32(6):705–14.
51. Walker SN, Sechrist KR, Pender NJ. The Health-Promoting Lifestyle Profile: development and psychometric characteristics. Nurs Res. 1987;36(2):76–81.
52. Murdaugh C, Moneyham L, Jackson K, Phillips K, Tavakoli A. Predictors of quality of life in HIV-infected rural women: psychometric test of the chronic illness quality of life ladder. Qual Life Res. 2006;15(5):777–89.
53. SAS. Statistical Analysis Software 9.2 ed. Cary, NC: SAS Institute Inc. 1984.