

Health Status of HIV-Infected Women Entering Care: Baseline Medical Findings from the Women of Color Initiative

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Abstract

The WOC Initiative is a prospective study of 921 women of color (WOC) entering HIV care at nine (three rural, six urban) sites across the US. A baseline interview was performed that included self-reported limitation(s) in activity, health conditions, and the CDC's health-related quality of life measures (Healthy Days). One-third of the WOC reported limiting an activity because of illness or a health condition and those with an activity limitation reported 13 physically and 14 mentally unhealthy days/month, compared with 5 physically and 9 mentally unhealthy days/month in the absence of an activity limitation. Age was associated with a three- to fourfold increased risk of an activity limitation but only for WOC in the urban sites. Diabetes was associated with a threefold increased risk of a limitation among women at rural sites. Cardiac disease was associated with a six- to sevenfold increased risk of an activity limitation for both urban and rural WOC. HIV+ WOC reported more physically and mentally unhealthy days than the general US female population even without an activity limitation. Prevention and treatment of diabetes and cardiovascular disease will need to be a standard part of HIV care to promote the long-term health and HRQOL for HIV-infected WOC.

Introduction

HIV-INFECTED WOMEN AND THOSE belonging to racial and ethnic minorities are more likely to postpone care for lack of transportation, feeling ill, or having other competing needs;^{1,2} miss medical appointments,³ and have late access to and more frequent discontinuations of ART,^{4,5} and have increased morbidity and mortality⁶⁻⁸ compared with other women and men. Related work suggests unique trajectories for the process of engaging and remaining in HIV care among WOC.^{9,10} Facilitating this process for WOC will require the development of tailored approaches.¹¹

Health disparities are influenced by many aspects of health-related quality of life. The Centers for Disease Control and Prevention's (CDC) Health-Related Quality of Life (HRQOL) measure has been used for two decades to assess quality of life in the US population as part of the Behavioral Risk Factor Surveillance System (BRFSS) and other

longitudinal studies.¹² The questionnaire includes modules about impairment due to mental, physical, or emotional illness. A longitudinal examination of the HRQOL in US populations indicated that the populations of six states (AL, CT, ME, NJ, NM, NC, OR) showed increasing numbers of both physically and mentally unhealthy days.¹³ Educational disparity was documented by noting that persons without a high school degree reported an average of 7.8 overall unhealthy days per month, compared to 4.0 days/month reported by those with college degrees. Similar disparities were evident for persons with household incomes <\$15,000 compared with >\$50,000/year (8.8 vs. 4.0 unhealthy days/month).¹³ An examination of the quality of life of older individuals reported that persons without a functional limitation were more likely to report incomes higher than \$75,000 (35%) compared with persons with an activity limitation (18%).¹⁴ Additionally, persons with a functional limitation were more likely to report having completed less

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than a high school degree (13%) vs. those that did not report a limitation (8%).¹⁴

Activity limitations are a significant issue for many people living with HIV (PLWH) despite improvement in treatment for PLWH. An activity limitation is one of a variety of medical, social-environmental, and personal characteristics that define the needs of HIV+ women entering care and the ability of these women to stay in HIV medical care. In previous reports, women described physical symptoms as a barrier to care in several disparate regions, including North Carolina¹⁵ and California.¹⁶ In HIV+ men who have sex with men (MSM) in Seattle, reporting a functional limitation on the SF-36 survey was more predictive of poor mental health than the experience of HIV-related stigma and prior history of victimization.¹⁷ HIV+ women injection drug users reported higher rates of depression with higher scores on a 6-item functional limitation scale.¹⁸ However, little is known about the activity status of women who are presenting to care for HIV. In light of the paucity of this information, the research reported here will address the following questions for both rural and urban clinic populations: (1) To what extent do HIV-infected women of color (WOC) report unhealthy days and an activity limitation when entering or re-entering HIV care? (2) Are specific racial/ethnic or other demographic or clinical variables associated with an activity limitation reported by women of color at entry or re-entry to care?

