Gender Differences and Psychosocial Factors Associated with Quality of Life Among ART Initiators in Oromia, Ethiopia

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Abstract

Health-related quality of life (HRQoL) is an important outcome to assess among persons living with HIV/AIDS, but few studies have been conducted in sub-Saharan Africa. We examined HRQoL among 1180 ART-initiating adults from six clinics in Ethiopia in 2012–2013, and compared the correlates of two subscale scores between women and men. Women scored significantly higher than men on both overall function (8.4 points higher) and life satisfaction (6.3 points higher). In multivariable models, psychological distress, low CD4+ count, unemployment, and food insecurity were associated with lower quality of life scores among women and men. Men whose last sexual encounter occurred 3 months to 1 year from the interview date had lower overall function and life satisfaction scores. Men between the ages of 30–39 had lower overall function scores. Protestant women and women in the low-middle social support category had lower life satisfaction scores. Assessment of HRQoL over time will help inform HIV care and treatment practices to ensure favorable patient outcomes.

Keywords

Quality of life; Gender differences; ART initiation; Psychosocial factors or variables; Ethiopia

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Introduction

Health-related quality of life (HRQoL) scales have been utilized to measure the effect of both HIV and its treatment on the functional capacity and well-being of persons living with HIV/AIDS (PLWHA) [1, 2]. In the era of antiretroviral therapy (ART), achieving high HRQoL is a priority in the long-term management of PLWHA in the United States and other higher-income countries [3–5]. The construct of HRQoL is based on the World Health Organization's definition of health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" [6] and has been used as a health measure of populations [7]. As life expectancy of PLWHA has increased with the use of ART, and HIV has become a chronic illness [8], HRQoL is of increasing importance. HRQoL has been shown to be a more sensitive marker of symptomatic changes than immunologic/virologic markers [9, 10]. In addition, several studies have reported that HRQoL plays a significant role in retention in care, treatment adherence and survival [11–14]. These studies have shown how patients with the same clinical criteria often have dramatically different responses to treatment. Second, by providing a measure of patient-perceived burden, ART programs can use HRQoL to monitor patient needs and improve retention and engagement in care. Finally, in 2010, Boer-van der Kolk et al. found that patient-reported HRQoL predicted survival among PLWHA independent of clinical and treatment status [13]. It has become increasingly clear that monitoring HRQoL is important for the sustainability of ART programs and the assessment of disease burden.

Prior studies have shown socio-demographic, psychosocial and immunologic factors to be predictive of HRQoL scores [11, 15]. However, few studies have examined these associations in sub-Saharan Africa (SSA)[16, 17]. Because the burden of HIV is greatest in SSA, a better understanding of HRQoL and its determinants among PLWHA is needed in this region [18].

Further, it is important to examine HRQoL scores by gender as men and women tend to experience the social and psychological impact of HIV/AIDS differently [9, 19– 21]. We explored gender differences in HRQoL among PLWHA initiating ART in Ethiopia, where the national prevalence of HIV is 1.5 % (~793,700) and HIV prevalence is almost twice as high among women (1.9 %) than in men (1.0 %) [22]. We also generated additional baseline HRQoL data among ART initiators and focused on the psychosocial correlates of HRQoL.

Data and Methods

Study Population

Participants included in these analyses were recruited in the Multi-level Determinants of Late ART Initiation (LSTART) study, a cross-sectional study conducted from June 2012 through April 2013 to examine the correlates of late ART initiation at six secondary-level urban hospitals in the Oromia State of Ethiopia. Participating health facilities were public sector HIV care and treatment clinics supported by ICAP at Columbia University through funding from the United States President's Emergency Plan for AIDS Relief (PEPFAR). Participant eligibility criteria included the following: at least 18 years of age, had initiated ART within 2 weeks of study enrollment, and consented to structured interviews.

