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The Impact of Stressful Life events, Symptom Status, and Adherence Concerns on Quality of Life in People Living with HIV

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Abstract

Studies concerning persons living with HIV (PLWH) report that stressful life events (SLE) contribute to an exacerbation of symptoms and reduced antiretroviral (ARV) adherence and quality of life (QOL). Little is known about whether these findings are site-specific. Our study's aims were to characterize the type and frequency of SLE for PLWH in Puerto Rico, South Africa, and the United States and to assess the impact of SLE by national site, symptoms, and ARV adherence concerns on QOL. The sample consisted of 704 participants. The total number of SLE correlated significantly with the total number of symptoms, adherence concerns, and QOL (p . 001). Overall, 27.2% of the variance in QOL was explained by the aforementioned variables. Although SLE were of concern to PLWH, worries about ARV adherence were of even greater concern. Routine assessment of ARV concerns and SLE can promote ongoing ARV adherence and improved QOL.

Keywords

adherence; HIV; quality of life; stressful life events; symptoms

Living with HIV infection encompasses a number of infection-related challenges. Such challenges include acute infection, decline of immune function, lifelong adherence to antiretroviral therapy (ART), the potential for developing opportunistic infections, and death. We will not describe these challenges further as they have been extensively covered elsewhere (Hester, 2012; Kumari & Singh, 2012; Sax, Cohen, & Kuritzkes, 2011). Increasing interest, however, has focused on life challenges that are not associated with HIV disease itself but can have a powerful impact on the course of the disease. The list of circumstantial challenges is extensive and includes loss of employment; financial worries; arrest and imprisonment; being the victim of physical or sexual violence; stigma due to race, disability, or sexual orientation; or the loss of a significant loved one by death or divorce, to name a few (Pence et al., 2012; Whetten, Reif, Whetten, & Murphy-McMillan, 2008). All of these issues have been found to be stressful life events (SLE) that can contribute to a variety of negative health consequences. Reda and Biadgilign (2012) have identified categories of factors in persons living with HIV (PLWH) that affect antiretroviral (ARV) adherence including patient and family/caregiver-related issues, medication-related factors, health care delivery system-related factors, and social-environmental factors. Other challenges for PLWH include the development or exacerbation of physical and psychological symptoms and/or a reduction in the ability to maintain ARV adherence and quality of life (QOL; Holzemer & Uys, 2004; Sayles, Wong, Kinsler, Martins, & Cunningham, 2009).

The definition of psychological stress by Cohen, Janicki-Deverts, and Miller (2007) highlighted the relationship between the stressor and the individual's adaptive capacity. They stated, "Psychological stress occurs when an individual perceives the environmental demands tax or exceed his or her adaptive capacity" (p.1685). Such demands may be

associated with positive or negative events including marriage and engagement as well as major motor vehicle accidents, illness, and death. Tosevski and Milovancevic (2006) highlighted the negative impact of SLE on physical health in a review article. Such events were found to be related to immune dysregulation and predicted progression to AIDS (Glaser, 2005). In addition, Leserman and colleagues (2007) found that stressful events resulted in a higher rate of HIV-related deaths. Both the type and number of stressful life events have an impact on psychological and physical functioning (Leserman et al., 2002). Elliott-DeSorbo, Martin, and Wolters (2009) found that financially-related SLE had a significant impact on reducing CD4+ T cell count (p .05) and the likelihood of more frequent hospitalization in children and adolescents who were infected with HIV (p .01). Finances, a social and environmental factor, were also noted by Leserman (2008) in a discussion of SLE and HIV disease progression. Higher SLE scores predicted faster progression to AIDS and, in a more recent study, contributed to risky sexual behaviors (Pence et al., 2010). We know little about whether recent SLE (occurring in the past month) have a similar impact on physical and psychological symptoms (number and types of symptoms across different countries) and how SLEs affect concerns about ART adherence and QOL.

Therefore, the aims of our study were as follows:

- Aim 1: To characterize the type and calculate the frequency of SLEs experienced by men and women living with HIV in a convenience sample from the United States, Puerto Rico, and South Africa.

- Aim 2: To compare the impact of SLEs by national site, symptoms (number and type of symptoms), and ART adherence concerns on QOL.

