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Quality of Life Among Women Living With HIV in Rural India

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A cross-sectional examination was conducted on quality of life (QOL) among women living with HIV (WLWH) in rural Andhra Pradesh, India. Baseline data were collected from 400 WLWH and their children. QOL was measured with 10 items from the Quality of Life Enjoyment and Satisfaction Questionnaire. Findings revealed low QOL scores; on a scale from 0 to 3, the mean QOL score was 0.38 (SD = 0.30). Depression symptoms were reported by 25.5%, internalized stigma was high, and most reported little to no social support. Multivariable analysis revealed positive associations between QOL and CD4+ T cells ($b = .0011$, $p = .021$) and social support ($b = .260$, $p < .0001$), and a negative relationship between QOL and internalized stigma ($b = -.232$, $p < .0001$). Interventions focused on improving QOL for WLWH should incorporate strategies to improve social support and adherence to antiretroviral therapy, while mitigating internalized stigma.

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Key words: HIV, India, quality of life, women

Quality of life (QOL) is a multidimensional concept that represents the individual's perception

of his or her physical, psychological, social, and cognitive health (Jackson, Krishnan, Meccone,

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Ockene, & Rubenfire, 2010). QOL refers to how satisfied and content the individual is about his or her life as a whole (Wilson & Cleary, 1995), and has become a critical variable that permeates all facets of life for women living with HIV (WLWH). QOL is important for women in general, and rural women in particular, because antiretroviral therapy (ART) has now made HIV infection a manageable chronic disease. As medical advances have prolonged life expectancy and physical health has improved, the next logical step of treatment is development and assessment of interventions related to improving QOL for WLWH. In this paper, we focus on QOL in WLWH in rural India.

Of the 2.09 million persons living with HIV (PLWH) in India (National AIDS Control Organization, 2015), half reside in rural areas that are often agrarian regions possessing poor infrastructure that limits access to health care (Pallikadavath, Garda, Apte, Freedman, & Stones, 2005). Rural WLWH, in particular, are often illiterate and lack employment; they report limited autonomy and less decision-making power (Amin, 2004). Moreover, in a recent study, while the majority of rural women had knowledge of HIV (61%; Subramanian, Gupta, & Ezhil, 2007), significantly fewer knew about ways to prevent transmission (28%), and fewer had even rudimentary knowledge of HIV transmission (23.4%; Ackerson, Ramanadhan, Arya, & Viswanath, 2012).

The state of Andhra Pradesh, the site of our study, has reported a prevalence of HIV (0.66%) higher than the other “high HIV prevalence states” of India such as Karnataka (0.45%), Gujarat (0.42%), and Goa (0.40%; National AIDS Control Organization, 2015). Andhra Pradesh is the eighth largest state in India, is situated on the southeastern coast, and hosts a total population of 49.38 million inhabitants (Directorate of Economics and Statistics, 2015). Because treatment centers for HIV are generally found in urban areas of India (Van Rompay et al., 2008), rural women are more likely to experience difficulties accessing care as compared to their urban counterparts (Gupta et al., 2008; Nyamathi, Sinha et al., 2011). In fact, recent data suggest that just 36% of adults eligible for ART in India ($CD4+ T$ cell < 350 cells/mm³) receive ongoing treatment (Joint United Nations Programme on HIV/AIDS [UNAIDS], 2014). This percentage may worsen as

India implements its planned expansion to persons with $CD4+ T$ cell counts lower than 500 cells/mm³.

Quality of Life (QOL) Research

Research in India among PLWH has revealed that poorer QOL was associated with being younger, female, living in a rural environment, newly diagnosed with HIV, not taking ART, and experiencing more stigma-related events (Mahalakshmy, Premarajan, & Hamide, 2011). Among PLWH in Andhra Pradesh, Vigneshwaran, Padmanabhareddy, Devanna, and Alvarez-Uria (2013) found the lowest QOL to be in social and daily activity domains. The lowest scores were reported in women, compared to men (Chandra, Satyanarayana, Satishchandra, Satish, & Kumar, 2009; Vigneshwaran et al., 2013); illiterate or separated women reported lower QOL scores than those who were literate or married (Vigneshwaran et al., 2013). In a study of 400 participants (212 female) in Tamil Nadu, 34% of respondents reported poor QOL (Charles et al., 2012). Predictors of poor QOL included being impoverished, earning less than Rs 2000/month (equivalent to USD \$38.46), being severely depressed, and having low social support.