Methods

WOC Initiative

The Women of Color Initiative (WOCI) is a prospective study of 921 women with HIV at nine sites across the United States funded by the Health Resources and Services Administration's (HRSA) Special Projects of National Significance (SPNS) program beginning in 2009 and continuing until 2014.^{19,20} The nine sites represent areas most affected by HIV across all regions of the US; six sites are in urban areas (Brooklyn; Chicago; Los Angeles; Miami; San Antonio, TX; Springfield, MA) and three in rural areas (Alabama; North Carolina; Longview, TX). At these sites participants were recruited from a variety of locations, including outreach at HIV testing centers, referrals from physicians, and homeless shelters. The Albert Einstein College of Medicine's Women of Color Initiative Evaluation and Technical Assistance Center (ETAC) was responsible for all cross site research and evaluation activities. The ETAC cleaned the data, edited it, and made a de-identified file available for the analysis. The ETAC, and each site, had Institutional Review Board approval for this study, as well as a certificate of confidentiality.^{11,20} Eligibility for the cross site evaluation was determined by patient self-identification as non-white, female or transgender female, HIV+, and not currently engaged in care at the recruitment site.

Survey measures

Survey questions included demographics, HIV care status, risk behavior, barriers to care and health, and health-related quality of life. The activity limitation question "Are you LIMITED in any way in any activities because of any impairment or health problem?" was taken from the Healthy People 2010 assessment of functional limitation or disability

to define the absence (no) or presence (yes) of an activity limitation. A "yes" answer to either this question or a second question "Do you now have any health problem that requires you to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone?" is used in the literature to identify individuals with disability or functional limitation.²¹ Therefore, the limitation discussed in this report is described as an "activity limitation," and the terms disability or functional limitation are used only when discussing findings in the literature using both questions or other measures. The HRQOL measure (CDC HRQOL-14) was developed by the CDC and included in the national BRFSS Survey since 1993.^{12,22} Two questions in the Core Module on self-rated health (mean number of physically unhealthy days and mentally unhealthy days) were used as independent variables.¹²

Medical illnesses were self-reported in response to questions about their health history: time since HIV diagnosis, the presence or absence of an AIDS diagnosis; questions regarding illness: pneumonia, hepatitis c, tuberculosis, thrush, vaginal yeast infections, sexually transmitted infections, diabetes mellitus, high blood pressure, heart problems, AIDS dementia, wasting, lymphoma, cervical cancer, other cancer, other conditions; questions regarding women's health: bacterial vaginosis, trichomoniasis, pelvic inflammatory disease, abnormal pap smear, chlamydia, gonorrhea, syphilis, genital herpes, current or recent pregnancy. Additional information regarding the variables may be found in the article by Eastwood et al, this issue.²⁰

Statistical analysis

Prior to conducting any analysis, univariate analysis was conducted to check for out of range and inconsistent values. This was done on a continuing basis during the study years, and any questions about the reliability of the data entry were discussed by the ETAC staff and program staff on an ongoing basis. After the univariate analysis, bivariate analysis was conducted to assess the relationship between selected demographic variables (age, ethnicity, US born, education, marital status, household members, employment, HIV care status), HRQOL variables (physically and mentally unhealthy days), and clinical variables (time since diagnosis of HIV, history of AIDS, pneumonia, thrush, hepatitis C, tuberculosis, cervical cancer, wasting, AIDS dementia, lymphoma, hypertension, diabetes, heart problems, other cancers, sexually transmitted infections, vaginitis, other illnesses, and pregnancy) and an activity limitation for urban and rural women. Independent groups *t*-tests were used for continuous variables and chi-square tests for categorical data. Multivariate logistic regressions predicting an activity limitation were conducted separately for urban and rural sites. An initial model was run including all predictors that were associated with the presence of an activity limitation at $p < 0.10$ in bivariate analysis for either the urban or the rural analyses (immigrant status, education, children <18 years old, household members, thrush, tuberculosis, cervical and other cancers, pregnancy were excluded). A second model was run for each group (urban and rural) containing only predictors that were significant ($p < 0.05$) in one or both initial models. Retained predictors were physically unhealthy days, age, employment, time since HIV, diabetes and heart disease.