Data Collection

Data collection consisted of patient interviews and use of clinical information routinely collected by clinicians at patient visits. For the interviews, providers referred interested patients to research staff to learn about the study. Research staff screened the patients for eligibility and solicited written informed consent. Consenting individuals completed an interview in Amharic or Oromiffa that lasted approximately 45 min and the questionnaire collected information on sociodemographics, behavior, socio-medical and psychosocial characteristics. Patient data routinely collected at enrollment in HIV care and during each clinic visit was documented by clinicians on national forms. Trained data clerks routinely abstracted relevant clinical data from patients' medical charts and entered them into electronic databases. Data quality assessments were performed every 3 months to assess completeness and accuracy. Interview data were linked with clinic medical records for the period of HIV care enrollment through 12 months after ART initiation and de-identified prior to analysis. The study was approved by the institutional review boards at Columbia University, the City University of New York, and the Oromia Regional Bureau of Health in Ethiopia.

Quality of Life Measurement

Instruments to measure HRQoL have been documented in use since 1973 [23]. The majority of efforts to use such instruments to measure HRQoL in the context of HIV postdate 2000, however [24]. For this reason many measures of HRQoL among PLWHA used instruments adapted from other conditions [25]. To date, no "gold standard" of measurement nor established definition exists for HRQoL in PLWHA [24]. The HIV/AIDS-Targeted Quality of Life (HAT-QoL) instrument, used here, was the first HRQoL measurement tool developed directly from the concerns of PLWHA [25]. The HAT-QoL has been in use since 1996 and has been shown to provide both a reliable and valid measure of HRQoL among symptomatic and asymptomatic HIV-infected persons [25, 26]. While the majority of studies that have used HAT-QoL focused on U.S. populations, it has also been proven to be a reliable measure in resource-limited settings, such as SSA [27, 28].

The HAT-QoL instrument measures the following nine subscales of HRQoL: overall function, life satisfaction, health worries, financial worries, medication worries, HIV mastery, disclosure worries, provider trust, and sexual function [25]. In this study, two of the nine subscales—comprising a total of ten items—were examined: overall function and life satisfaction. All HAT-QoL items addressed the 4 weeks before the date of interview. All questions had the same five-point Likert rated options from 1 (none of the time) to 5 (all of the time). Scores for each subscale were then transformed linearly to a possible range of 0–100, according to a prescribed algorithm [29], with higher values indicating better functioning and higher life satisfaction. The Cronbach's alpha reliability coefficient was 0.96 for the 6-item overall function scale and 0.85 for the 4-item life satisfaction subscale.

Covariates

Hypothesized correlates were chosen a priori based on associations found in the HRQoL literature. Correlates examined included age, marital status, number of children, education, religion, food insecurity, type of residence, electricity, work status, social support, HIV

disclosure status, time from last sexual encounter, psychological distress, time since enrollment in HIV care (in days) and early versus late ART initiation with late ART initiation defined as CD4 < 150 cells/μL or WHO IV.

Social support was assessed using a scale developed by Wortman, et al. for the Coping and Change Study, a psychosocial supplement to the Chicago site of the Multicenter AIDS Cohort Study [30, 31]. Response options for each item of the scale were ranked from 1 to 5, where 1 = none and 5 = all of the time. Higher scores represented higher levels of social support, and total scores were divided into categories by quartiles of the distribution among all respondents. Both food insecurity and electricity were assessed as dichotomous variables. Psychological distress was measured using the Kessler-10 Psychological Distress Scale where raw scores were divided based on cut-off levels [32].

Data Analysis

Categorical socio-demographic, psychosocial, and clinical variable distributions were compared between men and women using χ^2 tests. Wilcoxon rank-sum non-parametric tests were used to compare gender differences in median time from enrollment in HIV care and age. Univariate tests were used to examine measures of central tendency and dispersion for all variables.

Gender-stratified bivariate and multivariable linear regression analyses were performed to determine factors associated with HAT-QoL score. All factors associated at $p < 0.10$ in bivariate models were included in multivariable models. Multivariable models controlled for the following factors: age, marital status, number of children, religion, food insecurity, work status, social support, time from last sexual encounter, psychological distress, and early versus late ART initiation. All analyses were conducted using SAS version 9.3 (SAS Institute Inc., Cary, NC, USA).

Results

Participant Characteristics

Characteristics of all 1180 participants (458 males and 722 females) are shown by gender in Table 1. The majority of participants were women (61 %) and resided in urban settings (78 %) with a median age of 34 years (IQR 28–40). Most participants reported less than secondary education levels (72 %). The median time from enrollment in care to ART initiation was 88 days (IQR 16–940).

