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## Gendered differences in perceptions and reports of wellbeing: A cross-sectional survey of adults on ART in Malawi

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### Abstract

Few studies have examined gender differences in reported quality of life among persons living with HIV (PLWH) in low-income countries. We conducted a cross-sectional survey of adults on antiretroviral therapy in Malawi, including questions focused on wellbeing, and collected clinical data on these respondents. We compared men's and women's self-reported health and wellbeing using Poisson models that included socio-demographic covariates. Approximately 20% of respondents reported at least one physical functioning problem. In multiple variable models, men were significantly more likely to have a high viral load ( > 200 copies/mL; aIRR 2.57), consume alcohol (aIRR 12.58), receive no help from family or friends (aIRR 2.18), and to feel worthless due to their HIV status (aIRR 2.40). Men were significantly less likely to be overweight or obese (aIRR 0.31), or report poor health (health today is not "very good;" aIRR 0.41). Taken together, despite higher prevalence of poor self-rated health, women were healthier across a range of objective dimensions, with better viral suppression, less alcohol use, and less social isolation (although they were more likely to have an unhealthy BMI). Research that includes multi-dimensional and gender-specific measurement of physical, mental and social health is important for improving our understanding of well-being of PLWH.

### Keywords

HIV; ART; self-rated health; viral load; gender

### Introduction

Treatment with antiretroviral therapy (ART) is lengthening the life expectancy of adults living with HIV (Nakagawa, May, & Phillips, 2013); however, there is little research to understand this population's health and wellbeing beyond traditional HIV clinical outcomes

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(Catalan, Tuffrey, Ridge, Rosenfeld, & Team, 2017; High et al., 2012; Safreed-Harmon et al., 2019). A more comprehensive perspective on living with HIV is important, including health-related quality of life (Harris, Rabkin, & El-Sadr, 2018; Lazarus et al., 2016).

Previous studies with established ART clients have identified gender differences in health-related quality of life for adults living with HIV. Compared to men living with HIV, women living with HIV report worse quality of life and physical functioning (Rodolfo Castro et al., 2019; Hanass-Hancock, Myezwa, & Carpenter, 2015; Hestad et al., 2012; Kobayashi et al., 2019; Maki PM, 2018; Mbada CE, 2013; J. Mrus, Williams PL, Tsevat J, Cohn SE, Wu AW, 2005; J. M. Mrus, Williams, Tsevat, Cohn, & Wu, 2005; Musumari et al., 2019; Mutabazi-Mwesigire, Katamba, Martin, Seeley, & Wu, 2015; Tianyi, Agbor, Njamnshi, & Atashili, 2019; Zunzunegui et al., 2007). Conversely, while men living with HIV have reported higher self-reported health and quality of life (Rodolfo Castro et al., 2019; Jones DJ, 2003; J. Mrus, Williams PL, Tsevat J, Cohn SE, Wu AW, 2005), they often present with lower CD4 counts (“Differences Between HIV-Infected Men and Women in Antiretroviral Therapy Outcomes — Six African Countries, 2004–2012,” 2013; Kipp et al., 2010) and have worse ART outcomes than women (Kipp et al., 2010). Additional studies have shown that longer duration on ART may lead to worse Health Related Quality of Life (HRQoL) overall among both men and women, though differences between the genders have not been explored in this light (Munene & Ekman, 2014; Polsky D, 2005). This evidence suggests that gender-specific programming is needed to improve both subjective and objective health measures -- however, evidence from high-burden settings in Africa is relatively scarce (Cornell et al., 2015; Hanass-Hancock et al., 2015; Kipp et al., 2010), and there has been little exploration of how health, wellbeing and quality of life measures correlate with one another. We conducted this study to assess differences in reported health and wellbeing between men and women on ART in Malawi. We compared women and men’s self-reported health and wellbeing using surveys conducted with established adult (≥ 30 years of age) ART clients in Malawi.

