

Self-efficacy and knowledge of Anti-Retroviral Therapy among a cohort of HIV-positive pregnant women
in Option B+ from central Mozambique

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Abstract

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Objective

We assessed patient readiness for medication usage through knowledge of ART concepts and self-efficacy among pregnant HIV-infected patients in antenatal care as part of the Option B+ program in central Mozambique.

Methods

Data were collected *via* in-person interviews conducted by facility nurses during enrollment visits in antenatal care. Study participants were categorized based on timing of first HIV diagnosis (prior to attending antenatal care, at antenatal care prior to study enrolment, or at antenatal care the day of study enrolment). Associations were described between timing of HIV diagnosis and socioeconomic characteristics, clinical characteristics, knowledge of ART concepts, and self-efficacy, accounting for facility level clustering. Knowledge and self-efficacy were categorized as high/low based on responses to questionnaires.

Design

A cross-sectional analysis was carried out using baseline data from a cohort of HIV-infected pregnant women attending antenatal care at 10 public sector health facilities in Sofala Province, Mozambique.

Results

Of 1,573 patients enrolled, 738 (47%) were first diagnosed with HIV upon study entry during their current pregnancy, 504 (32%) prior to study enrollment during their current pregnancy, and 331 (21%) prior to their current pregnancy. Women who were first diagnosed prior to enrollment, whether during current pregnancy (OR 0.31, 95% CI 0.21, 1.01) or prior to current pregnancy (0.22, 95% CI 0.13, 0.35) were less likely to have low ART knowledge. Additionally, those first diagnosed prior to enrollment, both during (OR

0.64, 95% CI 0.36, 1.12), and before their current pregnancy (OR 0.49, 95% CI 0.24, 0.97), were less likely to have low self-efficacy compared with those diagnosed on the day of study entry.

Conclusion

We found that among study participants, women who were enrolled on the day of first HIV diagnosis and ART initiation were more likely to have low knowledge of ART concepts and low self-efficacy than women with a previous HIV diagnosis. These findings may provide an opportunity to identify women at high risk for loss to follow up and or low treatment adherence to achieve the recommended lifelong ART care under the Option B+ delivery model.

Introduction

Mozambique adopted the WHO recommended “Option B+” strategy in 2013, and rapidly scaled up prevention of mother-to-child HIV transmission (PMTCT) with the provision of lifelong antiretroviral therapy (ART) for pregnant and breastfeeding HIV-positive women (1). Mozambique has a high HIV prevalence that has increased in recent years, particularly among women. Prevalence among women ages 15-49 has increased from 11.9% in 2009 to 15.4% in 2015, with a prevalence of 18.8% in Sofala province (Figure 1), the focal area for this study (2,3). Initial studies on Option B+ in Mozambique have shown increased numbers of pregnant women diagnosed and initiated on antiretroviral medicines in antenatal care (4). Nationally, an estimated 95% of pregnant women diagnosed with HIV receive ART, in contrast to only 53% of the general HIV-positive population in 2015 (7). Despite these encouraging numbers, high loss to follow-up and low postpartum retention in care have been observed under Option B+ in Mozambique, as well as in other settings with generalized HIV epidemics and high rates of fecundity in Sub-Saharan Africa (4,5,6,7).

Previous studies assessing the implementation of Option B+ have identified factors that may influence ART adherence and retention. These include institutional factors at the health facility level, such as model of care delivery (8,9), as well as individual and societal-level factors such as male partner involvement, HIV status disclosure (10), and maternal and baseline gestational age (11). There was limited data on Option B+ patient preparation through ART knowledge and perceived self-efficacy to embark on lifelong treatment. Individual agency may influence medication adherence (12), and has been associated with increased adherence within the study population of pregnant women in central Mozambique prior to Option B+ (13).

Integrated PMTCT services include same-day ART initiation; however, there is potential that this approach may undermine women’s readiness to sustain lifelong treatment. Initial implementation studies recommended continued evaluation of counseling and support services around initiation of lifetime ART in integrated antenatal and lactation services (14). Formative research within our study population in Mozambique found that Option B+ patients reported feeling unprepared for their HIV diagnoses and desired to consult their male partners prior to treatment initiation (4). Recent longitudinal studies have found that loss to follow-up did not change with the maturation of the Option B+ program and underscore

the need to better understand how to implement programs to prepare women for lifelong ART (15).