Food insecurity, defined as having limited or uncertain availability of nutritionally adequate and safe foods (Weiser et al., 2011), is another correlate of QOL. Moderate to severe levels of food insecurity were associated with lower QOL in both men and women (Heylen, Panicker, Chandu, Steward, & Ekstrand, 2015). Further, as stigma, perception of stigma, and psychosocial consequences of stigma are known to compromise QOL and jeopardize treatment access and adherence (Kleinman et al., 2015; Zelaya et al., 2012), culturally-appropriate interventions are necessary to educate, provide support, and empower rural WLWH to confront stigma, limit vulnerability, and eradicate disparities (Rogers et al., 2006).

Currently, however, many challenges still exist for rural WLWH. This is particularly the case when WLWH hear about and experience stigma, discrimination, and other human rights abuses directed toward women like themselves (UNAIDS, 2014). A qualitative study of rural WLWH in Andhra Pradesh found that the barriers to accessing care included illness-related factors, limited physical and financial support,

and psychological factors (Nyamathi et al., 2016). For many rural women, surmounting the challenges of accessing care, maintaining adherence to medication regimens, and maintaining their own positive mental health status while acting as caregivers to others, may prove daunting (Sinha, Peters, & Bollinger, 2009).

Theoretical Framework

The guiding framework for our study of rural women's perceptions of physical, psychological, social, and cognitive health is the Comprehensive Health Seeking and Coping Paradigm (Nyamathi, 1989), which is most appropriate as it articulates factors that impact the health of the individual and barriers and facilitators to achieving optimum health. Factors include the thoughts and behaviors individuals rely on to overcome threats to health, to deal with life crises, and to retain or attain optimal health. Such variables include physical and psychological health, including QOL, stigma, depressive symptoms, food insecurity, and social and behavioral factors. These variables led to the selection of the measures utilized in this study.

Currently, there is little understanding of QOL, stigma, depression, and food insecurity among rural WLWH, particularly in areas where basic knowledge of HIV transmission is lacking (Ghosh et al., 2011). The aims of our study were (a) to provide an understanding of factors associated with QOL among rural WLWH in India, and (b) to gain a better appreciation of the challenges rural WLWH were experiencing. Theoretically-based correlates include depression, stigma, social support, and food insecurity.

Method

Design

We used baseline data collected from 400 WLWH in Southern India. The women were all enrolled in an ongoing longitudinal trial designed to assess the impact of a culturally tailored intervention on ART adherence, as well as on physical, psychological, and social outcomes for themselves and one child. Human Subjects Protection Committee clearances

were obtained in the United States from the University of California Los Angeles Office of the Human Research Protection Program and in India from the Institution Ethics Committee for the All India Institute of Medical Sciences. Baseline data for the 400 WLWH were collected from May 2014 to November 2015.

Sample and Setting

Women who met the following inclusion criteria were enrolled in the study: (a) 18 to 50 years of age, (b) diagnosed with HIV and receiving ART for 3 months or longer, (c) CD4+ T cell count greater than 100 cells/mm³, and (d) having at least one child (ages 3-8 years) living with them. The setting consisted of four demographically similar yet geographically distinct districts, which were then randomized into three of the four programs.

Screening Procedures

Approved flyers that provided details about the study were posted in selected Primary Health Clinics (PHC) frequented by WLWH. A recruiter met with women who were interested in further details in a private place at the PHC. The PHCs were selected because they were easily accessible community clinics for symptomatic care of PLWH. After further details about the study were provided, informed consent for the screening survey was discussed and signed. Thereafter, the research staff administered a 2-minute screener to determine eligibility for the potential participant. Once deemed eligible, the women were provided further details about the study and, if interest continued, a second consent form was described and signed, and the baseline questionnaire administered.

For women who were not able to demonstrate their HIV status by a hospital-generated ART card, HIV testing was conducted, with pretest and posttest counseling provided by the trained research staff. CD4+ T cell count testing was also conducted as part of the screening protocol.