Conceptual Framework

The University of California-San Francisco (UCSF) Symptom Management Model was selected as the conceptual framework to guide this research. The model was appropriate given its focus on symptom experiences and disease outcomes within the context of the person, environment, health, and illness (Dodd et al., 2001). SLE are part of the intersection of the person and the environment with consequences for individual QOL and the lives of loved ones, as well as for the health and illness trajectory. The concepts of person (socio-demographic variables), environment (SLE), symptom experience (symptoms), adherence (intersection between symptom status and management), and outcomes/symptom status (QOL) were the key constructs of the model examined in this study. Voss, Portillo, Holzemer, and Dodd (2007) have provided greater detail about the model.

Methods

Sample

This secondary analysis used baseline data from a randomized controlled trial that tested the efficacy of a symptom management manual as a resource to help PLWH manage HIV symptoms (Wantland et al., 2008). Data were collected as a convenience sample from HIV-infected adults ($N = 704$) at 13 clinical and community settings in the United States (Boston, Chicago, Philadelphia, Salt Lake City, San Diego, 2 sites in San Francisco, and 3 sites in Texas), 2 sites in Puerto Rico (Gurabo, San Juan), and 1 site in South Africa (Pretoria). Sites were community clinics, non-governmental organizations, and specialty clinics within larger medical centers. Data were collected between December 2005 and January 2007, and 704 men and women living with HIV were enrolled at baseline for this randomized controlled trial comparing the efficacy of a symptom management manual and a nutrition manual for improving self-care symptom management (Wantland et al., 2008). Baseline data were

included in our analysis to avoid effects of the intervention. Inclusion criteria were: 18 years of age and older, self-reported HIV diagnosis, experienced symptoms in the past week, willing and able to sign a consent form, and able to complete the study questionnaires. Exclusion criteria included having signs of dementia and the inability to understand the consent process.

Protection of Human Subjects

University of California San Francisco (UCSF) served as the coordinating site for our study and provided approval for the overall study as well as for the sites in San Francisco. Each site director obtained individual site approval for the recruitment of subjects from their protection of human subjects committees. Human subjects committee approval included de-identified data sharing with the central data repository at UCSF. Certificates of Confidentiality were required by the human subjects committees governing certain sites to assure the safety of the research participants and these were obtained. Informed consent was obtained from each research participant prior to enrollment in the study.

Each participant was recruited through flyers, word-of mouth, or by staff in the different organizations. Each interested participant met with the principal investigators or their study staff to explain the study. Decisions regarding participation in this study did not affect the care received with the exception that participants identified with excessive stress, adherence problems, or other reasons for clinical concern were referred to their health care providers.

After providing informed consent, participants completed questionnaires with limited or no assistance. Participants received a small gift such as a $15 (U.S.) grocery or pharmacy gift card to acknowledge the time devoted to participation in the study. Code numbers were used on questionnaires to safeguard the identity of the research participants. The separate list of names of the participants was destroyed after the third time data were collected for the randomized controlled trial and linking was accomplished through code numbers. As noted previously, only baseline data were used for the current study.

Instruments

A demographic questionnaire, Stressful Life Events Scale, Revised Sign and Symptom Check-list (rev.), and HIV/AIDS Targeted (HAT) Quality of Life Questionnaire were applied to investigate the relationships of SLE in the past month and symptom status (number and types of symptoms), ARV adherence concerns, and QOL.

All instruments were translated and back translated in Spanish for Puerto Rico and made available in English to the participants of the South African site (Wantland et al., 2008). Psychometric equivalencies of the instrument results in the United States, Puerto Rico, and South Africa indicated they achieved acceptable Cronbach's alphas of 0.70 or greater.

Demographic Questionnaire

A 13-item questionnaire was used to capture sociodemographic data. Information on age, ethnicity, gender, educational level, income adequacy, access to health insurance, number of children, living with children, and work for pay was obtained with this instrument. In addition, health status information was sought including current AIDS diagnosis, last CD4+ T cell count, ever been on ART, and currently taking ARVs.