Improved understanding of ART knowledge and self-perceived agency to participate in lifelong treatment for a highly stigmatized and challenging disease in low- and middle-income countries would increase understanding of the population and could improve future implementation strategies.

As Option B+ moves toward universal adoption, it is a priority to understand ART knowledge and self-efficacy among women initiating ART through Option B+, as these factors are potentially associated with increased postpartum retention (16,13). It is additionally crucial to better understand the population of women recently diagnosed through Option B+ to distinguish from those presenting with prevalent HIV to maintain/and or improve the effectiveness of PMTCT efforts.

We sought to describe self-efficacy and knowledge of treatment concepts among pregnant women initiating ART within Option B+ services in public sector facilities in central Mozambique by timing of first HIV diagnosis.

Methods

Study design: A cross-sectional analysis was carried out using enrolment data from a cohort of HIV positive pregnant women in central Mozambique. HIV positive pregnant women were recruited from routine antenatal care services in Sofala Province, and followed-up to assess retention in care, viral suppression through six months postpartum, and HIV transmission to exposed infants through six months of life.

Study setting: The study was conducted at 10 public sector health facilities providing PMTCT services including HIV testing and antiretroviral therapy in Sofala Province, central Mozambique. Eight facilities were urban (in Beira city), one peri-urban (in Dondo district) and one in a rural hospital (Nhamatanda district). Both the peri-urban and rural facilities are located along the Beira transport corridor.

Study population: Study participants included antenatal care patients at the 10 study facilities who either presented with a prior HIV diagnosis or tested positive during the study period for HIV, were 18 to 50 years old, and agreed to participate in nurse interviews. For the purposes of this analysis, participants were divided into three groups by timing of first HIV diagnosis, which could have occurred (A) on the day of study enrollment, (B) earlier in the current pregnancy, or (C) prior to the current pregnancy.

Sampling: Study facilities were chosen as they were the study clinics for the Systems Analysis and Improvement Approach (SAIA) cluster randomized trial, which tested a 5-step systems engineering intervention to improve the performance of PMTCT services (17,18). All eligible women attending antenatal care between July 2015 and March 2016 were invited to enroll in the study.

Data collection: Antenatal care nurses interviewed study participants at enrolment during routine antenatal care visits. All data were self-reported by the mothers during in-person interviews, and HIV testing, CD4 testing and treatment history confirmed by abstraction from charts where available. All interviews were conducted in Portuguese with data collected on mobile phones using Open Data Kit electronic data collection forms (29). Research nurses trained ANC nurses on data collection procedures and monitored incoming data for completeness.

Study measures: Study measures included patient demographics, obstetric history, HIV testing and treatment history, perceived health, level of preparedness to begin lifelong ART, and uptake of same-day ART initiation among those not yet on ART. The study analysis measures are outlined below:

Self-reported individual level sociodemographic and clinical measures including WHO HIV stage (I,II, III, IV) were collected in patient interviews and limited chart abstraction during antenatal care visits. Missing data is noted when greater than five percent of the sample.

Knowledge of ART was assessed using previously tested surveys and questions about treatment comprehension with the patient population in central Mozambique (13). These variables capture levels of knowledge of ART among women who have completed routine pre-ART counseling with facility nurses.

Responses were scored and the analysis included 100% (N=1573) of the participants with complete responses to all 3 questions. "High" knowledge was defined as scoring the highest cumulative score possible for all 3 knowledge questions. "Low" knowledge was defined as achieving a cumulative score less than the median score for all 3 knowledge questions. Questions included: (A) "who should take HIV medication", (B) "will ART help you live longer/better", and (C) "how long will you have to take ART" (Figure II).