We offered an incentive, which ranged from USD \$172 to USD \$182 for the entire program, depending on assigned group. Coercion was carefully considered by the human subject protection committee and avoided by providing a nominal amount of

compensation for the women to assist with childcare, loss of pay for the time of enrollment, or transportation needs.

Measures

All of our instruments had been used with either rural (Nyamathi, Hanson, et al., 2012; Nyamathi, Salem, et al., 2012) or urban (Ekstrand, Chandy, Heylen, Steward, & Singh, 2010; Ekstrand, Solomon, Gopalkrishnan, Krishnan, & Kumarasamy, 2010; Ekstrand et al., 2011; Steward et al., 2011) PLWH in southern India. The selection of these measures was guided by the theoretical framework. The questionnaire was translated from English to Telugu and back-translated from Telugu to English by a second research staff member (Marin & Marin, 1991).

Sociodemographic Factors

Sociodemographic information obtained included age, education, marital status, religion, and number of children.

Quality of Life

QOL was measured with 10 items from the Quality of Life Enjoyment and Satisfaction Questionnaire (Endicott, Nee, Harrison, & Blumenthal, 1993), an internationally used and validated measure (Heylen et al., 2015; Lee et al., 2014; Ritsner, Kurs, Kostizky, Ponizovsky, & Modai, 2002; Rossi et al., 2005). On a scale from 0 = *very unsatisfied* to 3 = *very satisfied*, participants indicated satisfaction with their health, finances, and other variables during the previous week. An overall score was created as the mean of all items ($\alpha = 0.79$).

Physical Health Factors

Months living with HIV. Each WLWH was asked the month and year that she was diagnosed with HIV to calculate the number of months she had been living with HIV.

ART regimen. Respondents self-reported the HIV medications they were taking. The ART regimen was verified via each woman's prescription slip or medica-

tion blister pack. All participants received medications at government-run ART clinics per the guidelines of the National AIDS Control Organization.

CD4+ T cell count. Blood samples collected at screening were sent to the district hospital lab for CD4+ T cell count determination by flow cytometry. The absolute numbers of CD4+ T cells were obtained by multiplying percent CD4+ T cell count from flow cytometry by total white blood cell count (determined by Act Diff Coulter). Women with CD4+ T cell counts lower than 100 cells/mm³ were excluded from the study, as these women were generally unable to participate due to extreme physical weakness and greater risk of not being able to complete all follow-up sessions. CD4+ T cells were analyzed as a continuous variable.

Opportunistic infections (OI). Participants were presented with a list of 8 OIs (e.g., tuberculosis, fungal dermatoses) and indicated for each whether they had experienced it in the previous 6 months. We summed the number of OIs selected. The scale was based on the most common OIs endorsed by our collaborating physicians.

Perceived ART symptoms and side effects. A similar procedure to the OI assessment was used with a list of 18 potential ART symptoms and side effects such as vomiting, loss of energy, and changes in body shape due to weight gain/loss.

Food insecurity. The Household Food Insecurity Access Scale (Coates, Swindale, & Bilinsky, 2007) was used to measure food insecurity. This scale used widely in India and elsewhere (Pasricha et al., 2010; Tsai et al., 2011; Vargas Puello, Alvarado Orellana, & Atalah Samur, 2013; Weiser et al., 2011) includes nine items that assess the frequency, in the previous 4 weeks, of worrying about not having enough food (1 item), and perceived insufficient quality (3 items) and quantity of food (5 items), due to a lack of resources. Response options range from 0 = *Never* to 3 = *Often*, and were summed across all items.

Psychological Health

Depression. The 10-item Center for Epidemiological Studies Depression Scale, short version

(Radloff, 1977), was used to measure the frequency and severity of depressive symptoms on a 0 to 3 scale. The Center for Epidemiological Studies Depression Scale has well-established reliability and validity (Radloff, 1977), including in India (Nyamathi, Heravian et al., 2011). Scores were summed, resulting in a range from 0 to 30, with higher scores for greater depressive symptoms. The scale was dichotomized at the suggested cut point of 10 or higher (Zhang et al., 2012) to indicate a need for psychiatric evaluation.