Stressful Life Events

The List of Threatening Experiences (LTE-Q) Scale consists of 12 SLE that may have been experienced by the participant including a serious illness, injury, or assault; death of a

parent, spouse, or close relative; unemployment; problems with a close friend; problems with the police; or loss of a valued item (Brugha, Bebbington, Tennant, & Hurry, 1985; Brugha & Cragg, 1990). The original questionnaire queried whether or not these events occurred (*Yes, No*) in the past 6 months or in the past 3 months. The sensitivity of the 3-month questionnaire was 1.0 and specificity was 0.88. Cohen's kappa for items ranged from 0.78 to 1.0 with the exception of the item, *something you lost or was stolen* (Cohen's kappa = 0.24). Brugha and Cragg (1990) considered this item unreliable but retained it in the questionnaire. Holzemer (2005) revised the questionnaire to reflect HIV-related concerns by adding eight additional items related to stigma and abuse of alcohol and drugs and used a past-month time frame for SLE. The new scale had a Cronbach's alpha of 0.88, which indicated excellent internal consistency.

Sign and Symptom Check-list for Persons with HIV Disease-Revised (SSC-Rev)

The SSC-Rev measures the frequency and intensity (*mild, moderate, severe*) of symptoms on that day (Holzemer, Hudson, Kirksey, Hamilton, & Bakken, 2001). The SSC-Rev consists of three parts. Part I contains 45 HIV-related physical and psychological signs and symptoms that cluster into 11 factor scores in addition to a total score. Part II consists of 19 physical signs and symptoms that do not cluster into factor scores. And Part III contains eight gynecological symptoms that cluster into one factor score. The alpha reliability for Parts I and II is 0.98. Part III items were not investigated in the current analysis.

HIV/AIDS Targeted Quality of Life Questionnaire

The HIV/AIDS Targeted (HAT) Quality of Life Questionnaire consists of 34 items that measure nine dimensions including overall function, life satisfaction, health worries, financial worries, medication worries, HIV mastery, disclosure worries, provider trust, and sexual function (Holmes & Shea, 1998; Holmes & Shea, 1999; Holzemer, Henry, Portillo, & Miramontes, 2000). Question responses range from 4 (*all of the time*) to 0 (*none of the time*). These dimensions were scored and the final dimension score was transformed to a linear 0–100 scale where lower scores were more negative and higher scores more positive. The scale has demonstrated good reliability and validity in a multi-site study of 1,217 PLWH wherein reliability coefficients ranged from 0.83–0.88 for the nine dimensions (Holzemer et al., 2000).

The Medication Worries sub-scale from the HAT Quality of Life instrument was used to investigate ARV adherence concerns. The Medication Worries subscale is a 5-item scale that addresses concerns about medications such as being worried about the effect of medications on the body, the burden of taking medications, the unpleasant side-effects, being unsure why medications were being taken, and the difficulty of living a normal life while on medications. Cronbach's alpha for the Medication Worries subscale was 0.87.

Data Analysis

All existing baseline data were cleaned and evaluated for outliers using SPSS Statistical package version 15.0. The first aim was assessed with descriptive statistics including means, standard deviations, and correlation analyses for each site. For the second aim, the total score of the HAT minus the five items concerning medication worries was computed as the dependent variable, QOL. A simultaneous multiple regression analysis was conducted regressing the HAT total score on four independent variables: (a) total number of stressful life events, (b) total number (64) of physical and psychological symptoms, (c) concerns about ARV adherence, and (d) site (United States was the reference category). Correlation matrices were computed to evaluate the correlation coefficients for each variable.

Results

Demographics

A majority of the 704 participants were male (61.6%) with a mean age for the total sample of 43.4 ($SD = 9.3$) years (range = 20–72). The sample self-identified as 33.0% African American ($n = 232$), 30.7% Latino ($n = 216$), 23.4% Caucasian ($n = 165$), 6.8% South African (n = 48), 3.6% multiracial ($n = 25$), 1.4% Asian ($n = 10$), and 1.1% Native American ($n = 8$). Most participants (77.1% $n = 543$) reported very low income levels. The majority (81.8%, $n = 576$) had taken ARV medications in the past, and 71.4% ($n = 503$) of all participants were currently receiving ARV medications.