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF WOMEN ENTERING CARE IN THE WOMEN OF COLOR HIV INITIATIVE: RURAL VS. URBAN SITES

	<i>Urban</i> N=641 (69.6%)	<i>Rural</i> N=280 (30.4%)	<i>Total</i> N=921 ^a (100.0%)	<i>Test Statistic</i> p value chi-square, df
Median age	43.3	39.3	42.3	
Age categories				0.213
Younger than 30	114 (17.8)	59 (21.1)	173 (18.8)	$\chi^2 = 3.1, 2$
30–50	392 (61.2)	154 (55.0)	545 (59.3)	
51 and older	135 (21.1)	67 (23.9)	202 (21.9)	
Ethnicity (race/racial groups)				<0.001
Non-Hispanic black	383 (60.1)	234 (83.6)	617 (67.3)	$\chi^2 = 80.0, 2$
Hispanic/Latina	224 (35.2)	20 (7.1)	244 (26.6)	
Other/multiracial	30 (4.7)	26 (9.3)	56 (6.1)	
Primary language spoken at home				<0.001
English	534 (83.3)	267 (95.4)	801 (87.0)	$\chi^2 = 25.0, 2$
Spanish	87 (13.6)	10 (3.6)	97 (10.5)	
Other	20 (3.1)	3 (1.1)	23 (2.5)	
Born in USA				<0.001
Yes	492 (77.2)	267 (95.4)	759 (82.8)	$\chi^2 = 44.8, 1$
No	145 (22.8)	13 (4.6)	158 (17.2)	
Education				0.001
Less than HS	286 (44.6)	93 (33.2)	379 (41.2)	$\chi^2 = 10.5, 1$
HS or greater	355 (55.4)	187 (66.8)	542 (58.8)	
Marital status				0.016
Single	408 (63.7)	154 (55.0)	562 (61.0)	$\chi^2 = 8.3, 2$
Married/partner	91 (14.2)	59 (21.1)	150 (16.3)	
Other	142 (22.2)	67 (23.9)	209 (22.7)	
Sexual orientation				0.010
Heterosexual	567 (88.9)	263 (94.3)	830 (90.5)	$\chi^2 = 6.6, 1$
Other	71 (11.1)	16 (5.7)	87 (9.5)	
Residence				<0.001
Rented/own house/apt.	369 (57.9)	206 (73.6)	575 (62.7)	$\chi^2 = 37.5, 3$
Institution	62 (9.7)	6 (2.1)	68 (7.4)	
Someone else's place	149 (23.4)	63 (22.5)	212 (23.1)	
Street/SRO	57 (8.9)	5 (1.8)	62 (6.8)	
Living here < 1 year? (yes)	337 (52.6)	125 (44.6)	462 (50.2)	0.027, $\chi^2 = 4.9, 1$
Have children < 18 years old? (yes)	272 (42.6)	145 (51.8)	417 (45.4)	0.010, $\chi^2 = 6.6, 1$
Household members				<0.001
Alone	244 (38.5)	57 (20.4)	301 (32.9)	$\chi^2 = 35.7, 2$
Children, no adults	151 (23.8)	64 (22.9)	215 (23.5)	
Adults, +/- children	239 (37.7)	159 (56.8)	398 (43.5)	
Employment status				<0.001
Full/part-time	89 (13.9)	76 (27.1)	165 (17.9)	$\chi^2 = 46.8, 4$
School	14 (2.2)	10 (3.6)	24 (2.6)	
Disabled	158 (24.6)	93 (33.2)	251 (27.3)	
Not working	345 (53.8)	88 (31.4)	433 (47.0)	
Other	35 (5.5)	13 (4.6)	48 (5.2)	
Income last month				<0.001
No income	168 (27.1)	51 (18.3)	219(24.4)	$\chi^2 = 42.7, 3$
\$1–500	147 (23.7)	40 (14.4)	187 (20.8)	
\$501–1000	237 (38.3)	115 (41.4)	352 (39.2)	
\$1001+	67 (10.8)	72 (25.9)	139 (15.5)	
Income last month came from				<0.001
Work	100 (16.4)	80 (29.9)	180 (20.5)	$\chi^2 = 31.6, 3$
Public sources	290 (47.5)	88 (32.8)	378 (43.1)	
Disability	31 (5.1)	25 (9.3)	56 (6.4)	
Other	189 (31.0)	75 (28.0)	264 (30.1)	