## Methods

### Study design:

This was a cross-sectional study of adults living with HIV who come to Partners in Hope Medical Center in Lilongwe, Malawi for their ART appointments and HIV care.

### Eligibility Criteria:

All participants were ≥ 30 years old, had been on ART for at least two years, and had no urgent health concerns at the time of survey.

### Site and respondent selection:

The study was conducted at Partners in Hope Medical Center, which operates a free HIV treatment program in Lilongwe, Malawi. Potential respondents were identified from the clinic waiting area through a convenience sampling process in which people in the line for ART appointments were randomly invited to participate in the study. Trained research assistants informed potential respondents about the study and assessed eligibility (≥ 30 years

old and on ART for at least two years). Eligible and interested individuals provided oral informed consent before beginning the survey.

### Data collection:

The survey tool included previously-validated questions on self-rated health (Deaton, 2008), social relationships (Cornwell, Schumm, Laumann, & Graber, 2009), cognition (Ofstedal, Fisher, & Herzog, 2005), symptoms of depression using the Center for Epidemiological Studies – Depression (CESD) tool (LS, 1977; Polsky D, 2005), substance use (Chang et al., 2019), physical functioning (Payne, Gomez-Olive, Kahn, & Berkman, 2017), and HIV-related stigma (Catalan et al., 2017). The survey was administered orally in Chichewa (local language of Malawi) by experienced Malawian research assistants. HIV outcomes were abstracted from respondents' medical records, including current ART regimen, adherence (as determined through medical chart review, good adherence as defined as 95%), and most recent viral load measurement (Asangbeh, Sobngwi, Ekali, Eyoum, & Msellati, 2016). Data were collected between June 10–28, 2019. Data were collected by two research assistants (one male, one female) who had previous experience with data collection. Both research assistants underwent a week-long training to help them understand the meaning behind all survey questions, and to practice administering the survey with as little bias as possible. The research assistants were native Malawians who were fluent in Chichewa, the language in which all surveys were administered. Additionally, participants were gender-matched to the research assistant administering the survey, to help alleviate gender bias (Catania JA, 1996; West & Blom, 2016). Further details about survey design and construction have been previously published (Moucheraud et al., 2021).

### Outcome variables:

The main health and wellbeing variables studied here were: reported health behaviors, self-rated health, mental health, cognitive functioning, and dimensions of intimate relationships. The two reported health behaviors of interest were alcohol consumption, operationalized as any current alcohol consumption versus none (dichotomous variable), and physical functioning, operationalized as the presence of at least 1 physical functioning challenge (activities of daily living e.g., walking, dressing, bathing, eating, etc.) versus no reported physical functioning challenges (dichotomous variable). Self-rated health was classified dichotomously as “very good” versus any other response (“good,” “moderate,” or “bad”). Symptoms of depression were considered present if the respondent attained a score of 16 or greater on the CESD questions per standard approach (dichotomous variable) (LS, 1977; Tuthill et al., 2019); cognitive functioning was based on a score that incorporated performance on a word recall task and ability to name common items (possible range: 0–27; higher score indicates better cognitive functioning). Lastly, dimensions of intimate relationships were operationalized through two dichotomous questions: first, whether the respondent reported receiving help from family or friends (e.g., with personal care, household help, financial help, etc.), and second, whether the respondent reported ever feeling worthless due to their HIV status (strongly agree or agree, versus disagree or strongly disagree).