For this analysis, we grouped 10 sites within the United States into one major site, two sites in Puerto Rico into one site, and retained the one site in South Africa as is. Differences were apparent among the sites. The sample from South Africa was significantly (p .001) younger ($M = 36.75$) than samples in the United States ($M = 43.86$) and Puerto Rico ($M = 44.01$). Significantly more females (85.4%) were in the South African sample. The sample in Puerto Rico was almost evenly divided by gender (male = 50.0%; female = 45.9%; transgender = 4.1%), while the participants in the United States were predominantly male (67.7%). Participants in South Africa were more likely to have had a grade school education (68%) versus participants in the United States (24.6%) and Puerto Rico (39.8%). Participants in South Africa were less likely to respond that they had adequate income and health insurance than their counterparts in the United States and Puerto Rico. Participants did not differ in the degree of paid work but did differ with regard to having children, with those in the United States least likely to have children (p .001) and the sample in South Africa significantly more likely (p .002) to have children living at home. U.S. and Puerto Rico participants were approximately twice as likely to ever have been on ARV medications than those in South Africa, with the latter less likely to be taking medications currently (See Table 1).

Stressful Life Events by Site

Aim 1—To characterize the type and calculate the frequency of stressful life events experienced by men and women living with HIV in a convenience sample from the United States, Puerto Rico, and South Africa. The data were examined both for the total sample and for the three site groupings. There were no significant differences in the total sample for SLE by gender, race, AIDS diagnosis, or whether individuals were taking ARV medications. There were significant differences in SLE by site, however. The mean for the total sample in the past month was 5.3 SLE with 5.6 SLE for the U.S. sample, 3.3 SLE for the Puerto Rican sample, and 3.5 SLE for the South African sample. The differences between the higher U.S. levels compared to Puerto Rico and South Africa were significant at the $p < .001$ level of significance. There were no significant differences between Puerto Rico and South Africa.

Financial problems were the most frequent SLE for PLWH in all three country sites. Unemployment was ranked second in frequency for the U.S. and Puerto Rican sites, while unemployment and being hospitalized shared second rank for the South African site. Third in frequency of occurrence was the death of a close friend/relative (U.S.) and abuse of alcohol or drugs (Puerto Rico). In a switch of rankings, abuse of alcohol or drugs ranked fourth in frequency for the United States and death of a close friend or relative was fourth in frequency for Puerto Rico. Death of a partner, spouse, parent, or child, and death of a close friend or relative shared fourth rank for frequency for South Africa, whereas no food due to lack of money was fifth in frequency for both the Puerto Rican and U.S. samples. What was distinctive about the frequency of these SLE was that being hospitalized and death of a partner or spouse were more frequent for the South African sample, while the abuse of

alcohol or drugs, and no food due to lack of money were more frequent occurrences in the United States and Puerto Rico. All of these life events were stressful but had differing frequencies in the different countries (See Table 2).

Aim 2—To compare the impact of SLEs by national site, symptom status (number and type of symptoms), and ART adherence concerns on QOL. As noted above, the 20 SLE are presented in Table 2 by site and frequency of occurrence. In Table 3 we present the 16 most frequently occurring symptoms of the 64 physical and psychological symptoms measured by the SSC-HIV-Rev instrument for each of the three country sites. The most frequent symptoms for U.S. participants included fatigue, depression, muscle aches, thirst, and difficulty concentrating. Puerto Rican respondents also identified muscle aches and depression but noted anxiety, weakness, and insomnia to be frequent occurrences. In addition to fatigue, South African respondents mentioned numbness of feet, headache, lack of appetite, and concern about weight loss as symptoms frequently affecting them. As is evident in Table 3, there were significant differences by site. SLE also affected physical and psychological symptoms. The b-weight indicated that for every 1-unit increase in SLE, there was a 3.04 increase in physical and psychological symptoms as measured by the SSC-HIV (rev).

The criterion variable of QOL was regressed on (a) SLE, (b) total symptoms, and (c) ARV adherence concerns. Multicollinearity was assessed by the eigenvalues of the scaled and uncentered cross-products matrix, condition indices, variance-decomposition proportions, variance inflation factors (VIF), and tolerances for individual variables. Multicollinearity was not a concern as indicated by the VIF, thus all predictors were retained in the model (See Table 4). As Table 4 indicates, both SLE and symptoms (total symptoms) had means with considerable variance.