By gender, a higher proportion of men (43 %) than women (24 %) initiated ART late ($p < 0.0001$). A higher proportion of men reported being married (65 vs. 46 %; $p < 0.0001$) and employed for payment (92 vs. 67 %; $p < 0.0001$). Women tended to be younger (median age 30 vs. 37 years for men; $p < 0.0001$) and a greater proportion of women reported food insecurity (24 vs. 18 %; $p = 0.11$).

HAT-QoL Scores

All participants, regardless of gender, scored lower on the life satisfaction subscale (mean score = 51, SD = 26.2) compared to the overall function subscale (mean score = 62, SD =

29.4). Women scored significantly higher than men on both of the subscales: 8.4 points higher on overall function (median score = 66.7 vs. 58.3; p = 0.01) and 6.3 points higher on life satisfaction (median score = 56.3 vs. 50; p = 0.02), Fig. 1.

Correlates of HAT-QoL Scores

In bivariate analyses, the following variables were associated with lower HAT-QoL scores at the p < 0.10 level for both subscales, among men and women: being single (ref: married), food insecurity, longer time from last sexual encounter, higher levels of psychological distress, and late ART initiation. Greater social support was significantly associated with HAT-QoL scores among both men and women. Among women, Muslims and Protestants reported lower HAT-QoL scores compared to those of other religions. Men who were between the ages of 30–39, unemployed, had fewer than three children, and disclosed HIV status to two or more people reported lower HAT-QoL scores.

In the multivariable model for overall function, mild psychological distress (reference (ref): low distress; β = −21.1, 95 % CI −25.8 to −16.5, p < 0.0001 for men; β = −19.6, 95 % CI −23.6 to −15.7, p < 0.0001 for women) and high psychological distress (ref: low distress; β = −48.4, 95 % CI −53.1 to −43.7, p < 0.0001 for men; β = −45.0, 95 % CI −49.1 to −40.9, p < 0.0001 for women), unemployment (ref: working for cash or in-kind); β = −12.7, 95 % CI −19.5 to −5.8, p = 0.0003 for men; β = −4.1, 95 % CI −7.6 to −0.5, p = 0.0233 for women) and late ART initiation (ref: early initiation; β = −6.7, 95 % CI −10.7 to −2.7, p = 0.0010 for men; β = −9.8, 95 % CI −13.7 to −5.8, p < 0.0001 for women) were independently associated with lower HAT-QoL scores, Table 2. Men between the ages of 30–39 (ref: 40 years; β = −5.3, 95 % CI −10.8 to 0.1, p = 0.05) also had lower scores. Men who reported their last sexual encounter occurring 3 months to 1 year from the interview date had lower overall function scores (ref: past 30 days; β = −8.2, 95 % CI −13.7 to −2.7, p = 0.0035).

With regards to life satisfaction, mild psychological distress (ref: low distress; β = −19.5, 95 % CI −23.5 to −15.5, p < 0.0001 for men; β = −17.2, 95 % CI −20.7 to −13.6, p < 0.0001 for women) and high psychological distress (ref: low distress; β = −41.7, 95 % CI −45.8 to −37.6, p < 0.0001 for men; β = −37.0, 95 % CI −40.7 to −33.3, p < 0.0001 for women), food insecurity (ref: never; β = −7.6, 95 % CI −12.4 to −2.7, p = 0.0022 for men; β = −11.1, 95 % CI −15.3 to −6.9, p < 0.0001 for women), and late ART initiation (ref: early initiation; β = −5.6, 95 % CI −9.1 to −2.2, p = 0.0014 for men; β = −5.9, 95 % CI −9.5 to −2.4, p = 0.0010 for women) remained strong correlates, Table 3. Unemployed men (β = −6.0, 95 %CI−12.0 to−0.09, p = 0.0465) and those who reported their last sexual encounter occurring 3 months to 1 year from the interview date (β = −5.9, 95 %CI−10.6 to −1.1, p = 0.0155) had lower life satisfaction scores. Protestant women (ref: Ethiopian Orthodox; β = −3.9, 95 % CI −7.5 to −0.4, p = 0.0279) and those in the low-middle social support category (ref: high social support; β = −4.8, 95 % CI −9.0 to −0.6, p = 0.0234) also scored lower on the life satisfaction subscales.