### Data analysis:

Sample characteristics were compared using chi-square tests for categorical variables (employment was tested using a Fisher's exact test due to small cell sizes), and continuous variables were compared using a t-test for difference in mean values. Multiple variable Poisson models were used to compare men and women on the above-described key outcomes; we report adjusted incident rate ratios (aIRRs) (the exponentiated coefficients from these Poisson models) and predicted probabilities based on margins from these models (at the mean value of all covariates). All regression models and predicted probabilities included covariates for age (continuous), educational attainment (categorical: no formal education, some primary school, completed primary school, some secondary school, completed secondary school, or pursued higher education), employment status (categorical: not working, casual or household-based work, or wage work), household wealth (quintiles based on an asset index), year of ART initiation, and current marital status (dichotomous: married, or not i.e., single, dating, separated/divorced, or widowed), and all used robust standard errors. Analyses were conducted using Stata v14 and p-values < 0.05 were considered statistically significant. Four respondents were missing data on recent viral load and time since starting ART, so were excluded from these analyses. No other data were missing.

### Ethical review:

Approval was obtained from the Institutional Review Boards at the University of California Los Angeles and the Malawi National Health Science Research Committee. No names or other identifying information were recorded.

### Results

A total of 205 clients were approached for participation. Twenty-eight clients declined to interview, and 177 clients expressed interest. Of these, 18 clients were screened out (7 due to being <30 years of age, 10 due to being on ART for less than 2 years, and 1 due to not feeling well that day), and 159 clients were ultimately interviewed. Twenty-five clients ended their interview early. Ultimately, 134 respondents completed the survey, of which around half were women (n=66). Respondents ranged in age from 30–88 years (no significant gender difference in average age: 50 years and 51 years for women and men, respectively) (Table 1). Approximately half of the sample had completed primary school or beyond, and although a greater share of women had lower levels of educational attainment, this difference was not statistically significant. More women were unemployed (30.3% versus no men), and more men were formally employed (i.e. not casual or agricultural workers) (35.3% versus 15.2% of women). Significantly more men than women were currently married (85.3% versus 43.9%); only one man was a widower, compared to approximately one-third of women who were widows. Both men and women were enrolled in the ART program for 9 years on average, and the most common ART regimen for both groups was tenofovir/lamivudine/dolutegravir (42.4% of women and 63.2% of men), although significantly more women were taking other ART regimens.

More men than women had a high viral load (  $> 200$  copies/mL) (21.9% of men versus 10.8% of women), and had worse adherence (32.3% of men had adherence below 95% at their most recent visit, compared with 18.5% of women). More men reported consuming alcohol (25.0% of men versus 3.0% of women) and tobacco products in the past 30 days (data not included in Table 1: 6 men versus 1 woman).

More women reported problems with physical functioning (ability to complete activities required for daily living e.g. mobility, dressing, bathing, eating) (24.2% of women versus 16.8% of men). Women exhibited better cognitive functioning than men (average score of 17.3 points versus 16.0 points on a 27-point scale adapted from the OCS-plus scale validated in South Africa (Humphreys et al., 2017) ). Women were more likely to be classified as overweight or obese, with 42.4% of female respondents having a BMI  $\geq 25$  versus only 14.7% of men.

A number of mental and relational health challenges were reported more commonly by men than women. More men (47.1%, compared to 39.4% of women) exhibited symptoms of depression. Men were also significantly less likely to report receiving help (personal care, household help, financial help, etc.) from a loved one: over half of men (54.4%) said that they received no such help, versus 24.2% of women. Additionally, nearly 40% of men said they ever felt worthless because of their HIV status, versus 21.2% of women who reported this.

Despite the numerous health challenges faced in this population, 34.3% self-reported having “very good health” on the day of the survey. However, this differed by gender: fewer than 10% of female respondents reported their health as “very good,” compared to over 58% of men. For both genders, there was no correlation between reporting being in “very good health” and either viral suppression, reported ART adherence, physical functioning, being overweight/obese, or reporting symptoms of depression (Appendix).

In adjusted models that included covariates for respondent background characteristics (age, educational attainment, employment, marital status, socioeconomic status, and year of ART initiation), men remained significantly more likely to have a high viral load (aIRR 2.57, 95% CI 1.09, 6.07), consume alcohol (aIRR 12.58, 95% CI 1.49, 106.57), receive no help from loved ones (aIRR 2.18, 95% CI 1.20, 3.96), and report sometimes feeling worthless due to their HIV status (aIRR 2.40, 95% CI 1.30, 4.42). They remained significantly less likely to report having “not very good” health on the day of the interview (aIRR 0.41, 95% CI 0.30, 0.57) (Table 2).