(continued)

TABLE 1. (CONTINUED)

	<i>Urban</i> N = 641 (69.6%)	<i>Rural</i> N = 280 (30.4%)	<i>Total</i> N = 921 ^a (100.0%)	<i>Test Statistic</i> p value chi-square, df
Health insurance				0.002
Private	21 (3.3)	24 (8.6)	45 (4.9)	$\chi^2 = 14.8, 3$
Medicaid	221 (35.0)	84 (30.1)	305 (33.5)	
Medicare/other public	119 (18.8)	41 (14.7)	160 (17.6)	
None	271 (42.9)	130 (46.6)	401 (44.0)	
HIV care status at study entry				<0.001
Newly diagnosed	112 (17.5)	61 (21.8)	173 (18.8)	$\chi^2 = 40.1, 4$
New to care	99 (15.5)	34 (12.1)	133 (14.5)	
Transferred to care	170 (26.6)	46 (16.4)	216 (23.5)	
Sporadic care	134 (20.9)	106 (37.9)	240 (26.1)	
Lost to care	125 (19.5)	33 (11.8)	158 (17.2)	

^aTotals may not equal 921 due to missing data.

Frequent mental distress (more than 14 mentally unhealthy days/month) was dropped from the model.

Results

Rural and urban population descriptions

Nine sites recruited 921 women of color during the interval November 2010 to July 2013 (Table 1). These are discussed in detail in the article by Eastwood et al., this issue.²⁰

Overall, 1 in 3 women reported an activity impairment and impairment was more common in urban women (35% vs. 28%) (Table 2). In urban women, an activity limitation was associated with increasing age, multiracial/other ethnicity, being disabled or not working, and being new to HIV care or receiving sporadic care. An activity limitation in rural women was associated with disability and advancing age ($p=0.04$), and was more frequent in women transferring care or being lost to care but this was not statistically significant.

Women reported the number of days that physical or mental symptoms limited their activity, and we examined the association with these symptoms in both urban and rural women by self-reported activity status. Both physically and mentally unhealthy day variables were significantly associated with an activity limitation. Women without activity impairment reported physically unhealthy days an average 5 days per month, but the presence of an activity impairment increased the number of days with these symptoms to 13 days/month. Women who reported an activity limitation reported an average of 14 mentally unhealthy days/month compared to women who did not report an activity limitation (9 days/month). Overall, women reported having healthy days one-half of the time (16 healthy days in the prior month) if they reported no activity impairment. Women with an activity impairment had healthy days only one-third of the time (8–11 days in prior month). Similar results were seen for urban and rural women.

Women provided information regarding their medical history by answering questions about HIV infection, HIV-related illness, general medical conditions, and women's health issues (Table 3). AIDS, pneumonia, and thrush were the most common HIV-related conditions reported by women. Among urban women, increased time since diagnosis, AIDS, pneumonia, and HCV were associated with a self-

reported limitation. In rural women, increased time since HIV diagnosis, and history of wasting were associated with a self-reported limitation. Histories of hypertension, diabetes, and heart problems were related to an activity limitation in both urban and rural sites. Women's health issues included history of STI reported by 50% of the women, and yeast infections (more frequent in rural women).

Being over 30 years of age was associated with a three- to fourfold increased risk of an activity limitation for urban women but was not a significant variable for rural women (Table 4). Not surprisingly, women who reported being disabled or who were not working were more likely to report an activity limitation than women who were employed, and urban women who had been diagnosed with HIV for more than 1 year were more likely to report activity limitation than those diagnosed for less than 3 months. The illnesses that emerged from the model as being associated were diabetes and heart disease. Interestingly, HCV was not a significant predictor in the multivariate models. However, cardiac disease was a striking predictor in both populations with a six- to sevenfold increased risk of a limitation. Diabetes was an important predictor in the rural model but not the urban model (3.2 OR; 1.26–8.26 95% CI).