Results of the omnibus test indicated statistically significant differences in the variables of interest by site. The Bonferroni post-hoc test reported that the United States had greater levels of SLE than Puerto Rico or South Africa. The difference in SLE between Puerto Rico and South Africa was not statistically significant. However, the Bonferroni post-hoc test reported that South Africa had greater ARV concerns than Puerto Rico or the United States. The difference between Puerto Rico and the United States was not statistically significant. Although there were significant differences by symptoms, there was no significant difference by site in QOL (See Table 5).

Overall, 27.2% of the variance in the QOL of these participants could be explained by a linear combination of SLE, the number of physical and psychological symptoms, and medication adherence concerns. The strongest unique independent predictors (sr^2) of QOL for this population were medication adherence concerns (10.9%) and total physical and psychological symptoms (3.4%); thus 14.3% of the variance was explained by symptoms and adherence concerns and the other 12.9% was shared variance. Finally SLE, symptoms, and adherence concerns were all inversely related to QOL (See Table 6).

Discussion

HIV-infected individuals living in the United States experienced more SLE than HIV-infected individuals living in either Puerto Rico or South Africa. Financial problems and unemployment were the most common problems in all three sites along with being hospitalized in the South African site. While the death of a friend or relative was a frequent occurrence in all three sites, death of a partner, spouse, parent, or child was higher in South Africa than for the other country sites.

Although ART is becoming more available in South Africa, infected persons may consult Sangomas or other alternative healers, delaying access to ARVs. Further, required participation in adherence education may delay access even further. The finding of the frequency of death among South African participants has implications for the resources required to sustain the family. For example, the death of an income-earning parent may leave children without fiscal resources or adult supervision.

For some SLE, the Puerto Rican sample was similar to the U. S. sample, such as *relative was seriously injured or assaulted* 21.4% (Puerto Rico), 22.6% (United States), and 12.6% (South Africa). For other SLE such as *problems with the police*, Puerto Rico was more like South Africa: 3.1% (Puerto Rico), 2.1% (South Africa) than the United States (15.9%). Whether these differences were cultural or due to sample selection was not clear from the data and will require further inquiry. *Lack of food* was relatively high in all three sites: United States (29.7%); South Africa (29.2%), and Puerto Rico (24.5%) suggesting that sample size was not a factor (U.S. - 558, Puerto Rico - 98, and South Africa - 48), but rather that our sample was relatively poor financially (See Table 1).

The fact that 82.8% ($n = 583$) of the participants reported experiencing one or more SLE in the past month documented the high prevalence of SLE in PLWH, a finding that corroborated the results from Mugavero and colleagues (2009). The major SLE were related to financial resources, unemployment, lack of food, death, and substance use. Pence and colleagues (2010) considered these events severe stressors and found that they were associated with an increase in sexual risk behaviors. The implication is that such stressors may result in an increase in HIV transmission absent assiduous ARV adherence.

The majority of our sample was poor and struggled with many stressors over the course of a month as noted above. The results of this study support the importance of the relationship between SLE and total symptoms, medication adherence concerns, and the need for health care providers to address this issue (Leserman, Ironson, O'Cleirigh, Fordani, & Balbin, 2008). The need to address problems related to SLE and symptoms cannot be over emphasized. The finding that adherence concerns had an even stronger relationship with QOL than SLE and total symptoms underscored the importance of addressing these concerns not only to sustain medication adherence and prevent ARV resistance but also to help maintain the person's QOL.

Limitations

The variation in sample size at the different sites was a limitation of our study. The samples from Puerto Rico and South Africa were relatively small compared with the United States sample, but they provided a unique insight into the SLE of men and women living with HIV in those sites. However, as this was a convenience sample, we do not assume representativeness and thus cannot extrapolate from the sample. In addition, a selection bias toward poorer patients could exist due to the recruitment sites that were used for the study. It was also possible that those who were unemployed had more time to participate in this study.

The instrument used to capture SLE in the past month may have underrepresented the number of life events that participants dealt with on a daily basis. A 6-month time frame was used with the original life threatening events scale allowing assessment over a longer time period and potentially capturing a greater array of events for each person. Although a 1-month time frame may under-estimate the experiences of these HIV-infected persons, the recall for 1 month may be better and it is impressive how many life events were experienced in that time frame. Another limitation was the small sample size for the site in South Africa.

Nonetheless, even with these sample sizes, the data were adequate to address the questions of interest in this analysis.