## Discussion

These results suggest important gender differences in reported health and wellbeing among older adults living with HIV – and a low correlation between self-rated health indicators and clinical outcomes. In this surveyed population of established ART clients in Malawi, men were significantly more likely to report challenges around mental health and social relationships than women, while women were more likely to report worse health as well as physical functioning and cognition challenges, despite having higher rates of viral

suppression. Men were also less likely to be virally suppressed and adhere well to ART regimens and were more likely to consume alcohol than women.

The significantly worse health status and health behaviors of men in this population – and their increased likelihood of reporting lack of social support, depressive symptoms, and challenges around HIV stigma – suggest a potentially important cluster of challenges. Studies from elsewhere in Africa among adults living with HIV have found a correlation between stigma and worse quality of life (Holzemer et al., 2009), and that social support can bolster ART adherence and improve quality of life (Ncama et al., 2008). These studies have shown how ART systems incorporating community and increased support systems can create better ART adherence and overall wellbeing among this population (Merten et al., 2010; Russell et al., 2016). Additional studies elsewhere in the world have shown important correlations between stigma and lower rates of ART adherence and other HIV-health related behaviors in PLWH, supporting the conclusion that increased stigma may have a detrimental effect on ART adherence (Earnshaw, Smith, Chaudoir, Amico, & Copenhaver, 2013). However, many of these studies have focused on measuring these relationships among women – so more information is needed about how social support may affect wellbeing and HIV outcomes among men.

Additionally, women were more likely to report poor self-rated health but scored better on several objective measures of health and well-being. This suggests that further work is needed to refine brief measures of self-reported health. This is an area richly deserving of further study, as many surveys rely on brief measures of self-reported health; our results suggest that more detailed questions may be needed, and that important gender differences may exist both in reporting health status and in what factors may be most salient to self-reported health. Our findings provide more nuance to a broader literature about the challenges of using and interpreting questions about self-reported health status (R. Castro et al., 2019; Frankenburg E, 2004; Olgiati, Barnighausen, & Newell, 2012).

Some limitations of our study should be noted. First, most measures of health and wellbeing were self-reported by respondents. As surveys were administered orally, reporting and social desirability bias may have led to under-reporting of key issues like stigma or symptoms of depression, and it is possible this bias differed by the respondent's gender. Efforts were made to eliminate interviewer bias through discussion of the questions during training, including how to ask the questions without judgement, though implicit bias on the part of the interviewers while presenting the questions may have swayed results by steering respondents away from answering in a way that is not socially desirable. Patients who declined to participate in the study may have biased our data towards a population that was more confident and comfortable with research, and therefore participating individuals may not be fully representative of the larger population of adults living with HIV in Malawi. In addition, our results should be generalized with caution: this study is based on a relatively small sample size; and the population was engaged in HIV care, largely highly adherent to ART and virally suppressed. Statistical analyses were affected by small sample size and the relatively low variation on HIV health indicators among respondents. Due to the cross-sectional study design, there is no way to confirm the temporal relationship between the use of ART and the outcomes measured.