Perceived self-efficacy measures were collected using a 12-item psychometric scale adapted for HIV medication adherence, which assesses individual coping beliefs for difficult life stresses (12). These are intended to capture individuals' beliefs about their ability to adhere to ART. The questions were previously

validated with the patient population in central Mozambique (13) (Figure III). Responses were graded on a five-point scale and the analysis included 93.4%(N=1477) of the study participants who provided answers to all 12 questions. Patients were divided into two mutually exclusive, exhaustive groups by level of self-efficacy. “High” self-efficacy was defined as a score greater than the median on the full 12-item scale, while “low” self-efficacy was defined as answering “not at all confident” or “a little confident” to all 12 self-efficacy questions.

Statistical analysis: The association between knowledge of ART concepts among women and timing of HIV diagnosis (on the day of study enrollment, earlier in the current pregnancy or prior to the current pregnancy) was determined using a mixed effects logistic model with random intercepts and clustering by health facility. Associations were assessed between participant characteristics and knowledge dichotomized as “High” knowledge (defined as a cumulative score greater than the mean) and, in a separate analysis, at “low” knowledge (defined as a cumulative score less than the mean). Random effects by health facility were predicted to assess the assumption of normal random effects and look for outlier facilities.

The association between self-efficacy and timing of HIV diagnosis as well as other participant characteristics was determined using a mixed effects logistic model with random intercepts and clustering by health facility. Associations were assessed between participant characteristics and self-efficacy dichotomized as “High” self-efficacy (defined as a combined score greater than the median) and, in a separate analysis, at “low” self-efficacy (defined as answering “not at all confident” or “a little confident” to all 12 questions). Random effects by health facility were predicted to assess the assumption of normal random effects and look for outlier facilities.

All analyses were completed using Stata version 14.2 (Stata Corp, College Station, TX).

Ethics statement: Ethical approval was granted by the institutional review board at the University of Washington. The Ministry of Health of Mozambique approved this study under the parent study which was registered with ClinicalTrials.gov (NCT02023658).

Results

Facility-level distribution: Ten public sector health facilities in central Mozambique registered patients for this study, including 8 located in urban areas of Beira district with one Mafambisse in a peri-urban location

of Dondo district and another Nhamatanda in a rural area in Nhamatanda district (Table 1). The distribution of patients varied by overall number and by the grouping of the timing of first HIV diagnosis which is representative of study inclusion criteria and facility patient load. The facilities with the highest number of patients included Chingussura (N=398), Manga Nhaconjo (N=356), and Manga Mascarenhas (N=202) with the lowest at Mafambisse (N=41), Chota (N=38), and Matadouro (N=27).

Cohort description: A total of 1,573 Option B+ patients met the study inclusion criteria in the study facilities, of whom 738 (47%) were first diagnosed with HIV at the start of this study, 504 (32%) at an earlier visit during their current pregnancy, and 331 (21%) prior to their current pregnancy (Table 2). Women enrolled in the study had a mean age of 26.6 years, while women diagnosed before the current pregnancy were older than those in the other two groups. Eighty-two percent had completed at least some education. Overall, 54.5% reported 30 minutes or less to reach the facility with less than 3% with travel times greater than 60 minutes. Those first diagnosed earlier in the current pregnancy were most likely to report a travel time of 30 minutes or less. Overall, the majority (51.6%) of women were enrolled in the second trimester of pregnancy; those who had been diagnosed earlier in their current pregnancy were more likely to present in the third trimester (62.5%. $p<0.001$).

Most women (85.3%) were currently married, with no differences noted by timing of diagnosis. Very few women (15.9%) reported an independent income. Those diagnosed prior to current pregnancy were more likely to report an independent income (19.2%, $p=0.04$). Women diagnosed prior to current pregnancy were more likely to have had at least one earlier pregnancy (92.6% vs. 84.4% in the whole cohort, $p<0.001$).

Data on HIV stage at the time of diagnosis were available for 1,190 members of the cohort, with the majority diagnosed at Stage I (92.3%). Women first diagnosed prior to their current pregnancy were more likely to have been at more advanced HIV stage at Option B+ diagnosis ($p<0.001$). Most women, regardless of timing of their first diagnosis, assessed their own health as “very good” at enrollment (87.1%).