Discussion

The rapid scale-up of ART in SSA over the past decade has both increased life expectancy and reduced HIV-related morbidity in this region [33]. Barriers to care and treatment still

exist [34, 35], however, including those in the realms of the psychosocial and socio-medical aspects of living with HIV/AIDS. Although psychosocial barriers to accessing care and treatment, such as stigma and HIV knowledge, have been well described in this region [36–38] less attention has been paid to socio-medical aspects such as HRQoL [16]. The assessment of HRQoL is central to understanding how people are affected by HIV infection and how this may, in turn, affect utilization of care across the HIV care continuum.

Our study results showed that elevated levels of psychological distress and late ART initiation were significantly associated with lower overall function and life satisfaction scores among men and women. The observed association between psychological distress and HRQoL is consistent with prior research from the region [39]. Although the cause of psychological distress is beyond the scope of this study, the availability of ongoing counseling services to PLWHA has been shown to help mitigate the trauma or other psychological effects that may result from receiving an HIV diagnosis, navigating complex drug regimens, or isolation caused by stigma [40, 41]. Our findings that persons who initiated treatment late (CD4+ count <150 cells/μL or WHO stage 4) had lower HAT-QoL scores than those with less advanced disease were also consistent with studies performed in other resource-limited settings that showed a strong correlation between clinical indicators and HRQoL [2, 12]. Both unemployed men and women reported lower overall function scores but the effect of unemployment on HAT-QoL scores was larger in men. Unemployment may reflect both poorer function and mental well-being directly influencing reported HRQoL [15]. In addition, unemployment may be more strongly associated with HRQoL among men as compared to women due to the higher labor participation rates of men in our study population. Lastly, food insecurity was associated with lower life satisfaction scores for both genders. In women, the effect of food insecurity on HRQoL was larger than for men. Food insecurity affects millions of households in SSA [42] and women tend to play a larger role in domestic responsibilities in this region [43].

Other factors associated with HRQoL varied by gender. Among women, Protestants reported lower life satisfaction scores than Ethiopian Orthodox, but the latter represented the majority of participants (>60 %). Women in the low-middle social support category also reported lower life satisfaction scores than women in the top social support category. Studies have shown that women may be more vulnerable to HIV-related stigma and social support may be a protective resource for mental health and quality of life among HIV-infected women [44]. For men, longer time from last sexual encounter and lack of employment were associated with both lower overall function and life satisfaction scores. Time from last sexual encounter and employment status may serve as indicators of functional status and, hence, may directly affect measures of overall function, in particular [3].

The study has several strengths as it represents one of the first studies to utilize HAT-QoL in Ethiopia and in an HIV-infected population at ART initiation. Measures of HRQoL in SSA have mainly focused on medication-related physical effects experienced by ART users [45]. However, social and psychological issues experienced by ART users can also play a pivotal role in HRQoL and influence health outcomes [18, 46]. By examining baseline HRQoL among ART initiators, our study focused on psychosocial correlates of HRQoL beyond the anticipated effects of ART. The study included a large and diverse sample of participants and

stratified by gender. It also utilized both clinical data as well as systematically assessing HRQoL through use of an established survey instrument.

Our study has some limitations worth noting. First, due to its cross-sectional design, we were unable to establish temporal associations between the covariates examined and HAT-QoL scores. However, our parameters were chosen a priori based on established literature of HRQoL predictors both in SSA and resource-rich regions, and our results were consistent with previous findings from both cross-sectional and prospective studies [3, 15, 41, 42]. Other limitations of our study included that we did not use the full HAT-QoL questionnaire. Due to the length of the study questionnaire, our study was limited to subscales exploring overall function and life satisfaction.

In Ethiopia, where an estimated 793,700 people are living with HIV [22], gender disparities exist not only in the prevalence of HIV/AIDS, but in the social, economic, and psychological impact of HIV/AIDS [47]. Additional information on HIV/AIDS-related outcomes, such as HRQoL, stratified by gender, should be identified for interventions specifically targeted to ART initiating patients to improve long-term health outcomes. Further research is needed to assess change in HRQoL over time to help inform HIV care and treatment and ensure favorable outcomes for all patients.