Implications for Health Care Providers

Our study has major implications for health care providers. SLE, especially financial issues and unemployment, have an impact on the wellbeing of HIV-infected patients on a daily basis. However, currently used patient assessments do not capture a review of current life events. Recurring conversations with patients regarding their SLE are critical; health care providers can only support patients through challenging times if they know the patients' problems. Knowledge of SLE may increase referrals to social and mental health services in the community, which could attend to these issues and prevent and address substance abuse issues, particularly in the United States and Puerto Rico. As we have seen, substance abuse was less of an issue in our South African sample. Finally, and most importantly, health care providers need to be aware of SLE and the potential impact on ARV adherence concerns and physical and psychological symptoms. Adherence concerns were most strongly correlated with QOL and thus are consequential not only for QOL, but also for adherence. Addressing adherence concerns and connecting HIV-infected persons with the appropriate psychological, as well as medical and nursing support is essential to adherence and the QOL of the patient.

Implications for Research

These findings have major implications for future studies. Longitudinal descriptive work is needed to understand the impact of SLE on ARV adherence concerns over time and to assess when such concerns emerge, the trajectory of such concerns and their relationship to disease markers such as viral load and CD4+ T cell count. Similar investigations are needed to explore the relationship of SLE and adherence concerns with physical and psychological symptoms. These studies would provide the foundation for intervention studies as to how to address ARV adherence concerns, prevent the onset of symptoms, and maintain QOL following a significant SLE. Research is also needed to assess the barriers to employment and on how to help PLWH find employment, remain employed, and better manage financial resources, a major SLE for HIV-infected persons.

Conclusions

Stressful life events have a major impact on many facets of an HIV-infected individual's life including concerns about adherence to ARV medications and QOL. SLEs need to be addressed on a regular basis so as to meet the complex needs of HIV-infected persons. By understanding the adherence concerns and life events that patients are distressed about, health care providers can work collaboratively with their patients to ensure that concerns are addressed, the treatment plan can be accomplished, and QOL enhanced.

Acknowledgments

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Clinical Considerations

- Stressful life events, especially financial issues and unemployment, have an impact on the wellbeing of HIV-infected patients and need to be assessed during patient visits.

- Nurses need to consider stressful events in the lives of HIV-infected patients and the potential impact of these events on antiretroviral adherence and physical and psychological symptoms.

- Addressing adherence concerns and stressful life events and connecting HIV-infected persons with appropriate psychosocial support, is essential to sustaining the antiretroviral adherence and quality of life of these patients.

Table 1

Demographics, Illness Indicators, and Past and Current Antiretroviral Medication Use for United States, Puerto Rico, and South African Sites

Variable	United States (n = 558)		Puerto Rico (n = 98)		South Africa (n = 48)		Cramer's V	df	F	p-value
Mean Age	43.86		44.01		36.75			2,703	13.77	<.001
Gender							.217			<.001
	N	%	N	%	N	%				
Female	167	29.9	45	45.9	41	85.4				
Male	378	67.7	49	50.0	7	14.6				
Transgender	13	2.3	4	4.1	0	0				
Education							.261			<.001
Grade School	137	24.6	39	39.8	33	68.8				
High School	236	42.3	29	29.6	9	18.8				
College Plus	185	33.2	30	30.6	6	12.5				
Income	N	%	N	%	N	%	.175			<.001
Inadequate	132	23.7	31	31.6	32	66.7				
Barely Enough	293	52.5	42	42.9	13	27.1				
Enough	133	23.8	25	25.5	3	6.3				
Insurance	N	%	N	%	N	%	.370			<.001
Yes	387	69.4	86	87.8	4	8.3				
No	171	30.6	12	12.2	44	91.7				
Children							2.42			<.001
Yes	240	43.0	59	60.2	42	87.5				
No	318	57.0	39	39.8	6	12.5				
Children at Home (X)	1.19		1.12		2.06			2,703	6.35	.002
Work for Pay	N	%	N	%	N	%	.026			.787
Do not work	421	75.4	77	78.6	37	77.1				
Work for Pay	137	24.6	21	21.4	11	22.9				
AIDS Diagnosis							.114			.001
No	277	49.6	68	69.4	30	62.5				
AIDS	260	46.6	25	25.5	18	37.5				
Don't Know	21	3.8	5	5.1	0	0				
Know CD4+ T Cell Value							.151			.001
Don't Know	207	37.1	19	19.4	24	50.0				