Low knowledge of ART concepts: All women who met the study inclusion criteria were included in the analysis for low knowledge of ART concepts as they completed all three knowledge based questions in the survey. (Table 3)

Timing of first HIV diagnosis was associated with having low knowledge of ART concepts. Women who were first diagnosed prior to study entry, whether during their current pregnancy (OR 0.31, 95% CI 0.21, 1.01) or prior to current pregnancy (OR 0.22, 95% CI 0.13, 0.35) were less likely to have low knowledge than those diagnosed on the day of study entry. Other factors associated with low ART knowledge included age and income. Women 25 years and older (OR 2.34, 95%CI 1.09-5.00) as well as those between the ages of 20 to 24 (OR 2.33, 95% CI 1.07, 5.08) were more likely to have low knowledge than those younger than 20 years old. Women who reported having income were more likely to have low knowledge (OR 1.78,95% CI 1.23, 2.58) than those who reported no income.

Self-efficacy: A total of 1,477 women, or 93.9% of all women who met the inclusion criteria for the study completed all self-efficacy questions in the survey and were included in the analysis of self-efficacy.

(Table 3)

Timing of first HIV diagnosis was associated with high self-efficacy. Compared to women diagnosed on the day of study entry, women who were first diagnosed earlier in their current pregnancy were less likely (OR 0.72, 95% CI 0.52,1.01), while those diagnosed prior to current pregnancy were more likely (OR 1.55, 95% CI 1.07, 2.24) to have high self-efficacy.

Women enrolled in their second trimester (OR 0.55, 95%CI 0.36, 0.85) or third trimester (OR 0.61, 95% CI 0.38, 0.95) of pregnancy were less likely to have high self-efficacy than women in their first trimester.

Timing of first HIV diagnosis was associated with having low self-efficacy. Women diagnosed prior to study entry, both earlier in current pregnancy (OR 0.64, 95% CI 0.36, 1.12) and prior to current pregnancy (OR 0.49, 95% CI 0.24, 0.97) were less likely to have low self-efficacy than those first diagnosed at study entry.

Older mothers were less likely to have low self-efficacy than younger mothers. Women ages 25 and older (OR 0.26,95% CI 0.13, 0.51) and the women ages 20- 24 (OR 0.39, 95% CI 0.19, 0.80) were less likely to have low self-efficacy than women younger than 20 years.

A final analysis found that adjustment for ART knowledge did not greatly alter the association between timing of HIV diagnosis and low self-efficacy. Women who were first diagnosed prior to study entry during their current pregnancy (OR 0.64, 95% CI 0.36, 1.14) as well as before their current pregnancy (0.49,

95% CI 0.24, 0.99) were less likely to have low self-efficacy than those diagnosed on the day of study entry, although only the latter association was statistically significant.

Plots were created to assess random effects by facility for low-self efficacy with covariates of HIV diagnosis timing and low knowledge of ART concepts found that the assumption of normal random effects was reasonable for this model and showed that the two facilities of Chamba and Chota may diverge.

Discussion

Our analysis found that among Option B+ patients in central Mozambique, the timing of first HIV diagnosis was associated with different levels of ART treatment knowledge and self-efficacy. Specifically, women first diagnosed with HIV on the day of study enrollment were likely to have low knowledge of ART concepts and low self-efficacy. These findings suggest that women newly diagnosed through antenatal services may not have been well prepared to begin lifelong ART treatment on the day of diagnosis as dictated in Option B+. Furthermore, as women diagnosed earlier in the current pregnancy had greater knowledge and self-efficacy than those diagnosed on the day of enrollment, it suggests that there was some selection bias amongst the women who returned to care after being diagnosed at an earlier ANC visit, with those who were less prepared being lost to follow-up.

More generally these results indicate an opportunity to classify women as high risk of poor retention and treatment adherence through the assessment of treatment readiness measures. While low retention in care under Option B+ has been documented broadly in Sub-Saharan African settings (5,6,7) and specifically in Mozambique (4,20), these findings provide insight into the level of preparedness experienced by Option B+'s target population. Disaggregating our study population into three groups by first HIV diagnosis timing enabled us to assess the population at highest risk based on their experience within Option B+. Assessing treatment readiness in routine care settings may provide an opportunity to identify these women and target them for further counseling or education.