Internalized stigma. A 10-item scale measured the extent to which respondents believed that they deserved to be shunned (five items, e.g., *should avoid visiting people, holding an infant*) or blamed/shamed because of their HIV infection (five items, e.g., *shamed the family, feel guilty*; Steward et al., 2008). Each item had a 4-point response scale (0 = *not at all* to 3 = *a great deal*), and responses were averaged to create a scale score. In prior studies with PLWH in India, the reliability for the entire scale was Cronbach alpha = 0.83 (Ekstrand, Bharat, Ramakrishna, & Heylen, 2012; Steward et al., 2011). In our sample, alpha was 0.66.

Social Factors

Social support. The MOS [Medical Outcomes Study] Social Support Survey (Sherbourne & Stewart, 1991) was used to assess four domains of functional social support: emotional/information support (8 items, e.g., *someone to share your most private worries and fears with*), tangible support (3 items, e.g., *someone to take you to the doctor if you needed it*), positive social interactions (3 items, e.g., *someone to have a good time with*), and affectionate support (3 items, e.g., *someone who shows you love and affection*). Each item was answered on a scale ranging from 1 = *available none of the time* to 5 = *available all of the time*. Per established scoring guidelines, a mean score for each domain was calculated, as well as an overall social support index consisting of all of the above plus one. Reliability ranged from alpha = 0.94 for the overall scale to 0.73 for the positive interactions domain.

One additional item assessed how many friends and relatives the respondent had with whom she felt

at ease and could talk with about what was on her mind (Sherbourne & Stewart, 1991). Given the large amount of 0 responses, we dichotomized this item as *any* (1) versus *none* (0).

Behavioral Factors

Adherence to ART. A self-reported measure assessed adherence to ART via a visual analogue scale (Giordano, Guzman, Clark, Charlebois, & Bangsberg, 2004), in which participants were shown a line with numbered intervals between 0 and 100 and were asked to point to the spot on the line that best represented the percent of pills they took in the past month. This measure has been validated with Indian patients (Ekstrand, Chandy, et al., 2010).

Data Analysis

Categorical variables were described with frequencies and percentages. Summary statistics for continuous variables included mean, standard deviation, median, and range. Bivariate associations of QOL with categorical variables were assessed via the Spearman's r test, and with continuous variables via Pearson correlation coefficient. Those variables bivariately associated with QOL ($p < .20$) were subsequently evaluated in a multiple linear regression model. Only variables associated with QOL at $p < .05$ were retained in the final model. The final model was examined for multicollinearity, heteroscedasticity, and influential outliers. One outlier was detected, but the observation was retained as removing it from the model did not change the findings. Analyses were performed in SPSS version 23 (IBM, Armonk, NY) and R 3.3.0.

Results

As reflected in Table 1, the mean age of the 400 WLWH was 33.8 years ($SD = 6.6$); more than half of the women (51%, $n = 204$) reported no formal education. The women were primarily Hindu (73%, $n = 290$), and more than half (53%, $n = 211$) were widowed. The majority of women (51%, $n = 203$) were on the tenofovir, lamivudine, and efavirenz (TDF, 3TC, EFV) ART medication regimen; mean

time since HIV diagnosis was 51 months ($SD = 35$). Mean percentage of pills taken in the previous month was 30% ($SD = 14$).

Physical and Mental Health

Physical and mental health characteristics of the women are reflected in Table 2. Nearly all women (96% to 100%) experienced symptoms in the areas of fever, lack of energy/fatigue, tingling/numbness in the hands or feet, diarrhea, nausea/upset stomach, and/or change in body shape. Additional symptoms experienced by at least 85% of the women included headaches, dizziness, and vomiting. CD4+ T cell counts lower than 350 cells/mm³ were found in

more than 40% of the women ($n = 165$). OIs reported were numerous and included febrile illness, diarrhea, and fungal dermatosis (90% to 100%); less common OIs included *Pneumocystis carinii*, candida, herpes simplex, tuberculosis, and vaginal discharge (64% to 66%). Mean number of OIs experienced in the previous 6 months was 4.69 ($SD = 1.29$), with a range of 1 to 8. Depressive symptoms were reported by 25.5% of the women ($n = 102$).