Acknowledgments

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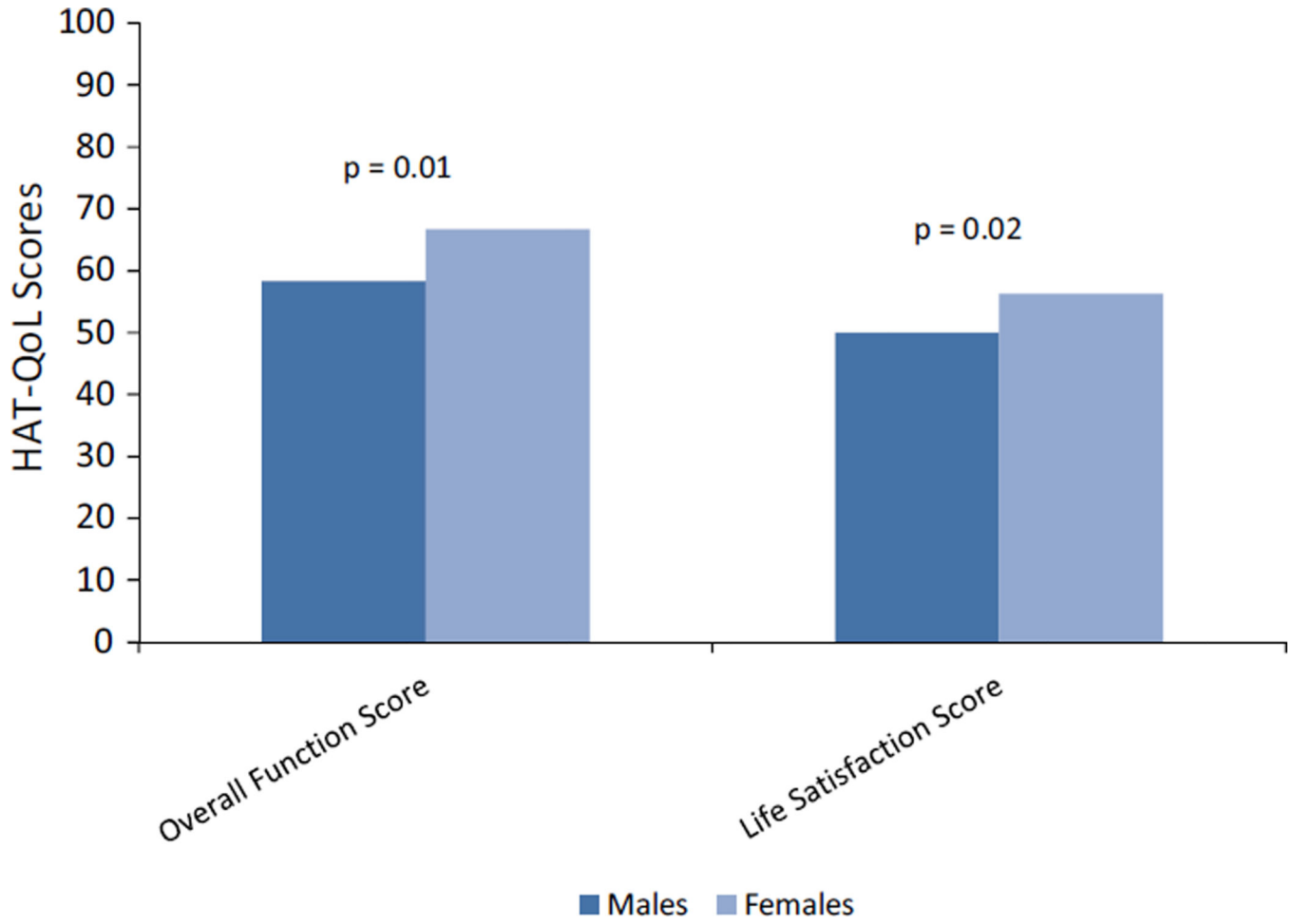
Fig. 1.
Median *HAT-QoL scores by gender, 2012–2013, Oromia, Ethiopia. *Defined as HIV/ AIDS-targeted quality of life instrument where scale = 0 to 100. Higher scores = higher quality of life