Our study was not without limitations which are important to consider in order to understand the results. First, as a cross-sectional study it could only describe the cohort on the day of ART initiation. Second, patient self-reporting was subject to recall bias which was only partly mitigated by patient chart abstraction and cross-review completed by the nurses responsible for data collection. Third, ART knowledge was assessed by the same nurses responsible for counseling the women, meaning nurses

may have identified and corrected misunderstandings when collecting the survey data that would otherwise have been missed. Additionally, the scoring of the knowledge questions to determine high/low ART knowledge was limited to the results of three questions out of seven questions related to ART knowledge due to high missing data in the other four knowledge related questions. Lastly there may have been limited generalizability of our results to other populations outside central Mozambique since the study population included only women from central Mozambique.

Despite these limitations our study had several strengths. First, our inclusion criteria were purposely broad, allowing us to enroll a study cohort that is representative of the underlying population in routine care in Mozambique. By disaggregating the population at first HIV timing we illustrated how these adherence barriers to lifelong therapy might be experienced through a patient centric approach within the implementation of Option B+. Second, the large sample size strengthened our results through increased precision. Third, prior experience within the public-sector health system in central Mozambique provided us with important contextual knowledge which enabled us to use previously tested and approved patient readiness measures for our assessments of ART treatment knowledge and self-efficacy (13). Lastly, the successful collection of readiness measures by public sector facility nurses demonstrated the feasibility to integrate these assessments into routine care.

Previous qualitative research used ART knowledge and self-efficacy to measure patient readiness for treatment adherence in sub-Saharan Africa (21, 22). Our findings demonstrated the utility of these measures using quantitative methods within the context of rapid diagnosis to initiation of lifelong ART. Future qualitative research that evaluates patient readiness under Option B+ could provide further insight about the barriers and facilitators to lifelong treatment at the institutional, societal, and intrapersonal levels.

Our pragmatic results support the suggestion that women who receive an HIV-positive diagnosis and ART initiation on the same day need further support for successful treatment adherence. The growing Option B+ implementation literature has noted concerns that women were not prepared for lifelong treatment, particularly in the postpartum period (4,5,6,14,15, 23). Several studies that evaluated patient outcomes by service delivery strategy found high loss to follow-up for patients with same day diagnosis and treatment (15, 20, 24). One study assessed treatment outcomes through patient experience with

ART treatment under pregnancy and found that women with recent treatment experience were more likely to have postpartum virologic failure (25). While these last findings contradict our own it notes the importance of further longitudinal assessments to understand the experience of pregnant women under HIV efforts that are highly focused on reducing mother to child transmission with less attention to the whole lifespan. Longitudinal research that evaluates patient readiness by timing of first HIV diagnosis within Option B+ could provide further insight into treatment retention and or/adherence.

Conclusion:

We found that among study participants, the women who were first diagnosed with HIV on the day of study enrollment were more likely to have low knowledge of ART concepts and low self-efficacy than those with a prior HIV diagnosis. These assessments of readiness may provide an opportunity to identify women at high risk for loss to follow up and or low treatment adherence to lifelong treatment under the integrated delivery model. Additionally, it supports the call for improved strategies and implementation science research to strengthen the delivery of integrative services that support pregnant women, particularly as they are first diagnosed with HIV.

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Figure I: Map of Sofala Province, Mozambique (2).