In conclusion, women in our study reported significantly worse self-rated health than men, but their male counterparts were less likely to be virally suppressed and reported poorer ART adherence, more symptoms of depression, and less social support. These findings suggest that programs for adults on ART should consider the roles of social support, mental health and stigma, and the unique ways in which men and women may experience these. An improved understanding of multi-dimensional wellbeing, and how this varies by gender, may be important for achieving improved HIV outcomes. Further research should explore more deeply the connections between wellbeing and HIV to create programs that will effectively address comprehensive health.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Appendix

Appendix: Association between self-rated “very good” health today, and other outcomes

	Among all (n=134): aIRR “very good” health today	Among women (n=66): aIRR “very good” health today	Among men (n=68): aIRR “very good” health today
<b>Physical health and health behaviors</b>			
*Viremia ( > 200 copies/mL)	1.42 (0.77, 2.65)	0.21 (0.04, 1.05)	1.51 (0.83, 2.77)
*Poor ART adherence (<95%)	0.74 (0.48, 1.14)	n/a	0.80 (0.50, 1.27)
Any physical functioning problem	0.70 (0.37, 1.33)	0.55 (0.05, 5.76)	0.79 (0.36, 1.73)
*Overweight or obese (BMI ≥ 25)	1.01 (0.45, 2.27)	0.34 (0.08, 1.44)	1.06 (0.51, 2.20)
<b>Mental health and social relationships</b>			
Symptoms of mild or major depression (CESD score 16+)	0.48 (0.28, 0.85)	n/a	0.77 (0.48, 1.23)

\*Indicates a variable abstracted from clinical charts; viral load and ART adherence measured at most recent clinical visit during last 12 months

n/a means model could not converge due to small cell sizes

aIRR from GLM models using Poisson distribution and log link function.

Models include covariates for: age (continuous), education (no education, some primary, finished primary, some secondary, finished secondary, beyond secondary), employment (none, casual/household work including agriculture, wage work), household SES (based on asset index, quintile groupings), year of ART initiation, currently married (yes/no), and, in “among all” models, gender

\*  
p<0.05,

\*\*  
p<0.01,



\*\*\*  
p<0.001

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**Table 1:**

Characteristics of respondents, and differences between women and men (n=134)

	Total (n=134)	Women (n=66)	Men (n=68)	p-value
<b>Background characteristics</b>				
Age, mean (SD; range)	51 (10.9, 30–88)	50 (11.4, 30–82)	51 (10.5, 33–88)	0.58
Educational attainment, n (%):				0.37
No formal education	14 (10.5%)	9 (13.6%)	5 (7.4%)	
Some primary	42 (31.3%)	25 (37.9%)	17 (25.0%)	
Finished primary	12 (9.0%)	5 (7.6%)	7 (10.3%)	
Some secondary	27 (20.2%)	11 (16.7%)	16 (23.5%)	
Finished secondary	19 (14.2%)	7 (10.6%)	12 (17.7%)	
Beyond secondary	20 (14.9%)	9 (13.6%)	11 (16.2%)	
Employment status, n (%):				<0.001
Not working	20 (14.9%)	20 (30.3%)	0	
Casual or household level work	80 (59.7%)	36 (54.6%)	44 (64.7%)	
Wage work	34 (25.4%)	10 (15.2%)	24 (35.3%)	
Married: Yes, n (%)	87 (64.9%)	29 (43.9%)	58 (85.3%)	<0.001
*Years since starting ART, mean (range)	9 (2–17)	9 (2–15)	9 (2–17)	0.68
*ART regimen, n (%):				<0.05
TDF/3TC/EFV	40 (29.9%)	23 (34.9%)	17 (25%)	
TDF/3TC/DTG	71 (53.0%)	28 (42.4%)	43 (63.2%)	
Other	23 (17.2%)	15 (22.7%)	8 (11.8%)	
<b>Physical health and health behaviors</b>				
*Viremia (< 200 copies/mL), n (%)	21 (16.3%)	7 (10.8%)	14 (21.9%)	0.09
*Poor ART adherence (<95%), n (%)	33 (25.4%)	12 (18.5%)	21 (32.3%)	0.07
Currently consumes alcohol, n (%)	19 (14.2%)	2 (3.0%)	17 (25.0%)	<0.001
Any physical functioning problem, n (%)	27 (20.2%)	16 (24.2%)	11 (16.2%)	0.25
*Overweight or obese (BMI ≥ 25), n (%)	38 (28.4%)	28 (42.4%)	10 (14.7%)	<0.001
<b>Cognition</b>				
Cognitive assessment score, mean (SD; range)	16.6 (2.8, 6–22.5)	17.3 (3.2, 6–22)	16.0 (2.3, 10.5–22.5)	0.008
<b>Mental health and social relationships</b>				
Symptoms of mild or major depression (CESD score ≥ 16), n (%)	58 (43.3%)	26 (39.4%)	32 (47.1%)	0.37
Receive no help from friends or family, n (%)	53 (39.6%)	16 (24.2%)	37 (54.4%)	<0.001
Sometimes I feel worthless because I am HIV+ (strongly agree/ agree), n (%)	41 (30.6%)	14 (21.2%)	27 (39.7%)	0.02
<b>Self-rated health</b>				
Health today is not “very good,” n (%)	88 (65.7%)	60 (90.9%)	28 (41.2%)	<0.001