Table 1

Participant characteristics by gender, 2012–2013, Oromia, Ethiopia

	(N = 1180)					P value
	Male			**Female**		
	N	**% or median/IQR**		**N**	**% or median/IQR**	
Number	458	38.8 %		722	61.2 %	
Age (in years)						
<29	78	17.0		296	41.0	
30–39	205	44.8		277	38.4	
40	175	38.2		149	20.6	<0.0001
Relationship status						
Married	297	64.8		335	46.4	
Not married/single	160	34.9		382	52.9	
Missing	1	0.2		5	0.7	<0.0001
Children						
None	112	24.4		141	19.5	
1–2	172	37.5		338	46.8	
3–4	120	26.2		144	19.9	
5	53	11.6		99	13.7	
Missing	1	0.2		0	–	<0.05
Education						
None	92	20.1		282	39.0	
Any primary	200	43.7		273	37.8	
Any secondary	111	24.2		126	17.4	
Any tertiary	48	10.5		34	4.7	
Vocational or other	6	1.3		5	0.7	
Missing	1	0.2		2	0.3	<0.0001
Religion						
Ethiopian orthodox	323	70.5		501	69.4	
Protestant	85	18.5		154	21.3	

	(N = 1180)				P value
	Male		**Female**		
	N	% or median/IQR	N	% or median/IQR	
Musim	47	10.3	61	8.4	
No religion/other[a]	3	0.6	5	0.7	
Missing	0	–	1	0.1	0.54
Food insecurity					
Never	172	37.5	250	34.6	
Ever	284	62.0	470	65.1	
Missing	2	0.4	2	0.3	0.11
Type of residence					
Rural	122	26.6	137	18.9	
Urban	335	73.1	585	81.0	
Missing	1	0.2	0	–	<0.05
Electricity					
Yes	344	75.1	581	80.5	
No	114	24.9	140	19.4	
Missing	0	–	1	0.1	0.06
Work status					
Cash or in-kind	419	91.5	485	67.1	
Not working for payment	39	8.5	235	32.6	
Don't know/refused	0	–	2	0.3	<0.0001
Social support					
Bottom 25 %	110	24.0	188	26.0	
Low-middle 25 %	139	30.3	166	23.0	
Middle-high 25 %	128	27.9	164	22.7	
Top 25 %	81	17.7	204	28.2	<0.0001
Disclosed (number)					
No one	86	18.8	81	11.2	
1 person	160	34.9	262	36.3	
2–5 people	145	31.7	251	34.8	

(N = 1180)	Male		Female		P value
	N	% or median/IQR	N	% or median/IQR	
>5 people	67	14.6	128	17.7	<0.05
Time since last sexual intercourse					
Within last 30 days	158	34.4	213	29.5	
>30 days–3 months	75	16.3	71	9.8	
3 months–1 year	95	20.7	123	17.0	
>1 year/never	130	28.5	315	43.7	<0.0001
Kessler distress category[b]					
None or low	175	38.3	305	42.2	
Mild or moderate	140	30.5	208	28.9	
High	142	30.9	205	28.4	
Missing	1	0.2	4	0.6	0.36
ART WHO stage					
Stage 1	68	15.0	188	26.0	
Stage 2	128	27.9	205	28.5	
Stage 3	240	52.3	299	41.4	
Stage 4	18	3.9	27	3.7	
Missing	4	0.9	3	0.4	<0.0001
Enroll WHO stage					
Stage 1	99	21.8	279	38.6	
Stage 2	134	29.2	174	24.2	
Stage 3	193	42.0	222	30.7	
Stage 4	15	3.3	16	2.2	
Missing	17	3.7	31	4.3	<0.0001
ART CD4 category					
<100 cells/µL	109	23.7	108	14.9	
100–250 cells/µL	208	45.5	252	35.0	
250 cells/µL	109	23.7	285	39.4	
Missing	32	7.0	77	10.7	<0.0001

