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Equity in adherence to antiretroviral therapy among economically-vulnerable adolescents living with HIV in Uganda

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Development

Adherence: Challenges

“When I first started taking ARVs, I learned I had to take them with food else I’d become nauseous. They also made my appetite too high. I felt hungry all the time. I tried to eat more than usual, but the hunger I felt during that time was too much. I just didn’t have enough food to satisfy my hunger, so I stopped taking my ARVs.”

- teenager living with HIV in Rakai

Equity and Adherence: Key Questions

- Economic and social factors have long been thought to influence **access** but in a context where ARV medication is free, do these factors also influence **adherence**?
- **Research Question** – Is ART non-adherence among Ugandan youth significantly associated with economic and social inequities?

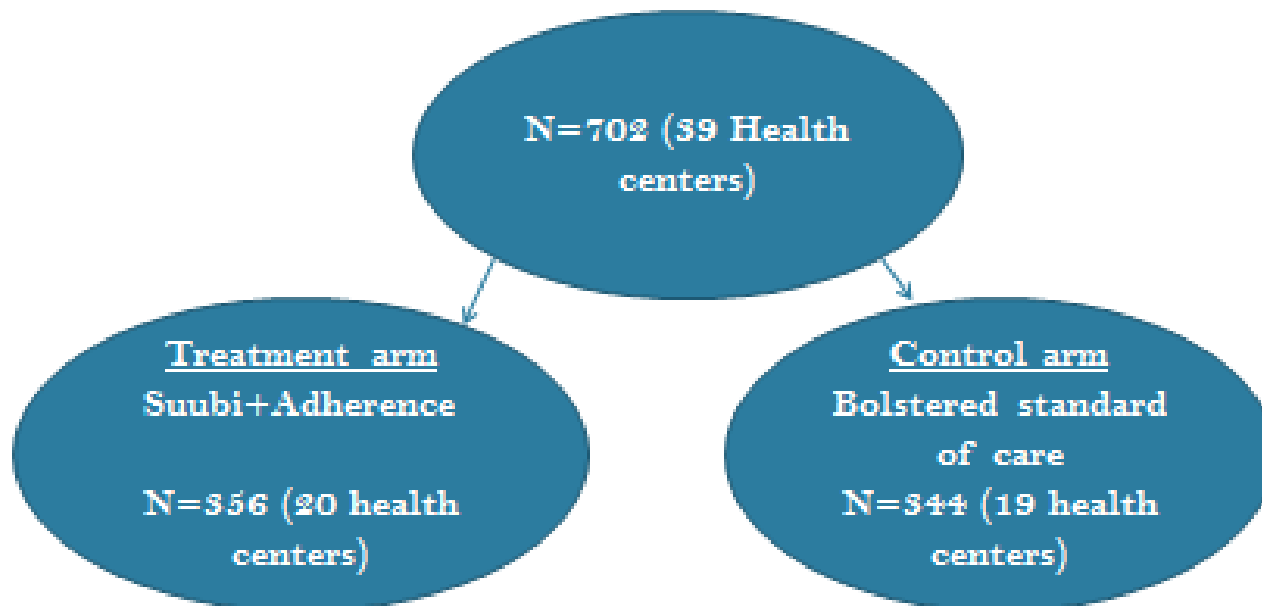
SUUBI+Adherence Design

- Using baseline data from **SUUBI+Adherence** study, 5-year (2012-2017) longitudinal cluster randomized control trial examining effect of financial asset intervention on adherence to ART
- Two-arm cluster design, 39 clinics, N= 702
- **Inclusion Criteria:**
 - Tested positive for HIV (confirmed by medical report and aware of status)
 - Living within a family
 - 10-16 years of age
 - Prescribed ART
 - Enrolled in care at a participating medical clinic