Figure II: Knowledge questionnaire and scoring guide

	Questions	Responses and scoring
Q1	Who should take HIV medication? Chose one.	1 <input type="checkbox"/> People with advanced HIV only (Score = 0) 2 <input type="checkbox"/> Men only (Score = 0) 3 <input type="checkbox"/> Pregnant women only (Score = 0) 4 <input type="checkbox"/> All people with HIV (Score = 1)
Q2	Will ART help you live longer/better?	1 <input type="checkbox"/> Not at all (Score = 0) 2 <input type="checkbox"/> Completely (Score = 1)
Q3	Now that you've started taking HIV medications, how long will you have to take them? Mark all that apply	1 <input type="checkbox"/> Until I feel better (Score = 0) 2 <input type="checkbox"/> Until I'm not pregnant (Score = 0) 3 <input type="checkbox"/> Until my physician tells me not to (Score = 0) 4 <input type="checkbox"/> The rest of my life (Score = 1) 5 <input type="checkbox"/> Other specify (Score = 0)

Figure III: Self-efficacy questionnaire

	How confident are you that you can stick to your medication schedule....	Not at all confident	A little confident	Somewhat confident	Fairly confident	Completely confident
Q1	... when it means changing your eating habits?	0	1	2	3	4
Q2	...when your daily routine is disrupted?	0	1	2	3	4
Q3	... when the side effects interfere with your daily activities?	0	1	2	3	4
Q4	... when you have difficulty swallowing?	0	1	2	3	4
Q5	... on the weekends?	0	1	2	3	4
Q6	... when you are busy?	0	1	2	3	4
Q7	... when you are tired?	0	1	2	3	4
Q8	... when you are down or depressed?	0	1	2	3	4
Q9	... when you are feeling healthy?	0	1	2	3	4
Q10	... when you are feeling sick?	0	1	2	3	4
Q11	... when you don't want to be reminded about HIV/AIDS?	0	1	2	3	4
Q12	... when it means taking your medications in front of people who do not know you are HIV+?	0	1	2	3	4

Table I. Facility characteristics and distribution of Option B+ patients by timing of first HIV diagnosis

Health Facility	District	Location	At study entry (N=738)	During current pregnancy (N=504)	Before current pregnancy (N=331)	Total (N=1573)
			N (%)	N (%)	N (%)	N (%)
Chamba	Beira	Urban	15 (2.0)	57 (11.3)	8 (2.4)	80 (5.1)
Chingussura	Beira	Urban	181(24.5)	164 (32.5)	53 (16.0)	398 (25.3)
Chota	Beira	Urban	38 (5.2)	0 (0.0)	0 (0.0)	38 (2.4)
Mafambisse	Dondo	Peri-urban	27 (3.7)	4 (0.8)	10 (3.0)	41 (2.6)
Manga Loforte	Beira	Urban	56 (7.6)	37 (7.3)	11 (3.3)	104 (6.6)
Manga Mascarenhas	Beira	Urban	48 (6.5)	75 (15.0)	79 (23.9)	202 (12.8)
Manga Nhaconjo	Beira	Urban	239 (32.4)	32 (6.3)	85 (25.7)	356 (22.6)
Matadouro	Beira	Urban	21 (2.8)	4 (0.8)	2 (0.6)	27 (1.8)
Nhamatanda	Nhamatanda	Rural	65 (8.8)	30 (6.0)	36 (10.9)	131 (8.3)
Ponta Gea	Beira	Urban	48 (6.5)	101 (20.0)	47 (14.2)	196 (12.5)

Table II: Individual level characteristics of Option B+ patients by timing of first HIV diagnosis*