Discussion

This report highlights the activity limitations and health conditions among WOC entering HIV care. We anticipated identifying specific variables associated with an activity limitation in rural vs. urban women, but in our multivariable analysis we did not find many differences. The activity limitations reported by the women in this initiative were related to having more than 14 physically unhealthy days/month, increasing age (urban only), disabled status, having HIV for longer than 1 year (urban only), diabetes (rural only), and heart disease.

We observed an association between increasing age and activity limitations but only in WOC at the urban sites. The lack of an association with age and activity limitation at the rural study sites may be explained by the smaller sample size and the slightly younger age distribution at the rural sites. The average number of physically unhealthy days described by women without an activity limitation (5 days/month) in the

TABLE 2. DEMOGRAPHIC CHARACTERISTICS OF WOMEN OF COLOR WITH AND WITHOUT ACTIVITY LIMITATION AT ENTRY INTO CARE

	<i>Women in urban sites (n=641)^a</i>			<i>Women in rural sites (n=280)</i>		
	<i>Activity limitation, N=226 [n (%)]</i>	<i>No activity limitation, N=410 [n (%)]</i>	<i>Chi-square (p)</i>	<i>Activity limitation, N=78 [n (%)]</i>	<i>No activity limitation, N=202 [n (%)]</i>	<i>Chi-square (p)</i>
Age categories (n=916)						
<30 years old	13 (11.4)	101 (88.6)	<0.001	9 (15.3)	50 (84.7)	0.043
30–50 years old	149 (38.3)	240 (61.7)		50 (32.5)	104 (67.5)	
≥51 years old	64 (48.1)	69 (51.9%)		19 (28.4)	48 (71.6)	
Ethnicity (n=913)						
Non-Hispanic black	131 (34.3)	251 (65.7)	0.030	62 (26.5)	172 (73.5)	0.207
Hispanic/Latina	78 (35.1)	144 (64.9)		9 (45.0)	11 (55.0)	
Other/multiracial	17 (58.6)	12 (41.4)		7 (26.9)	19 (73.1)	
Born in USA (n=912)						
Yes	181 (37.1)	307 (62.9)	0.111	73 (27.3)	194 (72.7)	0.382
No	43 (29.9)	101 (70.1)		5 (38.5)	8 (61.5)	
Education						
Less than HS	104 (36.6)	180 (63.4)	0.608	29 (31.2)	64 (68.8)	0.261
HS or greater	122 (34.7)	230 (65.3)		49 (26.2)	138 (73.8)	
Marital status (n=916)						
Single	134 (33.1)	271 (66.9)	0.050	42 (27.3)	112 (72.7)	0.970
Married/partner	30 (33.0)	61 (67.0)		17 (28.8)	42 (71.2)	
Other	62 (44.3)	78 (55.7)		19 (28.4)	48 (71.6)	
Do you have children < 18 yr? (n=913)						
No	139 (38.3)	224 (61.7)	0.115	41 (30.4)	94 (69.6)	0.365
Yes	87 (32.2)	183 (67.8)		37 (25.5)	108 (74.5)	
Household members (n=909)						
Alone	94 (38.8)	148 (61.2)	0.283	14 (24.6)	43 (75.4)	0.713
Children, no adults	52 (34.9)	97 (65.1)		20 (31.3)	44 (68.8)	
Adults, +/- children	76 (31.9)	162 (68.1)		44 (27.7)	115 (72.3)	
Employment (n=916)						
Full/part-time	10 (11.4)	78 (88.6)	<0.001	6 (7.9)	70 (92.1)	<0.001
School	4 (28.6)	10 (71.4)		1 (10.0)	9 (90.0)	
Disabled	91 (57.6)	67 (42.4)		41 (44.1)	52 (55.9)	
Not working	111 (32.6)	230 (67.4)		27 (30.7)	61 (69.3)	
Other	10 (28.6)	25 (71.4)		3 (23.1)	10 (76.9)	
HIV care status (n=915)						
Newly diagnosed	25 (22.5)	86 (77.5)	0.004	11 (18.0)	50 (82.0)	0.096
New to care	44 (44.4)	55 (55.6)		8 (23.5)	26 (76.5)	
Transfer care	60 (35.5)	109 (64.5)		19 (41.3)	27 (58.7)	
Sporadic care	57 (42.9)	76 (57.1)		29 (27.4)	77 (72.6)	
Lost to care	39 (31.7)	84 (68.3)		11 (33.3)	22 (66.7)	
<i>Health-related quality of life</i>	<i>Mean days</i>	<i>SE</i>	<i>t-test (p)</i>	<i>Mean days</i>	<i>SE</i>	<i>t-test (p)</i>
Physically unhealthy days						
No limitation	5.2	0.43	<0.001	4.4	0.56	<0.001
Limitation	12.8	0.76		13.5	1.37	
Mentally unhealthy days						
No limitation	9.1	0.56	<0.001	9.1	0.77	<0.001
Limitation	13.9	0.77		14.4	1.36	
Very healthy days						
No limitation	16.0	0.59	<0.001	15.6	0.82	0.001
Limitation	8.1	0.63		10.7	1.21	