SUUBI+Adherence Study Design

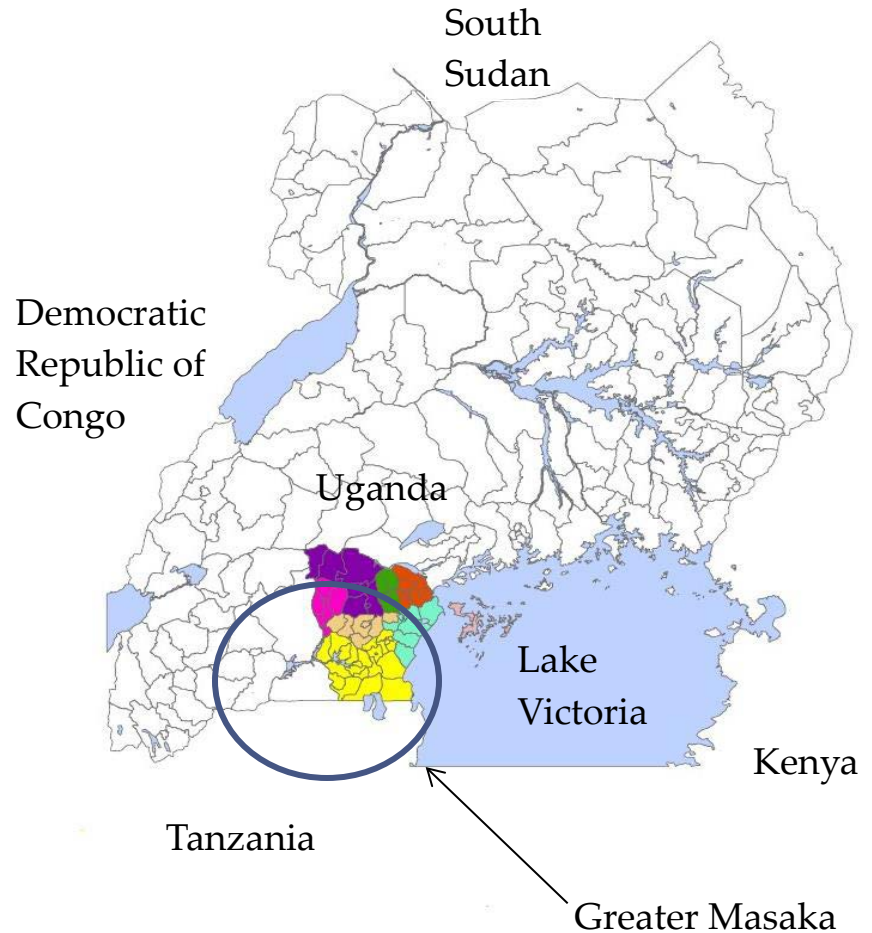
Random Assignment

39 Clinics in 6 Districts located in Southwestern Uganda



Study Setting

- Over 190,000 children (ages 0-17) are living with HIV in Uganda (UNICEF, 2015)
- 9.8% prevalence rate in study region of greater Masaka (Gov't of Uganda, 2013)
- 40% of Ugandans live on less than \$1.25 per day (World Bank, 2015)



Measuring Adherence

- Findings presented today from baseline data, limited to self-report measures of adherence
- Analysis underway of data from pill count, pharmacy refills, Wisepill devices and biomarkers (CD4 and viral loads)
- Comparability of self-report and other measures at baseline

Measure of Adherence	% Perfect Adherence
Self-Report	75%
Wisepill*	64%
Viral Load	59%

Study Measures

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ABSTRACT

Studies from sub-Saharan Africa indicate that children made vulnerable by poverty have been disproportionately affected by HIV with many exposed via mother-to-child transmission. For youth living with HIV, adherence to life-saving treatment regimens are likely to be affected by the complex set of economic and social circumstances that challenge their families and also exacerbate health problems. Using baseline data from the National Institute of Child and Human Development (NICHD) funded SuubiAdherence study, we examined the extent to which individual and composite measures of equity predict self-reported adherence among Ugandan adolescents aged 10-16 ($n = 702$) living with HIV. Results showed that greater asset ownership, specifically familial possession of seven or more tangible assets, was associated with greater odds of self-reported adherence (OR 1.69, 95% CI: 1.00-2.85). Our analyses also indicated that adherence to the nearest health clinic increases youth adherence to an ART regimen. Youth who