	At study entry	During current pregnancy	Before current pregnancy	Total
	N (%)	N (%)	N (%)	N (%)
Total population (N =1573)	738 (100.0)	504 (100.0)	331 (100.0)	1573 (100.0)
Age years (N=1544)				
Less than 20	62 (8.6)	45 (9.1)	12 (3.7)	119 (7.7)
20-24	235 (32.7)	184 (37.0)	77 (23.5)	496 (32.1)
25 and older	422 (58.7)	268 (53.9)	239 (72.9)	929 (60.2)
Education completed in years (N=1553)				
None	134 (18.5)	83 (16.7)	62 (18.8)	279 (17.9)
5 years or less	174 (24.0)	94 (18.8)	66 (20.1)	334 (21.5)
5-10 years	336 (46.3)	261 (52.3)	148 (45.0)	745 (48.0)
More than 10 years	81 (11.2)	61 (12.2)	53 (16.1)	195 (12.6)
Travel time to facility (N=1567)				
30 minutes or less	364 (49.7)	315 (62.5)	175 (53.0)	854 (54.5)
31-60 minutes	353 (48.2)	181 (35.9)	138 (41.8)	672 (42.9)
61-90 minutes	15 (2.0)	5 (1.0)	11 (3.3)	31 (2.0)
More than 90 minutes	1 (0.1)	3 (0.6)	6 (1.8)	10 (0.6)
Gestational trimester at baseline (N=1535)				
1	117 (16.2)	10 (2.0)	72 (22.4)	199 (13.0)
2	466 (64.6)	175 (35.5)	152 (47.0)	792 (51.6)
3	138 (19.1)	308 (62.5)	98 (30.5)	544 (35.4)
Current marital status (N=1554)				
Not married	96 (13.2)	74 (14.8)	58 (17.7)	228 (14.7)
Currently married	631 (86.8)	426 (85.2)	269 (82.3)	1326 (85.3)
Any income (N=1512)				
No	590 (83.5)	424 (87.2)	258 (80.8)	1272 (84.1)
Yes	117 (16.5)	62 (12.8)	61 (19.1)	240 (15.9)
Number of prior pregnancies (N=1522)				
0	121 (17.1)	92 (18.7)	24 (7.4)	237 (15.6)
1	179 (25.3)	150 (30.5)	58 (18.0)	387 (25.4)
2	407 (57.6)	250 (50.8)	241 (74.6)	898 (59)
Disease stage at diagnosis, (N=1190)				
Stage 1	443 (99.1)	445 (98.5)	211 (72.3)	1099 (92.3)
Stage 2	4 (0.9)	6 (1.3)	52 (17.8)	62 (5.2)
Stage 3	0 (0.0)	1 (0.2)	26 (8.9)	27 (2.3)
Stage 4	0 (0.0)	0 (0.0)	3 (1.0)	3 (0.3)
Missing	291	52	39	382
Self-reported health (N=1567)				
No	644 (87.9)	432 (85.7)	289 (87.6)	1365 (87.1)
Yes	89 (12.1)	72 (14.3)	41 (12.4)	202 (12.9)

*Data are missing in less than 5% of cases unless otherwise specified

Table III: Measurements of patient readiness for medication usage by timing of first HIV diagnosis with clustering by health facility

	N (%)	Odds Ratio	95% Confidence Interval	p-value
Low knowledge (N=1573)				
Diagnosed at study entry	193 (26.2)	Ref.	-	-
Diagnosed during current pregnancy	43 (8.5)	0.34	(0.23, 0.49)	<0.000
Diagnosed before current pregnancy	21 (6.3)	0.24	(0.15, 0.38)	<0.000
High self-efficacy (N=1477)				
Diagnosed at study entry	216 (32.0)	Ref.	-	-
Diagnosed during current pregnancy	202 (41.5)	0.72	(0.52, 1.01)	0.06
Diagnosed before current pregnancy	170 (54.0)	1.55	(1.07, 2.24)	0.02
Low self-efficacy (N=1477)				
Diagnosed at study entry	92 (13.6)	Ref.	-	-
Diagnosed during current pregnancy	71 (14.6)	0.64	(0.36, 1.12)	0.12
Diagnosed before current pregnancy	18 (5.7)	0.49	(0.24, 0.97)	0.05

Table IV. Low self-efficacy by timing of first HIV diagnosis timing and low knowledge of ART concepts with clustering by health facility

	N (%)	Adjusted Odds Ratio	95% Confidence Interval	p-value
Low self-efficacy (N=1477)				
Timing of first HIV diagnosis				
Diagnosed at study entry	92 (13.6)	Ref.	-	-
Diagnosed during current pregnancy	71 (14.6)	0.64	(0.36, 1.14)	0.13
Diagnosed before current pregnancy	18 (5.7)	0.49	(0.24, 0.99)	0.05
Knowledge of ART concepts				
High knowledge	1310 (83.3)	Ref.	-	-
Low knowledge	263 (16.7)	1.06	(0.03, 1.30)	0.85