^aDue to missing values at the urban sites, not all the characteristics at the urban sites add up to 641.

TABLE 3. CLINICAL CHARACTERISTICS OF WOMEN OF COLOR WITH AND WITHOUT ACTIVITY IMPAIRMENTS AT ENTRY INTO CARE

	Women in urban sites (n=641) ^a			Women in rural sites (n=280) ^a		
	Activity limitation, N=226 [n (%)]	No activity limitation, N=410 [n (%)]	Fisher's Exact (p)	Activity limitation, N=78 [n (%)]	No activity limitation, N=202 [n (%)]	Fisher's Exact (p)
<i>HIV-related health (total n with illness)</i>						
Time since HIV						
<3 months	23 (21.3)	85 (78.7)	<0.001	9 (18.0)	41 (82.0)	0.002
3 mo–1 yr	8 (19.5)	33 (80.5)		1 (4.5)	21 (95.5)	
>1 yr	186 (39.5)	285 (60.5)		67 (33.3)	134 (66.7)	
AIDS (n=175)						
No	151 (31.6)	327 (68.4)	<0.001	60 (25.6)	174 (74.4)	0.120
Yes	68 (50.0)	68 (50.0)		15 (38.5)	24 (61.5)	
Pneumonia (n=322)						
Never	127 (31.0)	283 (69.0)	0.002	44 (24.6)	135 (75.4)	0.095
Current or past	97 (43.5)	126 (56.5)		34 (34.3)	65 (65.7)	
Thrush (n=194)						
Never	175 (34.0)	339 (66.0)	0.109	52 (25.9)	149 (74.1)	0.180
Current or past	50 (42.4)	68 (57.6)		26 (34.2)	50 (65.8)	
HCV (n=132)						
No	175 (33.2)	352 (66.8)	0.013	66 (26.7)	181 (73.3)	0.126
Current or past	48 (46.6)	55 (53.4)		12 (41.4)	17 (58.6)	
Tuberculosis (n=74)						
Never	201 (35.1)	372 (64.9)	0.480	72 (27.3)	192 (72.7)	0.227
Current or past	24 (40.0)	36 (60.0)		6 (42.9)	8 (57.1)	
Cervical cancer (n=40)						
No	212 (34.9)	396 (65.1)	0.142	72 (27.5)	190 (72.5)	0.544
Current or past	13 (50.0)	13 (50.0)		5 (35.7)	9 (64.3)	
Wasting (n=32)						
No	218 (35.4)	398 (64.6)	0.616	66 (25.4)	194 (74.6)	0.000
Current or past	7 (41.2)	10 (58.8)		11 (73.3)	4 (26.7)	
AIDS dementia (n=13)						
No	218 (35.0)	404 (65.0)	0.060	77 (28.0)	198 (72.0)	0.485
Current or past	7 (63.6)	4 (36.4)		1 (50.0)	1 (50.0)	
Lymphoma (n=17)						
No	220 (35.4)	402 (64.6)	0.762	76 (28.1)	194 (71.9)	0.624
Current or past	5 (41.7)	7 (58.3)		2 (40.0)	3 (60.0)	
<i>General health</i>						
High BP (HTN) (n=279)						
Never	151 (33.0)	306 (67.0)	0.025	38 (22.2)	133 (77.8)	0.009
Current or past	74 (43.0)	98 (57.0)		40 (37.4)	67 (62.6)	
Diabetes (n=106)						
Never	190 (33.8)	372 (66.2)	0.015	61 (25.6)	177 (74.4)	0.033
Current or past	33 (49.3)	34 (50.7)		17 (43.6)	22 (56.4)	
Heart problems (n=59)						
Never	195 (32.8)	399 (67.2)	<0.001	64 (25.1)	191 (74.9)	<0.001
Current or past	29 (78.4)	8 (21.6)		14 (63.6)	8 (36.4)	
Other cancer (n=16)						
No	220 (35.3)	404 (64.7)	0.179	76 (28.0)	195 (72.0)	0.675
Current or past	6 (60.0)	4 (40.0)		2 (33.3)	4 (66.7)	
Other illnesses ^a (n=173)						
No	120 (29.1)	293 (70.9)	0.007	53 (22.8)	179 (77.2)	<0.001
Current or past	40 (43.5)	52 (56.5)		25 (55.6)	20 (44.4)	
<i>Women's health</i>						
STI (n=651, ever)						
Never	57 (29.1)	139 (70.9)	0.052	13 (18.8)	56 (81.2)	0.096
Past	126 (39.6)	192 (60.4)		48 (29.3)	116 (70.7)	
Current	43 (35.2)	79 (64.8)		17 (36.2)	30 (63.8)	