Variable	United States (*n* = 558)		Puerto Rico (*n* = 98)		South Africa (*n* = 48)		*Cramer's V*	*df*	*F*	*p*-value
Know	351	62.9	79	80.6	24	50.0				
Ever Taken HIV Medication							.212			< .001
No	76	13.6	18	18.4	24	50.0				
Yes	476	85.3	80	81.6	20	41.7				
Don't Know	6	1.1	0	0	4	8.3				
Taking HIV Medication Now							.175	< .001		
Yes	416	74.6	66	67.3	21	43.8				
No	142	25.4	32	32.7	27	56.3				

Table 2

Frequency (N, %) and Rank (Most Frequent[1–5]) of 20 Stressful Life Events in the United States, Puerto Rico, and South Africa

Variable	Total	United States		Puerto Rico		South Africa		Cramer's V	p-value
		(n = 558)	%	(n = 98)	%	(n = 119)	%		
Personally seriously injured or assaulted	137	123	22.0	6	6.1	8	16.7	.140	.001
Hospitalized	186	148	26.5	16	16.3	22[2,5]	45.8	.143	.001
Relative seriously ill, injured, or assaulted	162	126	22.6	21	21.4	15	31.3	.054	.361
Death of partner/spouse/parent/child	123	93	16.7	12	12.2	18[4,5]	37.5	.148	< .001
Death of close friend/relative	245	202[3]	36.2	25[4]	25.5	18[4,5]	37.5	.079	.113
Separated from spouse/partner	153	123	22.0	21	21.4	9	18.8	.020	.866
Break off steady relationship	175	145	26.0	19	19.4	11	22.9	.054	.359
Serious problems with close friend/relative/neighbor	161	137	24.6	18	18.4	6	12.5	.084	.084
Financial problems	369	287[1]	51.4	57[1]	58.2	25[1]	52.1	.046	.469
Lost job	116	94	16.8	14	14.3	8	16.7	.024	.819
Homelessness	137	123	22.0	11	11.2	3	6.3	.130	.003
No food due to lack of money	204	166[5]	29.7	24[5]	24.5	14	29.2	.040	.571
Lost something valuable	154	138	24.7	12	12.2	4	8.3	.137	.001
Problems with police	93	89	15.9	3	3.1	1	2.1	.158	< .001
Unemployed	330	258[2]	46.2	50[2]	51.0	22[2,5]	45.8	.033	.674
Sexually abused	91	84	15.1	5	5.1	2	4.2	.124	.004
Physically abused	101	90	16.1	9	9.2	2	4.2	.104	.022
Abuse alcohol/drugs	217	188[4]	33.7	26[3]	26.5	3	1.4	.154	< .001
Rejected by others due to HIV	176	149	26.7	22	22.4	5	10.4	.097	.036
Family rejected due to HIV	90	82	14.7	7	7.1	1	2.1	.116	.008

Note: Superscripts indicate five most frequently occurring events by site.

Table 3

Number and Type of 16 Most Frequent Physical and Psychological Symptoms by Site (%) Rank 1–16