Social and Resource Support

In general, the number of close friends or family reported by the women was low; 57% ($n = 227$) reported having no friends or family they could confide in. The highest type of support provided (tangible support) was, on average, 1.25 ($SD = .44$). All other types of support, which included emotional/informational support, positive social interaction, and affectionate support had an average rating of 1.05, which was at the *available none of the time* bottom point of the scale. Overall support reported was $M = 1.10$, $SD = .27$. Stigma findings, on the other hand, were reversed. The average score for internalized stigma, scored on a range of 0 to 3, was 2.29 ($SD = .30$). Food insecurity was likewise rated high by the women, with an average score of 21 ($SD = 3.96$) out of 27.

Quality of Life

QOL scores were almost uniformly low, with minimal dispersion. With a scale range from 0 to 3, the mean QOL score reported by these rural women was 0.38 ($SD = 0.30$). In reviewing the individual items that composed the QOL scale, the percentage of respondents indicating being *very satisfied* ranged from 0.3% ($n = 1$; *satisfaction with money situation*) to 8.3% ($n = 33$, *satisfaction with housing*). Besides housing, sexual drive (6.3%, $n = 25$) was the only other area for which more than 5% of women indicated satisfaction in the previous week.

Bivariate Analysis

A number of variables were positively correlated with QOL scores in the bivariate analyses (Table 3). These included being married (vs. divorce/separated or widowed, $p = .031$) and higher CD4+ T cell

Table 1. Demographic and ART-Related Characteristics of the Sample ($n = 400$)

Measure	<i>n</i>	%
Number of children		
1	134	33.5
2	198	49.5
3-6	68	17.0
Marital status		
Married	157	39.3
Widowed	211	52.8
Divorced/separated	32	8.0
Education		
None	204	51.0
<5 years	66	16.5
5-9 years	78	19.5
≥10 years	52	13.0
Religion		
Hindu	290	72.5
Christian	76	19.0
Muslim	34	8.5
ART regimen		
AZT + 3TC + NVP	124	31.0
AZT + 3TC + EFV	11	2.8
TDF + 3TC + NVP	59	14.8
TDF + 3TC + EFV	203	50.7
TDF + 3TC + ritonavir + atazanavir or lopinavir	3	0.8
	<i>M</i>	<i>SD</i>
Age	33.77	6.57
Percent adherence past month	30.2	14.4
Time since HIV diagnosis, months	50.9	35.3

Note. ART = antiretroviral therapy; AZT = zidovudine; EFV = efavirenz; NVP = nevirapine; TDF = tenofovir disoproxil fumarate; 3TC = lamivudine.

Table 2. Physical and Mental Health Characteristics of the Sample (n = 400)

Measure	n	%
Depression: CES-D short score ≥ 10	102	25.5
Number of close friends/family		
0	227	56.8
1	143	35.8
≥ 2	30	7.5
CD4+ T cell count > 350 cells/mm ³	235	58.8
Symptoms past 6 months endorsed by $> 50\%$ of participants		
Fever	399	99.8
No energy/fatigue	397	99.3
Tingling numbness in hands/feet	389	97.3
Diarrhea	387	96.8
Nausea/upset stomach	385	96.3
Change body shape due to weight gain or loss	383	95.8
Dizziness	379	94.8
Vomiting	377	94.3
Skin rashes	366	91.5
Stomach pain, cramps	356	89.0
Frequent headaches	356	89.0
Depression, mood swings	335	83.8
Trouble sleeping	303	75.8
Opportunistic infections past 6 months		
Febrile illness	398	99.5
Chronic or acute diarrhea	380	95.0
Fungal dermatoses	361	90.3
Herpes simplex/varicella zoster	255	63.7
Candida	252	63.0
<i>Pneumocystis carinii</i>	160	40.0
Tuberculosis	47	11.8
Vaginal discharge/reproductive tract infection	23	5.8
	<i>M</i>	<i>SD</i>
Quality of life (0-3)	0.38	0.30
MOS social support (1-5)		
Emotional/information support	1.08	0.28
Tangible support	1.25	0.44
Positive social interaction	1.08	0.27
Affectionate support	1.04	0.28
Overall social support	1.10	0.27
Internalized stigma (0-3)	2.29	0.30
Food insecurity (0-27)	21.0	3.96
Number of side effects in the past 6 months (0-18)	13.26	1.75
Number of OIs in the past 6 months (0-8)	4.69	1.29