ARTICLE HISTORY

Received ■
Accepted ■

KEYWORDS

Equity; HIV; youth; Uganda;
ART adherence; assets; Suubi

Primary outcome of analysis: **Self-Reported Adherence**, # of days respondent had missed at least one dose of medication in the last month

Independent Variables

Assets & Employment: household asset ownership, caregiver employment in formal labor market, available cash savings, parent or caregiver participating in a formal banking institution, material housing value

Food Security: number of meals per day, frequency of meat or fish consumption, breakfast consumed day of the interview

Social Equity: enrolled in school; distance to school, water source, and health clinic; electricity in the home; social support for adherence

Analysis

1. Bivariate comparisons of self-reported adherence and **individual** measures of economic and social equity (Binary Logistic Regression)
2. Bivariate comparisons of self-reported adherence and **composite** measures of economic and social equity (Binary Logistic Regression)
3. Multivariate analysis to understand if inclusion of each **composite** improves overall model fit (Multivariate Logistic Regression)

Binary logistic regression

	OR	OR 95% CI	P-Value
ECONOMIC EQUITY VARIABLES			
<i>Assets & Employment</i>			
Asset ownership	1.69*	1.00-2.85	.049
Employment of adolescent's caregiver in formal labor market	0.61 [†]	0.37-1.01	.055
Available cash savings	1.27	0.79-2.05	.321
Parent or caregiver participation in formal banking institution	1.07	0.75-1.54	.701
Material housing value	1.16	0.80-1.67	.434
<i>Food Security</i>			
Number of meals per day	1.49 [†]	0.92-2.40	.102
Frequency of eating meat or fish in past week	1.05	0.75-1.45	.796
Breakfast on day of interview	1.10	0.73-1.65	.642
SOCIAL EQUITY VARIABLES			
Primary or secondary school enrollment	0.85	0.57-1.59	.952
Physical proximity to school	1.13	0.70-1.82	.625
Physical proximity to water source	1.66	0.51-5.34	.399
Physical proximity to health clinic	1.49*	1.02-2.18	.040
Electricity in home	1.00	0.68-1.48	.993
Social support for ARV adherence	1.14	0.72-1.81	.590

Significance at $p < 0.05$ noted in bold with *, $p \leq 0.10$ noted with †

Results

Equity in Adherence by Economic Factors

In binary analysis:

- higher **asset** possession was significantly associated with optimal ARV adherence (OR 1.69, 95% CI: 1.00-2.85)
- number of **meals per day** neared statistical significance ($p=0.1$) in its association with adherence (OR 1.49, 95% CI: 0.92 – 2.40)

In multivariate analysis:

- the *Assets and Employment* composite significantly associated with adherence (aOR 1.70, 95% CI: 1.07-2.70)
- no relationship was found between the *Food Security* composite and adherence.

Results

Equity in Adherence by Social Factors

In binary analysis:

- close **proximity to a health clinic** was significantly associated with optimal ARV adherence (OR 1.49, 95% CI: 1.02-2.18)
- close **proximity to water source** and **school** as well as higher levels of **social support** demonstrated greater odds of adherence, though not statistical significant at traditional .05 value.
- no difference in adherence odds observed for **electricity**
- **enrollment in school** had an inverse relationship with optimal adherence, though not statistically significant

In multivariate analysis:

- **Social Equity** composite was associated with adherence (aOR 1.37, 95% CI: 0.84-2.23), though not statistical significant at traditional .05 value.