Variable	United States n (%)	Puerto Rico n (%)	South Africa n (%)	Total	Cramer's V	p-value
Muscle Aches	341 (70.5)[3]	71 (72.4)[1]	9 (18.8)[15]	421	.294	<.001
Weakness	329 (67.7)[9]	63 (64.3)[4]	11 (22.9)[12]	403	.245	<.001
Painful Joints	324 (67.9)[7.5]	53 (54.1)[9]	8 (16.7)	385	.287	<.001
Fatigue	355 (73)[1]	49 (50)[12]	28 (58.3)[1]	432	.188	<.001
Dry Mouth	323 (67.9)[7.5]	53 (54.1)[9]	8 (16.7)	384	.287	<.001
Thirst	335(69.8)[4]	55 (56.1)[6.5]	4 (8.3)	394	.341	<.001
Difficulty concentrating	329 (69.1)[5]	55 (56.1)[6.5]	5 (10.4)	389	.326	<.001
Depression	350 (72.8)[2]	67 (68.4)[2]	12 (25.0)[8.5]	429	.271	<.001
Memory Loss	317(66.3)[10]	52 (53.1)	6 (12.5)	375	.297	<.001
Fear/Worries	323 (68.1)[6]	53 (54.1)[9]	5 (10.4)	381	.321	<.001
Diarrhea	237 (52.0)	40 (40.8)	12 (25.0)[8.5]	289	.158	.001
Gas/bloating	265 (57.6)[14]	42 (42.9)	5 (10.4)	312	.264	<.001
Abdominal pain	238 (51.9)	41 (41.8)	9 (18.8)[15]	288	.185	<.001
Short of breath	245 (53.7)[16.5]	35 (35.7)	8 (16.7)	288	.226	<.001
Short of breath with activity	277 (59.3)[12]	34 (34.7)	12 (25.0)[8.5]	323	.241	<.001
Lack of Appetite	220 (48.5)	39 (39.8)	17 (35.4)[4]	276	.089	.091
Coughing	229 (50.7)	47 (48.0)[14]	11 (22.9)[12]	287	.150	.001
Concern over weight loss	203 (45.2)	40 (40.8)	15 (31.3)[5]	258	.079	.153
Insomnia	297 (62.9)[11]	56 (57.1)[5]	13 (27.1)[6]	366	.195	<.001
Anxious	259 (57.0)[15]	65 (66.3)[3]	9 (18.8)[15]	333	.229	<.001
Headaches	247 (53.7)[16.5]	40 (40.8)	18 (37.5)[3]	305	.120	.012
Blurred Vision	221 (48.8)	45 (45.9)[16]	6 (12.5)	272	.196	<.001
Numb/Fingers	250 (54.0)	46 (46.9)[15]	6 (12.5)	302	.223	<.001
Numb/Legs	221 (48.8)	51 (52.0)[11]	11 (22.9)[12]	283	.146	.002
Numb/Feet	266 (58.2)[13]	48 (49.0)[13]	20 (41.7)[2]	334	.106	.034
Itchy Skin	238 (52.8)	42 (42.9)	12 (25.0)[8.5]	292	.159	.001

Note. Superscripts indicate 16 most frequently occurring symptoms by site

Table 4

Correlation Matrix for Predictor Variables

Variables	Quality of Life	SLE	Total Symptoms	Adherence Concerns	M	SD
Quality of Life	----				88.63	19.33
SLE	−.232*	----			4.41	4.67
Total Symptoms	−.327*	.322*	----		39.60	36.14
Adherence Concerns	−.459*	.252*	.397*	----	69.69	28.48

Note: SLE = Stressful Life Events;

*
$p < 0.001$.

Table 5

Means and Standard Deviations of Key Variables by Site and Level of Significance

Variable	Site	Mean	SD	N	df	F value	p value
Total Life Events					2, 521	8.54	<.001
	United States	5.63	4.83	437			
	Puerto Rico	3.33	3.57	66			
	South Africa	3.52	3.20	21			
	Total	5.25	4.70	524			
ARV Concerns					2,521	10.13	<.001
	United States	69.04	28.66	437			
	Puerto Rico	64.47	27.53	66			
	South Africa	95.48	10.83	21			
	Total	69.52	28.53	524			
Symptoms					2,521	6.50	.002
	United States	46.26	37.74	437			
	Puerto Rico	42.30	31.49	66			
	South Africa	17.24	19.13	21			
	Total	44.60	36.84	524			
Quality of Life					2,521	.013	.987
	United States	89.14	18.94	437			
	Puerto Rico	89.02	16.03	66			
	South Africa	89.81	44.30	21			
	Total	89.15	20.15	524			

Note. ARV = antiretroviral.

Table 6

Multiple Regression Model Predicting Quality of Life

Variables	n	R	R^2/Part		df	F	p-value
Quality of Life	523	.522	.272		5, 518	38.76	<.001
Site (United States)							
South Africa			−.100	−.102			.008
Puerto Rico			−.006	−.006			.877
SLEs			−.092	−.099			.015
Total			−.187	−.211			<.001
Symptoms							
Adherence			−.331	−.369			<.001
Concerns							

Note. R = correlation coefficient, R^2 = coefficient of determination, Part = Part coefficient, = standardized slope, df = degrees of freedom, F = significance of variable within the model, *p*-value = observed significance level, SLE = Stressful Life Events