(N = 1180)	Male		Female		P value
	N	% or median/IQR	N	% or median/IQR	
ART initiation status					
Early	257	56.6	551	76.4	
Late	198	43.4	170	23.6	<0.0001
Days from enrollment in HIV care	455/458	33.0 (14.0, 523.0)	721/722	160.0 (19.0, 1142.0)	<0.0001

IQR interquartile range

[a] Other religion category = Catholic, Traditional, Other, and Other Christian

[b] Defined as the Kessler Psychological Distress Scale (K10) where <20 = well, 20–29 = mild/moderate, 30 = severe

Table 2

Parameter estimates from a multivariable linear regression model of overall function by gender, 2012–2013, Oromia, Ethiopia

Parameter	Men (n = 451)					Women (n = 708)				
	Estimates	SE	95 % CI		p-value	Estimates	SE	95 % CI		p-value
			Lower cl	Upper cl				Lower cl	Upper cl	
Age category in years (ref: 40)										
29	−5.09	3.08	−11.15	0.98	0.10	−2.98	2.65	−8.17	2.22	0.26
30–39	−5.35	2.78	−10.80	0.11	0.05	−1.25	1.89	−4.97	2.46	0.51
Marital status (ref: married)										
Single/not married	−0.50	2.70	−5.81	4.80	0.85	−3.12	2.23	−7.49	1.25	0.16
Children (ref: 5)										
None	0.94	4.10	−7.12	9.01	0.82	−1.97	3.17	−8.20	4.25	0.53
1–2	−0.12	3.47	−6.95	6.71	0.97	−1.08	2.85	−6.68	4.52	0.70
3–4	2.60	3.39	−4.05	9.26	0.44	−3.48	2.98	−9.32	2.37	0.24
Religion (ref: Ethiopian Orthodox)										
No religion/other	−2.28	11.58	−25.04	20.47	0.84	12.53	9.52	−6.16	31.22	0.19
Muslim	1.26	3.27	−5.16	7.68	0.70	−2.98	3.05	−8.97	3.01	0.33
Protestant	−4.42	2.50	−9.32	0.49	0.08	−3.53	2.00	−7.47	0.40	0.08
Food insecurity (ref: never)										
Ever	−0.11	2.84	−5.69	5.47	0.97	−2.63	2.37	−7.29	2.04	0.27
Work status (ref: cash or in-kind)										
Not working	−12.68	3.48	−19.53	−5.84	<0.05	−4.10	1.80	−7.63	−0.56	<0.05
Social support (ref: top 25 %)										
Bottom 25 %	0.20	3.27	−6.23	6.64	0.95	0.28	2.38	−4.40	4.96	0.91
Low-middle 25 %	3.85	2.94	−1.93	9.63	0.19	−2.09	2.37	−6.74	2.57	0.38
Middle-high 25 %	3.83	2.93	−1.92	9.58	0.19	0.35	2.29	−4.14	4.83	0.88
Last sexual encounter (ref: past 30 days)										
>1 year/never	−4.33	2.78	−9.79	1.12	0.12	−1.45	2.61	−6.57	3.67	0.58
3 months–1 year	−8.20	2.79	−13.68	−2.71	<0.05	−1.52	2.63	−6.67	3.64	0.56
>30 days–3 months	−3.36	2.89	−9.03	2.32	0.25	4.50	2.99	−1.37	10.36	0.13

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Parameter	Men (n = 451)					Women (n = 708)				
	Estimates	SE	95 % CI		p-value	Estimates	SE	95 % CI		p-value
			Lower cl	Upper cl				Lower cl	Upper cl	
Psychological distress (ref: none or low)										
High	−48.43	2.39	−53.13	−43.73	<0.0001	−44.98	2.09	−49.08	−40.88	<0.0001
Mild or moderate	−21.14	2.36	−25.78	−16.49	<0.0001	−19.65	2.02	−23.61	−15.69	<0.0001
Late ART status (ref: early initiation)										
Late initiation	−6.69	2.03	−10.68	−2.71	<0.05	−9.77	2.01	−13.73	−5.82	<0.0001

Correlates examined at the bivariate level included age, marital status, number of children, education, religion, food insecurity, type of residence, electricity work status, social support, HIV disclosure status, time from last sexual encounter, psychological distress, time since enrollment in HIV care (in days) and early versus late ART initiation with late ART initiation defined as CD4 < 150 cells/μL or WHO IV. All variables associated at p < 0.10 in bivariate models were included above