Note. CES-D = Center for Epidemiological Studies Depression Scale; MOS = Medical Outcomes Study; OI = opportunistic infection(s).

count ($r = .123, p = .014$). All types of social support (emotional, tangible, positive interaction,

affectionate, and total support) were highly related with QOL ($r = .174$ to $.251, p < .001$ for all variables). This was likewise true for the variable *Any Support* ($u = .44$ vs. $u = .34$ for *No Social Support*, $p < .001$) or *Having close relative or friends* ($u = .44$ vs. $u = .34$ for *None*, $p < .001$). Alternatively, several variables were significantly negatively related to QOL. This included *Number of OIs in the past 6 months* ($r = -.101, p = .044$) and *Internalized stigma* ($r = -.191, p < .001$). A trend for significant negative relationship for food insecurity and QOL was also observed ($r = -.088, p = .080$).

Multivariate Model

As depicted in Table 4, variables correlated with QOL in the bivariate analysis with $p < .2$ were evaluated using linear regression models. In the final model, greater QOL was found to be significantly associated with higher CD4+ T cells ($+10$ cells/mm³; $b = .0011, p = .021$), and greater social support ($b = .260, p < .0001$). Further, lower QOL was found to be significantly associated with internalized stigma ($b = -.232, p < .0001$). Marital status and number of OIs were no longer significant in the final model.

Discussion

Our cross-sectional study described QOL among WLWH in rural Andhra Pradesh, India. As highlighted by these data, rural WLWH encountered distinct barriers to care that could impose significant consequences on QOL. Furthermore, participants' limited sources of social support, as well as their perceived poor physical and mental health, may have resulted in a universally poor overall QOL. Final multivariate modeling revealed that higher QOL was significantly related to higher CD4+ T cell count and greater social support. Alternatively, lower QOL was significantly related to experiencing internalized stigma.

More than half of the study participants were widowed and without any formal education. Moreover, more than 40% had CD4+ T cell counts of 350 cells/mm³ or lower, while virtually all participants reported experiencing physical symptoms and/or OIs. To compound the problem, mean adherence to the ART regimen was found to be only 30%. High

Table 3. Correlates of QOL Score–Bivariate Analysis

Characteristic	<i>M</i> (<i>SD</i>)	Spearman's <i>r</i>	<i>p</i> -Value
Age in years		−0.078	.118
Marital status			
Married	0.42 (0.27)		.031
Divorce/separated	0.31 (0.26)		
Widowed	0.37 (0.33)		
Number of children			
1	0.35 (0.25)		.263
2	0.38 (0.28)		
≥3	0.46 (0.43)		
Education			
None	0.39 (0.32)		.581
<5 years	0.41 (0.33)		
5–9 years	0.38 (0.25)		
≥10 years	0.33 (0.26)		
Religion			
Hindu	0.39 (0.32)		.094
Muslim	0.28 (0.22)		
Christian	0.4 (0.27)		
Months since HIV diagnosis		0.026	.604
CD4+ T cell count		0.123	.014
Number of OI past 6 months		−0.101	.044
Depressive symptomatology			
No	0.4 (0.31)		.191
Yes	0.35 (0.26)		
Social support			
Emotional support		0.247	<.001
Tangible support		0.197	<.001
Positive interactions		0.251	<.001
Affectionate support		0.174	<.001
Total social support		0.237	<.001
Any social support			
No	0.33 (0.3)		<.001
Yes	0.44 (0.29)		
Any close friends or relatives			
No	0.34 (0.29)		<.001
Yes	0.44 (0.3)		
Internalized stigma		−0.191	<.001
Food insecurity		−0.088	.080

Note. QOL = quality of life; OI = opportunistic infection(s).

prevalence of various OIs may be attributed to geographic inaccessibility, as travel to health clinics, which were primarily located in cities, could be costly and required several hours of travel each way (Nyamathi, Sinha, et al., 2011).