(continued)

TABLE 3. (CONTINUED)

	Women in urban sites (n=641) ^a			Women in rural sites (n=280) ^a		
	Activity limitation, N=226 [n (%)]	No activity limitation, N=410 [n (%)]	Fisher's Exact (p)	Activity limitation, N=78 [n (%)]	No activity limitation, N=202 [n (%)]	Fisher's Exact (p)
Vaginitis (yeast) (n=461, ever)						
Never	112 (32.5)	233 (67.5)	0.225	28 (30.1)	65 (69.9)	0.001
Past	102 (39.1)	159 (60.9)		42 (24.4)	130 (75.6)	
Current	7 (38.9)	11 (61.1)		8 (80.0)	2 (20.0)	
Current pregnancy ^a (n=33, current)						
No	26 (26.5)	72 (73.5)	0.071	12 (23.5)	39 (76.5)	1.000
Yes	1 (5.9)	16 (94.1)		3 (18.8)	13 (81.3)	

^aDue to missing values, not all the characteristics at the urban sites add up to 641, and the rural to 280. For other illnesses, the total responses was only 782. For current pregnancy, the total responses was only 182.

present study was similar to the number reported by women aged 65–79 years old in the general population.²³ The CDC surveillance of health related quality of life indicated that US women reported an average of 4 physically unhealthy days per month, a reduction of 20% compared with the women in this study.¹³ In another analysis of data from the US population, age was associated with more functional limitations reported (44% of those with a functional limitation were over 65 years old compared with 38% of those without a functional limitation).¹⁴

Physical symptoms, but not mental illness, were associated with activity limitation in our cohort. Several studies with HIV-infected women have described physical symptoms as barriers to care. Severity of physical symptoms was associ-

ated with multiple barriers to care in recent work from the North Carolina site.¹⁵ Women at this site described missing clinic appointments when they felt sick or had medication side effects.¹⁰ California rural women (50% white, 29% Latina, 15% African-American) also reported more missed appointments in the presence of physical symptoms.¹⁶ The increase in physical symptoms as women age may be expected to influence adherence to medical care and to anti-retroviral therapy with subsequent reductions in outpatient care and increases in hospitalizations.²⁴

In the general US population, women reported 4 mentally unhealthy days in the last month, whereas the women without an activity limitation in our study reported 9 mentally unhealthy days/month (twofold excess health burden).²³