\*Indicates a variable abstracted from clinical charts

TDF/3TC/EFV: tenofovir/lamivudine/efavirenz; TDF/3TC/DTG: tenofovir/lamivudine/dolutegravir. Other ART regimens included: nevirapine-based (n=10), boosted protease inhibitor-based (n=12), dolutegravir with zidovudine/lamivudine (n=1)

p-value based on chi-square test of difference for all; except age, years since ART initiation, and cognition score, which used a t-test for difference in mean values; and employment, which used a Fisher's exact test

Viral load and ART adherence measured at most recent clinical visit during last 12 months. 1 respondent was missing viral load information, and 7 did not have a recent viral load measure (within the last year).

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**Table 2:**

Health and wellbeing outcomes for men, versus women (n=134)

	aIRR (95% CI)	Predicted probabilities from adjusted GLM models (95% CI)	
		Among men	Among women
<b>Physical health and health behaviors</b>			
*Viremia ( > 200 copies/mL)	2.57* (1.09, 6.07)	0.5% (0.3, 0.8%)	0.2% (0.01, 0.3%)
*Poor ART adherence (<95%)	1.99 (0.82, 4.80)	30.0% (15.3, 44.6%)	15.1% (5.0, 25.2%)
Currently consumes alcohol	12.58* (1.49, 106.57)	3.9% (0.5, 7.3%)	0.3% (0, 0.8%)
Any physical functioning problem	0.75 (0.29, 1.95)	13.3% (4.5, 22.1%)	17.6% (7.0, 28.3%)
*Overweight or obese (BMI ≥ 25)	0.31** (0.16, 0.60)	12.4% (5.5, 19.4)	40.0% (25.8, 54.2%)
<b>Mental health and social relationships</b>			
Symptoms of mild or major depression (CESD score ≥ 16)	1.30 (0.83, 2.02)	40.5% (27.5, 53.5%)	31.2% (20.4, 42.1%)
Receive no help from friends or family	2.18* (1.20, 3.96)	49.4% (34.5, 64.4%)	22.6 (11.7, 33.5%)
Sometimes I feel worthless because I am HIV+ (strongly agree/agree)	2.40** (1.30, 4.42)	40.8% (25.8, 55.7%)	17.0 (8.9, 25.1%)
<b>Self-rated health</b>			
Health today is not "very good"	0.41*** (0.30, 0.57)	38.2% (26.9, 49.4%)	92.4% (83.8, 100%)

\*Indicates a variable abstracted from clinical charts; viral load and ART adherence measured at most recent clinical visit during last 12 months

aIRR from GLM models using Poisson distribution and log link function.

Models include covariates for: age (continuous), education (no education, some primary, finished primary, some secondary, finished secondary, beyond secondary), employment (none, casual/household work including agriculture, wage work), household SES (based on asset index, quintile groupings), year of ART initiation, currently married (yes/no)

\* p<0.05,

\*\* p<0.01,

\*\*\* p<0.001