Our findings revealed a significant association between higher QOL and higher CD4+ T cell count. Early diagnosis, linkage to care, and retention in

high-quality HIV care, including access to ART and support for ART adherence, are needed to achieve higher CD4+ T cell counts and improved health outcomes. Adherence to an ART regimen can strongly influence perceived state of health, and result in high levels of QOL. Alternatively, perceived state of health and QOL may influence adherence to treatment.

More than half of our participants reported having no individuals on whom they could depend for social support; moreover, the experience of internalized stigma was high. Being widowed as a result of HIV and high levels of stigma surrounding HIV in Andhra Pradesh may have accounted for low scores in social well-being (Nyamathi et al., 2013), which may likewise have impacted QOL. As other studies have also revealed the significant relationship of social support to greater adherence to ART (Kelly, Hartman, Graham, Kallen, & Giordano, 2014; Nyamathi, Hanson et al., 2012), strategies to increase levels of emotional, tangible, and other types of social support are of high importance to improve both QOL and adherence to ART. Knowledge gained from our study can inform research and treatment that addresses ways to secure social support and strategies to improve adherence to ART and to mitigate experiences of internalized stigma.

While not significant in the multivariable model, participants reported significant insecurity about food availability, a QOL concern that is perhaps more disquieting in rural communities that are directly affected by negative environmental events such as pests and droughts (Heylen et al., 2015). With increasing rates of food insecurity, local governments can institute programs that allocate food to WLWH who are in need, and community physicians and nurses can inform WLWH about existing food programs. For example, in Andhra Pradesh, the government sells 35 kg of rice per HIV-affected family, only for persons showing an HIV card. As WLWH are among the most impoverished citizens in Andhra Pradesh, interventions are needed to combat this disparity.

Limitations

The unique cultural and geographic concerns of WLWH in Andhra Pradesh may confound attempts to extrapolate our data to different communities,

Table 4. Multiple Linear Regression Analysis

Variable	Bivariate Models			Final Multivariable Model		
	β	Standard Error	<i>p</i>	β	Standard Error	<i>p</i>
Age in years	-0.0021	0.0023	.3575			
Marital status (vs. married)						
Divorced/separated	-0.1129	0.0585	.0544			
Widowed	-0.0518	0.0318	.1043			
Religion (vs. Hindu)						
Muslim	-0.1117	0.0547	.0419			
Christian	0.0063	0.0389	.8715			
CD4+ T cell count (+10 cells/mm ³)	0.0012	0.0005	.0238	0.0011	0.0005	.0212
Number of OIs	-0.0359	0.0116	.0021			
Depressive symptomatology	-0.0504	0.0347	.1467			
Total social support	0.3768	0.0535	<.0001	0.2597	0.0579	<.0001
Any close friends or relatives	0.1078	0.0301	.0004			
Internalized stigma	-0.3305	0.0486	<.0001	-0.2319	0.0523	<.0001
Food insecurity	-0.0155	0.0038	<.0001			

Note. OI = opportunistic infection(s).

especially those outside of rural India. Additionally, the cross-sectional nature of the analyses precluded any conclusions of causality between the variables. Furthermore, when interpreting the multivariate results, one needs to keep in mind the limited range of very low QOL and social support actually observed in this sample, which limits conclusions about variables associated with high levels of QOL and potentially also limits generalizability of the findings.

Conclusions

Our findings underscored the severe lack of quality and social support, as well as high levels of depression and internalized stigma for these rural WLWH. We found strong positive associations between QOL and CD4+ T cell count and social support. QOL was negatively associated with internalized stigma. Future interventions to improve QOL for WLWH should incorporate strategies to improve social support, improve adherence to ART, and decrease the experience of stigma. Research is needed to assess the efficacy of health services that are comprehensive and culturally-sensitive in dealing with stigma, treatment of physical and mental health, and social support at the primary health clinics.

Disclosures

The authors report no real or perceived vested interests that relate to this article that could be construed as a conflict of interest.

Key Considerations

- Rural women living with HIV in India encounter distinct barriers to care that may impose significant consequences on quality of life (QOL).
- Participants' limited sources of social support, as well as their perceived poor physical and mental health, may have resulted in a poor overall QOL.
- Higher QOL was significantly related to higher CD4+ T cell count and greater social support.

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