TABLE 4. MULTIVARIATE ANALYSIS OF URBAN AND RURAL WOC WITH AND WITHOUT ACTIVITY LIMITATION

	Urban sites (n=636)			Rural sites (n=280)		
	OR	95% CI	p	OR	95% CI	p
Physically unhealthy						
< 14 days/mo	ref			ref		
≥ 14 days/mo	3.29	(2.18–4.97)	<0.001	6.37	(3.09–13.12)	<0.001
Age (years)						
< 30	ref			ref		
30–50	3.38	(1.60–7.13)	0.001	1.43	(0.54–3.84)	0.47
> 50	4.50	(1.98–10.23)	<0.001	0.93	(0.30–2.88)	0.90
Employment						
Any work	ref			ref		
School	3.66	(0.80–16.65)	0.09	0.55	(0.05–6.02)	0.63
Disabled	6.41	(2.94–13.96)	<0.001	6.13	(2.13–17.65)	0.001
Not working	2.90	(1.38–6.10)	0.005	4.54	(1.56–13.15)	0.005
Other	2.82	(0.95–8.38)	0.06	2.19	(0.31–15.27)	0.43
Time since HIV diagnosis						
≤ 3 mo	ref			ref		
3 mo–1 yr	0.84	(0.28–2.50)	0.75	0.22	(0.02–2.18)	0.19
> 1 yr	1.96	(1.08–3.56)	0.03	2.07	(0.80–5.36)	0.14
Diabetes						
No	ref			ref		
Yes	1.18	(0.64–2.18)	0.60	3.04	(1.22–7.58)	0.02
Cardiac disease						
No	ref			ref		
Yes	6.80	(2.66–17.36)	<0.001	7.08	(2.20–22.76)	0.001

Individuals with a functional limitation (yes to either Healthy People 2010 question) in the general US population reported 7.5 mentally unhealthy days, which is much less than the 14 days/month reported here by HIV+ WOC with an activity limitation (defined as a yes to only the activity limitation question). Despite the high number of days that women described as mentally unhealthy, activity limitation was not associated with mentally unhealthy days. In a French cohort, mentally unhealthy days did not predict activity status as assessed by work capacity. However, a limitation in activity was associated with reduction in mental HRQOL.²⁵

The condition most strongly associated with activity limitation in our study was the presence of cardiovascular disease. Mortality due to cardiovascular disease is becoming an increasingly recognized outcome in PLWH.²⁶ In an HIV population in Alabama, PLWH had high numbers of comorbid conditions with over 50% having hypertension and lipid abnormalities, over 5% having coronary artery disease and 25% having diabetes mellitus.²⁷ The development of morbidity of activity limitation places an excess burden on the individual and on society. The HRQOL in individuals with and without cardiovascular disease (CVD) was examined in the CDC BRFSS Survey. Women with CVD had a lower HRQOL measured by physically unhealthy days, mentally unhealthy days and inactive days.²⁸ Diabetes was also associated with an activity limitation but only in the rural sites of our study. The limitation of an association between diabetes and activity limitation to our rural sites may be related to the prevalence of diabetes in the study regions. Three of the rural but only one of the urban sites were located in states with more than 9% prevalence of diabetes.²⁹ However, diabetes is increasingly recognized as a significant comorbidity,³⁰ and aging HIV+ women reported co-morbidities such as diabetes as significant health burdens.³¹ Co-morbidities are playing an increasingly important role in the health-related quality of life and health burdens of HIV-infected individuals.

This study has several limitations that we considered when reviewing the results. The data here are from women with HIV who presented for care in study sites. It is possible that women who do not encounter the health care system at all have different characteristics than those who presented for care and consented for research participation. However, the findings presented here can be considered to be representative of HIV+ women who are entering care. The data presented here are not generalizable to those WOC who choose not to contact any HIV services. A second limitation is that the health conditions described in our study are based on self-report, as are the measures of HRQOL (e.g., unhealthy days). The self-report accuracy varies between diagnoses. It is most consistent for acute life threatening illnesses such as myocardial infarction and stroke, and least accurate for chronic conditions that are less understood such as heart failure.^{32,33} Since women were transitioning care at the time of enrollment and some study sites were not medical sites, the medical records at the entry sites were unlikely to be complete, making medical record abstraction unlikely to have provided more accuracy.

In conclusion, women reported more physically and mentally unhealthy days than the general US population of women even when they did not report an activity limitation. While age and time since HIV diagnosis were associated with

an activity limitation, cardiovascular disease was the most strongly associated predictor variable. Prevention and treatment of cardiovascular disease will need to be a standard part of HIV care to promote the long-term health and HRQOL of HIV-infected women.

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Author Disclosure Statement

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