Multivariate Logistic Regression

Adjusted Odds Ratio (aOR)	Model 1 aOR (95% CI)	Model 2 aOR (95% CI)	Model 3 aOR (95% CI)	Model 4 aOR (95% CI)
Demographic Factor				
Age	0.92 (0.66-1.28)	0.92 (0.66-1.28)	0.91 (0.66-1.27)	0.93 (0.67-1.30)
Gender	1.73* (1.25-2.40)	1.73* (1.25-2.41)	1.75* (1.26-2.44)	1.73* (1.24-2.41)
Number of HIV Meds	1.19 (0.81-1.74)	1.18 (0.80-1.74)	1.18 (0.80-1.73)	1.19 (0.81-1.75)
Economic Equity	-			
Assets & Employment		1.70* (1.09-2.67)	1.74* (1.10-2.76)	1.70* (1.07-2.70)
Food Security	-	-	0.90 (0.59-1.38)	0.88 (0.57-1.35)
Social Equity	-	-	-	1.37 (0.84-2.23)

Significance at $p < 0.05$ noted in bold with *

Discussion

Implications for Policy and Practice

- **Economic** and **social determinants** of adherence be given due priority in the design and development of programs affecting youth with HIV
- Interventions that aim to **improve financial assets**, foster **financial inclusion**, and provide **geographically closer HIV treatment services** such as through mobile clinics may offer promising returns for greater equity in ARV uptake and adherence among poor adolescent populations

Implications for Research

- Study only employed quantitative assessments of equity. Further research needed to understand **qualitatively** how adolescents interpret their economic and social advantage or disadvantage.

Discussion

- **Gender** – girls reporting optimal compliance to ARV regimen more often than boys. How might this change as young women marry and bear familial responsibilities? What specific challenges exist for adolescent boys?
- **Food Security** – when economic resources are scarce, are funds for food prioritized over funds for transportation to pick up medication? What validated measures are most appropriate and logistically feasible to measure food security in an equity framework?
- **School Enrollment & Stigma** – may it have an inverse effect on adherence? Fear of status disclosure and social ostracism?
- **“Equity”** – can we work towards a core set of common measures? Might these measures be applied in a multi-dimensional screening tool for youth prescribed ART to assess gaps and predict adherence interruptions? Routine monitoring of inequity benefit the strategic design of programs to reach the most vulnerable to non-adherence.

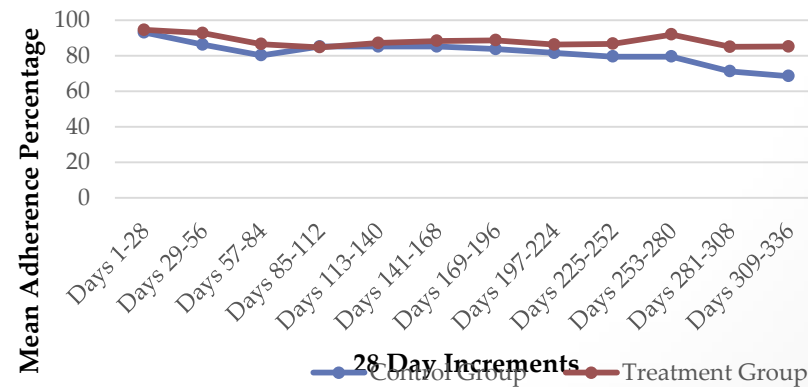
SUUBI+Adherence – Wave 2 Peek

Wave 2 – Viral Load Comparison

	Control n(%)	Treatment n(%)
Changed from detectable to below detectable	30 (9.2)	52 (15.3)
Became detectable	23 (7.1)	31 (9.1)
Remained detectable	91 (28.0)	95 (27.9)
Remained below detectable	181 (55.7)	162 (47.7)

Wave 2 – Wisepill Comparison

Mean Adherence % Single Dosage Participants - Control and Treatment Groups



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