Estimates greater than 1 are better

CI confidence interval, *SE* standard error

Table 3

Parameter estimates from a multivariable linear regression model of life satisfaction by gender, 2012–2013, Oromia, Ethiopia

Parameter	Males (n = 451)					Females (n = 708)				
	Estimates	SE	95 % CI Lower cl	Upper cl	p-value	Estimates	SE	95 % CI Lower cl	Upper cl	p-value
Age category in years (ref: 40)										
29	0.27	2.68	−5.00	5.53	0.92	0.28	2.37	−4.37	4.93	0.91
30–39	−2.11	2.41	−6.84	2.63	0.38	−1.96	1.69	−5.29	1.37	0.25
Marital status (ref: married)										
Single/not married	0.38	2.34	−4.22	4.98	0.87	−1.14	1.99	−5.06	2.77	0.57
Children (ref: 5)										
None	−4.20	3.56	−11.21	2.80	0.24	−4.13	2.84	−9.71	1.44	0.15
1–2	−4.65	3.02	−10.58	1.28	0.12	−1.14	2.55	−6.15	3.88	0.66
3–4	1.21	2.94	−4.57	6.99	0.68	−2.05	2.67	−7.29	3.19	0.44
Religion (ref: Ethiopian Orthodox)										
No religion/other	−12.25	10.05	−32.00	7.51	0.22	9.54	8.53	−7.20	26.28	0.26
Muslim	−0.13	2.84	−5.71	5.45	0.96	−2.70	2.73	−8.06	2.66	0.32
Protestant	−3.10	2.17	−7.36	1.16	0.15	−3.95	1.79	−7.48	−0.43	<0.05
Food insecurity (ref: never)										
Ever	−7.59	2.46	−12.43	−2.75	<0.05	−11.13	2.13	−15.30	−6.95	<0.0001
Work status (ref: cash or in-kind)										
Not working	−6.04	3.02	−11.98	−0.09	0.05	−2.11	1.61	−5.28	1.06	0.19
Social support (ref: top 25 %)										
Bottom 25 %	−1.57	2.84	−7.16	4.02	0.58	−0.76	2.14	−4.95	3.43	0.72
Low-middle 25 %	1.67	2.55	−3.35	6.69	0.51	−4.82	2.12	−8.99	−0.65	< 0.05
Middle-high 25 %	1.77	2.54	−3.22	6.76	0.49	−0.96	2.05	−4.98	3.06	0.64
Last sexual encounter (ref: past 30 days)										
>1 year/never	−2.99	2.41	−7.73	1.75	0.22	−0.09	2.33	−4.68	4.49	0.97
3 months–1 year	−5.89	2.42	−10.65	−1.13	< 0.05	−2.79	2.35	−7.41	1.82	0.24
>30 days–3 months	0.69	2.51	−4.24	5.62	0.78	2.23	2.67	−3.02	7.48	0.40

Parameter	Males (n = 451)						Females (n = 708)					
	Estimates	SE	95 % CI		p-value		Estimates	SE	95 % CI		p-value	
			Lower cl	Upper cl					Lower cl	Upper cl		
Psychological distress (ref: none or low)												
High	−41.69	2.08	−45.77	−37.61	< 0.0001		−37.00	1.87	−40.67	−33.32	< 0.0001	
Mild or moderate	−19.52	2.05	−23.55	−15.49	< 0.0001		−17.16	1.81	−20.71	−13.61	< 0.0001	
Late ART status (ref: early initiation)												
Late initiation	−5.66	1.76	−9.12	−2.20	< 0.05		−5.94	1.80	−9.48	−2.40	< 0.05	

Correlates examined at the bivariate level included age, marital status, number of children, education, religion, food insecurity, type of residence, electricity work status, social support, HIV disclosure status, time from last sexual encounter, psychological distress, time since enrollment in HIV care (in days) and early versus late ART initiation with late ART initiation defined as CD4 < 150 cells/μL or WHO IV. All variables associated at p < 0.10 in bivariate models were included above

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